Annex 3.3
Detailed Engagement Findings

Northern Powergrid: our business plan for 2023-28

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Introduction

The engagement programme to support development of our draft 2023-2028 business plan was held across a two-year period, starting with early and open engagement and then moving through phases of development which ultimately led to the propositions detailed within our business plan. The engagement process is framed into four broad waves or phases of activity as follows:

- **Wave 1** – open and formative engagement (2019-July 2020)
- **Wave 2** – testing our emerging thinking options with costed levels of ambition (August 2020-January 2021)
- **Wave 3** – refining and finalising our plan (January 2021-July 2021)
- **Wave 4** – plan finalisation stage (July-December 2021)

Summary of total engagement to date

Through the four waves of engagement, we have gathered extensive feedback on the 17 business plan areas as well as the plan overall. In total we have had more than 63,700 interactions with customers and broader stakeholders through 421 different engagement activities to support the development and refinement of our business plan priorities and propositions.

The table below shows the number of participants that have participated in each type of engagement within each wave. A summary of that engagement is as follows:

Number of interactions						
	Quant	Panels	Bilaterals	Elected Representative	Engagement Events	Total
Overall	57,587	1,476	107	314	4,297	63,781
Wave 1	2,137	481	13	24	2,107	4,762
Wave 2	13,946	470	23	156	880	15,475
Wave 3	31,536	367	38	55	504	32,500
Wave 4	9,968	158	33	79	806	11,044

Table 1: Number of interactions

These interactions have been held through a number of different engagement events totalling 421 activities. These have included individual meetings (bilaterals), panels, and meetings with our elected representative stakeholders, quantification activities such as surveys, as well as conferences, webinars and events which have been collectively grouped under engagement events.

Number of events						
	Quant	Panels	Bilaterals	Elected representative	Engagement events	Total
Overall	52	66	54	77	172	421
Wave 1	5	21	3	11	63	103
Wave 2	27	24	9	41	34	135
Wave 3	14	12	25	11	29	91
Wave 4	6	9	17	14	46	92

Table 2: Number of events

A summary of the engagement activity has been included to show the scale and depth of the engagement programme undertaken.

Throughout the engagement schedule, stakeholder feedback, challenge and insights have been continuously reviewed, categorised, analysed and triangulated to enable business leads to develop their propositions shaped by stakeholder priorities, understand their preferred levels of ambition and to respond to their current and future anticipated needs.

Document structure

To demonstrate this approach in action, the main business plan document and this annex provides an overview of how stakeholder engagement has actively shaped our 2023-2028 business plan propositions.

In each of the plan sections there is an engagement overview, an engagement synopsis and a detailed record of engagement for each plan output area. Where appropriate, cognate areas have been combined to enable related insights to be viewed collectedly (i.e. DSO, whole systems and decarbonisation).

- **Engagement overview (main business plan):** provides the top line engagement findings by area with engagement methods, overall reach, high-level insights and acceptance score by area. This has been structured to link to the propositions which respond to the engagement feedback.

- **Engagement summary:** at the start of each business plan section, there is a summary of engagement structured by the plan commitments that were developed. This summary provides a description of what we learnt from our stakeholders at each stage and how engagement has shaped the final commitments, drawing out any specific needs for further testing.

- **Detailed engagement summary:** by plan area, a chronological, high-level register of engagement activities undertaken with examples of insights gathered throughout the three waves. Note due to the volume and detail of stakeholder feedback, research and insights received, this section shows highlights rather than listing of the engagement reports analysed.

The main focus in each of the sections is to provide examples of the engagement undertaken that was formative for their business plan area and proposition development.

Consumer Value Proposition (CVP) engagement

Engagement for the CVPs is included in the comprehensive engagement reported. The final section of this report pulls out the relevant feedback and insight to make it clear how engagement has informed these specific propositions.

Decarbonisation

Stakeholder engagement summary

In this section, we describe below how waves 1 to 3 of stakeholder engagement informed the 12 outcomes incorporated in the scenarios and investment, DSO strategy and whole system sections of our 2023-2028 business plan. The plan outcomes are grouped around four central themes that were of most interest to our stakeholders:

- Decarbonisation pathways – informing the pace of change required to reach net zero emissions in the scenarios and investment section of our plan;
- Flexibility – informing the market enabling actions in our DSO strategy and flexibility solutions incorporated in in our decarbonisation investment section;
- Open data and digitalisation – informing the activities put forward in our DSO strategy but also of relevance to our digitalisation strategy and action plan; and
- Collaborative whole energy system - informing the whole system section of our plan.

Ref.	Outcomes	Engagement insight and triangulation	Eng ref:
SI1	**Efficiently put the network in a position to support LCT uptake and ensure all credible decarbonisation scenarios in our regions remain open for delivering net zero by 2050 or sooner**	**Decarbonisation pathways** **Wave 1:** Our early engagement on decarbonisation scenarios and required investment was conducted against a backdrop of our stakeholders taking a deep and prolonged interest in urgent action required to tackle climate change. The government had legally committed to achieving net zero emissions by 2050 and a significant proportion of our local authorities were declaring climate change emergencies. Many also set their own, earlier net zero targets. During wave 1, the announcements of these climate emergencies started to translate into actions required to reach these local net zero targets, in the form of local authority carbon reduction and climate change action plans. We heard from our stakeholders that we should be playing a leadership role in the transition to net zero. Also, that we should be providing investment that would enable faster decarbonisation than the national requirement to have achieved net zero by 2050. One of the most common reassurances sought by local government stakeholders was that the grid would not be a blocker to their more ambitious decarbonisation plans. Furthermore, it was important to our stakeholders that this transition should be achieved in a manner that was socially equitable and would not disadvantage the vulnerable and fuel poor. Our stakeholders were interested in understanding the emissions' impact of the different distribution future energy scenarios (DFES) and how local developments were reflected in the modelling. More decentralised pathways were preferred. The availability of our data on the Open Data Institute platform[1] was a useful enabler for this discussion. Stakeholders had an interest in sharing decarbonisation plans and exchanging the relevant data, with a particular interest in understanding where capacity is available for low carbon projects.	*E202* *E208* *E304* *E338* *E339* *E340* *E341* *E342* *E343* *E344* *E345* *E346* *E352*
		Wave 2: Our wave 2 interactions were greatly supported by our emerging thinking documents which were published in August and September 2020. In these documents, we asked our stakeholders to respond to the four big decarbonisation questions that would have the greatest influence on our plans – how fast, how flexible, how electrical and how local? We also set out indicative investment levels	

[1] https://odileeds.github.io/northern-powergrid/

Ref.	Outcomes	Engagement insight and triangulation	Eng ref:
		and actions to enable different levels of decarbonisation ambition, to provide some credible book ends for the order of magnitude that may be needed. Scenario modelling was produced to underpin our views on potential decarbonisation pathways and feed some early modelling to provide different price point service levels. We framed our potential actions as flexibility first, network investment and going further, faster. Stakeholders responded well to having this level of detailed information on which to engage with us. We obtained a significant amount of quantitative and qualitative feedback through direct engagement with different stakeholder groups and local leaders – be they local authorities or businesses. Focussed engagement was conducted with over 10k people with 36 focussed events (of over 100 events that were relevant). Recognising that the net zero target is legally binding, we had suggested to our stakeholders that the lowest cost service levels which meant standing still and not being on track for net zero decarbonisation were not really an option. This outlook was resoundingly endorsed with the majority of stakeholders supporting pursuit of an accelerated decarbonisation pathway that would enable us to reach net zero by 2050 at the latest. Stakeholders' ambitions were somewhat tempered by the need to balance the pace of decarbonisation with the associated bill impact and the need for the net zero transition to be fair. Elected representatives (councillors and MPs) in particular stressed the need not to leave anyone behind on the net zero journey. Overall, 75 per cent of our stakeholders supported Level C – 'Major upgrade' to E – 'A new world'. 88 per cent of respondents in the 'have your say' survey believed we should seek to meet governmental standards and achieve net zero before 2050. A small number of stakeholders suggested there should be an even more ambitious level than 'E'. The other clear feedback was that overall cost remained important. Wave 2 was being conducted against a backdrop of the global COVID-19 pandemic. Understandably, this meant that financial issues remained uppermost in our stakeholders' minds. MPs and councillors frequently referenced that whilst they personally wanted to see level 'E' on decarbonisation, Northern Powergrid must consider their most vulnerable constituents who were facing rising bills on all fronts at a time of economic uncertainty. Consequently, as we prepared our final propositions for wave 3, we were considering how we could deliver the urgent decarbonisation that was sought while keeping costs firmly under control. In step with this feedback, we reframed our approach to going further, faster and rather than simply advancing capacity upgrades from later periods, sought to increase the synergies between our asset replacement and refurbishment activity and the investment required to enhance network capacity for net zero. In essence, we have increased the investment in capacity by using asset upsizing when we intervene for network condition. Essentially, for low marginal cost, increasing the size of assets so that they are 'net zero ready'. There was also support for this from MPs and local government stakeholders from the perspective of minimising disruption by 'digging once'.	*E004* *E005* *E011* *E012* *E014* *E015* *E016* *E045* *E046* *E050* *E136* *E189* *E207* *E262* *E265* *E270* *E319* *E320* *E331*
		Wave 3: In this phase we were sharing our draft propositions for comment, as well as tackling how to manage the uncertainty that exists on the required speed of decarbonisation. Our stakeholders were clear that we needed to prepare for net zero with a planning approach that is responsive to deal with an uncertain future. We completed comprehensive scenario modelling with sensitivity analysis that was scrutinised in depth by the experts on our technical panel and sub-group of our customer engagement group (CEG).	*E251* *E258* *E264* *E283* *E285* *E286* *E324*

Ref.	Outcomes	Engagement insight and triangulation	Eng ref:
		The majority of customers recognised the climate emergency and were comfortable with spending more to enable accelerated decarbonisation. Given the uncertainty of national and local energy developments, as well as diversity in local net zero targets, stakeholders were in favour of a planning scenario that would enable any decarbonisation pathway that emerges. Our approach in choosing our planning scenario has been to prepare for net zero and the differing levels of decarbonisation ambition across our region, through collaboration and proactive network planning to enable the emerging pace of low carbon technology (LCT) uptake. This approach combined with our overall approach to monitor, manage and reinforce the network seemed to resonate well with stakeholders as a cost-effective way to deliver decarbonisation. Our network for net zero acceptance score was [72 per cent] overall based on feedback from domestic and SME customers. However, there were conversations that needed to continue into wave 4 following submission of our initial 2023-2028 plan, since some customers are still struggling to see how this plan relates to them.	
		Wave 4: The theme continued into this phase of prioritising explaining our intentions with stakeholders so that they could understand the implications for their own decarbonisation objectives. At our ED2 stakeholder webinar, of those who stated a preference, over half said that Northern Powergrid's plans would help their decarbonisation journey. This specific feedback matched the general messages from other interactions such that our plan has been refined as opposed to significantly changing direction between draft and final stages. At our webinar there was interest from local authorities in the rate of decarbonisation that we were supporting and how we would remain engaged with them to ensure that we are not a barrier to their decarbonisation pathway. Some of this discussion arose from a concern that our regional objective is to ensure we support emissions reduction to net zero by 2050 at the latest and not in the 2030s which is the target that some of our stakeholders have set. We are not expecting the same rate of decarbonisation across all our region so we are confident that we can go further, faster in those areas that adopt LCTs more quickly. Further, supported by local authority feedback, we are committed to develop the new local area energy planning processes and roles in association with our local authorities so that these interfaces can keep the question of 'how fast?' regularly reviewed. The potential new Ofgem rules for socialisation of connection costs (the Access Significant Code Review) generated significant interest in both our smaller (Citizens Panel) and larger (ED Industrial webinar) customer groups. There were a variety of views expressed that have informed our view that uncertainty mechanisms are required for both the Access and (similar but different) services cost socialisation question. Our commitment to our stakeholder throughout wave 4 was that we would keep them informed as these policy matters were determined.	*CR420* *CR416*

Ref.	Outcomes	Engagement insight and triangulation	Eng ref:
SI2	**Deploy a 'flexibility first' approach, always choosing network and customer flexibility solutions where cost effective and viable ahead of network reinforcement**	**Flexibility approach** **Wave 1:** Our transition to delivering functions of distribution system operation (DSO), was a key feature of our stakeholder engagement prior to the commencement of business planning. We first discussed what it could mean with expert and informed stakeholders in a webinar in 2017. From this point, the engagement continued to grow through time, becoming more involved as we continued through 2020 and shared what it could mean for our services in our 2023-2028 plan. Some early feedback from 2018 and 2019 was that effective communication and education was important, because DSO was seen as a complex topic for customers to understand. The transition from a distribution network operator (DNO) to a distribution system operator, was believed to demand more proactive communication of increasingly complex information, with a request that we frame conversations around individual topics instead of the broad subject of distribution system operation (DSO). This type of feedback encouraged us to include content in our emerging thinking like the 'day in the life' examples to make it relevant. We embarked on a series of publications and events that enabled us to explore DSO and the use of flexibility in managing our network. We produced DSO v1.0[2] in December 2018 and DSO v1.1[3] in October 2019. Specific roundtables and discussions were held with energy retailers, digitalisation/energy systems and heat stakeholders. Also, with our social issues expert group (SIEG), we explored the features of a socially inclusive transition. We concluded wave 1 of our engagement with stakeholders supporting our future role and our vision for DSO. We were seen as being in a good position to act as a collaborator or enabler of partnership working on the transition to DSO.	*E156* *E202* *E321* *E347* *E349*
DSO4	**Enhance processes and systems for network operations to enable a step change in our capability to optimise a system with increasing customer and network flexibility**	**Wave 2:** Our emerging thinking followed neatly on from our vision and development planning in our earlier wave 1 DSO publications. We set out how investing in people and systems to enable more flexibility in the energy system would be of benefit to customers. We also made clear that we favoured a 'flexibility first' approach that entailed initially evaluating whether flexibility (customer or network) was a viable solution. Only if not would we look to reinforce. Once local government stakeholders were given real world examples of how flexibility worked, they were very supportive of the principle. They noted that educating customers would be key. We explained how flexibility came in different forms and our initial investment modelling demonstrated the value to customers of price-driven flexibility – i.e. customers responding to cost signals in their bills that cause the network peak to be suppressed in a manner that has a beneficial impact on our network bill as our need to act is diminished. We had ongoing engagement with other energy market players and policy makers who continued to seek actions from us to support new flexibility markets – either DNO contracted flexibility or network investment that is an enabler for flexibility to be offered to the energy market. Stakeholders supported our flexibility first approach. The actions and approaches we were advocating continued to receive a positive response, as indicated by the high ratings for service levels C to E already described in the earlier section. Most domestic and business customers and 67per cent of rural customers similarly	E505 E086 E227 E262 E265 E276 E306 E313

[2] DSO 1.0 Emerging thinking https://www.northernpowergrid.com/asset/0/document/4686.pdf
[3] DSO 1.1 development plan https://www.northernpowergrid.com/asset/0/document/5139.pdf

Ref.	Outcomes	Engagement insight and triangulation	Eng ref:
		voted for the more ambitious levels proposed (options D or E) to create high levels of customer and network flexibility. Most of them said they would be willing to be flexible in using their energy, as a response to time-of-use tariffs. Stakeholders recognised this might be limited where customers' schedules are fixed and that the region requires additional investment in network capacity to enable widespread use of low carbon technologies (LCTs). In line with this feedback, we reduced some of our customer flexibility assumptions in our initial plan analysis relative to the modelling we did as part of our emerging thinking – albeit the expectations of the amount of customer flexibility at the end of the 2023-2028 period are a significant increase on current levels. Separately, we also included reinforcement for fault level investment that provides extra headroom for generation for which customer flexibility is not a feasible technical option.	
DSO5	**Enable significant uptake of customer flexibility and facilitate development of new markets for customers providing services to networks**	**Wave 3:** In wave 3 we continued to talk with local leaders and at the many stakeholder and customer panels we operated. We started to share and discuss the propositions we were formulating in bilateral meetings with those expert stakeholders interested in flexibility market growth. The aim to was to discuss specifics like the way in which others saw flexibility markets maturing and how these may be supported at different voltage levels on our network. Expert stakeholders believed that in the short-term, customer flexibility will be largely price-driven by energy suppliers offering time-of-use tariffs. We were particularly interested in validating our thinking on how we may work in collaboration on flexibility deployment with the electricity system operator (ESO) and market players such as commercial aggregators or flexible generators/storage. The engagement supported a view that low voltage (LV) system reinforcement is key to enable flexibility to operate and serve the energy market; that this LV flexibility should also be of use to the DNO and that the pace of development of these local markets to become liquid is highly uncertain. Flexibility service providers also highlighted the high transaction costs associated with LV flexibility unless it is automatically aggregated. These stakeholder reflections informed our judgement to assume that LV flexibility will provide a service as DNO contracted flexibility to benefit the extra high voltage (EHV) system only – i.e. we are not assuming that LV flexibility will be used by us to defer LV reinforcement (other than perhaps in the very short term). Our plan propositions are actively preparing and managing the decarbonisation of the energy network by developing our flexibility capabilities and approach.	*E224* *E231* *E232* *E233* *E234* *E235* *E236* *E234* *E240* *E281* *E284* *E302* *E324*
		Wave 4: A general theme was that our expert stakeholders were seeking more detail on our plan and other stakeholders were seeking more clarity. We responded to these calls in the Wave 4 period in our engagement activity and also in the updates we have made to our plan. In the plan, a new section has been added in our DSO strategy to explain how the different aspects of flexibility included in our plan and our view or vision for the 2020s. This has been created in response to the request for more clarity. Expert stakeholders were interested in deliverability of the plan and cross-linkage between the different plan areas. In response to this feedback and in line with the updated business plan guidance we have added more detail to our plan on how we will structure ourselves to support delivery of our DSO strategy with a focus on operational effectiveness and transparency. Further, we added detail to the linkage to underpinning data and digitalisation actions to enable flexibility. This extra detail will assist stakeholders to better monitor our progress in addition to the reporting to be performed by our assurance function within our new DSO business unit included in our final plan.	*CR407* *CR405* *CR436* *CR445*

Ref.	Outcomes	Engagement insight and triangulation	Eng ref:
DSO1	**Significantly expand our capture of network and market data to establish a vital building block for the smarter and more active energy system**	**Open data and digitalisation** **Wave 1:** In the aforementioned engagement on DSO, a key area that was of interest to our stakeholders and us, was how digitalisation and data could be used by us all to capture the benefits from a more flexible energy system. Our engagement started in 2018 with the energy systems round table that explored the value from open data and digitalisation of our grid. An open question we had in wave 1 was how we should set our priorities for digitalisation and data using the work being undertaken in 2015-23 on smart grid enablers as a foundation for the next period. The discussion with our stakeholders and across our industry, supported by our DSO v1.0 and DSO v1.1 publications set a clear ambition for digitalisation to extend down to the LV system to enable us to manage the increase in adoption of LCTs by our customers. Also, the work of the Energy Data Taskforce set out a compelling vision for presumed openness and energy system data sharing, where one of the known business cases was using data to support or establish flexibility markets – increasingly at the local level or aggregated resources that may benefit larger pieces of the energy system. Some local authorities and community energy groups expressed an interest in having additional network and energy data available to them to inform modelling, local planning, and their understanding of the actions needed to reach the net zero target. Likewise, we received feedback on how we could further develop and improve our online tools like AutoDesign, which was very positively received after its launch in early 2020.	*E081* *E202* *E323* *E352*
DSO2	**Transform our analysis capabilities to enable data-driven decision-making in planning and operational timescales**	**Wave 2:** Our emerging thinking and digitalisation strategy and action plan (DSAP) set out a clear vision for digitalisation and data linked to decarbonisation actions. We explained how it would support our approach of flexibility first, including the importance of LV monitoring. Our propositions on data services, particularly the suite of analysis tools we have included in our plan, were discussed with the parties that could make use of them, allowing us to refine our thinking. In particular, flexibility providers identified the importance of more network open data and two-way data exchange to identify when local flexibility will be sufficiently available. Also, parties such as an electric vehicle (EV) charge point operators and storage developers confirmed that more data was required on network constraints to enable them to bid for service provision.	*E004* *E005* *E207* *E227* *E276* *E306*
DSO3	**Unlock new capabilities and benefits for customers through provision of open energy system data and engaging in joint planning with our stakeholders**	**Wave 3:** We continued to gain strong support for the vision that open data and proactive data sharing would underpin a successful low carbon energy transition. Specifically, flexibility providers and aggregators believed that data would be key for developing a flexible energy system. As such, we have included actions in our DSO strategy around sharing data more actively and we will continue to work with stakeholders to develop the business cases, methods and techniques. In particular, we were urged to share more real-time data and we have included actions to grow this capability. This also features in our consumer value propositions (CVPs) where there is further detail on the stakeholder engagement. Our dialogue with expert stakeholders (like the ESO) assisted in us refining our plan propositions on appropriate digitalisation actions to develop flexibility in the system.	*E226* *E232* *E303* *E231* *E232* *E233* *E234* *E235* *E236* *E237* *E306*
		Wave 4: For open data and digitalisation, a feature of this stage of our stakeholder engagement was again the desire to see more detail in our proposals. To address this need we created a stronger linkage in our final plan to demonstrate how the new capability we are building in data and analysis will be used to make better	*CR431* *CR435* *CR441* *CR444*

Ref.	Outcomes	Engagement insight and triangulation	Eng ref:
		decisions- particularly associated with the uptick in LV system development (flexibility or reinforcement) to meet the new load from electric vehicle charging in particular. Stronger linkage was also created between the customer benefits we are seeking to deliver from a smarter, more flexible energy system, the outcomes we are committing to in the DSO strategy and the underlying data and digitalisation enabling actions.	*CR442* *CR415*
WS1 WS2 WS3 WS4	**Remove barriers for customers to use their equipment to support the whole energy system, launching an open register and energy match-making process that enables parties to work together to reduce costs and deliver whole system benefits.** **Ensure our customers' future needs are met through cross-sector and cross-vector planning, including annual workshops with a wide range of stakeholders such as the heat, hydrogen and transport sectors to develop our regional DFES scenarios.** **Develop the blueprint for the next generation network by rolling out proven microgrid technology and deploying network voltage optimisation to deliver energy efficiency savings for customers.** **Facilitate knowledge exchanges with organisations specifying future LCTs and low carbon use cases.**	**Collaborative whole energy system** **Wave 1:** Viewing our actions through the lens of the whole energy system or the 'total bill' has resonated well with stakeholders throughout the last few years. From the outset of our wave 1 engagement, stakeholders wanted to understand and minimise the cost impact from investment to facilitate decarbonisation and switching away from cheaper fossil fuels. As such, this caused us to consider whole system in its wider sense – i.e. not just the link between electricity distribution and transmission. Innovation was recognised as key to delivering net zero in the required timeframe. Innovators wanted to work closely with us, be part of the network innovation projects and test their proposed solutions. Collaboration was recognised as a critical enabler for achieving net zero. We continuously heard there was appetite to do more beyond traditional investment planning and to demonstrate a more joined-up approach across the industries. Stakeholders urged collaboration with manufacturers of smart products, EVs and autonomous vehicles to ensure design of their products is inclusive and conducive to future needs of customers. We began to engage with our stakeholders on the new, emerging concept of local area energy plans (LAEPs). As there was no common definition, we sought to determine their geographical scale, their scope, their timeframe, who leads their development, as well as our involvement in producing them and, separately, our involvement in drawing together the conclusions of any such plan.	*E057* *E155* *E335* *E348* *E349*
		Wave 2: The engagement on our decarbonisation levels was accompanied by discussion on how we should engage with local plans to meet net zero. In particular, we discussed LAEPs, using our convening power to bring a number of our local authorities together with us and the local gas distributors. Our goal was to understand each other's' needs and explore how we could effectively work together – another example of needing to set a common grounding of understanding. As part of this work, we committed to always seek trilateral conversations on these topics – electricity, gas and local authority. This was in response to the expectation from stakeholders that utilities should work together to plan future needs. Generally, there was a very strong welcome from local government stakeholders for the level of engagement conducted during wave 2 and a desire for continued close working. In particular, local authorities were keen to have the opportunity for more regular, strategic discussions about their energy plans and requirements and wanted to involve us in their plans from the outset to gain an early understanding of what was feasible.	*E004* *E005* *E130* *E207* *E222* *E223* *E265* *E276* *E307* *E308* *E309* *E314* *E316*

Ref.	Outcomes	Engagement insight and triangulation	Eng ref:
		Wave 3: Our engagement increased with local authorities and the gas distribution sector on LAEPs. We published a joint charter with Northern Gas Networks (NGN) setting out a series of principles for how we could continue to work with our local authorities and support them with LAEP development. This consolidated what we had already heard to establish the common ground on which to continue the dialogue. We expect LAEPs to follow in 2022 from those local authorities with more ambitious carbon reduction targets and we look forward to supporting them. Our propositions are a direct response to the call from stakeholders to work collaboratively with customers and energy sector partners to enable participation and develop shared plans for the decarbonisation transition. On innovation, our microgrids and voltage optimisation proposition reflects the continued support we have had from stakeholders to find novel solutions for a resilient, future network that maximise benefits and minimise costs.[4] Finally, collaboration with early adopters including community energy was considered important to gather the necessary practice and learning to inform future network standards and services for all customers.	*E218* *E228* *E229* *E226* *E232* *E303* *E236* *E258* *E264* *E284* *E301* *E324*
		Wave 4: Our whole system thinking was generally supported by our stakeholders in wave 4 of our engagement. However, we still took the opportunity to listen to feedback and make changes in our final plan. Our microgrid proposals were of great interest and feedback included the need to set out what we are proposing in the next five years in the context of the longer-term direction. This proposition was identified in our draft plan as establishing a blueprint for the next-generation network and our stakeholders were keen to learn more. Accordingly, we have added content in this area with further explanation. Likewise, the benefits of the voltage optimisation draft proposition were appreciated but we were challenged to set out more clearly how vulnerable customers in particular would benefit. We clarified our explanation in this area. Lastly, our cross-utility dialogue confirmed the ongoing commitment from Northern Gas Networks to continue to collaboratively drive forward our approaches on local area energy plans. This did not change our final plan, but was useful confirmation of our current pathway and resonated well with the local authority continued interest in these place-based action plans for decarbonisation.	E418 CR430 CR431
		Draft plan acceptance research and findings ***Net zero:*** *The acceptance score of net zero is 72 per cent. Overall acceptability was high for net zero delivery with trust equally important to customers at 72 per cent.* ***DSO:*** *The acceptance score of DSO is 68 per cent. This area was harder to navigate for customers and they felt it was not directly relevant for them.* ***Whole systems:*** *The acceptance score for whole systems is 69 per cent. This area was harder to navigate for customers and they felt it was not directly relevant for them.*	*E325*

[4] These became CVPs, partly due to the appetite shown by our stakeholders. See more detail on the engagement we conducted in the CVP section.

WAVE 1 – open and formative engagement

In the first wave of engagement, we ran a range of panels, roundtables, surveys and published reports engaging >1,300 stakeholders on decarbonisation. Engagements were focussed on net zero targets, the need for collaboration to achieve them, as well as the more specific conversations about network capacity, the costs of the low carbon transition and ensuring the transition is socially inclusive.

- Themes that were covered by the events and addressed in the sections that follow the table of events:
  - Different net zero targets have been set locally and should link with future energy scenario modelling.
  - Existing and future network capacity was a key area of interest for stakeholders.
  - Transition to net zero needs to be socially inclusive.
  - Total energy transition costs are important to aid effective future decision making.
  - Stakeholders believed we have a key leadership role in net zero transition.
  - Effective communication and education is important because DSO was seen as a complex topic for customers to understand.
  - Stakeholders supported our future role and our DSO vision.
  - Innovation will be key for delivering decarbonisation within the agreed timeframes.
  - Collaboration was recognised as a critical enabler for achieving net zero.
  - It is important to note that the feedback received in wave 1 was subsequently echoed in wave 2 and wave 3.
  - The 54 events where decarbonisation was a specific sub-topic are listed below:

Engagement reference	Name	Subgroup	Engagement type	Date	No engaged
E351	Total Power Systems factory visit	Solution provider	Meeting	01/05/17	5
E352	DSO v1.0 consultation	Various	Roundtable	23/01/19	68
E321	DSO and energy retailers Roundtable	Utilities	Roundtable	09/05/19	15*
E322	Transforming Heating Roundtable	Various stakeholders	Roundtable	10/05/19	25*
E323	How do we build a smart energy system centred around the needs of our customers?	Various stakeholders	Roundtable	15/05/19	25*
E335	Conversations with an interested customer – community energy representative	Local interest groups	Meeting	08/2019	1
E111	York, North Yorkshire & East Riding LEP workshop 'Leading in a climate emergency – a collaborative approach'	Regional politics	External event – workshop	25/09/19	19

Engagement reference	Name	Subgroup	Engagement type	Date	No engaged
E336	Local Authority EV forum	Various	Forum	25/10/19	75*
E157	UKPN Flexibility Forum Event	Various stakeholders	External event – forum	12/11/19	236
E337	Meeting with NE LEP	Regional politics	Meeting	14/11/19	2
E057	Ensuring an inclusive transition to DSO for all people in our region	Various stakeholders	Workshop	28/11/19	20
E202	Creating a sustainable energy future for the North	Various stakeholders	Conference	29/11/19	120
E325	Moving to DSO Webinar	Various stakeholders	Webinar	18/12/19	74
E112	Call with the North East, Yorkshire and Humber BEIS Regional Energy Hub	Regional politics	Telephone Call	13/01/20	8
E156	ESO flexibility forum - power responsive event	Central government	External event – forum	15/01/20	251
E113	Meeting with Leeds City Council	Regional politics	Meeting	16/01/20	4
E078	Local Authority forum	Regional Politics	Forum	31/01/20	29
E034	Consumer panel	Consumers	Panel	01/02/20	34
E114	Introductory meeting with Transport for the North	Regional politics	Telephone Call	05/02/20	6
E155	Flexible Power meeting	Various stakeholders	Meeting	07/02/20	10
E017	Emerging Thinking: Climate Change Adaptation	Various stakeholders	Deliberative roundtable	10/02/20	14
E338	Ryedale Council	Regional politics	Meeting	13/02/20	1
E115	Energy Systems Catapult/ENA event - Local Area Energy Planning workshop	Corporate interest groups	External event – workshop	18/02/20	22
E116	Meeting with City of York councillors	Regional politics	Meeting	27/02/20	4
E079	Supporting the electrification of transport in our region engagement event	Various stakeholders	Workshop	28/02/20	32
E339	Harrogate Council	Regional politics	Meeting	03/03/20	6
E194	DG Forum	Utilities	Forum	04/03/20	6
E340	Hull City Council	Regional politics	Meeting	05/03/20	2
E208	DFES workshops (2) – Leeds and Newcastle	Consumers	Workshop	06/03/20 and 13/03/20	50
E117	Discussion about Distribution Future Energy Scenarios (DFES) with Sheffield City Region LEP	Local interest groups	Meeting	11/03/20	1
E118	Discussion - Energy System Catapult's Local Area Energy Planning tool's application in Newcastle	Regional politics	Meeting	13/03/20	1
E341	Meeting with Barnsley Council	Regional politics	Meeting	31/03/20	2

Engagement reference	Name	Subgroup	Engagement type	Date	No engaged
E081	AutoDesign workshop for ICPs	Utilities	Workshop	03/04/20	30
E342	Meeting with Northern Gas Networks	Utilities	Meeting	20/04/20	3
E343	Meeting with WYCA	Regional politics	Meeting	24/04/20	2
E032	Consumer panel - Future of Energy	Consumers	Panel	27/04/20	58
E344	Meeting with Tees Valley LEP	Regional politics	Meeting	27/04/20	3
E119	Net zero scenario engagement - North of Tyne Combined Authority	Future energy stakeholders	Meeting	04/05/20	2
E120	Net zero scenario engagement - Sheffield City Region Combined Authority	Future energy stakeholders	Meeting	04/05/20	4
E345	Meeting with Redcar and Cleveland Council	Regional politics	Meeting	05/05/20	1
E075	SME Panel - Customer Service	Consumers	Panel	08/05/20	20
E096	Social Issues Expert Group	Vulnerability	Focus Group	08/05/20	4
E346	Meeting with Sheffield City Council	Regional politics	Meeting	12/05/20	1
E347	ENA and OLEV meeting	Central government	External event – Meeting	29/05/20	31
E121	Technical panel - Net Zero Scenarios for Emerging thinking	Future energy stakeholders	Panel	08/06/20	6
E196	Community Energy Webinar Net Zero	Future energy stakeholders	Webinar	18/06/20	64
E348	Community Energy England's Community Energy Conference - Part Two	Future energy stakeholders	External event – webinar	29/06/20	50*
E147	Technical panel - Introduction and 2023-2028challenges	Future energy stakeholders	Panel	30/06/20	6
E349	Meeting with OLEV	Central government	Meeting	17/07/20	11
E085	OLEV EV connections roundtable	Various stakeholders	External event -Roundtable	22/07/20	35
E350	Workshop session with Greater Lincolnshire LEP	Various stakeholders	Workshop	29/07/20	15*
E122	Newcastle City Council Climate Change Committee's meeting	Regional politics	External event – Meeting	30/07/20	20*
E122	Meeting with Newcastle City Council	Regional politics	Meeting	31/07/20	1
E122	Meeting with E.ON	Utilities	Meeting	31/07/20	1

*A best estimate of number of people engaged where this information was not recorded

Different net zero targets have been set locally and should link with future energy scenario modelling

- Stakeholders were interested in understanding the emissions' impact of the different DFES energy pathways and how local developments are reflected in the modelling. More decentralised pathways were preferred.

- Through our early engagement with stakeholders, we learned that: **(E352)**

    - National Grid's future energy scenario (FES) models are nationally understood and accepted as a useful set of assumptions which provide interested parties with common reference points needed to consider the future energy system. To ensure sufficient granularity each DNO should produce scenarios modelled from the FES clearly stating assumptions used to reach the final forecast. This approach allows providers to understand why the DNO's view is different to FES and if they are realistic;

    - Stakeholders are willing to make informed decisions of their own as long as they have full visibility of methodology and assumptions made in each scenario; and

    - In terms of the flexibility market, the appetite is for longer term visibility and stability: i.e. the longevity of flexibility needs by the network (reinforcement deferment or avoidance).

- During our workshops, we asked participants to vote for the scenario that they preferred to see locally. Consumer Renewables (more ambitious, most decentralised) scenario was preferred. We also asked about local authority net zero targets and plans, and observed that there are a number of different targets set – both for the local authority area or for local authority operations; most had not yet published their plans. **(E208)**

- At the 'Leading in a climate emergency – a collaborative approach' workshop, participants discussed how councils are moving at different speed - either through the lack of knowledge or capacity. LA officers felt councillors were either disinterested or were simply not aware of the gravity of issues facing them as well as citing engrained structural issues**. (E111)**

- Stakeholders at the Climate Change Adaption session requested information on different topics regarding the scenarios and modelling used to form our plans. **(E017)**

- BEIS Regional Energy Hub representatives agreed with the draft outline for the decarbonisation section of the 2023-2028 Business Plan, which we shared**. (E112)**

- West Yorkshire combined authority/Leeds City Region LEP said they are to approach us with the work they are doing on zero emission pathways and some proposals for defining what local area energy planning might be. **(E112)**

- Transport for the North were planning to model decarbonisation pathways for the whole transport system in the North as well as EV uptake in the region, creating Transport Future Scenarios (including EVs and public transport) which will include transport use changes over time. They want to explore sharing the outputs and updates as open data. They also work with Element Energy on this. **(E114)**

- At a meeting with City of York Councillors, CYC said they have an ambition to become carbon-negative and have an ambition to electrify the bus fleet(s) servicing York. CYC proposed to use York as a DSO test bed. They were interested to explore what Local Area Energy Planning means. **(E116)**

- Participants from the North of Tyne combined authority (CA) said that they don't have planning powers and all local LAs have different approaches. Energy might - or might not - be included in the joint statement made by LAs as part of devolution deal. Not sure where LAEP would fit. **(E119)** They also added:

    - The CA was planning to develop a large-scale revolving fund to finance the efforts to achieve the net zero target. In light of the pandemic, their focus is on green recovery.

    - Primary focus locally is on the economic development, e.g. new homes, transport for NECA level (7 LAs), but their aim is to make these climate-ready. However, LAs are apprehensive of the precedent

with house builders taking a LA to court after it asked for higher climate-compliant standards for buildings.

  - The CA recognised the importance of investment ahead of need/capital investment.

- The LEP representative said that Sheffield LA were targeting 2030 as they net zero target. **(E117)**

- Sheffield City Region LEP's decarbonisation incentives largely dependent on national budget announcements and stimuli. As for Local Area Energy Planning, they are not exploring, for example, a localised cost in a similar form to a council tax but rather developing local 'investment packages'. **(E117)**

- Arup are conducting an EV infrastructure planning study for the LEP, using our DFES data – it was agreed we would meet separately so Arup's feedback can inform our DFES. **(E117)**

- Sheffield City Region Combined Authority said that currently, all planning was done at a LA level, however the upcoming devolution agreement might include planning provisions and 'energy devolution', alongside more powers related to transport. **(E120)**

- Using our DFES data, Arup had carried out a modelling exercise for EV charging infrastructure locations in Sheffield City Region area and were in the process of wrapping up the project – ready to share it. They offered a separate session to explore it in detail and compare with our net zero modelling results, where they have explored what is needed to support increased EV ownership (number of EV charging points - private/public/hybrid delivery). The work was initiated after South Yorkshire came out low in benchmarking for the volume of EV charging points. **(E120)**

- Sheffield Council has a target of reaching net zero by 2030. They are working with Arup and Ricardo on their plans for how to achieve this and would like a follow up discussion with Northern Powergrid in June when they will be further on in their thinking. Keen to involve stakeholders in their net zero plans and to learn from Northern Powergrid on how best they could achieve net zero. They had been looking at National Grid's future energy scenarios and were very interested in looking at Northern Powergrid's local ones. **(E346)**

- Harrogate Council asked for us to share decarbonisation plans with them. **(E339)**

- Newcastle University representative said that the decarbonisation journey matters too, not just the destination. This was echoed by other participants. **(E208)**

- The Centre for Sustainable Energy wanted to find out what modelling has been done and the background about how it was done. **(E208)**

- At a DFES workshop, a participant from CEG asked for better evidence to support Northern Powergrid planning, awareness of benefits of data sharing from participants, evidence to feed into national policy debate. **(E208)**

- Another participant said it may be interesting to show a view as to the penetration of EVs/heat pumps relative to the population. This way heat maps are not skewed by densely populated areas. **(E208)**

- One participant from the workshop said it would be great to find out more about the model and levels of data with it. **(E208)**

- Another participant said they would like see a demonstration of the tool. **(E208)**

- Participants in general were keen for more detail. For example, a participant from CSE said detail about the methods used would be good, detail about data sources, perhaps a diagram or two about how they are combined to produce the outputs. **(E208)**

- A student from Newcastle University they would like to better understand the model (mathematical model of demand) – the structure, data inputs & outputs, and asked if a report will be published on this. **(E208)**

- The technical panel also suggested us to consider further sensitivity-testing of the model to identify the key tipping points, if that has not been done so far and to be clear and specific in how we present the information. They welcomed the net zero scenarios for emerging thinking which were built bottom-up, reducing the link with National Grid FES, and received the visualisation tool well. **(E121)**

- Barnsley Council said they were towards the beginning of its decarbonisation journey. Its paper on Zero 40, which is the plan for the Council to be net zero by 2040, had been delayed as a result of COVID-19. They were developing a five-year strategic energy action plan, which it expected could be ready in the next six months. They asked us how we were planning to meet the increased demand on the system that will be required from electrified heating and the uptake of EVs. **(E341)**

- West Yorkshire CA's spatial devolution plan is expected in 2023-24. In near term, Element Energy have developed pathways will allow them to identify 10-15 projects for near-term in areas of greater decarbonisation opportunity. **(E343)**

- Our scenarios were seen as reasonable and complementary to WYCA's work. **(E343)**

Existing and future network capacity was a key area of interest for stakeholders

Stakeholders wanted to share decarbonisation plans and exchange the relevant data, and to understand where capacity is available for low carbon projects.

- Participants also said we must consider the risk of fuel-poor customers self-disconnecting, or self-rationing in the case that price signals for flexibility come in the form of financial penalties. **(E057)**

- At a Social Issues Expert Group we hosted, participants believed data from cities on pollution must be available, and could support the case for net zero. There was also a belief that corporate volunteering is needed more than ever, as charities are struggling, and companies can do more to support net zero. **(E096)**

- For local authority representatives at the local authority forum (AutoDesign launch), cost and network capacity were key areas for concern when undertaking EV planning. AutoDesign was seen as an essential tool to help address this. Assessing electrical supply is also a major challenge when embarking on a new project, and again, AutoDesign was seen as a potential solution. **(E078)**

- At the AutoDesign workshop for ICPs, ICPs/DNOs said they wanted access to all network data and tools that can help them to extend the scope of works they can offer their clients. 84per cent of those who responded said they had no experience of using AutoDesign, the remaining 16per cent had registered to use AutoDesign but had limited experience or knowledge of the tool. **(E081)**

- Leeds City Council are asking for an EV charging point to be installed in each parking space in new developments. Local developers have claimed this would incur high costs, based on simple calculations that are not taking diversity into account. It was suggested that guidance needed on design considerations for developers (and LAs to be aware of this), for new developments and associated car parks. **(E113)**

- At the EV connections issues roundtable, participants taking part saw cost, communication and network capacity as barriers to carrying forward their plans. Most were not aware of support already available from DNOs. **(E085)**

- BEIS Regional Energy Hub representatives were interested in discussing the subject of capacity and economic development in Local Enterprise Zones, among other sites. For example, new planning requirements for new developments in Leeds will require an EV charging point in each parking bay. **(E112)**

- Participants at the EV workshop said reserving capacity on the network is important and must be efficiently utilised by building the most appropriate chargers in the most suitable areas. **(E079)** Other feedback included:

    - Grid capacity can't meet legislation requirements for new housing developments, e.g. an EV charger in every home.

- EV charging from solar PV - many raised the issues that often cars are not plugged in when the sun is shining.
- Charge points at work - Can large employers consider work charging hubs?
- Strategic rapid chargers on popular routes should be somewhere that is desirable to stop for 30 minutes: Don't stop to charge, charge to stop
- Car charger location information is not all in one place e.g. on apps.
- There is a large cost to installing charging in cities and many questioned if charging and grid infrastructure can provide the capacity for city charging.
- Finding costs of adding capacity can eat up development budgets.
- How will converting streetlights to solar effect EV on-street charging?
- Gathering data is the top priority
- Smart charging has potential to alleviate load on the grid and free up capacity.
- We should be more proactive in supporting decarbonising public transport.
- The best way to shift transition is to improve public transport - can Northern Powergrid work with bus depots on decarbonisation of fleets?
- How can Northern Powergrid work with big power users?
- Can big power users open car parks at the weekend for public?
- Can local authorities partner with app developers and Northern Powergrid to provide a route to the end user to encourage recruitment for gamification strategies?
- Has Northern Powergrid considered working with tech companies like HIV?
- Can Northern Powergrid improve dialogue with fleet managers in helping understand grid capacity in terms of electrifying fleet?
- What do fleet managers need in the next 5 years to ensure it works for 10-15 years?
- Can Northern Powergrid improve dialogue with local authorities to understand fleets and location of fleet yards?

– Hull has growing power needs as a result of large-scale city regeneration projects that are being delivered and they require closer working with us to deliver the correct sizes network for the future. **(E340)**

– At the DFES workshop, participants talked about the importance of the openness of the data, because it allows for reuse, scrutiny and improvement by a third person. **(E208)**

– At the workshop, we asked participants what network data they would like us to make available. Responses varied: **(E208)**

- LV connectivity model;
- GIS data of assets down to feeder, EV forecasts, cable records, asset ages, cable types, secondary sub capacity;

  - GIS compatible localised data at a greater level of granularity;
  - Substation capacity;
  - Priority to rural substations / capacity for community rural projects to connect into substations;
  - Data forecasts, EV data, DNO costs; and
  - Postcode data for what is supplied on LV feeder.

- At the DFES workshop, participants were asked if they had any thoughts or insights on our DFES scenarios and the likely pace of change. **(E208)**
  - 'I appreciate for main DFES scenarios that Northern Powergrid disaggregated quantities of EV, heat pumps to primary substation level, however I would challenge the underlying uptake rates. The target is net zero; yet Northern Powergrid FES show EV ownership being one per household by 2050; but value of carbon is so low that it may be more affordable to offset, thus to me will greatly defer uptake should UK government provide this option, through additional contributions to vehicle excise duty. Also, many businesses are promoting working from home – will car ownership be maintained or will it decline.'
  - 'The pace of change is a particular challenge to DNOs and the way they are funded, [which] should be reformed further to allow for more adaptive planning.'
  - 'You need to consider low/medium/high growth options for development in terms of power supply demand. How do you engage with developers and volume house builder?'
- Tees Valley CA mentioned they are exploring private wire/IDNO models in three areas due to costs, and are inclined to favour hydrogen future scenarios. Tees Valley LEP's Energy Strategy to be published towards the end of the year after a consultation with LAs. **(E344)**

Transition to net zero needs to be socially inclusive

Customers believed that the transition to DSO must be socially inclusive in terms of protecting vulnerable customers, fuel poor, rural, customers.

- Participants in Newcastle were divided as to whether public transport or EV infrastructure should be the priority for local authorities. While elderly and retired people generally advocated for improvements to public transport, families with young children were more likely to push for an expansion of existing EV infrastructure. Some consumers suggested that local authorities should achieve a compromise by investing equally in both public transport and EVs. As there is no consensus on this issue, Northern Powergrid should encourage Local Authorities to invest in both public transport and EV infrastructure. **(E034)**
- At our ensuring an inclusive transition to DSO for all people in our region workshop, participants gave a range of feedback: **(E057)**
  - Northern Powergrid should consider system changes that were not considered in the initial analysis we completed;
  - There is a clear increased requirement for flexibility in the system;
  - Climate change is affecting demand.
- At the net zero community energy webinar, for over half of the respondents, their top priority remained climate change, however as questions and other feedback suggested, stakeholders are keen to ensure this is a socially just transition and leaves no one behind. **(E196)**

- We were asked if we were taking into account multi-generational aspects and, secondly, the link between decarbonisation and climate change adaptation **(E112)**

- Smaller councils with advanced decarbonisation plans, but without the budget of cities, are looking for innovative solutions to enable greater change. **(E338)**

- The technical panel recognised that the importance of just transition is potentially at odds with Ofgem's current intention to achieve net zero at least cost. They thought the government might want to see more growth in the North if green growth/levelling up approach is taken **(E121)**

- We received stakeholder feedback regarding the need for the transition to DSO to be socially inclusive **(E352)**:

    - The DSO transition should be inclusive by design;

    - DSO widens the definition of what a 'vulnerable energy customer' is;

    - Smart meters have the potential to deliver an informed, more affordable service for vulnerable customers, in a considerate manner;

    - DSO reshuffles the costs and benefits of the energy system, and the challenge is to get the socialisation of both costs and benefits right; and

    - It may be a challenge to support vulnerable customers without jeopardising the decarbonisation momentum or putting off early adopters.

- Stakeholders wanted to know how we can ensure the benefits of the DSO transition are realised by all – including the most vulnerable customers. **(E352)**

- Participants expressed lot of interest in social inclusivity, green recovery and climate justice, covered by different speakers. **(E348).**

Total energy transition costs are important to aid effective future decision making

Stakeholders wanted to understand and minimise the cost impacts from different investments needed to facilitate decarbonisation (including the uptake of low carbon technologies, delivery of infrastructure and bill impacts from switching away from cheaper fossil fuels)

- York, North Yorkshire and East Riding LEP stated that their renewable generation policies would only reach 55per cent of 2050 target. 'Circular economy' initiatives are designed to capture the remaining 45per cent. **(E111)**

- At our technical panel focusing on our 2023-2028 plan, when considering challenges participants said we need to pay attention to whether the plan is investing enough, too much, or at the right level across all areas. We must give consideration to the justification of avoided costs outside of the price control window. **(E147)**

- A number of participants asked about the total costs associated with each scenario; some asked about the DNO related costs. **(E208)**

- Reaching the residual emissions currently modelled for the three net zero scenarios might not be enough. Energy sector might need to achieve more to compensate for other sectors where emissions are more challenging to tackle. This would mean doing more 'heavy lifting' and delivering a greater carbon reduction – to leave leeway e.g. for sectors more difficult to decarbonise, such as aviation, as available technology makes it comparatively easier. **(E121)**

- Following-up on the call of 9 March 2020, meeting participants explained that members of OLEV team had joined BEIS as part of a re-structure. They were interested to consult all DNOs on the domestic customer journey and the associated costs. Additionally, they were interested in discussing innovation (in particular,

voltage reduction project and AutoDesign accuracy); whether we are updating our EV strategy; and our engagement with fleet managers. **(E349)**

Stakeholders believed we have a key leadership role in net zero transition

Stakeholders believed we have a leadership role in decarbonisation and should enable net zero targets to be met ahead of national target. Any movement towards net zero should be socially equitable and not put the vulnerable and fuel poor customers at a disadvantage.

- We held a Northern Powergrid Stakeholder Summit in November 2019. While this was an opportunity to discuss all aspects of our business, the clear focus was on our role in decarbonisation. It provided us with a clear mandate from our stakeholders to take a leadership role in decarbonisation in our region. There were also various points of detail that helped to influence our thinking on issues relating to the DSO transition. **(E202)**

- Participants in Leeds and Newcastle at a Consumer Panel were supportive of Northern Powergrid taking on more responsibility in a future smart energy network. **(E032)**

- The majority of participants in Leeds and Newcastle had little to no prior knowledge of Net Zero. Some were unaware that Net Zero relates specifically to emissions and instead connected it to other sustainability issues such as recycling. **(E032)**

- Participants in Newcastle at a Consumer Panel did not feel they had enough information about the government's strategy for meeting its net zero targets, or about the impacts that might arise from efforts to reach net zero by 2050. Many participants raised concerns about the financial implications of net zero and the potential for hidden costs to be passed on to consumers, while some were also suspicious of so-called 'green taxes' due to concerns that the money raised might simply disappear into government contracts. **(E034)**

- These participants also said that Northern Powergrid should inform its customers of its strategic approach to reaching net zero, and ensure transparency around any costs that might be passed on to consumers. **(E034)**

- Consumer Panel believed Northern Powergrid as a large business with the relevant expertise had to 'lead by example' in taking actions to achieve the net zero target. **(E034)**

- Participants in Newcastle largely agreed that the UK should aim to reach net zero emissions, but there was some disagreement regarding the 2050 target. Those with positive views felt it was 'appropriate and achievable' and would allow enough time to build public support while setting an example for other countries to follow, although some did not believe it was realistic to achieve net zero by 2050, Others felt that this target was not ambitious enough, and that 2050 would be too late to prevent the worst impacts of climate change. **(E034)**

- At our 'supporting the electrification of transport in our region engagement' event, the overriding theme is that we are being challenged to do more. Participants believe Northern Powergrid should be 'driving' not 'supporting' the transition. **(E079)**

- Newcastle City Council had not considered who should lead on/take decisions on local energy plans. **(E118)**

- The SME Panel on customer service saw a clear role for Northern Powergrid to be a source for independent, expert advice around flexibility, energy efficiency and EVs (including the best option for their geographic area), the practicalities/route to adopting these and cost associated. Advice should not just be monetary; the panel see Northern Powergrid as an intelligent, experienced team which customers could benefit from. **(E075)**

- At the Net zero community energy forum, out of 35 respondents, 60 per cent rated the Community Energy Strategy at four stars, while nine rated it at three and five rated it five stars. Over 70 per cent of respondents were unsure whether there was something missing from the strategy, suggesting people needed more time to engage with and digest it. **(E196)**

- Redcar and Cleveland have a target of achieving net zero by 2030 for the borough. They are primarily relying on the carbon capture technology developments at Net Zero Teesside to achieve this goal as the majority of their

emissions come from industry. One of the representatives felt that there was an 'expertise gap' in this area at the council; although a new colleague was due to join them shortly. They added that the Council would 'definitely benefit' from learning more about Northern Powergrid's future energy scenarios to inform their thinking. They mentioned they were looking to set up a climate change task force and would be keen for Northern Powergrid to be engaged with this. **(E345)**

Effective communication and education is important because DSO was seen as a complex topic for customers to understand

- The transition from DNO to DSO was believed to demand more proactive communication of increasingly complex information, framing conversations around individual topics instead of the broad subject of DSO.

- Our three round table events on the subject of energy retailers, heat, and smart energy systems were our response to dedicate time to different areas of the DSO transition in response to stakeholder input which asked us to break DSO into component parts. All three events provided opportunity for a 'deep dive' and feedback. The energy system event had a BEIS speaker leading a discussion on the importance of open data and sharing the work of the Energy Data Task Force. This was seen as a growing area of interest with stakeholders that needed incorporating in our plans. **(E321, E322, E323)**

Stakeholders supported our future role and our DSO vision

- Stakeholders supported our vision for becoming DSO and believed we could be well-placed to act as the neutral and trusted facilitator to optimise the energy system.

- 84 per cent of delegates agreed with our draft guiding principles, but some consensus emerged on the need to add some proposition around impartiality and transparency. Other feedback included: **(E352)**

    - In order to help flexibility providers in their investment decisions, any clarity on order of prices and expected timeframes is appreciated. Similarly extra visibility of flexibility needs in future years, as well as decision drivers and the methodology used are welcome.

    - There is a preference to deal with the network operator over a platform.

    - At this point in the market development a number of flexibility providers have a preference for fixed price procurement over auctions.

    - Delegates were reassured to hear that electricity system operator (ESO) / distribution system operator (DSO) coordination is within the current scope of industry collaboration.

    - The system should be designed for automation. Consumers will incur unnecessary costs should every action be taken through a notification prompt. The onus may be on the Distribution Network Operator (DNO) to educate the industry that this is the preferred approach.

    - Stakeholders were unanimous in asking for long-term visibility on flexibility needs.

    - There was a desire to clarify the potential for the actions of an Active Network Management (ANM) scheme working against the provision of an ESO balancing service.

    - ANM customers find it useful to be provided with a nonbinding curtailment forecast (as we currently do as part of the connection offer).

    - It is worth considering the question of cost distribution when it comes to ANM (i.e. should the cost be socialised across the wider customer base, thereby benefiting large connection customers?).

- There was a lot of interest in DSO making data available **(E352)**

  - There is a large appetite from our stakeholders for more network data (mapping, capacity, losses, power flows, frequency and voltage, down at the LV level). This is driven by the desire for better whole system planning (at local authority level), more transparency (quality of supply), and the appeal of potential revenue sources (flexibility).

  - The vision described is one where the DSO provides the data, a basic description, and usage guidelines, and then takes a step back (does not get involved in prescribing various usages), but instead lets creativity and innovation take place – Transport for London was quoted as an example.

  - Big data introduces the challenge of the requirement for a new type of skillset in our organisation; and
— Standardisation and common taxonomy should be a focus.

- Stakeholders wanted to know if the DSO function could be opened up to competition and, secondly, how can we as a DSO ensure neutrality, and who is the arbiter/guardian of that. **(E352).**

- The future development of the Flexible Power platform was discussed and common format for sharing network constraint data. The participants felt there was scope for collaboration with the ESO and for more DNOs to join the platform in the future. **(E155)**

- There was a common interest to continue ongoing conversation on North East LEP's Energy Strategy, community energy and DSO among other topics. **(E337)**

- The need to increase visibility and time period between visibility and procurement of flexibility was identified. **(E157)**

- Heavy emphasis was put on the requirement for flexibility to feature in 2023-2028 business plans. At present, ESO was not convinced DNOs are taking it seriously enough. **(E156)**

- At the Distributed Generation (DG) owner operator forum, we were asked 'are you starting to learn from smart grid enablers yet?' **(E194)**

  - using data and smart-grid solutions to make the right decisions and staying on top of advancing technology will drive the best results;

  - gathering data is top priority; and

  - smart charging has potential to alleviate load on the grid and free up capacity.

Innovation will be key for delivering decarbonisation within the agreed timeframes

Innovation continued to be a key area of stakeholder interest. Innovators wanted to work closely with us, be part of the network innovation projects and to test their proposed solutions.

- Stakeholder feedback from our consultative event was: **(E352)**

  - The governance process of Northern Powergrid's innovation portfolio, specifically around investment decisions, is not well known by some of our stakeholders;

  - DNOs need to consider the implications of industrial heat decarbonisation in addition to domestic heat; and

  - Digital transformation offers a large potential to the development of flexibility platforms and of energy management.

- At the climate change adaption emerging thinking session, stakeholders said they would like to see broader proposals that consider climate challenges other than flooding, and also that utilise natural solutions to climate change adaption, such as the use of vegetation to protect against flooding. **(E017)**

- A technical solution was identified for potentially improving resilience of less well served areas of electricity network, leading to idea for the microresilience network innovation project. **(E351)**

- Conversations with an interested community energy customer identified an opportunity for energy efficiency through voltage reduction, using smart meters. Using smart meter voltage information as part of our HV voltage control algorithms has the potential to reduce customers' energy consumption, and therefore their collective bills by tens of millions of pounds per annum. This has led to our Boston Spa Energy Efficiency Trial (BEET) and the CVP around voltage optimisation for energy efficiency. **(E335)**

- BEIS Regional Energy Hub stakeholders were interested in the use of battery/diesel generators - in the context of North East Energy Catalyst partnership's Energy Innovation Challenge Programme. **(E112)**

- OLEV were interested in EV uptake impacts on networks and the accuracy of AutoDesign quotes. **(E347)**

Collaboration was recognised as a critical enabler for achieving net zero

We continuously heard there was appetite for us to do more beyond traditional investment planning and to demonstrate a more joined-up approach across the industries. Stakeholders urged collaboration with manufacturers of smart products, EVs and autonomous vehicles to ensure design of their products is inclusive and conducive to future needs of customers.

- A high number of participants had registered for our EV workshop, identifying a keen interest in this a very topical subject. **(E336)**

- One participant said they had heard a lot before and weren't very impressed by the level of ambition shown in EVs. They thought the information on balancing demand was useful. **(E079)**

- Participants talked about how EVs means that your fuel station is at home. This alters what users need for charging when away from home in terms of fast charging and slow charging provisions. There asked if there have been discussions around increasing car hubs and share points and proactive discussions about getting people out of cars and into public transport? **(E079)**

- Stakeholders believed that **(E352)**:

    - The function to optimise the whole energy system is an essential one, but a vacant one for now. In the conversation, DNOs emerged as a trusted, neutral party that could act as a catalyst in that space;

    - New value propositions around local energy are very much in the emerging phase, and it will take clearer economic incentives for new ones to come to market;

    - Technology and automation can be a solution to drive customer engagement (otherwise low because of apathy or low-price signals), but still requires an initial buy-in from the customer; and

    - Stakeholders of local energy are varied including: housing developers, local authorities, community energy, social housing providers, energy retail companies, etc.

- Newcastle City Council was keen to explore ways we could share data more actively and in real time. There is a significant amount of modelling and spatial analysis undertaken by Newcastle, and we identified some immediate areas for collaboration or data sharing. **(E134)**

- At our 'Creating a sustainable energy future for the North' stakeholder summit, there was a desire among participants for collaboration and utilising a systems approach to make the most of the available opportunities and overcome barriers specific to the region. **(E202)**

- Participants wanted to build and maintain awareness of the different needs of customers in urban and more rural areas. **(E202)**

- A stakeholder at the DFES workshop talked of the importance of Northern Powergrid getting input from all local and planning authorities. Universities can be a good collaborative starting point too. **(E208)**

- Network (electricity and gas) representatives agreed that the definition of a Local Area Energy Plan (LAEP) was still unclear and raises more questions than answers. It is too late for LAEP to inform the next (2023-28 period), but we can start the conversation/collaboration now (and many of us already have) and there would need to be enough flexibility in the price control framework for it to continue and be adaptable to any further policy changes. **(E115)**

- Newcastle City Council believed that local area energy planning (LAEP) was an evolving discipline and has not been fully developed. **(E118)**

- We later heard that Newcastle was targeting net zero emissions by 2030. Coupled with that, the significant modelling and analysis capabilities at the council, referenced before, led us to conclude that Newcastle might be emerging as a likely candidate for LAEP development: **(E122)**

    - It was evident that there is political will and interest, as well as capacity, to target net zero emissions by 2030.

    - The council was developing a decarbonisation action plan to be signed off in September. Critically, the timelines for their action plan are aligned with our business plan – both aiming for completion in Q4 2020.

    - They were developing (in-house) modelling of the emissions' impact of a number of potential initiatives/projects to reach the 2030 target.

    - Newcastle was one of the Energy System's Catapult's LAEP trial areas – they have good foundations and database for this work already. With more data available (our DFES and NGN's work on hydrogen) they thought it was now more achievable; NCC have already indicated they would want to see more granular, feeder-level, data to facilitate LAEP.

    - They are keen to collaborate with NGN and us, however, more inclined to rely on solutions that use electrification to decarbonise heat and transport due to the 2030 timeline and as hydrogen was yet unproven.

    - NCC were also looking to develop a net zero website/online information tool for residents, which could include signposting to the installers, the DNO, among others.

- NCC's decarbonisation ambitions were further supported by a BEIS-funded heat pump (HP) trial, which is installing a mix of 250 air-source, ground-source, and hybrid HPs in properties on the gas grid (lead by E.ON) in the following 6 months. We agreed to continue working conversations to find a way that all sides can collaborate to ensure a smoother customer journey. Northern Powergrid also believed this project could generate an added benefit of improving our processes for connecting significant volumes of low carbon technologies in a short period of time, which is relevant for increasing future uptake volumes. **(E122)**

- NGN believed LAs should benefit from some tools and data to support their net zero planning. **(E342)**

- WYCA sees itself as coordinating and scrutinising the planning approaches to ensure their region achieves its decarbonisation target. A representative shared a schematic drawing on how the interaction between CAs, LAs, Northern Powergrid and others might look like to enable energy planning. (**E343**)

- Sheffield Council said that they are keen to learn from other councils. Local authorities wanting to learn from best practice is a point that has come up on a number of calls recently. **(E346)**
- LAEPs were mentioned on the webinar as an area of interest for Community Energy England. **(E348)**
- Greater Lincolnshire LEP was keen to explore LAEP concept further and revisit their devolution asks. **(E350)**

WAVE 2 – testing our emerging thinking with costed levels of ambition

Wave 2 of our engagement was used to testing options generated through wave 1 – gauging levels of customer ambition and defining our outcomes. Engagement was carried out with domestic customers, partners, commercial customers, SMEs, local interest groups, regional politics, central government, internal stakeholders, corporate interest groups, utilities, and future energy consumers.

Our wave 2 engagement follows the publication of the emerging thinking documents in August and September 2020, where priorities identified from wave 1 developed into a series of costed options, tested with customers and stakeholders to gather their preferences. We presented five different service levels (A-E) for decarbonisation, asking stakeholders to select their preferred ambition level.

A significant majority of customers supported Northern Powergrid pursuing an accelerated decarbonisation pathway, reaching net zero by 2050 at the latest. However, stakeholders' ambitions were somewhat tempered by the need to balance the pace of decarbonisation with the associated bill impact and the need for the net zero transition to be fair.

- We asked our stakeholders four key questions to determine our actions to support decarbonisation:
  - How fast?
  - How local?
  - How electric?
  - How flexible?
- Our stakeholder feedback has been grouped by theme. The service level preferences and voting results following publication of our emerging thinking in August/September 2020 have been summarised in:
- Ambition and priorities – service levels
- In addition to voting results, we received rich stakeholder feedback on the following topics:
  - Ambition and priorities – local feedback
  - Awareness raising and leadership in net zero transition
  - Balancing the use of flexibility with network investment
  - The need for a fair transition – balancing the costs and the speed of decarbonisation
  - The emerging concept of Local Area Energy Plans
  - Collaboration and innovation is needed to achieve the net zero target
  - In total, we ran >75 events, engaging >10,700 stakeholders in wave 2.

The 77 events where net zero was a specific sub-topic are listed below:

Engagement reference	Name	Subgroup	Engagement type	Date	No engaged
E319	Willingness to pay – focus groups	Consumers (Domestic, SME, Vulnerable & Future)	Focus groups	06/2020	64
E308	Conversations with a train manufacturer and a power supply solutions' provider	Corporate Interest groups	Meeting	08/2020	5
E320	Willingness to Pay – Quantitative Survey	Consumers (Domestic and SME consumers)	Survey	08/2020	714
E309	Department for Transport workshops	Central government	External event – workshop	04/08/20	10*
E311	Zero Carbon Yorkshire webinar	Local interest groups	External event – webinar	11/08/20	20*
E123	Engagement with Community Energy England on Local Area Energy Plans	Future energy stakeholders	Telephone Call	18/08/20	1
E124	Engagement with York and North Yorkshire East Riding Local Enterprise Partnership	Regional politics	Meeting	19/08/20	1
E036	Findings from interviews with rural consumers	Consumers	Interviews	20/08/20	39
E125	Engagement with Newcastle City Council – continued	Regional politics	Meeting	20/08/20	3
E312	Sheffield City Region LEP	Regional Politics	Meeting	21/08/20	1
E126	Meeting with BEIS to discuss heat decarbonisation policy	Central government	Meeting	26/08/20	6
E024	2023-2028 connections engagement - Headline results	Connections customers	Various	01/09/20	65
E109	Technical panel - Climate Change Adaption	Future energy stakeholders	Panel	01/09/20	6
E047	2023-2028 Regional Political Engagement – September	Regional politics	Online Meetings	09/2020	35
E136	Community Energy Forum	Future energy stakeholders	Forum	03/09/20	47
E189	Emerging Thinking - internal feedback	Internal Stakeholders	Survey	07/09/20	194
E010	SME Panel, meeting 4	Consumers	Panel	10/09/20	20
E086	DG Owner Operator forum	Various	Forum	24/09/20	19
E127	Engagement with Newcastle City Council – continued	Regional politics	Meeting	24/09/20	3
E013	Northumberland, Tyne and Wear Net Zero Leaders Forum	Various	Forum	25/09/20	21
E188	Bilateral meeting with an automotive producer	Corporate interest groups	Meeting	25/09/20	4
E313	National Grid ESO	Utilities	Meeting	28/09/20	3
E002	Interviews with rural consumers	Consumers	Interviews	28/09/20	34
E019	Net Zero: Exploring pathways for Decarbonisation	Various	Deliberative roundtable	29/09/20	29
E128	Meeting with National Grid	Utilities	Meeting	30/09/20	1

Engagement reference	Name	Subgroup	Engagement type	Date	No engaged
E314	Conversations and meetings with National Farmers Union, EA Technology and University of Leeds	Various stakeholders	Meeting	10/2020	8
E129	Meeting with City of York Council (part of 2023-2028 political engagement programme)	Regional politics	Meeting	01/10/20	4
E046	2023-2028 Regional Political Engagement – October	Regional politics	Meetings	10/2020	74
E015	Teesside Net Zero Leaders Forum	Various	Forum	02/10/20	15
E012	North Yorkshire Net Zero Leaders Forum	Various	Forum	09/10/20	13
E016	West Yorkshire Net Zero Leaders Forum	Various	Forum	13/10/20	8
E011	Humber Net Zero Leaders Forum	Various	Forum	16/10/20	24
E331	Emerging Thinking: Net Zero part 2	Various	Deliberative roundtable	16/10/20	34
E088	Local Authority Forum - Focus on local area planning	Regional Politics	Forum	21/10/20	23
E014	South Yorkshire and Northern Lincolnshire Net Zero Leaders Forum	Various	Forum	23/10/20	7
E005	Consumer panels (both Leeds and Newcastle)	Consumers	Panel	26/10/20	48
E207	'Have your say' Customer Survey	Consumers	Survey	28/10/20	9179
E152	Emerging Thinking microsite other voters	Consumers	Microsite	30/10/20	60
E315	Conversations with Delta-EE, TNEI and SGS	Various	Meeting	11/2020	2
E050	Emerging Thinking consultation	Consumers	Survey	01/11/20	1147
E045	2023-2028 Regional Political Engagement – November	Regional politics	Meetings	11/2020	12
E130	ENA/BEIS - Heat and Buildings Strategy Roundtable	Central government	External event – roundtable	02/11/20	66
E316	Meeting with a hydrogen producer, Northern Gas Networks, and others	Various	Meeting	05/11/ 20	6
E131	Call with the North East, Yorkshire and Humber BEIS Regional Energy Hub	Regional politics	Meeting	05/11/20	4
E132	Community Energy Stakeholder Panel	Future energy stakeholders	Panel	06/11/20	10
E133	Meeting with City of York Council on LAEPs	Regional politics	Meeting	06/11/20	6
E134	Meeting with Newcastle City Council - follow-up	Regional politics	Meeting	06/11/20	2
E004	Consumer panels (both Leeds and Newcastle)	Consumers	Panel	11/11/2020	52

Engagement reference	Name	Subgroup	Engagement type	Date	No engaged
E135	Engagement with York and North Yorkshire Local Enterprise Partnership - continued; report also includes the findings from the workshop LEP held on 23 November	Regional politics	Meeting	19/11/20	78
E136	Community Energy Forum	Future energy stakeholders	Forum	19/11/20	47
E055	Future customer insights report - University students	Consumers	Focus groups	25/11/20	21
E137	Meeting with City of York Council on LAEPs – continued	Regional politics	Meeting	01/12/20	10
E139	Meeting requested by with a housing association to discuss strategic priorities	Consumers	Meeting	01/12/20	1
E310	2023-2028 Regional Political Engagement Report December	Regional politics	Meetings	12/2020	14
E056	Future customer insights report – secondary school students	Consumers	Survey	12/2020	157
E054	Future customer insights report – college students	Consumers	Survey	12/2020	288
E210	Digitally-excluded – research with Green Doctors	Consumers	Survey	12/2020	63
E317	DG Owner Operator Forum	Various	Forum	03/12/20	24
E138	Community Energy Stakeholder Panel	Future energy stakeholders	Panel	04/12/20	7
E318	Transport provider bilateral	Corporate interest groups	Meeting	07/12/20	1
E200	Stakeholder Panel - end of year event	Various	Panel	11/12/20	13
E020	A force for good – Creating holistic sustainability strategies for the North	Various	Deliberative roundtable	22/12/20	24
E153	Emerging Thinking SME voters	Consumers	Microsite	24/12/20	12
E154	Emerging Thinking – rural panel	Consumers	Microsite	24/12/20	19
E217	Durham Energy Institute	Future energy stakeholders	Meeting	18/01/21	4
E218	Community Energy group	Future energy stakeholders	Meeting	19/01/21	1
E222	Meeting with City of York Council, Northern Gas Networks and Yorkshire Water on LAEPs	Various	Meeting	21/01/21	11
E227	Innovative energy supplier	Utilities	Meeting	21/01/21	1
E262	Northern Powergrid Local Authority Forum: Collaborating for a local green recovery	Regional politics	Meeting	21/01/21	20

Engagement reference	Name	Subgroup	Engagement type	Date	No engaged
E270	2023-2028 Regional Political Engagement – January 2021	Regional politics	Meetings	01/21	8
E307	Meetings with Newcastle University and NGN to discuss decarbonisation in Winlaton - several meetings	Various	Meeting	01/21	6
E306	Meeting with a smart meter company	Utilities	Meeting	22/01/21	5
E263	IDNO Connections Forum	Utilities	Forum	26/01/21	4
E265	Northern Powergrid Stakeholder Summit - Net Zero Energy Future for the North	Various	Conference	28/01/21	140
E278	Community Energy England and Ofgem Information Sharing Event - Significant Charging Review	Various	External event – webinar	28/01/21	50*
E223	Transport for the North and northern DNO meeting	Regional politics	Meeting	29/01/21	6
E276	EV and heat workshop	Future Energy stakeholders	Workshop	29/01/21	12

*A best estimate of number of people engaged where this information was not recorded

Ambition and priorities – service levels

We offered the following five service level options for our stakeholders to choose from to select their preferred ambition level:

- Option A: Not on-track for net zero emissions by 2050, with -£0.06 bill impact per year.
- Option B: Not on-track for net zero emissions by 2050, with £0.00 bill impact per year.
- Option C: On track to reach net zero by 2050, with +£1.81 bill impact per year.
- Option D: On track to reach net zero by 2050 or earlier, with +£2.25 bill impact per year.
- Option E: On track to reach net zero by 2050 or earlier, with +£4.29 bill impact per year.

Overall, 78 per cent of our customers supported level C – 'major upgrade' to E – 'a new world'. 88 per cent of respondents in the 'have your say' survey believed we should seek to meet governmental standards and achieve net zero before 2050. A small number of stakeholders suggested there should be an even more ambitious level than E.

- At consumer panels in Leeds and Newcastle **(E004)**, participants were asked about the level of ambition with which they thought Northern Powergrid should pursue Net Zero and the resulting impact on their bill. Survey and panel participants were presented with five different service level options:
    - In Leeds voting was as follows:

      A – 0 per cent (0), B – 0 per cent (0), C – 28 per cent (8), D – 17 per cent (5), E – 55 per cent (16)
    - In Newcastle voting was as follows:

      A – 0 per cent (0), B – 0 per cent (0), C – 53 per cent (10), D – 42 per cent (8), E – 5 per cent (1)
- The majority of consumers in Leeds selected option E (On track to reach net zero by 2050 or earlier) with many explaining the urgency of climate change and the need to decarbonise quickly as their reasoning. In the Zoom

sessions, consumers questioned the efficacy of being as ambitious as possible in this area when reaching net zero is a nationwide target and is partially reliant on other industries and businesses getting on board, for it to be successful. **(E004)**

- In Newcastle, participants were more inclined to select option C (On track to reach net zero by 2050) and option D (On track to reach net zero by 2050 or earlier). Participants who chose option C felt that aiming to reach net zero five years earlier is not worth the additional cost but that this option would be a good step in the right direction. In the discussions, consumers who chose option D said that it was the right level of ambition where options A, B and C were akin to 'standing still' and option E was too ambitious. **(E004)**

    - Domestic and business customers were asked to choose their preferred service level option for decarbonisation in the emerging thinking consultation on net zero. **(E050)**

    - Among the 1050 domestic customers surveyed, options C-E received similar support. 107 participants did not choose any of the options and selected the response "I don't know". The voting results were are as follows: A – 6 per cent (65), B –16 per cent (171), C – 26 per cent (277), D – 18 per cent (188), E – 23 per cent (242). **(E050)**

    - Among the 91 SME participants surveyed, three did not choose any of the options and selected the response "I don't know". The voting results were as follows: A – 11 per cent (10), B –22 per cent (20), C – 22 per cent (20), D – 16 per cent (15), E – 25 per cent (23). **(E050).**

    - Of the six vulnerable representatives who saw the decarbonisation/net zero plan area, one chose service level option A, one opted for option B, and four preferred option C. The representatives who preferred Option Commented that this was the most balanced option, allowing Northern Powergrid to reach the 2050 target without being too much of a burden on financially vulnerable people. One representative wanted to see further investment in this area, but only if Northern Powergrid absorbed the costs of this rather than customers. The voting results were as follows: A – 17 per cent (1), B –17 per cent (1), C – 67 per cent (4), D – 0 per cent (0), E – 0 per cent (0). **(E050)**

- Domestic customers were more likely to choose service level option C, with just over a quarter (26 per cent) selecting this, whilst business respondents most commonly chose the most ambitious option E, with a quarter (25 per cent) selecting this. However, a similar proportion (23 per cent) of domestic customers chose option E and just over one in five (22 per cent) business customers selected option B and the same proportion (22per cent) preferred option C. **(E050)**

- Within the domestic sample, the following groups were significantly more likely to choose option E:

    - The older age brackets of 45-64 (24 per cent) and 65+ (29 per cent) compared to those aged 18-29 (16 per cent). This could be attributed to increased uncertainty currently with regards to the job market and income, as COVID-19 has disproportionately affected the younger age bracket.

    - Those aged 18-29 (62 per cent) were significantly more likely to be concerned about their personal finances compared to those aged 45-64 (51per cent) and 65+ (18 per cent).

    - Men (27 per cent) compared to women (20 per cent).

    - Respondents who said they either never struggle to pay their household bills (25 per cent) or struggle only sometimes (22 per cent) compared to financially vulnerable customers who always struggle (6 per cent).

    - Respondents who were concerned about climate change (26 per cent) compared to those who were neither concerned nor unconcerned (16 per cent) and those unconcerned (13per cent).

    - Respondents who were concerned about the impact of COVID-19 on the UK economy (24 per cent) compared to those who were neither concerned nor unconcerned (15 per cent).

    - Respondents who were concerned about the impact of COVID-19 on their region (25 per cent) compared to those who were neither concerned not unconcerned (13 per cent).

- The small minority of domestic customers who chose option A did so due to the reduced bill impact associated with this service level, often referring to their utility bills being high enough already and expressing concern for those in fuel poverty. Business respondents who chose option A most commonly referred to the lower bill impact or, more generally, felt that this was the best option. A couple of respondents did not value investment in this area they felt it was a waste of money, especially as other countries are much higher polluters **(E050).**

- Domestic respondents who preferred option B were similarly focused on the impact on their bills, preferring this service level due to the zero cost associated with it. With regards to the 2050 Net Zero target not being met, some respondents were simply not concerned by this whilst others would have liked to choose one of the more ambitious options, but felt they were unaffordable. Finally, some respondents commented that it was not the customer's responsibility to fund investment in this area but rather the governments. A handful felt that the money should come out of Northern Powergrid's profits. Business respondents who preferred option B primarily wanted to see their bills remain the same, especially in the context of a potential recession impacting incomes. **(E050)**

- Domestic respondents who chose option C primarily referred generally to 'improvements' in this area or, more specifically, achieving the 2050 net zero target being worth the additional cost. The more ambitious options D and E were felt to be too expensive, so option C offered the best compromise. Another important theme to unpick would be the feeling amongst some respondents that high or even moderate levels of customer flexibility are not realistic. Thus, option C assuming low levels of flexibility was preferred. Business respondents who selected option C felt it was important that the 2050 net zero target was achieved and generally agreed that option C was the best, most cost-effective way of achieving this. **(E050)**

- Domestic respondents who opted for service level option D valued investment in achieving net zero earlier by 2045, and felt that the cost associated with this was acceptable or good value for money. Business respondents who chose option D were largely quite general in their responses, referring to this service level as being the most reasonable, efficient offer. A couple of respondents felt it was urgent to invest in bringing the net zero date forward and, similar to the domestic sample, some comments were made that high customer flexibility was not realistic. **(E050)**

- As with option D, some domestic respondents found the more ambitious option E appealing but were deterred by the assumption around high levels of customer flexibility, preferring the security of more network reinforcement. Respondents who chose the most ambitious option E generally ascribed to the view that this is a 'climate emergency' and investment should be made to achieve net zero as quickly as possible. Considering the benefits, namely protecting the environment, and ensuring future generations can enjoy it, respondents generally felt the cost was worth it. Aligned with the views of the domestic sample, business respondents who opted for the most ambitious Option E stressed the urgency of investing now for the good of the planet and environment. They valued investment to bring forward the net zero date further. **(E050)**

- In the emerging thinking rural panel survey with 19 participants, where votes were cast through the microsite, options C-E received similar support. The voting results were as follows: A – 5 per cent (1), B – 5 per cent (1), C – 15 per cent (3), D – 47 per cent (9), E – 26 per cent (5). **(E154)**

- SME respondents were shown service level options A-E for decarbonisation, outlined in customer-friendly language. Following an opportunity to ask clarification questions, participants were asked which service level they wanted to see Northern Powergrid commit to in their business plan for 2023-2028. A: 0 (0 per cent); B: 0 (0 per cent); C: 3 (18 per cent); D: 5 (29 per cent); E: 4 (24 per cent); I don't know: 5 (29 per cent). **(E010)**

- As part of the regional political engagement meetings, we asked about the level of ambition Northern Powergrid should pursue with decarbonisation. Across the meetings taking place in October **(E046)** and November **(E045)** the vast majority of respondents consistently opted for either option E (18/34) or D (12/34), although it should be factored in that the participants are likely to naturally be more in favour of decarbonising faster given that they had chosen to attend the event**.** Across the meetings taking place in September, 1/13 voted B, 1/13 voted

C, 4/13 voted D, and 7/13 voted E **(E047).** The final results were: A – 0 per cent (0), B – 2 per cent (1), C – 11 per cent (5), D – 34 per cent (16), E – 53 per cent (25).

- In the emerging thinking microsite survey with 12 SME participants, options C-E received similar support. The voting results were as follows: A – 0 per cent (0), B – 8 per cent (1), C – 33 per cent (4), D – 25 per cent (3), E – 33 per cent (4). **(E153)**

- In emerging thinking microsite survey with 60 other participants, options C-E received similar support. The voting results were as follows: A – 5 per cent (3), B – 3.33 per cent (2), C –23.3 per cent (14), D – 18.3 per cent (11), E – 50 per cent (30). **(E152)**

- The community energy panel would like to see Northern Powergrid to be ambitious on decarbonisation with majority opting for option E – our most ambitious scenario. **(E138)**

- The future customer insights report on university students showed that students think that the region should achieve net zero as soon as possible or by 2050 at the latest. **(E055)**

- College students believed that the net zero 2050 target date was either just right (36 per cent) or a bit too slow (32 per cent). **(E054)**

- Majority of secondary school students felt that the net zero 2050 target date was just right (43per cent) or bit too slow (35.7 per cent). **(E056)**

- In a 'have your say' customer survey, we asked participants 'Do you think this region should seek to meet the UK government's legally-binding target to achieve net zero greenhouse gas emissions before 2050?' 87.59per cent (8,009) responded 'Yes' and 12.41 per cent (1,135) voted 'No'. **(E207)**

- We also asked participants if they thought we should invest more money to enable faster decarbonisation or prioritise affordability and fairness in 2023-28. 23.41 per cent (2,134) respondents thought we should enable faster decarbonisation and 76.59per cent (6,980) respondents voted for prioritising affordability and fairness in 2023-28, doing what we need to keep pace with decarbonisation by 2050 while keeping costs for customers as low as possible. **(E207)**

- In the internal survey, 87 per cent of our colleagues wanted the Northern Powergrid region to the government net zero target before 2050; 64per cent want to prioritise affordability and fairness (keeping customer costs as low as possible) over investing more money and hence higher bills, to decarbonise faster; 62 per cent believed Northern Powergrid should lead where the transition to net zero is slower. **(E189)**

- At our emerging thinking net zero part *2* roundtable, stakeholders wanted to see ambitious targets from Northern Powergrid regarding pathways to net zero and decarbonisation, with most stakeholders in favour of service levels D or E. Of the 28 stakeholders who shared their preference, 7per cent were in favour of option C, 14 per cent were in favour of option D and 79 per cent were in favour of option E. **(E331)**

- A few stakeholders commented that ambitious targets are necessary and that the proposed maximum increase in customer bills is relatively low. There was suggestion that seeing the accelerating effects of climate change may motivate customers to pay more for ambitious decarbonisation proposals, potentially beyond those detailed in service level E. Comments relating to the stakeholders service level preferences included: **(E331)**

    - Suggestions that there is a need to aim the highest level, with the understanding that if challenges or restrictions limit what can ultimately be achieved, then level D would still be a good outcome.

    - Comment that the success of the renewable energy sector was down to ambitious targets, and that decarbonisation proposals should therefore take the same approach;

    - Concern that level E may require a large amount of flexibility from customers, particularly EV users; and

- Comment that the amount that can be achieved will largely depend on Ofgem's response to investment proposals.

Ambition and priorities – local feedback

- On a call with the BEIS Regional Hub, West Yorkshire combined authority (CA) said their modelling results (reaching net zero by 2038 in West Yorkshire and by 2034 in North Yorkshire) highlight a gap and show differences to Northern Powergrid's DFES/emerging thinking scenarios - Northern Powergrid's projections are lower and reach net zero between 2040 - 2050. **(E131)**

- Participants agreed that local and central electricity generation would provide most benefit. **(E010)**

- One stakeholder at the North Yorkshire net zero leaders forum commented on the speed of the transition to net zero, noting that Newcastle City Council has a net zero target of 2030 whilst all the public sector organisations have a target around 2040. They referred to the emerging thinking document in saying that Northern Powergrid are working towards net zero by 2050 and questioned whether Northern Powergrid were subsequently considering the fact that by 2030 they would need to be at least 50per cent of the way there and that by 2040, they should be 80 – 90 per cent of the way there. **(E013)**

- During the 2023-2028 regional political engagement series, the Northumberland County Council said they have a net zero by 2030 target and are very committed to achieving this. They had carried out detailed modelling to support this. **(E310)**

- Similarly, in our meeting with Gateshead Council in the same series as above, they said they did not think Northern Powergrid's costs were much in the context of overall energy bills. Gateshead has set a net zero target of 2030. **(E310)**

- Bradford is aligned with WYCA targets and WYCA's carbon pathways report, expected in Q1 of 2021, which will give the best guidance for what Bradford's decarbonisation response will be. A councillor said that the main thing that is slightly different for Bradford to other LAs is that they are coming from a sustainability angle rather than purely emissions reduction. Bradford is trying to develop a district heating network with private wire. Like Gateshead, they raised concerns about the cost of connection for this and said that charges are a barrier for district heating. A councillor also raised concerns about connection costs more widely. For example, the Council have the budget for a large solar farm but this will require a large connection. Additionally, they highlighted the costs of installing large voltage chargers for an electric bus network and that LAs are having to bear these upfront. They asked if there was a way they could be socialised. They are looking at transitioning to heat pumps where possible within the Council's own estate and have a target of raising all properties in the district to EPC C – this will see 'quite a big switch' to electric heating but they said they are still currently in the planning stages of this. **(E310)**

- Hull City Council supported level E for decarbonisation and thought that the additional £4.29 (on the bill pa) seemed reasonable. Hull has set a decarbonisation target for 2030. The Council has employed The Carbon Trust to develop a pathway for Hull to reach this and two additional pathways for Hull and East Riding to reach net zero by 2040. There are a number of regeneration and development projects planned or being considered, including a new cruise terminal, EV infrastructure and charging hubs, using car parks as urban solar farms and energy storage opportunities and a district heating network. There is also a seven-year upgrade project for the A63 which runs through the centre of the city. **(E310)**

- During engagement with York and North Yorkshire Local Enterprise Partnership, Tyndall centre's analysis of carbon budgets suggests that Northern Powergrid's scenarios are likely not in line with the Paris Climate Change Agreement (as the LEP highlighted during the meeting on 2 November 2020). There was also an appetite to collaborate on a pan-northern level to carry out EV uptake planning collaboratively to include all modes of travel and take holistic approach, being linked with rail and enabling more efficient procurement activities. **(E135)**

- Participants at consumer panels who supported an ambitious approach to decarbonisation (i.e. aiming to reach net zero before 2050) felt that this would provide a 5 - 10 year 'buffer' should Northern Powergrid encounter difficulties in implementing its decarbonisation strategy. However, some participants argued that there was

little benefit in Northern Powergrid's region being significantly more ambitious in its decarbonisation targets than the rest of the country. **(E004)**

- Participants in Newcastle were divided about the appropriate level of ambition for regional decarbonisation. While some argued for more ambitious approaches that would provide buffers before the 2050 national target, others felt that such approaches were not realistic and that there was no need for the region to exceed the national target. Overall, Newcastle participants also expressed more concern about costs than those in Leeds. **(E004)**

- At a meeting with the Newcastle City Council, it was discussed that they are looking to trial a Virtual Power Plant (VPP) in a selected ward – developing the project over the next 6-8 months, and think a LAEP could be developed for the same area as the VPP proposal and act as a trial and a precursor for a wider area plan. Also, NCC's Decarbonisation Action Plan has now been approved and the action list includes components required to come up with a LAEP. **(E127)**

- Some SME respondents at our fourth SME Panel suggested that the 2050 date was arbitrary and ascribed to the view that we are in a climate emergency and need to aim for net zero as soon as possible. Generally, respondents favoured investing more money sooner, to enable a faster transition to net zero. **(E010)**

- Some SMEs in the North East felt the North East region could (and should) aim to reach net zero faster than other regions courtesy of the region's high levels of innovation and 'give it a go' mindset as well as the geography, price of land and relatively small population. However, others wanted to see national standardisation, referencing the difficulties associated with recycling policies being different across the country and expressing concern that if they were, for example, travelling with an EV, they would hope that other regions would have charge points widely. **(E010)**

- One participant at the Humber net zero leaders forum expressed the view from an earlier net zero session that Northern Powergrid should be going beyond option E and being more ambitious in this area. They further referred to his experience in 2008 of helping develop a plan for decarbonising the Humber region through high level power and steam sharing on the bank. They stated that one of the biggest obstacles they faced, beyond the political and technical constraints, was a lack of commitment from Northern Powergrid to facilitate the plan because they claimed that the Grimsby circuit was not suited to sharing or export. Without specific commitments from companies wanting to move on to the area, it was a 'catch 22' situation. **(E011)**

- There is strong ambition for decarbonisation amongst stakeholders including LAs in North Yorkshire with, for example, a net zero target of 2034 for the LEP and ambition to be net negative by the 2040s. Ambition was noted by representatives of the City of York, which has had a longstanding commitment to carbon reduction since 2008, and a number of developments in progress such as electric Park & Ride fleet and possibility of a clean air zone. **(E012)**

- At the South Yorkshire and Northern Lincolnshire net zero leaders forum, one participant asked whether, in light of the industrial decarbonisation strategy being published in spring 2021, Northern Powergrid should be given a delay in submitting their business plans as their plans will be determined by economics and policy decisions contained within this strategy. They felt that until those policies were announced, Northern Powergrid could not be expected to give a concrete position on their strategy. They further referred to the CCC sixth carbon budget, due to be published in December 2020. **(E013)**

- There is appetite for decarbonisation in Northumberland and Tyne & Wear. For example, Northumberland County Council and Newcastle City Council have net zero targets of 2030 and other public sector organisations have a target of about 2040. Northumberland National Park has already met and gone beyond net zero, offsetting emissions of nearby cities. However, there were concerns raised by stakeholders about the diversity of this region, and thus the need for an agile approach to decarbonisation with support for vulnerable and rural/off-grid communities. **(E013)**

- Across South Yorkshire and Northern Lincolnshire, there are varying degrees of ambition for decarbonisation in the region, with net zero targets ranging from 2030 (Sheffield) to 2050 (Lincolnshire) and electrification ambition amongst big industry players like British Glass. **(E014)**

- Despite uncertainty around potential uptake of low carbon technologies like EVs, participants agreed that increased electrification to support the net zero transition was inevitable and, as such, there is strong regional support for investment ahead of need to future-proof the network. **(E014)**

- There is strong ambition for decarbonisation amongst LA stakeholders in Leeds and Wakefield. Leeds City Council, for example, declared a climate emergency in March 2019 and is working towards a net zero target of 2030. Similarly, Wakefield Council has pledged to become carbon neutral by 2030. A lack of resources is one of the core barriers in the region and this is something Northern Powergrid should keep in mind, particularly in relation to comments made by Leeds City Council that a lack of resources limits their ability to be involved in developing and delivering LAEPs. **(E016)**

- 2023-2028 Regional Political Engagement showed that political stakeholders are highly enthusiastic about Northern Powergrid's proposals and for being more ambitious. One participant said that there is 'very strong support from communities in Craven for decarbonisation. They went on to say 'be as bold as you can' on decarbonisation whilst being mindful that it is a very diverse borough with some for whom climate change will not be something they think about at all. **(E045)**

- At the Humber net zero leaders forum, Hull City Council explained that they have committed to a 2030 carbon neutral target for the city, whilst the region aspires to reach net zero by 2040. The Council want to be ahead of the curve but face significant challenges. The most significant challenge is that, as an urban authority with no rural attachment, the council's ability to generate its own energy is restricted to rooftops or to using land areas for canopy systems. Another challenge is addressing how to put in place EV infrastructure on residential streets without off-street parking. The representative was further concerned that the EV infrastructure combined with the city's ongoing regeneration programme would put pressure on an already constrained grid. Finally, they referred to the city's heat infrastructure, predicting that it would be a blend of hydrogen, electricity and district heating with the majority of the city centre likely being district heating, whilst hydrogen could become the solution for urban areas outside of the city centre. His overarching priority was balancing the need to deliver growth to the city whilst, at the same time, decarbonising. They felt it was important to understand the skill requirement for the decarbonisation process in order to ensure local colleges can produce the right people. **(E011)**

- A representative from East Riding Council commented in response that that their area was the opposite of Hull in that they are a very rural authority with no cities. In terms of their net zero target, they stated that they were currently following the government's target of 2050 but had an ongoing climate change review panel, so this date could be subject to change. They further clarified that they were signed up to the Humber 2040 carbon neutral target for industry. **(E011)**

- A representative from Engie referred to their efforts in driving developments across the UK as well as partnerships with LAs in pursuit of the net zero agenda. In the South Humber region, Engie have a development with solar storage and they are looking at other available technologies to create an energy park. They felt that this presented an interesting opportunity for them in that they could supply energy directly to local industry, as well as feed that power into the distribution network. **(E011)**

- A representative from the South Bank stated that the focus for them was the growth agenda. They referred to a lot of energy based developments which create significant opportunities for the region. For example, the council have almost 800 hectares of enterprise zone on the South Bank. They further referred to recent activity which affect the region, including: a recent announcement in North Lincolnshire by SIA, the Korean steel manufacturer; Boris Johnson extending targets for off-shore wind and Elon Musk flying into Bristol to look at his requirement for a gigafactory. They commented that Humber was also a contender for siting of a gigafactory. **(E011)**

- One participant stated that an oil refinery is massively energy intensive and highly carbon emitting, so it was important to them that they play their part in decarbonisation. They referred to huge opportunities in the Humber region; for example, a key part of lithium batteries is developed in Humber, which presents an economic opportunity but requires a huge amount of energy. They emphasised the need for everyone to be flexible, as well as the need for the grid to be resilient and able to cope with peak demand on the network.

They also wanted to see Northern Powergrid willing to think creatively in terms of solutions and work with other key organisations. **(E011)**

- A participant from the CCS commented that the CCS did not exist to set targets and drive the change, but rather to be an enabler. They referred to suppliers on the framework who provide a wide range of opportunities from feasibility studies through to implementation plans and construction, so the key is using these resources in engaging and supporting their customers (i.e. LAs) working towards net zero. They pointed out that a representative from the health sector was missing from the meeting and felt that they should be brought into the conversation around these plans for the region, referring to the NHS' own sustainability plan. Finally, they asked where things are in looking at a city-wide approach, rather than organisational. **(E011)**

- Another referred to their company's primary projects, which look at mixed asset deployment like onshore turbines and solar farm and are based rurally. Their main question was around capacity on the network which would enable them to achieve their main aim of creating microgrids for residential villages. They further referred to another programme they were looking at, which was deploying solar, onshore turbines and storage to clients across the region through access to a green bond. Again, they wanted to make sure there would be enough capacity on the grid for that generation. Finally, they referred to oil and gas dependency in home heating and asked whether the time dependent green homes grant would cause unprecedented demand and, subsequently, a supply issue for the network. **(E011)**

- A participant from Hull University had a net zero target of 2027 for the campus and felt it would be valuable to talk to Northern Powergrid about working together to achieve this. They further added that decentralised local generation and distribution was an area of research interest and, again, suggested that collaboration on that might be fruitful in future. **(E011)**

- More generally, there is an appetite for decarbonisation in the region. Hull City Council has set an aspirational net zero target of 2030; there are various companies involved in innovative, low carbon projects (e.g. blue and green hydrogen, off-shore wind); and the potential development of microgrids. **(E011)**

- At the North Yorkshire net leaders' forum, one participant said that the key priority for the region is to reach net zero by 2034 and be net negative into the 2040s. They commented that to get to where they want to there need to be a huge uplift in both electricity generation and use within the region. They also said that the vast majority of the region is rural with potential for renewables generation. They were enthused to hear that Northern Powergrid are hoping to play a more active role in encouraging community energy and flexibility. **(E012)**

- Another stakeholder commented that York had its first carbon management plan in 2008 to reduce carbon emissions so there is a longstanding commitment. They listed some key developments that are already happening in York e.g. the park and ride fleet will be electric, significant interest in a clean air zone in York and pedestrianizing the city centre. **(E012)**

- There was a clear appetite from regional stakeholders for investment ahead of need, and desire for a connections process which is flexible and supports community energy developments. **(E012)**

- At the Northumberland, Tyne and Wear regional conference, a participant commented that the way in which the energy market is configured goes against the poverty agenda and that there is such a thing as a 'poverty premium', whereby the lives of people who struggle to pay bills are consistently made more difficult: for example, pre-payment meters meaning they have to pay for the privilege of having a meter in their property; poor credit ratings meaning they get a worse deal and pay more for their power; and they often do not have an online bank account, which is another penalty. They wanted to see poverty proofing built into Northern Powergrid's plans so that financially vulnerable customers, who care about climate change and want to do their part, could benefit from net zero too. **(E013)**

- Another participant expressed concern regarding inequality and black spots of high deprivation across County Durham. A core priority for them was ensuring that vulnerable people are taken on this journey to net zero as well. They wanted reassurance that there would be an active plan in terms of how to support vulnerable communities and felt that whilst energy efficiency was a part of this, a lot of people also need fuel poverty and debt advice, and a safety net. **(E013)**

- One participant referred to the number of rural off-grid communities there are in the region and felt that ensuring no one is excluded from enjoying the benefits of net zero should be a priority. They asked how this would fit in with Northern Powergrid's aims. **(E013)**

- One participant stated that the properties in the National Park were not on the gas network so would have to go down electrification route. However, some of the electricity network cannot support the installation of low carbon technology so their challenge is exploring how they are going to improve the network so they can start installing low carbon tech. They have a net zero ambition for the National Park by 2040, which they felt was achievable due to only having 2000 residents. **(E013)**

- A participant from York University stated that the University's challenge was setting an ambitious yet achievable net zero target along with a carbon reduction plan. They have plans to refurbish a college, moving it from gas to direct electric or heat pump. The other solutions they are considering include solar panels on the roofs of buildings and additional EV charge points. They asked to what extent their potential ambitions would be constrained by the capacity of the grid as they would not want to commit to an aspirational goal that the grid could not support. **(E013)**

- One participant stated that the main focus of the North East is hydrogen, as Middlesbrough produces 66per cent of national hydrogen. They commented that they were working with a number of organisations aspiring to a net zero hydrogen region and asked whether there were discussions between Northern Powergrid and people with these aspirations for a hydrogen economy. **(E013)**

- The National Park had met and gone beyond net zero, offsetting emissions of nearby cities. Northumberland County Council's net zero target is 2030 and the resource of the National Park is the main reason for this. The participant suggested that achieving net zero was not just about the electricity, but also land management and other factors. As an organisation, the National Park Authority was lowering its carbon footprint in 2006/2007 and managed to halve their footprint between 2009 and 2014. Now they are helping the County Council with their targets. **(E013)**

- A participant from the Environment Agency said they had only recently become involved with LAEPs and that their role as an environmental regulator means they will have a greater part to play in this going forward. They wanted to see the Environment Agency being an enabler rather than a barrier to these initiatives. They are keeping in close contact with organisations like Northern Powergrid to allow things to be more streamlined. They are already starting to connect the dots and 'joining up', but communication needs to be improved. **(E013)**

- At the South Yorkshire and Northern Lincolnshire net zero leader's forum, a participant from the Sheffield City region stated that the region had declared a climate emergency in 2019 and after some modelling work was done, set a 2040 net zero target. This poses some pressure as well as potential confusion due to varied targets; for example, Rotherham has a target of 2040, whilst Sheffield borough's target is 2030 and Barnsley has committed to 2045. As a result, Sheffield City MCA has sought to become the aggregate of those targets. They also felt it was important to point out that the date is not the only thing that matters, it is also about the amount of carbon spent in that time (or rather the 'area under the curve'). For example, they have a carbon budget in South Yorkshire of 44.7 million tonnes of carbon between 2020 and 2100. **(E014)**

- Leeds City Council have also declared a climate emergency and set an ambitious target for the city to be carbon neutral by 2030. The council is leading the way in achieving this and the stakeholder referred to a report they had shared with Northern Powergrid which provided the detail. However, the target is very challenging and whilst the council is trying to enable the transition as far as possible, the stakeholder felt they could not deliver net zero by 2030 alone. **(E016)**

- The participant followed by referring to the Leeds Climate Commission, which brings together major players in the decarbonisation area and exists to understand the main barriers to decarbonisation in the region and unlock these. They clarified that the main barriers in Leeds were: policy, at both the local and national level; lack of finance (the council is looking into how to make some solutions commercially viable); and a lack of skills and capacity, which makes the delivery of programmes a challenge. For example, having the capacity to insulate all homes is a challenge. **(E016)**

- Wakefield Council stated that they were on a similar trajectory to Leeds City Council, but a step behind. They referred to their climate change action plan, due to be published in the next week [from date of event 13th October 2020], which they shared some themes from, including: low carbon estates and land assets; transitioning fleet to ULEV vehicles organisationally; renewable energy generation; introducing behaviour change into the organisation; and carbon offsetting for any residual emissions using the council's own assets and land for tree planting. **(E016)**

- The stakeholder was concerned in relation to scope 3 emissions, which they felt were difficult to quantify and often the missing element. The council outsources a lot of the work to third parties who deliver services on their behalf and the stakeholder estimated that these emissions would account for 80-90per cent of the council's overall emissions base. Therefore, they felt it was important to also look at their procurement processes, including challenging their own suppliers and negotiating better outcomes in fixed contracts. In terms of how Northern Powergrid could help, they felt that Northern Powergrid could educate customers on how to tap into incentivisation schemes. They also saw scope for Northern Powergrid to support in the 'build back better'/ green recovery through investment in bridging the skills gap and creating opportunities. **(E016)**

- One participant, who has set up a business which focuses on the needs of domestic customers with technology solutions like storage heating, wanted to understand what more Northern Powergrid could do to support communities in decarbonising, particularly disadvantaged households. They commented that when we talk about the electrification of heat, customers who already have electric heating seem to get left behind and suppliers are not interested in acting on this. They added that households with electric heating are twice as likely to be fuel poor compared to those with gas heating. **(E014)**

- Although Newcastle City Council are planning to reach net zero earlier than the legally binding net zero target by 2050, NCC fundamentally need support from the central government (specifically, price parity for low carbon transition is needed) and are planning to lobby for funding to support pilot projects/trials, e.g. zero-emissions city centre, district energy projects. **(E125)**

- The council outlined highlights of their net zero plan, which provisionally includes **(E125)**:

    - Reducing energy consumption by about 30per cent in homes and by about 35 per cent in non-domestic properties.

    - Increasing rooftop solar PV to about 30 per cent of homes and about 60 per cent of non-domestic properties.

    - Installing heat pumps in about 60 per cent of homes and about 20 per cent of non-domestic properties.

    - Low carbon district energy networks to supply 20 per cent of homes and about 75 per cent of non-domestic properties.

    - Hydrogen blended in the gas mix up to about 20 per cent for all properties.

    - A range of smaller impact interventions including wind energy to about 4 per cent of non-domestic properties, renewable biofuels to about 4 per cent of properties and biogas to about 4 per cent of properties.

- At a meeting with a housing association, who have properties in multiple locations across the area Northern Powergrid serve, they talked about their aim to achieve net zero by 2035 by installing solar PV, batteries and heat pumps, phasing out gas (added benefit to decarbonisation is improved safety), exploring flexibility services, converting van fleet to EVs. As a result, they are interested on LCT cluster impact on Northern Powergrid's network and flexibility services. **(E139)**

- At the South Yorkshire and Northern Lincolnshire net zero Leaders Forum, a participant picked up on Northern Powergrid's DFES modelling, which predicted double the amount of solar power by 2028, asking whether the forecast figures for PV, EVs, heat pumps etc. were based on current energy policy. They commented that the

figures showed a massive uplift and felt that incentives were insufficient to encourage that level of uptake of these technologies. **(E014)**

- They further questioned how this all tied up with the relevant LAs, as this was a big concern for them. They referred to Leeds where a 2038 net zero target had been set, impacting the glass manufacturing industry, but stated that they were not consulted during the decision-making process. This creates problems for their investment cycle for the equipment they need like furnaces, which have a lifecycle of 15 years. They felt it was important for LAs to engage with local stakeholders to ensure their targets are technically feasible. **(E013).**

- At our meeting with BEIS to discuss heat decarbonisation policy, they said that they are targeting heat pump installation rates of 600k per annum from 2028. **(E126)**

- BEIS were interested in our feedback about c.60per cent of the local authorities aiming to reach net zero early and engaging on net zero scenarios after they have been published, as well as our heat pump trials from our Customer-Led Network Revolution innovation project. Their 3 x 250 heat pump trials (including one in Newcastle) could use these results and potentially build on it. **(E126)**

- Engagement with York and North Yorkshire Local Enterprise Partnership showed the implementation of policy recommendations from the LEP's decarbonisation abatement pathways modelling work would require 49-141 FTEs and £1.5-£4.9 billion investment across YNYLEP area. Not all of it would be roles/responsibility owned within LEP. **(E135)**

- Sheffield City Region Combined Authority/Local Enterprise Partnership have just been awarded £2.6m to install EV charging points in South Yorkshire. Indicatively, they are aiming for c.195 fast 22-24kW charging points and about 35 rapid 50kW+ charging points across multiple locations in South Yorkshire (Sheffield, Doncaster, Rotherham, Barnsley). They have worked with Arup to model the potential locations which could be most suitable for installing the charging points, and have mapped the proposed sites (using our DFES data). However, they are also keen to consider a range of options (i.e. a number of smaller chargers/delivering future-proof infrastructure in selected sites to allow for more charging points or upsizing rapid charging points at a later date, or V2G solutions). However, a key consideration is that the EV infrastructure needed to be delivered promptly. (E312)

- A customer survey organised with Green Doctors (63 participants in total, including 26 per cent digitally excluded participants), identified the following findings **(E210)**:

    - On average, the participants rated their worry about climate change at 6 out of 10.

    - 49 per cent said that the government's 2050 target was too slow, 33 per cent said it was about right, and 7 per cent said it was too fast.

    - 58 per cent said it was more important to keep energy charges as low as possible, whereas 42 per cent said it was more important to improve the network, so it has less impact on the environment.

- To prepare for the willingness to pay survey, Northern Powergrid ran focus groups on all topics. Net zero came third of the 11 priorities tested. However, consumers found the description in the plan too vague, but prioritised it anyway out of a sense of duty. **(E319)**

- Net zero came closer to the bottom of the priorities (8 out of 9 discussed) when only vulnerable customers voted through a chip allocation exercise. **(E319)**

- Net zero came towards the middle of the pack for SMEs, as they prioritised Safety and Security. **(E319)**

- However, future customers saw net zero as a societal necessity, prioritising it as first overall, despite not fully understanding the actions being proposed or required. **(E319)**

- In Northern Powergrid's 'willingness to pay' exercise, net zero came as one of the top areas in terms of priority, behind reliability, among domestic, SME and vulnerable customers **(E320)**

- One of the top two priorities under 'meeting the needs of consumers and network users' was 'working with our customers to connect more renewable energy sources like solar and wind power and to support the uptake in electric vehicles **(E320)**

- One participant at the Northumberland, Tyne and Wear regional conference referred to the challenge of EV charge points in rural areas with terraced housing (e.g. shared charge points or building a new village car park with charge points). This is what his organisation are currently doing – they have a project at the moment where they are installing EV charge points in publicly accessible car parks for areas with high proportions of terraced dwellings. **(E013)**

- Another participant commented that the statistics provided in the summary document were impressive, especially in relation to the 8000km of overhead lines which have been improved or enhanced in the last period. However, they expressed concern about decarbonisation in rural areas because single phase overhead lines would not be able to cater to the number of EVs and air source heat pumps needed in the future in these areas. They further questioned whether the smart meter roll out programme was happening as quickly as Northern Powergrid would like in order to assist them in planning network reinforcement. **(E013)**

- Transport for the North (TfN) shared an overview of their newly published Future Travel Scenarios. Future Travel Scenarios explore decarbonisation pathways using a mix of transport modes, behaviour change, population, and other vectors. Their scenarios are slightly more ambitious than the CCC's forecasts - setting out 55per cent reduction in emissions between 2018 and 2030 & 90per cent emissions reduction by 2040. The scenarios used had also diverged from Department for Transport's travel scenarios. TfN were interested how modelling could be supplemented/overlaid with DFES and infrastructure data. **(E223)**

- DNO representatives were interested in sharing/aligning key assumptions between the DNOs and Transport for the North's respective modelling exercises. **(E223)**

- One DNO mentioned they were running an innovation project to create a model which would overlay transport flows with the network model. This would enable modelling transport flows and network infrastructure to project viable locations for EV charging facilities. TfN mentioned they had been considering how transport and network infrastructure modelling could be joined up across the north and were interested to explore it further. **(E223)**

- Stakeholders expressed interest in community level renewable energy production, including developing local hydro power generation systems and generating heat from waste materials. One stakeholder questioned whether there is sufficient grid capacity for the proposed level of community energy production. **(E331)**

- Other stakeholders suggested that scaling up investment in infrastructure such as heat pumps is necessary to meet the proposed net zero targets, but that this will be challenging for local authorities, particularly during the next price control period. **(E331)**

- A few stakeholders also questioned how Northern Powergrid ensure its scenario modelling is robust. **(E331)**

- Stakeholders expressed concern that Ofgem may stifle ambition by focussing too heavily on keeping customer costs down. Stakeholders therefore questioned what action is being taken to ensure Ofgem's support. **(E331)**

Awareness raising and leadership in net zero transition

- A participant at the West Yorkshire net zero leader's forum commented that they saw electrification as playing a major role in the transition to net zero, especially in relation to transport. Therefore, they saw Northern Powergrid's role as crucial in ensuring a reliable grid to facilitate uptake of EVs in Leeds city. They added that certain parts of the grid could not cope with generation like PV, so collaboration with Northern Powergrid is important to understand where the hotspots are and how the council can help ease pressure on the grid (e.g. through programmes like district heating). They referred to the national debate around the role of heat, stating that Leeds was at the centre of the discussion on whether we should go down the hydrogen route (district heating) or electrification (heat pumps). They foresaw problems with heat pumps in parts of Leeds, namely that there is no room for them. **(E016)**

- There was more contention, but still a lot of support for, helping educate people about reducing their carbon emissions. **(E056)**

- One stakeholder commented that the information in the session was quite overwhelming, complex and included jargon, so they would need to do further research. They suggested that Northern Powergrid should educate and work with consumers to enable them to understand and work with the DNO, e.g. helping them understand the benefits of smart meters. **(E015)**

- During 2023-2028 regional political engagement, the calls with council leaderships demonstrated the need for more education on what the future energy system will look like and the tangible benefits for households, businesses and local authorities. There was also interest in understanding more about how vehicle to grid charging, EVs for storage and community energy would work. Generally, there is a strong interest in community energy but a lack of knowledge about what support is available **(E045)**

- Ultimately, SMEs felt the government should lead the net zero transition. Respondents expected Northern Powergrid to work with relevant authorities and to bring their expertise to the big questions, in more of a facilitator role. It was felt that Northern Powergrid had sight of a lot of data and information which would be invaluable. They should, along with other DNOs, share this information with the Government. Respondents assumed that Northern Powergrid already did this. Some respondents also suggested that Northern Powergrid should play a role in influencing and pushing the government to offer incentives (e.g. grants, subsidies, and salary sacrifice schemes), encouraging businesses to invest in renewables. **(E010)**

- Local authorities have said that they are keen for Northern Powergrid to share its knowledge to help their understanding about whether their plans are realistic. Most local authorities wanted continuing ties including direct involvement by Northern Powergrid in their energy and decarbonisation planning. **(E046)**

- Participants largely felt that Northern Powergrid should provide its customers with information about the costs and benefits of low carbon technologies in order to encourage uptake. They also felt it was important to provide financial incentives and to invest in EV charging infrastructure, to address potential barriers to widespread adoption of such technologies. **(E002)**

- BEIS' Heat and Buildings Strategy is to be expected soon and set out a new package of near-term policies to decarbonise heat. It was said BEIS would take a 'fabric first' approach and target 200,000 heat pump installations per year by 2025. It was agreed that decisions are needed on how to encourage community-level heat pump roll-out as well as the network upgrades for large scale, planned heat pump deployment, specifically in the off gas grid and new build sectors. More specific decision on hydrogen's role in heating is to be taken in 2025. **(E130)**

- BEIS recognised that an improved HP notification compliance was required to avoid faults on DNO networks **(E130)**

- At a decarbonisation of transport and heat workshop, it was acknowledged by several stakeholders that there is a lack of leadership from national government and that organisations like OLEV were not taking a lead role in aspects such as resolving issues of EV charging without off street parking. It was felt national guidance was required. **(E276)**

- It was noted by installers that there were administrative issues with Green Home Grants with delays to installers being paid. This has ultimately limited the ability for installers to scale up their business to meet the challenge. This was particularly an issue with heat pump installations. Other feedback included **(E276)**:

    - Local authorities highlighted that funding was a key enabler for the transition, particularly for heat pump schemes which are expensive. It was felt that decarbonisation funding wasn't available for long and that there was uncertainty around future funding.

    - There was also comment around the need for greater financial incentives for the general public.

    - In addition, it was commented that the high upfront costs of heat pumps, and the long payback period make the investment difficult to justify. There needs to be a more compelling reason to switch when gas is ultimately cheaper.

- Particularly in regards to heat, there was felt to be a lack of heat pump installers to hit installation targets that have been set. Installers must be gas safe registered which inhibits ability to take on apprentices and it was felt this was unnecessary. There was also felt to be a skills gap around retrofit. Finally, it was noted that even the double glazing industry requires retraining in order to ensure installation is suitable for heat pump installation in the same property. **(E276)**

- Installers and local authorities agreed that the onus should not be on local authorities to facilitate the roll out of EV infrastructure and instead this should be on the commercial organisations who can deliver it. There was also a comment that other DNOs were doing more work in this area to bring stakeholders together to innovate and focus on solutions. **(E276)**

- It was suggested that Northern Powergrid could support the roll out through facilitating engagement with petrol forecourt suppliers to understand their willingness and planning around installation of charging points. It was felt that Northern Powergrid would be able to have a more strategic conversation about this than a council would be able to have individual. **(E276)**

- Support was needed to clearly communicate energy futures to the public in order to set their expectations. for example, recognising that most people will only need to charge their car once a week and so being concerned about having a charge point at home maybe isn't necessary, and actually they could 'fuel up' once a week In the community replicating how they fuel their car up now - could Northern Powergrid take a lead role In determining the likely energy future around EV charging and make recommendations as to how investment could be made at a Local authority level? **(E276)**

- Installers have difficulty installing EV charging points in homes with a looped supply and this can't be identified until the installation is being attempted. It was suggested that Northern Powergrid could make this information available upfront and also respond more quickly to address a loop supply when it is identified. **(E276)**

- There was a feeling that Northern Powergrid can lead the way for the region in terms of helping provide a clear picture of what consumers are and aren't willing to do regarding flexibility and behaviour change. It was suggested that Northern Powergrid could share insights they have collected already and recommendations as to how people can be motivated to change their behaviour. This was particularly discussed In relation to EV but relevant to heat too. **(E276)**

- A council said that there is a lack of internal expertise and they are keen to understand more from Northern Powergrid about how they can reduce their energy output. **(E270)**

- One more senior political stakeholder said that the feeling from higher up in the council is that in the last 18 months decarbonisation has risen up the local political agenda and there is now a lot of support for pushing forward with big carbon ambitions. The Council is now ready to put its head above the parapet. **(E270)**

- They raised concerns that if the unit cost of electricity increased this would be a disincentive to investing in EVs. In terms of their own plans, the representative outlined: they are shrinking their property portfolio and this has been accelerated by home working from coronavirus. For the buildings they will still own, they are very keen on self-sustaining and are looking at energy generation. They have £1bn from the government decarbonisation grant fund and are looking at solar and battery storage for their buildings. They are also looking at whether they can use existing land that they own for a solar farm. **(E270)**

- One Councillor thought that public education was key. They said that it will be really important for people to understand more about flexible energy use and peaks in demand. This followed on from Northern Powergrid explaining a real world example of how flexibility would work with smart charging and heat pumps heating up the house when electricity costs are low and then using the house as a balancing mechanism for the grid. The councillor seemed to really understand the concept of flexibility when given this example of what it would mean in practice and saw the benefit of the public having this understanding too. From other local authority calls, a

key theme was the need to communicate clearly how flexibility would work in practice and its tangible benefits. Similarly, the lead climate change officer from the council thought that the main barrier to customer engagement was the complexity of it all. They were keen to work in partnership with Northern Powergrid to support residents to engage with decarbonisation **(E270)**

- Stakeholders also commented that local authorities lack the skills and expertise to deliver greater domestic energy efficiency and that Northern Powergrid could play a greater role in enabling this. **(E331)**

- Stakeholders highlighted the importance of educating customers about energy systems, developing their 'energy IQ'. **(E331)**

The need for a fair transition – balancing the costs and the speed of decarbonisation

- There was general consensus that consumers in areas where infrastructure is being upgraded quickly should pay more than consumers in less ambitious council areas. Participants queried whether payments could be spread to help people who can't afford price increases cover the costs. **(E004)**

- There is concern that currently industrial customers subsidised by domestic customers through distribution use of system (DUoS) charges. **(E132)**

- 63 per cent of young people value investment in the electricity network to make it greener and more sustainable. 76 per cent wanted investment to target specific areas. These young people highlighted the importance of impact. **(E054)**

- Majority of your people is supportive of surcharge in order to create a greener network. Most popular contribution level was '£1-5' over nothing with few choosing higher values. Over all young people were willing to contribute something compared to nothing. **(E056)**

- Similarly, in a survey amongst college student future customers most popular contribution level was either 'nothing' or '£1-5'. **(E054)**

- Community energy panel would like to see a price increase going further and faster as this is justified. It was stressed that the transition needs to be fair. A different approach was suggested with general taxation as a means to fund network investment instead of customers' bills. **(E138)**

- Bradford Council were concerned about costs to customers and asked why the funding for these plans couldn't come through central government taxes rather than a flat rate. **(E310)**

- A participant of the community energy stakeholder panel said the current network funding/regulation model did not work. **(E138)**

- At a community energy stakeholder panel, stakeholders said that social and environmental values need to be factored into energy policy and network regulation: 'The system we are using as an economic model to create fairness but it doesn't do that, some of us care about fuel poverty and the human misery that creates, but also the economic costs to social care, the NHS, lost time in education, OR a climate crisis point of view. This model takes no account of what we value as communities.' **(E132)**

- A participant of the community energy stakeholder panel asked if there was a way to differentiate the costs – if everyone currently pays the same cost for Northern Powergrid's services, is there a way this could be differentiated, e.g. so the vulnerable pay less? **(E138)**

- On the contrary, some participants at the panel said 'you are trying to sow a patchwork quilt.' Northern Powergrid has to address getting to net zero, and not social issues - it's not your expertise; tackling both you're going to fall on all sides. **(E138)**

- In order to increase uptake, students feel that low carbon technologies should become more affordable and accessible. Students feel both affordability and speed are important in efforts to decarbonise. **(E055)**

- Respondents agreed that whilst they wanted the transition to net zero to be as fast as possible, this should be balanced with the need for it to be affordable and fair. Respondents were willing to pay more to fund investment sooner and assumed that this would not entail a huge increase in bills. However, they reflected on the fact that whilst they may be in a position to afford this, financially-vulnerable consumers would not be. This necessitates the need for a careful balance and more support for these people (primarily from the government). One group wanted to see Northern Powergrid shareholder dividends reduced in line with responding to climate change need. **(E010)**

- One topic of discussion across net zero leaders forums was the issue of diversity of housing and infrastructure. For example, at the North Yorkshire Leaders Forum, one participant pointed out that one of the key challenges of the region is how diverse it is. In Durham alone there are large rural patches as well as large settlements; there are large areas of deprivation as well as affluent areas (e.g. Durham City and Sedgefield). They stated that whilst the region is blessed with large amount of natural resources for energy generation (e.g. wind turbines, solar power), it also suffers from significant old housing stock and fuel poverty. **(E012)**

- Most interviewees from rural areas wanted to see some level of investment in regional decarbonisation in order to meet the 2050 net zero target. However, several customers raised concerns about increased costs to consumers. **(E002)**

- Most participants at consumer panels in Leeds and Newcastle wanted Northern Powergrid to be ambitious in driving regional decarbonisation, although there were some concerns that the most ambitious emerging thinking options might lead to excessive costs for consumers. **(E004)**

- Some participants said that adoption of low carbon technologies would likely be minimal without educational campaigns to promote the benefits associated with such technologies. Many customers said that Northern Powergrid, the relevant local authority or the UK government should provide financial support to offset prohibitive initial costs. **(E004)**

- At the West Yorkshire net zero leaders forum, one participant raised that the core issue for his organisation was fuel and food poverty, which they expected to double as a result of COVID-19. They felt it was important for Northern Powergrid to consider the impact of increasing bills on these households who are unable to afford their current bills. Any increase in investment and, subsequently, bills would have a detrimental impact on vulnerable customers. **(E016)**

- They went to say that they recognised the value of the work which Northern Powergrid are already doing in communities, but would like to see this scaled up, especially in the context of COVID-19. They suggested that Northern Powergrid could invest in smaller organisations like his that work closely with people in tackling fuel and food poverty through income maximisation. They felt that investment in community organisations would go further than investment in bigger organisations (e.g. Citizen's Advice) because the funds would not get 'eaten up'. Moreover, the people that his organisation provides support to often do not like to deal with 'outsider' organisations, even Leeds City Council, so Northern Powergrid could reach this group more easily through trusted community organisations. **(E016)**

- At the net zero exploring pathways for decarbonisation event, there were wide-ranging questions that touched on the price implications of Northern Powergrid's decarbonisation plans **(E019)**. These included:

    - whether the prices presented are monthly or annual;

    - whether the prices presented are for domestic customers;

    - whether any uplift in cost accounts for those in financial stress who may struggle; and

    - whether Northern Powergrid's focus is on reducing prices across the board (i.e. downward pressure) or targeting support for fuel-poor customers.

- At our consumer panel incorporating a review of emerging thinking including decarbonisation, participants said providing information on cost break down results in higher ratings of value for money. **(E005)**

- At a roundtable on emerging thinking and net zero, participants expressed differing views about cost, with some suggesting that the proposed cost increase is relatively low and that customers may be happy to pay more for decarbonisation, whilst others express concern that the impact of cost increases may be unevenly felt across customer groups. It was also felt it would be difficult to ask customers to reduce or change their patterns of energy consumption, which would have implications for Northern Powergrid's ambitions and the decarbonisation process. **(E331)**

- At our Stakeholder Summit, Adam Scorer, Chief Executive of National Energy Action and Peter Taylor, Professor of Sustainable Energy Systems at the University of Leeds, joined Siobhan Barton for a discussion centred on the challenges and considerations around ensuring the low carbon transition is just and inclusive. Adam was asked 'What needs to happen to balance the need for decarbonisation with support for vulnerable citizens?' and outlined five key areas which require action **(E265)**:

    - Ensure that technology focussed on decarbonisation of heat actually works in homes (as important to learn what doesn't work as what does).

    - Support vulnerable and fuel households beyond what is set out in business plans.

    - Do more to support households and communities to engage in a flexible energy market – particularly support in navigating the rules and regulations.

    - Northern Powergrid can also use various government schemes, like ECO, home upgrade grants to leverage in energy efficiency opportunities.

    - Speaking directly to vulnerable/fuel poor households to understand the route-map to heat pumps and EVs.

    - Focus innovation projects on vulnerable households. This requires a shift in focus from dealing with Asset Managers and huge construction firms, to organisations that work with vulnerable and fuel poor – like National Energy Action.

- Questions were raised covering a wide range of regulatory matters affecting the sector, with the main focus on the outcomes of Ofgem's Significant Charging Review (SCR) after Ofgem's presentation on this topic **(E278).** The questions highlight the uncertainty community energy groups are facing while SCR is on-going, as well as:

    - Ofgem's position on enabling local supply;

    - whether Ofgem recognises the social and economic value community energy projects bring and if connections cost will reflect and accounting for social and carbon values, recognising their benefits; and

    - ensuring fairness in distributing costs associated with decarbonisation.

- It was highlighted by several stakeholders that they are concerned about the impacts of decarbonisation on fuel poverty and that we need to ensure it does not make the situation worse. Another highlighted concerns around vehicle to grid charging and that those with off street parking (often more affluent) can potentially take advantage of associated income and benefits whilst those that don't will miss out on the opportunity. **(E276)**

- One political stakeholder said that the difficulty is the trade-off between carbon reduction and energy costs — if it was just an additional £4.29 (the modelled impact of decarbonisation option 'E' on a domestic customer bill) that would be fine, but if we're also moving to heat pumps then this will raise bills as well so 'doubling up on the penalty'. They said that this would be a hard one to sell to council housing tenants and they want to defer price increases to vulnerable residents as late as possible. The stakeholder didn't want the energy bills to increase

hugely and so didn't think that switching to heat pumps right now (whilst it is still cheaper to run gas boilers) is the right thing to do. **(E270)**

- Stakeholders made a range of comments relating to the cost implications of the service levels, including: **(E331)**
  - the high costs of electrification without effective insulation;
  - the impact of increasing costs on those who cannot participate in
  - flexibility markets;
  - that price increases may be compounded by the move to home working;
  - that the ability to pay more varies significantly between customers, resulting in unequal impact of price increases;
  - that messaging around bill increases will be critical, with a suggestion that the cost increases should be framed in such a way that communities can see the benefit of what they're paying for;
  - concern about ensuring fairness when some of the technological investments proposed, such as electric vehicles, tend to be used by better off customers;
  - suggestion that the cost difference between levels C and E is significant and it is therefore important to understand that achieving targets sooner comes at a cost; and
  - whether the costs of decarbonisation need to be passed on to customers.
- Questions were raised about whether changing the way we pay for energy, such as introducing a localised energy tax, could provide a fairer way of meeting the costs of decarbonisation. One stakeholder also questioned whether there is a need for greater collaboration with energy companies around green tariffs. **(E331)**
- Stakeholders stressed the importance of the decarbonisation process supporting job creation and skills development, suggesting that employment and skills proposals should focus on those areas hardest hit by COVID-19. **(E331)**
- Stakeholders discussed the challenges of meeting the energy needs of rural communities and stressed the importance of considering rural customers in the proposals. Questions related to this issue included: **(E331)**
  - whether off grid communities are included in Northern Powergrid's consideration of rural communities and customers; and
  - whether developing on site renewable energy generation should be considered as an alternative to connecting rural properties in National Parks to the grid.
  - Stakeholders expressing concern that pricing and investment decisions based on numbers of people using a service may leave rural areas with more limited infrastructure than urban areas, suggesting that clarity and transparency is needed around this issue.

The emerging concept of local area energy plans (LAEPs)

- Most customers at Consumer Panels in Leeds and Newcastle did not support Northern Powergrid diverting resources to areas with more ambitious decarbonisation targets, and instead argued that a single binding target should be applied across the region. Similarly, consumers did not want to see different bills across areas to reflect local decarbonisation targets, as they felt this amounted to a 'postcode lottery'. **(E004)**
- A stakeholder mentioned that they recently had an approval to move forward with local energy planning. This was recognised as a step in the right direction. **(E200)**

- It was recognised that DNOs in general should put more focus on local energy planning. **(E200)**

- At our local authority forum focusing on local area planning, access to funding and resources were discussed, with the need for political backing or vision to unlock local budgets and investment, as well as funding support from central government. **(E088)**

- Participants were divided as to whether Northern Powergrid should divert resources to areas with more ambitious decarbonisation targets. Some participants felt that this was a suitably pragmatic approach, as the whole region could not be reasonably expected to decarbonise at the same rate; while others argued that it was unfair to divert resources away from other areas and that local councils should pay for any costs arising from the adoption of more ambitious targets. **(E004)**

- From engagement with Newcastle City Council, while there is no appetite to go into very granular level for modelling, perhaps a local area energy plan/modelling could be developed for a local area, i.e. a smaller area of a city - starting by a local data cleansing exercise (from the Energy Systems Catapult's modelling tool and our DFES) **(E125)**

- We spoke ahead of the Community Energy England (CEE) meeting with the Energy Systems Catapult (ESC). Community energy is not mentioned in the draft methodology; CEE are keen it is recognised as an important component to activate the local stakeholders and decide/deliver local plans, which we both agree with. We discussed the tools and work Northern Powergrid is already undertaking, and CEE agreed DFES was an excellent basis for a LAEP, and recognised the need for shared responsibility to allow LAEPs to form, recognising the sometimes limited capacity/frequent change of personnel in LAs. **(E123)**

- Recognition of the need for a LAEP, at least for a part of Newcastle, but without sense of ownership/urgency. A number of actions depend on central government, pilot project scale-up, and the NCC's Decarbonisation Action Plan needs to be signed off in September. Looking for what they can do before grid reinforcement. **(E125)**

- At our Local Authority forum focusing on local area planning, the vast majority (73per cent) of the voting participants believed that a medium-term timescale is most appropriate when developing a LAEP, out to 2025-2040, those who had indicated a one year timescale highlighted the need for urgent, immediate action. **(E088)**

- During another meeting with York and North Yorkshire Local Enterprise Partnership, they mentioned they were not certain whether energy is in scope of/has specifically been provisioned for in North Yorkshire's devolution bid yet. To facilitate devolution, a local government reorganisation will need to happen, removing the two-tier local authority system. **(E124)**

- The LEP said that lack of capacity in LAs was a recognised issue. They suggested that areas where community energy groups are conducting Rural Community Energy Fund funded feasibility studies might be considered as LAEP 'pockets'. **(E124)**

- At our meeting with City of York Council, as part of 2023-2028 political engagement programme, it was expressed that CYC have appetite to and are well-placed produce a Local Area Energy Plan. Also that York Central' housing development near the train station is the largest brownfield site in the UK, and they foresee a fully electric development. **(E129)**

- Although the York City Council said they recognise the time is of essence, they were unsure of the production timeline required for a LAEP - they recognised the council needs to firm up their objectives, i.e. decide if scope 3 emissions are included in their net zero target by 2030 and, generally, raise awareness within the Council. **(E133)**

- At a meeting with the City of York Council on LAEPs, it was agreed that a LAEP should allow aligning all of our plans that inform investment (CYC, Northern Powergrid, Y&NY LEP, NGN), which partners are enthused about and that attracts partners to work with CYC, and plan for delivering investment at lowest cost to meet the net zero aspirations by developing a project pipeline and identifying quick wins. It should inform big key decision points (e.g. hydrogen gas network timelines) and build on and use a localised view of the evidence base

developed by the decarbonisation pathways modelling work. Work should be frame in 'emergency' language to allow detailed planning for 2020-2025 and less detailed planning for 2025 onwards. **(E133)**

- At the second meeting York City Council on LAEPs, they said they were unsure what scale and scope a Local Area Energy Plan (LAEP) in York should take - still considering the appropriate way of structuring and governing this planning and engagement process. They have begun considering starting LAEP for a small area of the city to begin with - to make the task manageable - and coincidentally have had recent interest from residents in a local area. It was not yet apparent this work will evolve further with the aim of developing a LAEP. **(E137)**

- Representatives from a local community joined the second part of the meeting. They were interested in developing a community charging facility for EVs, which is future-proof for any subsequent charging point additions at a later date. They had approached both Northern Powergrid and CYC for support. In longer term, the community was considering decarbonisation of the community incl. heating – but had no obvious appetite for developing a LAEP. **(E137)**

- In an internal survey, one respondent noted that engagement with localised energy plans has to be very carefully managed to ensure that plans remain fair and socially inclusive, as they can see a real danger in 'those who shout' get a better service **(E189)**

- At the meeting with City of York Council, York & North Yorkshire LEP, Northern Gas Networks and Yorkshire Water to discuss the development of a LAEP, the thinking about LAEPs had evolved, informed by Energy System's Catapult's (ESC) reports (ESC's seven-step process to develop LAEP presented in the meeting). CYC and YNY LEP recognised the spatial aspect is missing from the analysis carried out to date and are considering options for developing a Local Area Energy Representation report, which would allow to add the spatial planning aspect. **(E222)**

- One participant highlighted that as well as the development of the LAEP, there were other CYC and regional activities relevant to LAEP development **(E222)**:

    - local plan also in process;
    - upcoming development of the next version of our next local transport plan;
    - YNY LEP devolution – two options have been put forward and are being considered by ministers. Both would result in a significant restructuring of local government in North Yorkshire; and
    - existing projects they are already delivering.

- With GD2 starting on 1 April 2021, Ofgem have provided a fund for getting ready to net zero reopeners and allow to support net zero projects to prepare for it. NGN was interested in exploring how this regulatory mechanism could be used in conjunction with LAEPs. **(E222)**

- CYC might be planning to re-run some of the decarbonisation abatement pathways analysis for York area, unless the local area representation study can draw on the data produced for the York and North Yorkshire region and address it as part of that process. Looking for funding options to fund the further analysis required. **(E222)**

- The vast majority of the stakeholders attending our LA Forum (73 per cent) believed that a medium term timescale is most appropriate when developing a LAEP, out to 2025-2040. **(E088)**

- 52 per cent of attendees indicated that they are thinking of developing a LAEP with 35 per cent unsure and only 13 per cent preferring not to develop one. **(E088)**

- 48 per cent of attendees believed that Local Authority sized area is the appropriate level of granularity for a LAEP (medium level), with 28 per cent indicating that the larger Local Energy Partnerships (LEP) offer a more suitable scale for LAEPs. **(E088)**

- Key enablers for developing a LAEP identified were access to the necessary funding, resources, data and expertise, as well as political will **(E088)**:
    - Participants agreed that political backing or vision is needed to unlock local budgets and investment.
    - The availability of expert resources and funding remained key issues stifling the aspirations to develop a LAEP.
    - Participants discussed the need for funding and whether this might come from central government, e.g. via the LEPs or through the comprehensive spending review.
    - It was agreed that allocated resource within local authorities was required to develop a plan, but also highlighted the importance of cross department access and engagement to ensure plans were multi-vector.
- There was a consensus that continued engagement with Northern Powergrid is vital to continue the discussions and help to develop any further plans. **(E088)**
- Participants were interested in where to access further information on LAEP methodologies and were interested in closer working with Northern Powergrid's data team and the potential for training run by Northern Powergrid on the data that is currently available. **(E088)**
- One participant said that whilst data sharing by Northern Powergrid had been useful, a more collaborative approach from the DNO to weighing up priorities and making decisions would be useful. **(E088)**
- Stakeholders questioned how local groups might initiate the development of Local Area Energy Plans, whilst other stakeholders expressed doubt that local authorities have the capacity and skills to develop local energy plans. **(E331)**
- Although stakeholders acknowledged that this was not purely the responsibility of Northern Powergrid, ongoing engagement on this topic would benefit from a standard response to this issue. **(E331)**

Balancing the use of flexibility with network investment

- We asked panellists **(E004)** to answer how much flexibility in energy use they thought we should expect. The answers ranged on scale from 1, 'expand the size of the network in anticipation of low customer support for flexibility (higher cost) to 5, 'maintain the size of the network, in anticipation of high customer support for flexibility (lower cost).
    - In Leeds voting was as follows:
        - 5 – 10 per cent (3), 4 – 35 per cent (10), 3 – 14 per cent (4), 2 – 24 per cent (7), 1 – 17 per cent (5)
    - In Newcastle voting was as follows:
        - 5 – 5 per cent (1), 4 – 16 per cent (3), 3 – 69 per cent (13), 2 – 5 per cent (1), 1 – 5 per cent (1)
- Consumers in Leeds were relatively divided across the scale. In the online discussions, participants revealed that they would be prepared to be flexible but raised concerns that it may not be quite so straightforward. In particular, participants queried how this would work for people with irregular shift patterns and what kind of differences in cost there are between using energy on peak versus off peak. With regards to incentives, consumers in Leeds suggested encouraging controlling energy remotely and making use of storage technology.
- Participants in Newcastle were swayed more towards the 'maintaining the size of the network, in anticipation of high customer support for flexibility' end of the scale than their counterparts in Leeds. In their online discussions, participants expressed willingness to be flexible where possible, especially considering the increased number of people working from home due to the coronavirus pandemic. Others raised concerns

about their ability to be flexible, and whether inability to be flexible 'would be punished'. There was wide agreement amongst participants that more information and awareness would be required to encourage consumers to be flexible. Some participants felt that a real cost saving is the only way to incentivise increased flexibility.

- Participants in consumer panel **(E004)** were asked about their view on network investment: 'How fast should we aim to reach net zero?' They were asked to select an answer on scale from 1, 'accelerate investment, creating a quicker pathway to net zero' to 5 'limit investment, creating a slower pathway to net zero'.
    - In Leeds voting was as follows:
        - 5 – 7 per cent (2), 4 – 24 per cent (7), 3 – 10 per cent (3), 2 – 24 per cent (7), 1 – 35 per cent (10)
    - In Newcastle voting was as follows:
        - 5 – 10 per cent (2), 4 – 32 per cent (6), 3 – 32 per cent (6), 2 – 16 per cent (3), 1 – 10 per cent (2)
- The majority of participants in Leeds felt that Northern Powergrid should accelerate investment, creating a quicker pathway to net zero and on the whole, they supported the idea of Northern Powergrid diverting resources to help more ambitious councils reach their goals. Consumers who disagreed felt that councils who want to achieve their goals before 2050, should fund this themselves. Participants surmised that diverting resources could be unfair and may lead to some areas, such as Leeds, being left behind, but generally, participants felt that this was fair as 'somebody's going to have to be last'. **(E004)**
- Consumers in Newcastle were less supportive of diverting resources to more ambitious councils, with many expressing that those councils should cover the cost themselves. Participants generally agreed that this would be unfair and would leave some areas paying extra but not seeing any benefits. **(E004)**
- Participants from City of York Council said there is a fine balance to be had with providing enough, but not too much, detail as part of master planning exercise. Energy master planning has been attempted - but there is a risk of it not being taken forward ('sitting on the shelf') – we need to recognise this won't deliver detailed techno-economic modelling for every project. Instead, we should aim to give as much detail as possible over to private sector/third parties to entice uptake. **(E133)**
- Most young people (20 of 26) said they did want to use a time of use energy tariff. **(E054)**
- Gateshead Council saw flexibility and peer to peer trading as central to decarbonisation. However they have a private wire network and want to conduct peer to peer trading through this. They want to see a further 4MW of solar and 6MW of heat through private wire peer to peer trading. Gateshead wanted to understand more what the transition from DNO to DSO and what peer to peer trading would mean in practice **(E310)**
- Participants recognised the benefits of flexible time of use energy tariffs, although there was some concern that such tariffs would not be widely adopted due to customers' fixed schedules, a lack of smart meter usage and the high costs associated with smart appliances. **(E004)**
- There is also a clear appetite from stakeholders for investment ahead of need to encourage uptake of low carbon technology in the region, especially EVs. Flexibility is also important and greater partnership working with LAs to understand where hotspots exist and how to reduce load on the grid would be positive. **(E016)**
- Views were generally mixed among the two SME groups that discussed LAEPs; some wanted to see more local energy as they felt this was 'greener', whilst others did not have a preference for this. However, it is worth noting that the idea of locally-generated energy and how this links to net zero was a more difficult concept to grasp, and some respondents were unable to provide a considered response without more information. **(E010).**
- Participants from rural areas were largely supportive of Northern Powergrid investing in flexible connection options for customers, and encouraging the adoption of low carbon technologies. **(E002)**

- At the net zero leaders forum, one participant, who was at the start of thinking about the potential for flexibility in the operations of the terminal, was pleased to hear another describe the openness Northern Powergrid has in having these conversations. The view was that collaboration on flexibility solutions with Northern Powergrid for industry partners was key going forward. **(E015)**

- At the fourth SME panel, most respondents liked the 'flexibility first' approach in theory and felt that with effective public education, we could see this kind of behaviour shift. However, they generally agreed that realistically, as small businesses, their ability to be flexible was limited because their energy consumption was based on the needs of their businesses and business continuity was their greatest concern. Financial incentives were important but would need to be significant to effectively incentivise businesses to be more flexible. **(E010)**

- Most rural consumers were very interested in the idea of a 'time of use' tariff, with many reporting that they would actively seek to switch to such a tariff. Some, however, felt that they would need more information about peak times and potential savings, due to concerns that inflexible work schedules would prevent them from taking advantage of off-peak rates. **(E002)**

- Participants from consumer panels in Leeds and Newcastle recognised the benefits of flexible 'time of use' energy tariffs, although there was some concern that such tariffs would not be widely adopted due to customers' fixed schedules, a lack of smart meter usage and the high costs associated with smart appliances. **(E004)**

- One of the themes that emerged from discussions at the forum was around network capacity, with many stakeholders questioning whether the grid could cope with increased demand. Related to this, flexibility was generally considered to be very important and some stakeholders were actively looking for ways their energy generation could help ease the burden of network reinforcement for Northern Powergrid. **(E011)**

- At the North Yorkshire net zero leaders' forum, one participant spoke about an environmental group set up in Ryedale which is an umbrella for more local environmental groups, many of which want to develop a local community energy project. However, current concerns are around network capacity. John said they are keen to understand what changes might be brought in that will encourage and make the process easier for local communities. **(E012)**

- At the net zero exploring pathways for decarbonisation event, participants had specific questions on Northern Powergrid's views/activities on approaches to generation and storage, including: 'How much distributed storage will be required – and will it be in front or behind the meter? Can redundant EV batteries be used for storage on local networks? Does Northern Powergrid plan to use substation premises for distributed and renewable generation? What plans are there to properties off the gas network that use carbon intensive fuels to switch to more environmentally friendly solutions?' One stakeholder was keen to challenge as to whether ANM for generation is counter to decarbonisation. **(E019)**

- A small number of participants at the event had specific questions regarding the capacity of the grid, and the need for investment vs flexibility and active network management. Questions included: **(E019)**

    - Northern Powergrid's heat maps show over half of the substations red or amber – is there a plan to invest to make more substations green, or is Northern Powergrid relying on active network management?

    - Are their flexibility incentives to reward companies that reduce demands on the grid (i.e. council car park lighting reductions etc.)?

    - Is flexibility more expensive than traditional reinforcement?

    - Come community groups give up because of a lack of connectivity – are there any plan to invest to improve this?

  - How do peer-to-peer energy markets fit into the plan?
  - Does moving to a decentralised system represent a significant shift in how Northern Powergrid utilities its assets – will it have an impact on Northern Powergrid's traditional business model?

- Headline results from 2023-2028 connections engagement showed that although customers were willing to be flexible with their electricity usage many also highlighted that it may not be practical to do this on a day to day basis. Some expressed that they felt the small contributions they made as an individual would not make a difference. **(E024)**

- In this engagement, Generators gave clear indication that they felt it was vital Northern Powergrid invest in their infrastructure, highlighting that the expected surge in low carbon technologies, especially EVs would cause issue without investment. Generators highlighted that they felt it was vital for Northern Powergrid to be more proactive and share more information in regards to this. **(E024)**

- Across contactors and consultants there was a clear view that Northern Powergrid's key priority for the future would be to ensure they invest in their network in order to guarantee that the infrastructure they have in place is ready for facilitating the transition to net zero. **(E024)**

- Findings from interviews with rural customers demonstrated that the majority of rural consumers anticipated an increase in their energy consumption over the next ten years. The most commonly cited reasons for this were the potential proliferation of electric vehicles and an increased dependence on smart appliances or other electrically powered devices. **(E036)**

- Many of these participants expressed concern that the network would be unable to withstand an increase in electricity usage, citing their own experiences of issues with the network, the prevalence of new builds across the Northern Powergrid region, and increased domestic energy consumption as a result of the COVID-19 pandemic. **(E036)**

- Nearly all participants interviewed supported the development of a smart energy network on the basis that it would lead to reduced costs for consumers and would create environmental benefits due to the reduction in wastage. Several interviewees also felt that it was sensible for Northern Powergrid to embrace emerging technologies to enhance the efficiency of the network. **(E036)**

- Overall, rural customers were happy to support the development of a smart network as long as it did not affect network reliability, particularly for those with more inflexible consumption needs. While many customers felt that reliability was more important to them than potential cost- savings, others welcomed a reduction in costs as they felt any impact on reliability would be minimal. **(E036)**

- On our call with National Grid, they said that capacity for electric vehicle charging is key to facilitating their uptake and increasing owner/driver confidence in EVs. Where capacity is provided alongside motorway service stations, it could come either from National Grid or a DNO (depending on the optimum solution in each location) - it is important to work together on developing solutions. Based on the work done for Project Rapid, optimal road network planning would be providing an electric vehicle charging station for every 50 miles. **(E128)**

- Funding for infrastructure could provide capacity for other low carbon projects/installations e.g. solar farms and site tenancy duration would not be a barrier if the funding for capacity is allocated centrally - hence it can provide an economic stimulus for a green recovery. **(E128)**

- At our Stakeholder Panel end of year event, one participant talked about the capacities on new housing stock – saying that we're seeing that capacities are quite a bit lower than what you'd expect on a standard 80s/90s build - the actual electricity capacity requirement is significantly down which leads us to think you can do more with what's in the ground at the present time. **(E200)**

- The stakeholder also asked what is being put on those networks that can support the DNO when additional capacity is needed. Our networks are in a good position - it's a matter of how we can help Northern Powergrid in terms of flexibility. **(E200)**

- In our bilateral with the ESO, they agreed our approach to the DSO initiatives we shared is sensible and provided insights which helped clarify some of our initiatives further. We agreed to continue to engage with them on an ongoing basis. **(E313)**

- In our bilateral with a transport provider, they stated they do not regard themselves as able to provide flexibility as it would have an impact on their schedules. **(E318)**

- A stakeholder asked if Northern Powergrid will invest in copper in 'challenged parts' of the network or use flexibility. **(E311)**

- A stakeholder said flexibility on generation slows down decarbonisation as it restricts it. **(E317)**

- Attendees wanted to explore link between new connections agreement contracts and DSO type services and whether there should be some inclusion of future flexibility services, such as ODFM, in new connections arrangements. **(E086)**

    - Stakeholders prioritised advanced notice of planned outages and having contact details for relevant staff as most important info Northern Powergrid can provide.

    - Regarding planning outage information priorities, stakeholders prioritised having options to reduce outage impact and wanted a better process for updating site details.

- An innovative energy supplier **(E227)** believed that transaction costs will be very high for low voltage (LV) flexibility, and that it is likely aggregated LV flexibility will be used to resolve issues on high voltage (HV) network, instead of LV flexibility solving 'problems' on LV network; or disaggregated LV flexibility providing these solutions. They also expressed that flexibility providers have a poor understanding of the system needs for flexibility on the distribution network: firstly, how localised they are, and secondly, where specifically they are or will arise.

- Investment from Northern Powergrid to get the grid ready for the net zero transition was of high value to the group. Stakeholders were keen to understand what this investment might look like in terms of location and technology so that plans and projects such as community charging hubs can be aligned with this. They were looking for policy statements or long term planning positions that would provide this detail. There was also a clear desire from local authorities to bring Northern Powergrid to the table to be part of the conversations around future infrastructure required to support the LCT roll out from the start. **(E276)**

- In one of our bilateral meetings with a North East MP, they were sceptical about flexibility as a solution to reaching net zero. They said: '[flexibility solutions] are fine on paper but not in real life - changing the way people do things and earning money sounds good but won't work in practice.' They thought that the only solution was a bigger network. The participant favoured option E for decarbonisation on the basis that we have to deliver net zero however they said that there had to be 'absolute transparency' about what the money is used for. They also asked what other options there were for not passing all the costs on to the consumer. Their view was that the costs should not all be passed on to domestic use and that it is emissions from industry that are the big issue and need to be tackled first. Balancing the ambition to deliver net zero with the cost impact for customers was frequently raised by elected representatives, both MPs and councillors. Whilst many personally favoured option E, they highlighted the importance of considering the associated bill impact on those in fuel poverty and in the most deprived areas in their regions, for whom climate change was not on their agenda. A number of council officers raised that whilst the bill increase was not much in isolation, the question is whether it is affordable in the wider context of everything else. For example, one council mentioned that they would be increasing council tax this year, as well as referencing high unemployment as a result of the pandemic, pay freezes and other bills also increasing. **(E270)**

- Stakeholders expressed concern about the challenges involved in changing customer behaviour around flexible energy usage, whilst also highlighting that similarly significant behaviour shifts have been possible in the past, for example around plastic bags or during the pandemic. Stakeholders note that behaviour change relating to heat pump technology will be very difficult, as people are satisfied with the immediacy of gas boilers. **(E331)**

- One stakeholder suggested that it would be preferable for the DSO to control how flexibility is issued and controlled, but that Ofgem may not allow this. **(E331)**

- Stakeholders stressed the importance of investment and collaboration to the decarbonisation process and questioned the extent to which decarbonisation processes with DNOs and Northern Powergrid are being coordinated. **(E331)**

- Stakeholders asked about the extent to which Northern Powergrid envisions itself as having a role in encouraging greater flexibility amongst customers. **(E331)**

Collaboration and innovation is needed to achieve the net zero target

- One participant at the Humber net zero leaders forum felt that one key way in which Northern Powergrid could help the council was in relation to understanding what the internal architecture of the network needs to look like or how it can be developed within an urban area. As more power is generated in local urban areas and is used for buildings, the participant wanted to understand how the additional capacity could be shared more effectively to increase the resilience of the local network and to take some of the pressure off network reinforcement. **(E011)**

- 72 per cent of young people are comfortable or very comfortable with the sharing of street-level data (for example, to look for common trends and patterns in energy usage within a village or town) **(E054)**

- 64 per cent of young people were comfortable or very comfortable with the sharing of low-level power consumption data (e.g. peaks and troughs in power usage by an individual household during the day). **(E054)**

- The SME panel recognised that customer behaviour could be changed by innovation. **(E010)**

- A participant in the SME panel suggested a collaboration between Northern Powergrid, Ofgem and Energy Saving Trust to educate consumers on the benefits of being flexible. **(E010)**

- A representative from Hull City Council said there was a need to join up energy system planning and spatial planning. They suggested Northern Powergrid should be having strategic discussions with Highways England about how it could use the groundwork for this as an opportunity to upgrade the network – it might be a way of getting significant additional capacity into Hull. There needs to be greater sharing and collaboration between Hull and Northern Powergrid so that Hull has more of an understanding of the energy requirements of its plans and whether there is sufficient network capacity or if there will need to be reinforcement. Hull is a stock retaining authority i.e. it owns all of its council housing stock, and has a rolling programme of energy efficiency measures. **(E310)**

- BEIS were keen to explore the impacts of heat pumps on electricity networks and the potential ways to work collaboratively to ensure smooth roll-out of low carbon heating – their target is for heat pump installations to reach 200k heat pump installations per year by 2025. **(E130)**

- At the North Yorkshire net zero leaders forum, one participant queried slides in the presentation that related to using smart technology to connect generators with consumers, and how this works in reality when there is more load on the network than generation. **(E012)**

- The Newcastle City Council were keen to explore ways we could share data with each other more actively and in real time. There is a significant amount of modelling and spatial analysis undertaken by NCC, and we have identified some immediate areas for collaboration or data sharing. **(E134)**

- Future energy participants at the climate change adaption technical panel said they would like to see more detail on how we use assets in network operations and how the type of technology we use is changing **(E109)**

- We took part in two Department for Transport workshops, which they organised to inform their Transport Decarbonisation Plan, as outlined in their report 'Decarbonising Transport: Setting the challenge', published in April. With wide range of stakeholders in attendance, the key asks of government was to set a clear direction for

decarbonising transport, continue financial support for low carbon transport, and the need for a holistic policy which also includes energy. It was recognised that modal shift of transport use is required, and local areas have a role in facilitating this too. Scrappage schemes that provide 'mobility credits' which can be used towards public or active transport (in addition to purchasing a new private vehicle) were suggested. **(E309)**

- Across the region, collaboration is an important, recurring theme. Participants at the South Yorkshire and Northern Lincolnshire net zero leaders forum felt that Northern Powergrid should work more closely with combined and local authorities as well as energy dense industries to understand their plans for the future, to enable Northern Powergrid to plan their network reinforcement more effectively. **(E014)**

- At West Yorkshire net zero leaders forum, there was clear interest from these groups in having practical questions about Northern Powergrid's pathway to decarbonisation, particularly around capacity, flexibility generation, and storage. Stakeholders made a range of comments and questions around how Northern Powergrid is collaborating with different organisations. These centred on **(E016)**:

    - linking up with local gas networks;
    - working with zero carbon solutions businesses to focus energy saving schemes in places where the network is stretched;
    - engaging with Energy Systems Catapult (on LAEPs);
    - working with the voluntary sector to help communities and engage the fuel poor; and
    - working with community organisations to lobby for investment / policy drivers.

- On a call with the BEIS regional energy hub, stakeholders said data sharing has been very useful and good, but it needs to progress into collaborative decision-making. They believed it would be worthwhile for DNOs and others to share investment pipelines and bring together investment decision-making organisations in a conversation group (LAs, LEPs, utilities). This could be an extension of BEIS energy hub's remit to set the mandate - the conversations could then take place at different levels or be managed regionally. **(E131)**

- In terms of data and digitalisation, an internal participant made the comment that they would need to be convinced of data security and data ownership arrangements before being willing to engage in digitalisation of something so fundamental as electricity supply **(E189)**

- Another discussed a specific project that they are working on which is set to trial different types of technologies within their sites and using them as 'living laboratory trial sites' so they can bring in different technologies at different time frames and look at how they interact. They felt that this could help trialling potential solutions for the transition to net zero but expressed concern on whether this would have a disruptive impact on the local network and asked if this type of work had been done elsewhere and/or whether they could temporarily go above their current capacity agreement to trial such technologies. **(E012)**

- At the North Yorkshire net zero leaders forum, one participant queried whether there was a 'pushback' of future planning for all DNOs in terms of where and what they can invest in and whether this will ease as DNOs transition to DSO. They expressed an interest in starting to do smart services work with the DNO but has found this difficult as one part of the DNO was keen to engage with this but when the application was submitted there was pushback. **(E012)**

- South Tyneside Council are looking at abstracting heat from flooded abandoned mines in a local village. A participant commented that there were coal mines across the region, so felt this was something Northern Powergrid should look at. They added that in one of the town centres, the energy centre will be comprised of abstraction of heat from mines and low-cost cooling from the River Tyne estuary, the gasification of waste wood to turn it into syngas to run CHP engines, PV cladding for the energy centre, PV rafts within Tyne dock to generate electricity and PV canopies in appropriate car parks for connection of vehicles to charge up. They suggested that there was a lot of technology out there not reliant on electricity and that Northern Powergrid should be looking at generating electricity from resources. **(E013)**

- In our two community energy events, stakeholders asked for more support around community energy in rural areas, training around delivering energy efficiency advice, and more on how Northern Powergrid can invest in the network ahead of need to achieve net zero, so these should be a priority for Northern Powergrid in 2021. As well as more forums, stakeholders would like Northern Powergrid to support them with innovation projects, funding opportunities and energy efficiency training in 2021. **(E136)**

- At the net zero leaders forum, one stakeholder queried whether hydrogen featured in Northern Powergrid's future business plan, referring to how the government will lay out its hydrogen strategy in May 2021. The stakeholder would like to see hydrogen play a part in decarbonisation. **(E015)**

- Another stakeholder felt that Northern Powergrid could play a role in supporting ambitions to achieve net zero in farming, particularly looking at livestock farming which has specific power requirements. There is the potential to decarbonise agriculture through energy profiling and integrating renewable energy into that. They stated that they were looking to do this with input from Northern Powergrid on how best to integrate into the grid. They referred specifically to pigs that use a lot of energy (e.g. needing temperatures up to 27 degrees when young, and then needing to be cooled down to 18 degrees when older). These energy requirements are met by electricity, as there is typically no gas heating. **(E011)**

- Cost effective decarbonisation of the rail sector poses a significant challenge, particularly with regard to the interplay between fixed infrastructure and mobile infrastructure costs. We are in discussion with a train manufacturer and power supply solutions' provider for the rail sector to develop a joint understanding of how to optimise the fixed and mobile costs, including the train, the catenaries, the rail supply and the electricity network. **(E308)**

- The National Farmers Union had identified the opportunities for using electric farm machinery as a storage asset out of its active farming season. We are considering ways of using this for resilience and inter-seasonal storage in rural areas. **(E314)**

- Technical experts believed that the roll-out of smart, community-level energy solutions will accelerate net zero transition and improve energy efficiency. **(E315)**

- A hydrogen producer mentioned they were developing a high energy density hydrogen storage solution with associated fuel cell for electricity production and electrolysis for hydrogen production. This has potential to offer solutions for both low carbon mobile generators for restoration and inter-seasonal storage. We are continuing to engage with them as they develop their thinking. **(E316)**

- A housing association representative mentioned they were involved in innovation trials with other DNOs and interested in creating Virtual Power Plant/peer-to-peer trading and community energy. As a result of trials, they have 12 months of solar and battery data they could share. **(E139)**

- The stakeholder from a housing association was interested to continue strategic engagement on decarbonisation – forecasts, flexibility, and energy system transition. **(E139)**

- At the 'A force for good – Creating holistic sustainability strategies for the North deliberative roundtable', we asked participants what Northern Powergrid should focus on in the medium term (2023-28) in terms of sustainability **(E020)**. Stakeholders were able to select up to three priority areas:

    - 100 per cent voted for green recovery and levelling up – investing to support economic recovery, creation of green jobs and development of skills;

    - 81 per cent voted for supply chain – working with our suppliers and contractors to amplify positive outcomes:

    - 69 per cent voted for enabling net zero – facilitating (or leading) decarbonisation in the NE and Yorkshire; and

  - 69 per cent voted for reducing pollution – minimising impact from our own activities (oil loss, waste etc.)

- We then asked what Northern Powergrid should focus on in the long term (from 2028 onwards) in terms of sustainability. Stakeholders were able to select up to three priority areas: **(E020)**

  - 75 per cent voted for reducing our environmental footprint;
  - 69 per cent voted for circular economy; and
  - 69 per cent voted for leading to achieve net zero targets.

- Participants in the session were interested to hear about Northern Powergrid's sustainability proposals and enthusiastic about discussing their own organisation's approaches to sustainability. A few participants commented that there appears to some commonality between their own organisations and Northern Powergrid's sustainability strategies, without specifying what these areas of commonality are. One participant also questioned how Northern Powergrid plans to balance its social, economic, and environmental priorities within the proposals, asking in what kinds of situations the benefits in one area would outweigh potential benefits in another. **(E020)**

- Participants provided examples of what their organisations are currently doing in relation to environmental sustainability, including **(E020)**:

  - Programmes aimed at flood prevention and ensuring reliable and resilient water services;
  - The use of carbon modelling to inform strategy and policy;
  - Setting ambitious carbon reduction targets, for example, Northumbrian Water attempting to reach net zero by 2027;
  - Strategies aimed at improving energy efficiency in homes and reducing the costs of low carbon technologies, with certain projects specifically targeted at disadvantaged areas or those considered vulnerable;
  - Conducting research on a range of sustainability issues, including those related to construction methods, land management and the use of sustainable materials; and
  - Focussing on the idea of a 'legacy' when managing projects, in terms of what is left behind in a community once a project is completed.

- A participant mentioned there was interest for the 'community to buy grid', however it was unclear if that is only for purposes of installing a heat network or running a local electricity network. **(E311)**

- In terms of collaboration, an automotive producer **(E188)** has decarbonisation high on the agenda, it has invested heavily in onsite renewable generation, and its business plan is linked with uptake of electric vehicles (EVs) – looking at vehicle to grid opportunities and other distributed generation. They are looking for messaging alignment with Northern Powergrid in engaging with government policy, whilst supporting our 2023-2028 plan. Charging reform presents significant challenges to them, with the Targeted Charging Review (TCR) set to land them in the top 'charging band' for similar sites (EHV-connected) and therefore almost certainly with the highest fixed charge. Lastly, they also mentioned they are thinking about the role of IDNOs, in relation to the discounts applied to customers. The automotive producer appreciated that this was not in our scope for 2023-2028 and would need to be a policy decision, if our charging methodology was to allow lower costs for certain 'types' of customer.

- Northumberland County Council was keen to partner with Northern Powergrid on projects where the two business plans align and they see a lot of overlap. A participant highlighted that a key part of the devolution deal was to become a rural exemplar of how things can be done and that Northumberland are keen for Northern

Powergrid's thoughts on innovation projects. They said the council would be doing a lot on installing charging points up and down the A1 and on artery routes. **(E310)**

- Newcastle University and NGN were looking at ways to decarbonise heating in a North East village. This developed into a joint trial where natural gas will be replaced with either hydrogen or electricity for heating and cooking developing understanding for the transition to low carbon heating. **(E307)**

- Yorkshire Water mentioned they were planning to discontinue production of biogas at one of their sites and will be installing solar PV instead - private wire considered - and they could potentially add extra capacity if that could be used in the surrounding area. **(E222)**

- At a Northern Powergrid Local Authority Forum on collaborating for a local green recovery, the role of hydrogen vs electrification was discussed. The potential role of hydrogen in decarbonising heavy vehicles and heating was mentioned, with participants questioning whether hydrogen would be a viable decarbonisation option soon enough. **(E262)**

- In our bilateral with a smart meter company, participants outlined customers are interested in co-locating solar PV and storage. We have forwarded our (publicly available) NIA Distributed Storage and Solar Study (DS3) findings to them to allow them to best frame their development of such installations **(E306)**

- During the Northern Powergrid IDNO Workshop, the following points were raised **(E263)**:

    - IDNOs would like more communication and information-sharing, e.g. on best practices and innovation, and related to transition to DSO. IDNOs work closely with ICPs, but less so with DNOs.

    - Joined-up network planning doesn't happen because the relationship at DNO/IDNO boundaries is static (not dynamic like ESO/DNO) via a fixed kVA in the bilateral connection agreement. There is also no incentive for the IDNO to hand back unused capacity to the DNO.

    - More commonality and consistency would be welcomed – common minimum standards e.g. for network design would be welcomed by IDNOs perhaps developed through formal cooperation between the ENA and the INA (Independent Networks Association). Ideally all customers should have the same overall network experience e.g. on network performance, decarbonisation and through DSO, but there are 15 IDNOs and 300 ICPs. The ICPs are not all partnered with IDNOs - ICPs compete on installation price and then offer up assets for adoption.

    - The need for a two-way data sharing mechanism to allow exchange of network data between DNOs and IDNOs on parts of the network that have a measurement devices available for example on a 33kV substation was discussed.

    - IDNOs wanted to understand arrangements and communication required for them to engage with the flexibility market (also via supplier or flexibility provider) to allow them to provide services to a DNO, and whether there were barriers to providing flexibility services.

- Several stakeholders, local authorities and installers, said that it would be useful to have greater visibility of the HV network (perhaps through enhancements to AutoDesign) to identify the best possible locations for projects that will keep costs down. It would enable Local authorities to identify an opportunity and then engage a commercial organisation around the delivery of a charging hub or forecourt at that site. **(E276)**

- A stakeholder commented that heat maps could share a greater level of detail around substations. They said that capacity wasn't the only determining factor about whether a connection would be possible. They felt it would be useful to append further information about each substation such as whether the board can be expanded, whether the switchgear needs replacing or if there was a spare circuit breaker bay, for example. **(E276)**

- There was suggestion that better access to Northern Powergrid system planners would be useful to help identify sites. Northern Powergrid said they were happy to have these conversations. **(E276)**

- There was debate around what future EV charging infrastructure should look like. It was felt that Northern Powergrid had a role In helping to establish what the best model would be going forward – for example should councils be concerning themselves with rolling out EV charging points into 8`estates with no off street car parking or focussing on community hubs? **(E276)**

- A stakeholder commented that quicker and more innovative connections for projects like charging forecourts would be welcome to help facilitate the LCT roll out. **(E276)**

- It was suggested that Northern Powergrid could take a more active role in helping customers join projects together to create efficiencies in power sharing, heat sharing, or sharing upfront costs. **(E276)**

- 34per cent of the Council's emissions are down to their fleet. Currently, 5per cent of their fleet is electric and they are looking to increase this to 20-25per cent. The representative wanted reassurance that there would be the grid capacity to support this. They run a lot of HGVs which they think will ultimately probably be run by hydrogen. **(E270)**

- When engaging with a community energy group, it was discussed that: **(E218)**

    - In the near-term, they are planning to connect a solar farm (and/or wind turbine). In the long-term, they are interested in local supply of electricity - matching the production from the solar PV farm they are looking to install with the heat demand in the local village.

    - They are still at the scoping stage and proceeding with the feasibility study funded by their Rural Community Energy Fund grant; they have applied for a connection cost estimate and wanted to discuss the current infrastructure capacity for the export of generation to understand it better.

- At a follow-up meeting with the Durham Energy Institute (DEI) **(E217)**, it was discussed that:

    - The DEI regularly partner with local authorities and are just beginning a small project looking at the impact on carbon emissions and energy demand of the shift to home working during the pandemic. The project is to complete in June 2021. It was agreed they would share the outcomes to potentially inform the next iteration of DFES.

    - The DEI is always keen to work with partners on data analysis if there are any areas of research that Northern Powergrid would like to explore with their collected data.

- Stakeholders commented that there may be opportunities for greater collaboration with Northern Powergrid around reducing energy consumption. **(E331)**

- Stakeholders also expressed concern that customers may not be happy with the lack of flexibility afforded by heat storage technologies. They commented that new heat storage solutions may need to be developed that give customers' greater control when they need heat. **(E331)**

- Stakeholders discussed the opportunities that hydrogen energy could bring to the decarbonisation process, particularly regarding energy consumption related to housing and mobility. They suggested that hydrogen can play an important role in offering flexibility within the energy network whilst also enabling collaboration between energy networks. Stakeholders discussed the ideal location for electrolysers in relation to renewable assets and questioned how much flexibility there is around the placement of electrolysers. **(E331)**

- One stakeholder suggested that instead of asking how much electrification, we should be asking how much hydrogen, as the deployment of hydrogen energy is more uncertain. **(E331)**

- Stakeholders commented that they would like to see networks making more data publicly available, such as information about present or future network constraints and injection points. They suggested a data tool combining Northern Powergrid, Northern Gas Networks and National Grid data could assist developers in assessing project viability, particularly in relation to renewable energy or hydrogen developments **(E331)**

- One stakeholder questioned whether carbon ion batteries for use in transportation have been included in Northern Powergrid's modelling. **(E331)**

WAVE 3 – refining and finalising our plan

– In wave 3 we tested and refined our plans and priorities wherever feedback was inconclusive, where we had differences of opinions, or where new areas had areas had emerged. This stage included our business plan acceptability research with consumers and stakeholders. The four central themes that were of most interest to our stakeholders with content captured in the detailed sections below the table are:

- **Decarbonisation pathways** – informing the pace of change required to reach net zero emissions in the scenarios and investment section of our plan;
- **Flexibility first approach** – informing the market enabling actions in our DSO strategy and flexibility solutions incorporated in in our decarbonisation investment section;
- **Open data and digitalisation** – informing the activities put forward in our DSO strategy but also of relevance to our Digitalisation Strategy and Action Plan; and
- **Collaborative whole energy system** - informing the whole system section of our plan.

We ran 41 events, engaging 2,463 stakeholders in wave 3 covering decarbonisation and these events are listed below:

Engagement reference	Name	Segment	Method	Date	No engaged
E228	Meeting with Cadent	Utilities	Meeting	05/02/21	1
E259	Northumberland County Council	Regional politics	Meeting	11/02/21	5
E229	Heat pump manufacturer	Future Energy	Meeting	16/02/21	3
E251	Willingness to Pay quantitative prioritisation – Choice Experiment	Consumers	Online survey	17/02/21	1,908
E301	Heat Pump Association	Future Energy	Meeting	18/02/21	1
E231	Flex provider insight growing customer flexibility - flexible generator	Future energy	Meeting	02/03/21	1
E232	Flex provider insight growing customer flexibility – National Grid ESO	Utilities	Meeting	03/03/21	1
E233	Flex provider insight growing customer flexibility - energy supplier	Utilities	Meeting	03/03/21	1
E234	Flex provider insight growing customer flexibility – commercial aggregator	Future Energy	Meeting	04/03/21	1
E235	Flex provider insight growing customer flexibility – technology company	Future Energy	Meeting	04/03/21	1
E249	Northern Powergrid Future Service Design Workshop	Future Energy	Workshop	04/03/21	15
E264	Northern Powergrid Local Authority Forum: Net zero action planning	Regional politics	Meeting	11/03/21	22

Engagement reference	Name	Segment	Method	Date	No engaged
E236	Meeting with Energy Systems Catapult - Heat-as-a-service and flexibility	Future Energy	Meeting	15/03/21	3
E237	Flex provider insight growing customer flexibility -- energy supplier	Utilities	Meeting	15/03/21	1
E282	Durham County Council's Climate Emergency Strategic Board - summary two meetings	Various	Meeting	18/03/21 and 23/04/21	15
E252	Northern Powergrid Citizens' Panel, Round 1: Asset Resilience	Consumers	Panel	26/03/21	49
E238	Meeting with the City of York council and NGN	Regional politics	Meeting	01/04/21	2
E239	Meeting with BEIS local energy team	Central government	Meeting	07/04/21	1
E240	EV charge point installer bilateral meeting	Future Energy	Meeting	12/04/21	1
E224	Flexibility Service Provider bilateral meeting	Future Energy	Meeting	21/04/21	1
E302	Flexible generator	Utilities	Meeting	22/04/21	1
E280	Meeting with the York & North Yorkshire LEP and NGN	Utilities and Regional Politics	Meeting	22/04/21	2
E226	National Grid ESO	Utilities	Meeting	23/04/21	1
E281	Flexibility Services Dialogue - commercial aggregator	Future Energy	Meeting	23/04/21	1
E283	Carbon Trust - Hull and East Riding decarbonisation pathways modelling discussion	Regional Politics	Meeting	28/04/21	3
E284	Flexibility Services – EV charge point installer	Future Energy	Meeting	28/04/21	1
E258	Citizens' Panel, Round 5: Decarbonisation	Consumers	Panel	29/04/21	45
E285	Meeting with West Yorkshire Combined Authority	Regional politics	Meeting	06/05/21	4
E324	Citizens' Panel, Round 6: Final session	Consumers	Panel	07/05/21	47
E286	Catch-up meeting with the NE LEP	Regional politics	Meeting	19/05/21	3
E305	Community Energy Stakeholder Panel - feedback on CVPs	Future energy stakeholders	Panel	21/05/21	7
(CR424)	Intergenerational Research – Part 1	Consumers	Research	01/03/2021	40*
(CR401)	Decarbonisation of Heating event	Various stakeholders	Workshop	25/03/2021	49
(CR402)	Decarbonisation of Transport event	Various stakeholders	Workshop	25/03/2021	67
(CR403)	DG Owner Operator forum	Various stakeholders	Forum	30/03/2021	21

Engagement reference	Name	Segment	Method	Date	No engaged
(CR422)	Rural Community Energy training session – getting to net zero	Future energy stakeholders	Workshop	22/04/2021	55
(CR429)	Transport for the North and northern DNO meeting	Various	External event – meeting	28/04/2021	10*
(CR404)	Meeting with a flexibility solutions provider	Future energy stakeholders	Meeting	10/05/2021	1
(CR406)	Meeting with a charging solutions supplier	Future energy stakeholders	Meeting	13/05/2021	2
(CR425))	Citizens Panel - Final session: Innovation proposals	Consumers	Panel	13/05/2021	45
(CR423)	Community Energy training session – energy efficiency	Future energy stakeholders	Workshop	20/05/2021	25

*A best estimate of number of people engaged where this information was not recorded

Decarbonisation pathways

We need to prepare for net zero with a planning approach that is responsive to deal with an uncertain future (Scenarios and Investment).

- At round one of the Northern Powergrid citizens' panel on asset resilience, many SMEs felt net zero should be 'top of the agenda'. Some, however, felt that the pressure to decarbonise should be on the motor industry rather than the network and that net zero should not overshadow everything else, though they believe this isn't happening with Northern Powergrid. **(E252)**

- At round five of the Northern Powergrid citizens' panel on decarbonisation, participants had mixed views about Northern Powergrid's role in supporting local authorities, businesses and domestic customers to decarbonise. On the whole, participants agreed that Northern Powergrid could use their technical expertise to support where possible but that it is not necessarily Northern Powergrid's role to do so. Consumers felt that this responsibility lies with government, businesses themselves and energy suppliers but that Northern Powergrid should support where possible in a capacity that does not take focus away from its core remit. Some consumers however, felt that Northern Powergrid do have a responsibility to support where they can. **(E258)**

- The majority of participants felt that Northern Powergrid have found the right balance in terms of ambition in this area, adding that they appreciate the flexibility and consider it to be sensible. **(E258)**

- The vast majority of participants felt the bill impact linked to decarbonisation was justified, and that they would be happy to pay it. Some consumers did acknowledge that whilst they are happy with the bill impact, it may have implications for more vulnerable customers. **(E258)**

- Participants had mixed views about whether Northern Powergrid had a role to play in supporting local authorities to decarbonize **(E258):**

    - Some felt that Northern Powergrid's main role should be as the 'facilitator of the A and B roads' but that decarbonisation is a shared responsibility, and they have no problem with Northern Powergrid being a reference hub as part of a shared network.

    - Others felt that Northern Powergrid does have a role to play in supporting local authorities to decarbonise but that it should be local and national government driving decarbonisation, while Northern Powergrid's technical expertise can be useful as a sounding board.

- Some participants cited Northern Powergrid's knowledge as the reason they have a responsibility to share that where they can, particularly to support local councils who are facing budget cutbacks and may need that extra support.

- Some SME consumers specified that they envisioned Northern Powergrid to work with contractors and suppliers on technical advice, rather than working directly with the local authority themselves.

- Domestic consumers, for the most part, felt that it was the responsibility of the business themselves to seek out information on decarbonisation, but that they would be happy for Northern Powergrid to support the businesses if they were asked. Some felt that it would be useful for Northern Powergrid to work with businesses in this way but that it isn't necessarily Northern Powergrid's responsibility to do so.

- SMEs felt that Northern Powergrid does have a responsibility to support local businesses to decarbonise. They felt that Northern Powergrid should tackle this as independent experts giving impartial advice on how best to decarbonise.

- Participants were divided on whether the responsibility to help domestic consumers decarbonise lay with Northern Powergrid or their supplier. Some felt that Northern Powergrid should take on this role, especially for vulnerable customers, but a few participants felt that customers should go to their supplier first, and Northern Powergrid second, but added that not everyone is aware of Northern Powergrid to be able to do so. Others felt concerned about the cost of decarbonisation and suggested that government should be supporting those people who can't afford to decarbonise, perhaps even publishing a list of those places that are trustworthy and can help domestic customers decarbonise.

- Some SME consumers reiterated the above but also added that Northern Powergrid should be pressuring government and that putting the onus on domestic consumers to decarbonise, takes the pressures and spotlight away from big corporations.

– At a meeting with a major heat pump manufacturer to discuss credible heat pump forecasts and collaborating to enable more rapid heat pump uptake in the region it was noted that our DFES heat pump uptake scenarios were credible **(E229)**:

    - Government's target of 600k heat pumps p.a. by 2028 and the more ambitious Climate Change Committee's target of 1 million heat pumps p.a. by 2030 were both deemed credible.

    - It was said that heat pumps can be built and supplied quickly.

    - In near-term, this will be driven by housing standards and social housing; for the private sector retrofit, price parity and more roll-out mechanisms will be required from government.

    - However, the stakeholder was conscious that 'too fast, too soon' approach might result in the households regarding these systems as an inferior outcome for themselves.

– On existing heat pump statistics of 4000+ heat pumps installed in our region to date (source: Renewable Heat Incentive installation reports), they believe they are inaccurate/misleading as the RHI information would list heat pump servicing multiple properties as one installation. A recent installation of HPs to service an apartment block in our region was mentioned as an example. **(E229)**

– At a meeting with the Heat Pump Association (HPA), they believed our DFES show credible range of heat pump uptake scenarios. It was noted that there was confidence that HP supply chain can deliver on heat decarbonisation, but some asks for the government remain - to address the need for heating system retrofit in existing properties, set a phase-out date for high-carbon fossil fuel heating (such as oil heating), facilitate installer training, and attain cost-parity among fuels. **(E301)**

– While some uncertainty remains around heating policy, the direction of decarbonisation policy sends a clear signal to the sector. HPA were encouraged by the developments in smart controls and Time-of-Use tariffs,

enabling flexible use of heating, however remain conscious that heat pump uptake timeline coincides with EV uptake timeline. Additionally, some heat pumps come with electric back-up. Both factors could contribute to increased local demand from the grid. **(E301)**

- The City of York Council LAEP could act as a 'pathfinder' for York and North Yorkshire **(E238)**:
  - Local area energy representation study has been commissioned by all LAs and the YNYLEP but it will only deliver a spatial representation of the current energy landscape; further work required to develop a LAEP.
  - To be considered how this work could be scaled to serve as a 'pathfinder' and if it would be replicable.
  - At least four decarbonisation scenarios would be considered - matching York & North Yorkshire LEP Decarbonisation Abatement Pathways; also to consider how it would interact with DFES and how networks can provide resourcing (system planning teams/engineers) to support it.
  - Development of a standard LAEP and stakeholder consultation could take up to 13-15 months and cost between £100-£200k. 3-4 months are provisioned for local stakeholder engagement.
  - The output would be delivered an interactive map, outlining the projects for the next 10 years. The next step from that would be to develop a local investment portfolio.
- Similarly, when engaging with the Northumberland County Council, they shared a summary of their decarbonisation action plan, which has now been approved and published (net zero target by 2030). Plan includes investment required and estimates jobs created. Key initiatives include **(E259)**:
  - Great Northumberland Forest

    Significant emissions' offset is planned to be achieved by carbon sequestration (afforestation).

    This leaves an estimated total of 709ktCO_2 to be reduced through other means – through partnerships, including with Northern Powergrid, and policies to reduce emissions.
  - Novel district heating schemes

    A feasibility study has been completed for a district heating scheme in Blyth, which would use mine water heat. Now looking for funding for techno-economic study.

    Looking at installing some heat pumps in council properties e.g. a leisure centre.
  - Roll-out of EV infrastructure

    On-street charging pilot with Connected Kerb will be a trial of six sites, each with three pairs of 7kW charging points.

    Decarbonising own fleet.

    Further infrastructure planning in process.
- Furthermore, they were very keen to explore synergies between trenching required to install fibre and to install new electrical connection, where properties are off the electricity grid. **(E259)**
- At a meeting with Cadent, they spoke about the LAEP-like plans developed for Greater Manchester area and being considered for an area of London. A potential collaboration towards a Local Area Energy Plan was discussed for South Yorkshire. **(E228)**
- During Climate Emergency Strategic Board meetings, the following were discussed **(E282)**:

  - Durham County Council was interested in developing a LAEP and was in conversations with potential delivery partner.
  - BEIS believes the Borderlands energy masterplan would develop a model approach to LAEP. They were therefore interested to understand how DCC's approach would differ.
  - Another stakeholder felt that clearly setting the parameters and goals of the actual LAEP work itself should be framed to identify opportunities that can be subsequently realised.

- A charge point installer believed that our DFES 2020 shows a credible range of EV uptake scenarios, especially in the near and medium-term (unless existing policy is rolled back or there are supply chain bottlenecks). They believed that it is possible that EV uptake could be accelerated even further if the residual value of petrol or a diesel vehicle diminished to the point where it became impossible to lease. They said there was much more uncertainty about EV uptake forecasts during 2040s and 2050s however. **(E240)**
- The charge point installer believed that the ratio of charging points to EVs could be around 1.1, with around 72 per cent of drivers having access to off-street parking and around 60 per cent expected to therefore charge at home. **(E240)**
- The installer welcomed the prospect of having a database to check whether services are looped as well as the new app as extremely useful; looped services were considered the biggest barrier to charging point roll-out. **(E240)**
- The installer echoed Northern Powergrid's reflection that there is quite a lot of activity driven by local authorities for public charging points, own fleets, and, in some cases, electrifying buses. They believed the business case for buses was already easy to make, as an electric bus is already cheaper to run. They felt LAs have 'a seeding role' in creating the momentum but private sector is better placed to deliver most of the public infrastructure – in the same way that a LA wouldn't install and operate a petrol station. **(E240)**
- Decarbonisation pathways modelling work had been started for Hull and East Riding aiming to complete it in the next couple of months. The stakeholders sought clarifications about our DFES and underlying assumptions. **(E283)**
- In terms of 'willingness to pay', decarbonisation was ranked third out of twelve (3/12) in terms of importance for domestic customers **(E251)**:
  - Prioritisation level is variable due to different visions of decarbonisation.
  - Generally seen as a high priority although often confusion about what it entails.
  - Customers value more tangible actions (e.g. flexible connections, EVs) as Northern Powergrid targets were bold.
  - High priority for younger generations who like ambitious targets.
  - Approach should be fair to all (e.g. vulnerable, rural, fuel poor).
- It is likely there has been some level of confusion between decarbonisation business plan performance area (ensuring our network enables others to decarbonise and meet their net zero targets) and the business carbon footprint' plan performance area ('reducing the emissions from our own business operations').
- Internal decarbonisation was ranked first (1 out of 12) in terms of importance of this business plan area for domestic customers, yet from all of the business plan areas, it also received the most conflicting views:
  - It is fundamentally a highly valued concept in principle as it was often linked with net zero.

  - When presented as part of road to net zero (i.e. carbon reduction in the network), it was highly valued. In the context of office carbon reduction (i.e. introducing low-emission cars into the fleet), it was valued less.

  - It is interpreted as a possible confusion over benefit to the business itself versus benefit to everyone.

- West Yorkshire Combined Authority (WYCA) mentioned capacity to enable local net zero targets remains a key topic of interest. WYCA are keen to input into the relevant 2023-2028 processes and hoping the new Mayor could attend Northern Powergrid's regional event. **(E285)**

- They were keen to understand Northern Powergrid's planning scenario better, i.e. whether it will accommodate their 2038 net zero target, whether any other investment is required which they could support or where Northern Powergrid could look for alternative funding sources like bonds and what additional evidence Northern Powergrid require for the completion of their draft 2023-2028 plan. **(E285)**

- In first session of citizens panel, some consumers had explained that they were been confused about bill impact but after attending the final session, they felt that this had been well explained and that they had a better understanding. This is demonstrated by the number of people who answered the question correctly in the session polls. However, this does suggest that communication needs to be clear as possible and understanding should be checked more frequently. **(E324)**

- The majority of consumers agreed that they liked the proposal of regional energy advisors in principle but there were some concerns around the logistics and delivery of this proposal. Consumers saw the value in this role, particularly for rural and vulnerable customers, but expressed concerns around whether two regional energy advisors would be sufficient. A few consumers suggested that there might be more cost effective ways of getting the information out, such as putting the information on the website or on customer bills. **(E324)**

  - In first session 34 consumers (75.5 per cent) said that they valued the investment into regional community energy advisers.

  - In second session 75.5 per cent of consumers (34 consumers) who answered this poll question said that they valued the investment into regional community energy advisers. The remaining 24.5 per cent (11 consumers) said that they did not.

- Most participants felt that the level of ambition of this business plan is suitable, and a number of consumers expressed that they ‘can’t fault it’ and are massively impressed with Northern Powergrid’s ambition. **(E324)**

- Participants expressed support for Northern Powergrid’s business plan and felt that it struck the right balance between ambition and value for money. All rated the acceptability of the overall business plan at 7 out of 10 or higher. Several participants added that whilst it is appropriately ambitious, it is also achievable, which they considered to be critical. Some referred to Northern Powergrid’s statement which lays out a commitment to ensure that no customer gets left behind. These participants queried how Northern Powergrid can ensure this, both in terms of business plan affordability and deliverability for vulnerable customers, and they suggested that a word such as ‘endeavour’ may be more appropriate. **(E324)**

  - In the first session, 41 consumers (91.1 per cent) said that they supported the level of ambition of the business plan. Consumers felt that the level of ambition is appropriate, and that whilst the plan is ambitious, it is also achievable.

  - In the second session, 91.1 per cent of consumers said that they supported the level of ambition of the business plan, with 2.2 per cent (one consumer) saying they did not. The remaining 6.6 per cent did not answer the question.

- Most consumers said that they felt that the £6 bill impact was justified. Consumers expressed their support for the work that Northern Powergrid has put into producing the business plan and felt that it is great value for money, particularly considering the work that will be done in terms of future proofing. However, whilst consumers agreed that the bill impact was justified, there were concerns about the impact on vulnerable groups

and whether it represented good value for money for them. Key to this was ensuring vulnerable customers and those living in fuel poverty aren't detrimentally affected.

- The majority of consumers expressed support for Northern Powergrid's overall business plan, with many adding that they felt it was excellent value for money. Consumers felt that the business plan struck the right balance and allows for changes in direction or adapting to changing circumstances. **(E324)**
    - In the first session, 41 consumers (93.3 per cent) said that they felt Northern Powergrid's plan was value for money, the remaining 3 consumers (6.7 per cent) did not answer that poll question.
    - In the second session, 39 consumers (86.6 per cent) said that they thought Northern Powergrid's business plan is affordable for customers. 3 consumers (6.6 per cent) said they did not and the remaining 6.6per cent did not answer the question.
- Consumers expressed respect for Northern Powergrid in bringing along their customers with this journey, adding that it feels like Northern Powergrid genuinely care about their customers. **(E324)**
  From the intergenerational research it was clear there was a limited understanding of Net Zero across generations, but also a gut reaction that the 2050 target was too distant. For most, this should come sooner. Upon deeper consideration there was concern that changes may be left to the last minute then panic/date pushed back. **(CR424)**
- There was no understanding of how net zero would be achieved (or awareness of legislation to reach the target). **(CR424)**
- The research highlighted physical barriers (e.g. pre-payment meters, listed properties). **(CR424)**
- When considered on a personal level, families have affordability concerns. There were also concerns about the state of economy and of personal finances due to COVID-19. (**CR424)**
- Small achievable goals were suggested as being more impactful and engaging (e.g. smaller, 5 year targets). **(CR424)**
- It was reported that adopting a flexible approach to electricity usage generally makes sense for all, however incentivisation must come in a variety of forms **(CR424)**. This includes:
    - Financial (i.e. money back, cheaper tariffs) is important for mid and older generations.
    - Convenience (being able to schedule energy use remotely) is most important for younger and mid generations.
    - Emotive (ability to track consumption/cost savings, messages about how individual behaviour saves the environment) is most important to inspire the younger generation
- Regarding net zero ready equipment, the gut preference was for net zero ready equipment to be installed now across generations. Doing it once was seen as more logical, efficient and saving money. There was some hesitation however. A need to prioritise affordability, especially during COVID-19, was mentioned most by mid generation. A minority (younger generation) questioned that if there will be improved technology in the future, was it better to wait? The younger generation were happy to pay more later whereas the older generation who were more minded to paying now. **(CR424)**
- When asked about the preference for paying for the infrastructure over 20 or 45 years, the older generation were more likely to say 20 years, so that the younger generation will benefit in the future (they were concerned about grandchildren having to pay more to get on housing ladder etc.). The older generation also had a general preference to pay off debt earlier rather than later. The mid-generation felt they will pay either way and were most likely not to voice a preference. The younger generation saw themselves as benefiting the most, so felt it was fair they pay more over the 40 years. They also prioritised affordability now (in COVID-19 context). **(CR424)**

- At the decarbonisation of heating event, the key focus of discussion was about network capacity and reinforcement and whether there is enough network capacity to support an increase in electrified heating applications. **(CR401)** Some examples of specific feedback and questions included:
    - "How is the main heat pump loading estimated for on the network. We're finding issues with the costs of network reinforcement required to connect, particularly on slightly larger developments that are using renewable heat, such as heat pumps. I would like to know more about Northern Powergrid's plan to address issues and what's their strategy going forward?"
    - "There are a number of things that need to be brought into play - I don't think people understand the energy landscape full stop. It's a complex area and not something that people have had to deal with in the past. Certain areas are better as they've had investment in the past, and other areas have different drivers. There definitely won't be one size fits all."
    - "We are hoping that prices will come down as gas prices start to increase and gas and electricity both level off."
    - "A lack of skilled engineers and knowledge is a big issue. There are many mistakes that can be made with a heat pump system that are very difficult to rectify afterwards. It's a bit like learning a language, you can say the odd sentence very quickly, but you're not fluent. We are concerned about the negative publicity for systems that are either costing too much or not actually heating properly and a lot of customers will blame the technology rather than the installation. It worries me that a lot of the schools and colleges don't run any renewable energy training, they're still rooted to oil and gas. That has got to change because there's no point in educating people how to fit oil and gas, when it's going to be banned in 2028. We must move away from fossil fuels training. Currently there is no public route, only private funded courses. We need to educate the kids that are coming through the system now, because they're the ones that will be doing installations in 10 to 15 years."
- There was also wide interest in heat pumps and the "shared loop" systems as discussed by a heat pump manufacturer who were part of the panel discussion. **(CR401)**
- There were high-level discussions about hydrogen and its role in the future of decarbonised heating. **(CR401).**
- Attendees across both the decarbonisation of heating and decarbonisation of transport events had a very broad range of knowledge about the subjects discussed and different expectations for the event. The format could be improved by holding workshops either with specific groups about these subjects, or about very specific themes within these subjects. **(CR401, CR402)**
- Network capacity and reinforcement were raised as concerns at the decarbonisation of transport event, particularly whether there is enough network capacity to support EV uptake. **(CR402)**
- There was less support for hydrogen where vehicles and transport are concerned and overwhelmingly stakeholders were in favour of "getting on with" electrification rather than waiting for a future technology. **(CR402)**
- Stakeholders in community energy training sessions clearly stated a desire to learn more about low carbon heat projects and retrofit, and wanted Northern Powergrid to support them to develop local heat decarbonisation strategies, including advice on heat pumps. **(CR422)**
- At the Community Energy training session on energy efficiency, community energy stakeholders reported wanting funding support to undertake further training as energy assessors, to enable them to support energy efficiency and fuel poverty alleviation in their communities. **(CR423)**
- In terms of renewable electricity generation, stakeholders would like Northern Powergrid to proactively support them to resolve network connection cost issues, and continue feeding back to Ofgem and government on their behalf. **(CR423)**

- At the two Community Energy training sessions, community energy stakeholders in the Northern Powergrid region expressed a need for targeted training on specific areas of community energy activity, and have valued training received on rural projects and energy efficiency. **(CR422, CR423)**

- In a meeting with Transport for the North (TfN) and other northern DNOs, development of a local pan-northern transport model was proposed and discussed. The model would combine future transport scenarios, demand for transport, and associated energy infrastructure requirements. This proposal received a lot of support from TfN's local partners as well as the DNOs on the call. **(CR429)**

Flexibility first approach

Key messages and topics were:

- Stakeholders supported our 'flexibility first' approach (network for net zero, DSO)

- We have a key role in developing local flexibility markets (DSO)

- At our future service design workshop, we engaged future energy participants on flexibility services and received a range of feedback **(E249)**:

    - make the service as accessible and user-friendly as possible;

    - publish information on flexibility markets, financial value, and carbon intensity and forecasted requirements; and

    - promote case studies for communities to follow and work on narrative and framing flexibility as a part of the net zero transition.

- In response to what Northern Powergrid's role is expected to be on flexibility, feedback included **(E249)**:

    - help integrate vehicle to grid charging (V2G);

    - support local balancing;

    - long term forecasts for constraints and flex value;

    - publish real time data;

    - help enable local peer to peer (P2P) trading; and

    - create a framework and easy to use interface.

- As to how can Northern Powergrid best support you to understand flexibility services, participants mentioned:

    - case studies and examples;

    - accessible information and data on its impact;

    - roadmap showing individual and community benefits;

    - carbon saving potential; and

    - should be app based and service focussed.

- At round five of the Northern Powergrid citizens' panel on decarbonisation, flexibility was discussed. Most participants support the concept of flexibility, even if they would be unwilling to use flexible tariffs themselves.

There are some concerns about the practicalities, cost implications and effectiveness of this approach – but on the whole, consumers appreciate the value of flexibility. **(E258)**

- Participants supported the idea of a 'flexibility first' approach but some were unsure how well this would work in practice. One example of this was whether it will become ineffective if too many people start using energy in off-peak hours. Others were concerned that this pushes the responsibility to decarbonise onto domestic consumers. **(E258)**

- One home energy storage company said their primary focus is 'behind the meter' optimisation of battery schedules. For them, flexibility is an additional revenue option on top of these core focus areas. When deciding whether to participate in providing flexibility they would look to evaluate the potential revenue gains from providing flexibility against loss of revenues from other activities. For a battery operator, the opportunity cost of providing flexibility is not just the time windows where flexibility is needed, but the lost time after that window to re-charge assets. **(E281)**

- In principle, the operator is open to providing any of the four standard flexibility products on Flexible Power. Which product(s) are most attractive will depend on where they are offered and the maturity of their asset portfolio. This will be specific to different zones and need to be considered case by case. Contracts with long lead times are attractive for early stage projects where asset investment is being considered. However, with a more mature asset base, more reactive products may be more attractive as they offer an additional revenue stream without having to commit significant asset capacity in advance. **(E281)**

- An EV charge point installer agreed that the primary flexibility market is market-driven customer flexibility, e.g. time-of-use tariffs. A secondary market will emerge from 3rd party signals, and responding to pre-existing network conditions. A tertiary market might appear in the form of DNO frequency response. They expect DNOs to publish information of where there is any clustering or constraints, and EV charge point operators would expect to bid in to provide flexibility services. **(E240)**

- They stated statistics show there is substantial flexibility potential throughout the day from vehicles plugged in and not charging. Their data also show an evening EV charging peak which is slightly later than DNO/system peak and another peak between midnight and 1:00 at night for those benefitting from off-peak electricity tariffs (and a morning peak around 9:00). **(E240)**

- During our engagement on flexibility services, the operator said they 'really want' to participate in DNO flexibility services but at this stage are uncertain about which markets they would be able to participate in. However, they should be able to participate given units are increasingly remotely updated and controlled and therefore have the capability to provide demand side response. **(E284)**

- The operator thought that the majority of charging point owners would be open to participating in flexibility services given it requires little to no effort from them with minimal disruption. The representative quoted figures that an EV driver would typically drive ~28 miles per day with a charge every three days for three hours or so. Therefore, adjusting a charging schedule overnight will cause very little disruption to the car owner. In many cases, end users may not be directly aware that they are participating in providing flexibility services. Rather, they will just have opted in to smart charging. **(E284)**

- The operator went on to say that the main obstacle to aggregators providing DNO flexibility at present is their lack of scale in specific geographies. As scale builds, they think aggregators are less vulnerable to 'postcode lotteries' than other classes of providers as their assets are spread over our region, it's just that they don't currently have asset density to offer significant flexibility at present. **(E284)**

- A large energy supplier **(E233)** expressed that they would want to see LV flexibility markets to defer reinforcement for LV circuits and use it to plan for efficient and well justified network expenditure. They also commented that flexibility is not a long-term solution, but you could rarely be wrong for using flexibility to defer investment solution.

- They are also predicting an explosion in flexibility when market wide half hourly settlement (MHHS) and advances in technology will lead to electric vehicles but are yet to be convinced that secondary markets (trading

in generation access) is going to be a real thing. Will be dependent on outcome of network charging reform. However, they also noted that MHHS is not mandatory for customers. Customer choice could mean that customers will categorise as:

  - inerts (i.e. non switchers);
  - peak users who don't want to be exposed; or
  - flexibility customers with EVs who think that there is value in them to shift peak.
  - It is unclear how many will fall into each case. **(E237)**

- Moreover, they said that LV visibility is key to development of local flexibility markets, and they want to see smart meter data used alongside new LV monitoring. They also believe that the point when flexibility should take off with supplied is when suppliers waiting for MHHS that will enable pass-through of costs that are borne by the customers **(E237)**

- Referring to neutral market facilitation, the energy supplier is seeking to train others on the use of the Common Evaluation Methodology so that they may better understand the methods we use to evaluate our options between network and customer. But more importantly wants to see more co-creation of solutions rather than DNOs charging ahead. Working groups through ENA Open Networks - using use cases for common things happening. Wants to see us sharing our use cases and think together with the market - test our understanding rather than assume. Also wants to see more of a separation in the sides of the business between the investment decision making and network/ customer solutions. They are in agreement with those assessing the need and those seeking customer solutions being in the same part of the business, but focus on the fact that the investment decision maker needs to make decisions transparent **(E237)**

- A commercial aggregator **(E234**) referred to a best practice example, saying that a transition step to growing more LV flexibility is what UKPN did with its threshold of 10kW for HV needs (down from 50kW). They also mentioned that in the short term, seeking long-term contracts to make the sense for investors and then through time then we should move to shorter term day-ahead markets that are more efficient and are a better fit for a deep and liquid future market. Short-term markets suit optimization by LV customer aggregators.

- At the same meeting with a commercial aggregator **(E234)**, they said they expect take up of domestic batteries to provide arbitrage and other services. MHHS will be a trigger [from 2024] as this will involve more active supply tariffs alongside the benefits today from capturing solar (deemed) export and arbitrage in energy markets.

- It was mentioned that they like the fact that Northern Powergrid are collaborating with other DNOs on Flexible Power. In particular, it is good that Northern Powergrid are providing an automated interface (API) to deal with mass take up of flexibility. Also, they like the WPD 'coming soon…' aspect of where the flexibility is likely to turn up before the tender **(E234**)

- At our meeting with the technology platform provider, it was discussed that the primary value is from energy flexibility today and not network flexibility. Value from future markets will depend on Ofgem charging reform. The direction of travel as voiced by Ofgem is uncertain but tends to suggest that more value from flexibility will move to network flexibility. They believe that the intraflex[5] trial is very interesting as it is testing the day ahead provision of flexibility as this lends itself to EV users where aggregators can better forecast what they may offer to buyers of flexibility (like Northern Powergrid). **(E235)**

- The provider also pointed to the fact that it is hard to predict when local flexibility will be sufficiently available and manageable to be used to defer reinforcement at the local level. Barriers to above. There is need for better information on available network data and provide two-way data exchange capability so that we may both understand the need and the resource availability for performing LV flexibility **(E235)**

[5] https://www.westernpower.co.uk/projects/intraflex

- The provider also raised that they could use three-phase LV loads to provide LV flexibility and also balance the load between phases. Open question to which this is a mass market or marginal solution. **(E235)**

- Energy Systems Catapult (ESC) reported that *Heat-as-a-Service* offering is developing, but there was uncertainty how it will evolve **(E236)**:

    - It depends how flexibility markets and customer protections will evolve.

    - There is a gap in understanding on how much people are actually prepared to use flexibility and be flexible.

    - There are potential risks to vulnerable consumers.

    - There is uncertainty about how this service is going to monetise the subscriptions - ESC's trial was centred on assumptions for monthly subscriptions, but there are price caps on energy bills.

- ESC's heat as a service trial about 4 years ago **(E236)** found that customers were open to flexibility as long as they're as warm as they want: 62 per cent customers were comfort focused, 21 per cent most focused, and 17 per cent value focused. Their research indicates that heat as a service likely leads to cost savings for customers coupled with an increase in energy consumption. ESC are using their simulation capabilities to understand the impacts of heat as a service in the future through NIA-funded projects and potentially also their living lab.

- A flexibility service provider said they share Northern Powergrid's approach to flexibility, and would like to explore what initiatives put in place by us would the stakeholder respond to/engage with. They also mentioned exploring how the market for different flexibility mechanisms could develop and what initiatives are being put in place by others **(E224).** Further points included:

    - The 'postcode lottery' is the biggest challenge for this party in terms of becoming a provider of DNO contracted flexibility services. They have previously responded to our EOIs but not been able to provide services as their existing assets are not connected to the right substations and / or at the appropriate voltage level. They are very keen to be made aware of any future expressions of interest and / or formal tenders for flexibility services in the Northern Powergrid region.

    - The service provider would, in principle, be open to providing any of the four core flexibility services developed by ENA Open Networks and Flexible Power. Ultimately, they all provide a revenue stream to an asset owner. However, those products which provide the highest levels of utilisation and / or guaranteed payments will be most attractive. Availability fees were highlighted as an attractive contractual element as they provide an assurance of income even if flexibility services are not dispatched.

    - The provider also provides flexibility services to the Electricity System Operator (ESO). Having access to a long-term contract and/or guaranteed income levels would be a significant factor in their decision about whether to provide services to a DNO or the ESO.

    - Early visibility of future flexibility requirements is important in maximising the potential for flexibility providers to participate in tenders.

- At our meeting with a flexible generator on growing customer flexibility **(E231)**, it was discussed that:

    - Gas peakers are seen as a transition technology.

    - They agree with our stakeholders that low carbon flexible resources will be the key to support delivery of a decarbonised energy system. But until the 2030s, we will need to rely on high carbon natural gas.

    - Where, when and how much flexibility is the key understanding they need us to provide to guide their projects to invest in new flexible generation.

- At a later meeting with this flexible generator **(E302)** it was discussed that:
    - Having clear, simple statements of flexibility needs is crucial to encouraging participation. If requirements are too complex or require a lot of work for providers to interpret, they will just not participate. This is particularly relevant if the overall financial value on offer is low relative to other opportunities for flexibility providers.
    - They have a total portfolio of over 150MW of assets with a similar amount again in development. Many of their assets are located in Northern Powergrid's region; they agreed to provide a list of these. Given their scale, they would probably not be interested in flexibility requirements below approximately 2MW as it would not be worth their while to go to the effort of bidding.
    - Based on their current understanding, they would not base their decisions on where assets are located by the availability of DNO contracted flexibility opportunities; the volumes offered by DNOs are not significant enough. Unless much higher volumes are offered, they would only be willing to bid on contracts where they already have assets connected at the correct locations and voltage levels.
    - They are not very familiar with Flexible Power or the four standard flexibility products. Based on a brief description of the standard products, they would be interested in providing any of the Flexible Power services if connected at the right location. However, products with long term contracts and regular availability and utilisation windows are most attractive. Their ability to provide Restore / Dynamic services would be dictated by the availability of their assets at the time the service was called.
    - They do not apply a hard rule to unit pricing for flexibility provision. Their decision to bid and accept a contract would be driven by a number of factors including: length of contract on offer, size and frequency of flexibility dispatch, level of availability windows and alternative options for utilising their assets (e.g. providing services to ESO).
    - It was discussed that market intelligence indicated that £300/MWh was a price point that had been sufficient to secure flexibility contracts for other DNOs. The flexible generator indicated that, provided a sufficient volume of power was needed (e.g. 10MWh per week) then £300 was a potentially attractive price point. However, during evening peak times a higher price may be needed given increased competition for flexibility services.
- At our meeting with National Grid, it was noted that a DSO is important for efficiency of flexibility, while ESO and electricity system need more distribution connected flexibility in order to provide sufficient controllable flexibility as such resources connected at transmission are reducing. **(E232)**
- At another meeting, there was appreciation that we align with our initiatives and plans for Long Term Energy Scenarios and we used information provided by the ESO to revise our initiative on Planning Forecasting Analytics Further points included: **(E226)**
    - We note that as part of developing our DSO initiatives on System Development that we missed that DNOs can provide solutions to the transmission system such as load shifting or network reinforcements based on transmission requirements
    - For customer connections and access planning, we revised the alignment of some initiatives, however in the round both Northern Powergrid and the ESO agreed on the principles of our initiatives related to these areas of interactions
    - For operational liaison and incident planning and management, our approach to the ICCP link was confirmed as good but it was highlighted that we need to consider our control room resourcing to adequately resource the two-way exchange of near-real-time data.
- A number of recommendations were suggested for Northern Powergrid at the DG Owner Operator forum in March 2021. Northern Powergrid should continue to inform DG operators about Operational Downward Flexibility Management and push National Grid ESO to simplify the ODFM process, it should work to ensure

operators are aware of and reminded about the lower network security from single circuit connections, and it should look to engage with connections team on updating T&Cs in connection agreements to include flexibility opportunities. **(CR403)**

- There was general support and agreement from attendees that the Trial of improved customer notification service for EHV outages had improved the notification process – members of the forum voted 15 to 0 that the steps Northern Powergrid had taken during the trial regarding outage notification would improve the provision of information on planned EHV outages. It was noted that Northern Powergrid need to communicate how and when the outputs from this trial will be implemented as business as usual. **(CR403)**

- The forum also discussed future topics which would be of most interest to cover. Attendees were most interested in hearing more about flexibility and outages. Voting summary was as follows:

    - flexible power – local flexibility EOIs and tenders (24%),
    - notifications and communications for outages/constraints (24%),
    - operational Downward Flexibility Management (18%),
    - other communications with Northern Powergrid and points of contact (18%); and
    - recent outage updates (15%). **(CR403)**

- We discussed procurement horizons in a bilateral with a flexibility solutions provider. It was said that currently this business would prefer to bid for flexibility services at near real time intervals. They are participating in IntraFlex trial project and have found the near real time capability a good fit for their needs. As markets mature and business scale grows they could participate in longer term contracts as they would have more certainty about the volume of flexibility they can provide. However even these longer term arrangements would need to feature a degree of flexibility in volumes which can be determined closer to real time. **(CR404)**

- The highly localised nature of DNO flexibility markets is challenging. Currently this aggregator's largest portfolio of assets in one Constraint Management Zone (CMZ) would be ~200 but there will a cap on how much this can grow given only a certain number of households will ever be connected in to a given substation. Some aggregators may be more likely to be able to participate as one of a range of flexibility providers in a given location, rather than meet the entire need alone. **(CR404)**

- In terms of the operation of flexibility services, IntraFlex project has been this aggregator's most positive experience to date. The high degree of automation and 'machine to machine' capability was highlighted as a major positive. We discussed Flexible Power which were also positive about given its API facilities, but it was noted that there is still more manual intervention required to operate services via Flexible Power compared to IntraFlex. **(CR404)**

- Overall, ease of operation of flexibility services as a more important priority than having simple procurement processes. This may change as their level of involvement with DNO contracted flexibility grows. **(CR404)**

- Current flexibility agreements are in the £270-300 per MWh price range with other DNOs. Impression is that these prices may fall over the long term as markets mature and bidding becomes more competitive. **(CR404)**

- Short term and long term flexibility contracts - typically favoured by DNOs to date – were discussed with flexibility services supplier. Stakeholder's view was that, currently, long term arrangements are attractive because they offer a certainty of revenue which can in turn be used to offer incentives to customers to sign up. However, as scale grows and consumer confidence in smart charging cements, shorter term markets may become more attractive. **(CR406)**

- Smart charging is critical enabler for reducing EV charging costs. Stakeholder highlighted that consumer trust and confidence in smart charging is a critical enabler for its success, and consumer confidence grows in line with familiarity with the technology. They also believe that, as *time-of-use* tariffs become more common and

increase in complexity it will be increasingly difficult for consumers to set optimal charging schedules without the assistance of smart charging software/devices. Because of the way smart charging works, it can be difficult to accurately prove delivery of a service without a strong base-lining methodology – for a smart charging provider to show that the charging schedule was influenced by DNO flexibility contracts. **(CR406)**

- Early provision of information on distribution network constraints was highlighted as important in allowing companies to understand future market opportunities when they are planning where to focus efforts to sign up customers. **(CR406)**

- Northern Powergrid's plans to enhance LV monitoring and increasingly provide open data where presented as areas of our investment. These were well received. **(CR406)**

- We discussed pricing for DNO flexibility contracts. This customer prefer location specific approach to the flat rate £300/MWh as they feel it can offer additional value and ties pricing to the specific needs of a DNO in a given CMZ. It was noted that, even at £300/MWh, the revenue on offer to an individual EV owner via an aggregator for providing DNO contracted flexibility will be low. This reinforces the need for trust in smart charging solutions and for consumers participation to be largely passive. If effort is required from consumers, the value on offer is unlikely to be sufficient to encourage them to participate. **(CR406)**

- Very positive about Piclo Flex and about the development of Flexible Power. It was noted that operating on Piclo Flex can be challenging for providers with lots of small assets and would like to see more development to accommodate those needs. In general, increasing automation of procurement and service operation will be critical for allowing aggregators to participate in the future growth of DNO flexibility. **(CR406)**

- **Open data and digitalisation**

Key messages and topics were:

- Open and proactive data sharing will underpin a successful energy transition (DSO).

- Stakeholders urged us to explore ways to share data more actively and in real time (DSO).

- At our Future Service Design Workshop Report, we engaged future energy participants on data services and received a range of feedback **(E249)**

    - Publish more up-to-date, granular data on energy use and carbon intensity of electricity.

    - Refine tools to assess future energy scenario data and network reinforcement plans.

- We also asked participants what kind of support they would expect their answers included: **(E249)**

    - real time interactive data;

    - simple user interface;

    - good quality, free, open data;

    - substation monitoring;

    - help understanding and interpreting data;

    - data on carbon intensity of electricity;

    - more data on consumption in rural communities;

    - network data available at detailed level; and

  - collaborate with other utilities.

- Asked what type of information would it be beneficial to be shared with them, participants mentioned the following **(E249)**:
  - grid capacity and upgrade plans;
  - partnership opportunities and contact information;
  - benchmarking information; and
  - information on funding and support for engaging people in energy efficiency.
- In response to what data did the participants receive now and why, they shared that they receive **(E249)**
  - estimates of new connection costs;
  - LV substation peak load data;
  - feeder line monitoring data;
  - connection heat maps for potential community rooftop PV projects;
  - ODI future scenarios tool; and
  - national energy usage data to educate young people.
- Lastly, on what the characteristics of a service that would help participants access the data they need are, they mentioned the following **(E249)**
  - Should support local energy planning, but Northern Powergrid needs to develop trust and collaborate more to achieve this.
  - Trusted data which is accessible and easy to use.
- At the Northern Powergrid local authority forum on net zero action planning **(E264)**
  - Local authorities had little to say on how they currently use Northern Powergrid's data – the overriding impression was that they need more clarity on what data is available and how to access it.
  - There was interest in further training to understand Northern Powergrid's heat map and how to use it to inform project development and site allocations.
  - Local authorities were interested to collaborate with Northern Powergrid not just on Local Area Energy Plans, but also on the development of the LAs local plans.
  - There may be opportunities for Northern Powergrid to collaborate with local data experts such as the Urban Observatory in Newcastle on data visualisation.
- National Grid was also of the opinion that data and digitalisation is the key area where we need to co-ordinate our intentions. Distribution and transmission companies need common approaches to enable us to share data to help each other deliver efficient services. **(E232)**
- The Energy Systems Catapult also reported different data needs for different stakeholders **(E236)**

  - consumer data, preference data;
  - building data, incl. EPC data; and
  - network and retail price data in combination with modelling and simulation tools.

- The Energy Systems Catapult believed there was a high uncertainty on what is and what will/might be important (for data and services), and therefore data discovery (wider energy data availability) was important, i.e. making data openly available to enable others to explore its uses, or additional data that would be useful to be shared. **(E236)**

- The Energy Systems Catapult were interested what are the 'big ticket items' where data/research/information is not available readily and is needed - from energy network perspective - to feed into their research and projects. **(E236)**

Collaborative whole energy system

Key messages and topics were:

- Collaboration and joint energy planning is needed (DSO).
- Whole energy system collaboration and planning is a priority (whole systems).
- Stakeholders expect cross-sector and cross-sector coordination (whole systems).
- Collaborating with early adopters, LCT experts and community energy groups will help shape an effective energy transition (whole systems).
- Innovation is a priority in shaping the development of a future network (whole systems).

- At the Northern Powergrid local authority forum on net zero action planning **(E264)**:
  - 93 per cent of the stakeholders agreed that Northern Powergrid and NGN hosting joint workshops to facilitate a single conversation between local government and both networks would be useful for them, while 7per cent said they did not know.
  - There was interest from a range of parties in the role of hydrogen in the region. Discussion recognised that there may be higher value uses of hydrogen outside of using it in decarbonising heat – and that further research is needed, e.g. on costs.
  - One GDN highlighted that they are starting to talk to potential hydrogen producers and to undertake some joint spatial mapping projects, e.g. with Tees Valley and Humber.
  - LAEPs were discussed as one route to explore the role of hydrogen further.
- YNYLEP told us they were looking to apply for Community Renewal Fund to seek co-funding for development of four local area energy plans (LAEPs), covering the LEP's area, and building on the local area energy representation work which is in progress, carried out by Energy Systems Catapult. They believed that co-funding from networks would strengthen bids for funding. **(E280)**
- It was recognised that it would probably not be feasible to financially support all LA-scale LAEPs due to the limited size of distribution network funding that would not support a LAEP for every LA. **(E280)**

- It was still somewhat unclear how LAEP modelling work could be scaled to serve as a 'pathfinder' and if it would be replicable. NGN and Northern Powergrid agreed to keep sharing knowledge and working on this collaboratively with LAs. **(E238)**

- The proposed work would deliver an interactive map, outlining the projects for the next 10 years. The next step from that would be to develop a local investment portfolio **(E238)**

- The Borderlands project was seen as a trial for LAEPs, one which should develop a model approach to developing them. It was discussed that there was no 'best practice' of a LAEP developed/delivered to date, but different stakeholders were delivering different aspects of it well. LAEPs in the borderlands could be thematic (e.g. rural and urban) instead of a LAEP for each LA. **(E239)**

- It was agreed that Northern Powergrid's approach is sensible with respect to LAEPs **(E239)**, specifically:

    - for both network operators, Northern Powergrid and NGN, to engage with stakeholders jointly, as set out in the Charter;

    - for networks to see themselves as a key contributor and key stakeholder in LAEP development process, but not a financer for LAEPs; and

    - for defining the four stages of LAEP maturity. The four stages Northern Powergrid and NGN had defined were: 1.) target; 2) strategy; 3) pathways; 4.) LAEP. It was further noted that some elements of the Borderlands Energy Masterplan will include strategy or pathways analysis, while most will be closer to actual LAEP in terms of maturity.

- BEIS said they are keen to ensure there are synergies, but not a duplication of government's funding; resources are limited and need to be used wisely. They believed there might not be enough learning and knowledge exchange going on. **(E239)**

- A commercial aggregator expressed that they are seeking innovation and market growth through tenders and learning by doing. They have participated in commercial projects in a trial way, and seek full commercial auction where they continue to learn and iterate. They also believe that Northern Powergrid should contract with lower volumes even if insufficient to fill the volume they think we need. Effectively use the service to learn and build capability. **(E234)**

- A technology platform provider also mentioned that Innovation is occurring acceptably but there is a shortage in pulling together the pieces or outcomes from trials. These need to be consolidated better so that we can link the pieces together and work out what needs to be done **(E235)**

- At our meeting with West Yorkshire Combined Authority, they confirmed that they would like to have more regular conversations with Northern Powergrid. Four areas of discussion were identified for a follow-up **(E285)**:

    - local area energy planning;

    - energy data;

    - energy efficiency projects/collaboration; and

    - electrifying bus depots.

- During our catch-up meeting with the North East Local Enterprise Partnership (LEP), the points raised were **(E286)**:

    - The LEP was supportive of our three decarbonisation CVPs (voltage reduction, microgrids, open data platform).

  - Northern Powergrid's letter on LAEPs had triggered some work on scoping energy master planning (Local Area Energy Planning) - the LEP is proposing coordinate any such exercise across the LAs in their region and is seeking an initial scoping meeting with key organisations (including Northern Powergrid) in late June/July. Recognising 2023-2028 proposal for LAEP advisors, LEP suggested they might use the time before 2023-2028 (i.e. 2021-2022) to scope the exercise - so they maximise their benefit from the Northern Powergrid's added capacity to support the work.

  - There are different definitions of microgrids and it is a key area of interest for industrial companies in the NE, e.g. local ports and industrial clusters. They were not sure if this meant private wire and/or LCT installations behind the meter, and/or local energy management.

  - In 2020, the Energy Innovation Challenge programme ran by NE Energy Catalyst (which Northern Powergrid is a part/a partner of), allocated £200k across the three rounds, funding 10 SMEs in the NE with £20k each and supporting a total of 36 SMEs. There is no funding to continue this support/competition for SMEs and there is an approach to the network companies to fund continuation.

  - Community Energy in the Northeast study is almost completed - as expected, there are significant synergies with Northern Powergrid's 2023-2028 proposals and 2015-23 work, the NE LEP agreed to share results shortly.

  - NE LEP is recruiting two Project Managers to start in July who will work with LAs to create business cases/investment cases for their low carbon projects – acting as an 'energy accelerator'.

- We sought the community energy stakeholder panel's views on CVPs (voltage reduction, microgrids, open data platform) by email. Majority of panellists responded, giving overwhelming support to these propositions. Many expressed interest in being involved in the roll-out. **(E305)**

- The HPA recognised the need to collaborate and welcome the opportunities for working together, offering Northern Powergrid to present at HPA's meetings, if of interest and to continue on-going conversations. **(E301)**

- A heat pump manufacturer discussed the various complications with air-source heat pumps (ASHP) and hydrogen heating. While ASHPs and hydrogen are favoured options for heat transition, these may not be the most efficient solutions for the (whole) energy system i.e. **(E229)**.

  - the cost of hydrogen vs. other fuels and the technical challenges of producing sufficient amounts do not appear competitive/credible. The estimated hydrogen costs today do not include the price associated with carbon capture, utilisation and storage (CCUS) and the associated infrastructure roll-out.

  - ASHPs have higher overall energy demand than ground-source heat pumps (GSHPs)

  - the majority of ASHPs are fitted with back-up resistance heaters. On days when ASHPs cannot function properly (cool days with very high humidity), the back-up heaters could create four-fold demand on the electricity network.

- Networks of GSHP pipes that provide heat to multiple properties akin to a heat network could be running at a similar price point to gas and create less demand from the electricity network; use waste heat and provide cooling in the summer. Some parties believe this is the best solution for the system and are exploring this with a number of investors and the government. **(E229)**

  - Networked heat pumps could be running at a similar price point to gas.

  - Such a system can absorb waste heat.

  - Estimate that networked GSHPs would have lower energy demand from the grid - lower electricity use than ASHPs.

  - Such heat network roll-out could mean building 8 nuclear stations less.
  - Connection cost could be similar to gas standing charges.
  - Can provide cooling in the summer.
  - Volume and supply chain cost efficiencies could be driven by roll-out in social housing initially.
  - Recognise this might mean becoming a regulated network company.

- The ground could be used as an inter-seasonal heat/energy store. **(E229)**

- In the decarbonisation of transport event, the subject of whole systems came up in the breakout groups and participants were interested how Northern Powergrid, along with other key stakeholders, could support a "whole systems" approach to decarbonisation. **(CR402)**

- In Citizens Panel, the majority of consumers could see some value in *Voltage Optimisation* proposal and felt that it could offer reduced energy consumption, benefits to the environment and cost saving. Some consumers had concerns about the logistics surrounding this proposal and questioned whether there were other more cost effective alternatives available. **(CR425)**
  - There were mixed feelings across the panel regarding the value of this proposal. The majority of consumers identified a number of aspects of this proposal that they did value. They felt that overall, it is a great idea as it can contribute to reduced energy consumption, benefit the environment and is cost saving.
  - Consumers liked that this proposal would make use of existing technology (smart meters) and increase capacity on the network. Some consumers said they would be happy to trial this if it were in their area and a few actively queried whether a trial would be taking place near them.
  - Some consumers were unsure about the value of this proposal, expressing reservations about how it would be achieved logistically when not every household has, or uses, a smart meter.
  - From a business perspective, SME consumers saw value in this proposal, particularly the cost-saving opportunities and the fact that businesses would have to replace equipment less frequently

- Most consumers could see the value of *Microgrids* proposal, even if they do not live in an area that would necessarily benefit. Where there were concerns, these were focused around the environmental impact of batteries, the 'short-term' nature of this solution and potential pressures on domestic consumers to install. **(CR425)**
  - Consumers who live in rural areas were the most positive about this proposal but other consumers who do not live rurally acknowledged its value despite this proposal being unlikely to impact them. Some consumers felt that 30 microgrids are not enough, whilst others felt this level of ambition was appropriate.
  - Some consumers felt like this proposal is a short term fix and that, rather than investing in this proposal, more could be done to find permanent solutions for the communities most at risk of power cuts. Others were concerned at domestic customers feeling pressured to install them and that the batteries used as part of this proposal are bad for the environment.

- The majority of consumers saw the value in *Open Data Platform* proposal and felt that it plugs an existing gap in free, independent advice around decarbonisation. However, there were a few concerns about the visibility of Northern Powergrid and whether enough people would know about the platform to use it. **(CR425)**
  - For the most part, consumers felt that the open data platform is a good idea and could see the value. They felt that it would plug the existing gap in free, independent advice around decarbonisation and

could provide a unique experience for the customer. One consumer suggested that the platform could be signposted on EPC reports to increase awareness and usage of the platform.

- Some consumers had concerns around visibility of the platform, noting that their knowledge of Northern Powergrid was limited before they joined the panel. Others felt that the platform should not be abused and should not advertise or recommend specific suppliers but remain independent.

WAVE 4 – checking and finalising our plan

In wave 4 we checked that the proposals we had set out matched our stakeholder expectations and demonstrated sufficient ambition, with a purpose of refining our final plans. This wave of engagement followed the publication of our *ED2 business plan – draft for consultation* documents in July 2021, where we had set out specific proposals based on the engagement with stakeholders in wave 1 to wave 3.

Our proposals were generally supported by our stakeholders in wave 4 of our engagement. However, we took the opportunity to listen to feedback and make changes in our final plan, refining it where stakeholders wanted to see more detail or more clarity.

The four central themes continued to be of interest to our stakeholders with content captured in the detailed sections below the table are:

- **Decarbonisation pathways** – informing the pace of change required to reach net zero emissions in the scenarios and investment section of our plan;
- **Flexibility first approach** – informing the market enabling actions in our DSO strategy and flexibility solutions incorporated in in our decarbonisation investment section;
- **Open data and digitalisation, and the transition to DSO** – informing the activities put forward in our DSO strategy but also of relevance to our Digitalisation Strategy and Action Plan; and
- **Collaborative whole energy system** - informing the whole system section of our plan.

We ran 65 events, engaging 10,805 stakeholders in wave 4 covering decarbonisation and these events are listed below:

Code	Name	Subgroup	Engagement Type	Date	No Engaged
(CR430)	Community Energy Forum - Community Renewables in a Climate Emergency	Future energy stakeholders	Forum	17/06/2021	51
(CR413)	North East Climate Coalition Steering Group Committee	Regional politics	External event – meeting	21/06/2021	14
(CR407)	Meeting with flexible power developer and operator	Future energy stakeholders	Meeting	21/06/2021	1
(CR410)	Scenarios for decarbonisation – presentation at an Efficiency North event for social landlords	Consumers	External event – conference	24/06/2021	50*
(CR431)	Technical Panel – Whole Systems and DSO	Challenge group	Panel	29/06/2021	6
(CR419)	Introduction to East Coast Hydrogen project	Utilities	Meeting	05/07/2021	4
(CR405)	Meeting with asset optimisation provider	Future energy stakeholders	Meeting	07/07/2021	1

Code	Name	Subgroup	Engagement Type	Date	No Engaged
(CR432)	Meeting organised by York and North Yorkshire LEP to discuss LAEP proposals	Regional politics	External event – meeting	13/07/2021	15*
(CR433)	Intergenerational Research 2	Consumers	Research	21/07/2021	21
(CR455)	Summary of two meetings: 1. External meeting organised to discuss NE Community Energy Research Study outcomes (13 July) and a 2. Follow-up on the study outcomes with Centre for Sustainable Energy (30 July)	Future energy stakeholders; Regional politics	External event – meeting; Meeting	13/07/2021 and 30/07/2021	10
(CR435)	Meeting with BEIS: ED2 DSO strategy submission	Central government	Meeting	06/08/2021	3
(CR434)	Community Energy Stakeholder Panel	Future energy stakeholders	Panel	06/08/2021	4
(CR408)	West Yorkshire CA – action plan for decarbonisation	Regional politics	External event – meeting	09/08/2021	21
(CR421)	Net Zero Hull and East Riding Workshop	Regional politics	External event – workshop	13/08/2021	14
(CR436)	DSO Strategy: Ofgem feedback	Central government	Meeting	13/08/2021	4
(CR409)	Transport for the North's EV Steering Group meeting	Various	External event – meeting	16/08/2021	26
(CR437)	Webinar for Community Energy groups to discuss Ofgem's minded to decision on Significant Charging Review	Future energy stakeholders	Webinar	20/08/2021	12
(CR438)	Meeting with Rural Community Energy Fund officers	Future energy stakeholders, Regional politics	Meeting	25/08/2021	2
(CR439)	Meeting with Calderdale County Council	Regional politics	Meeting	31/08/2021	5
(CR441)	Northern Powergrid and ESO flexibility dialogue	Utilities	Meeting	01/09/2021	2
(CR440)	Meeting with Cadent	Utilities	Meeting	01/09/2021	1
(CR411)	Social Issues Expert Group	Vulnerability	Focus Group	02/09/2021	7
(CR442)	DSO Strategy: National Grid ESO feedback	Utilities	Meeting	07/09/2021	2
(CR443)	Meeting with the Borderlands Growth Deal project representatives to discuss energy planning	Regional politics	Meeting	14/09/2021	2
(CR414)	Community Energy Forum: Local Energy – Paving the way to net zero	Future energy stakeholders	Forum	16/09/2021	34
(CR420)	ED2 Stakeholder Webinar	Various	Webinar	21/09/2021	101
(CR444)	DSO Metrics: Ofgem feedback	Central government	Meeting	28/09/2021	2
(CR445)	Meeting with a flexibility provider	Future energy stakeholders	Meeting	28/09/2021	2
(CR412)	Ensuring nobody is left behind – internal workshops and meetings	Internal stakeholders	Meeting	30/09/2021	1
(CR446)	Digital Catapult roundtable - Do energy networks need greater intelligence?	Future energy stakeholders	External event – roundtable	05/10/2021	40*

Code	Name	Subgroup	Engagement Type	Date	No Engaged
(CR415)	LCT Workshop insights	Various stakeholders	Workshop	14/10/2021	9
(CR416)	Industrial workshop	Customers	Workshop	19/10/2021	13
(CR417)	Future Fairness Panel	Vulnerability	Panel	19/10/2021	7
(CR418)	Cross Utility Workshop	Utilities	Workshop	20/10/2021	8
(CR447)	Meeting organised by UK100 to discuss DNO engagement with local government	Regional politics	External event – meeting	21/10/2021	9
(CR448)	External meeting - follow-up on the community energy in the North East research study	Future energy stakeholders, Regional politics	External event – meeting	26/10/2021	6
(CR449)	Meeting with Energy Accelerator project managers	Regional politics	Meeting	27/10/2021	2
(CR450)	Meeting with a housing association	Consumers	Meeting	29/10/2021	2
(CR451)	Meeting with Humber Freeport representative	Regional politics	Meeting	01/11/2021	1
(CR452)	Phone call with a representative from North Yorkshire County Council	Regional politics	Phone call	02/11/2021	1
(CR453)	UK-Nordic EV roundtable	Various stakeholders	External event – roundtable	02/11/2021	50*
(CR454)	Community Energy Stakeholder Panel	Future energy stakeholders	Panel	05/11/2021	5
CR426	Citizens Panel (Bill Impact)	Consumers	Panel	20th & 23rd Sep	37
(CR465)	Business Plan Acceptability Testing	Consumers	Quantitative survey	Oct-Nov 2021	1,742
(CR466)	ED2 Acceptance Comms (winter awareness campaign mail-out)	Consumers	Quantitative survey	Nov 2021	8,141

*A best estimate of number of people engaged where this information was not recorded

Decarbonisation pathways

- During our second intergenerational research study, participants said that changes that will impact upon consumers' own homes/day to day lives are of greatest concern to them – namely topics of "Heating"/"My Home"; "Transport" (cars); "Purchase Decisions". Consumers demonstrate most knowledge about purchase decisions and already most active in this respect. Heating/energy topics considered most relevant for Northern Powergrid to address. **(CR433)**

- For all of the topics discussed, the families were interested in understanding the real Impact (value of change incl. the whole life cycle considerations) for each option, as well as the associated costs (different components of costs), as well as: **(CR433)**

    - On heating, they wanted to know more about the non-fossil fuel options for heating, their set up and ongoing maintenance, and associated disruption;

    - On the wider subject of "My home", they wanted to know more about the energy efficiency options, disruption of behaviours and impact/aesthetics within the home, and any quick wins they could adopt.

    - On cars, they wanted to know more about their reliability and charging, technology as well as repairs for electric vehicles, as well as to understand the design of low/no emission zones in city centres.

    - On public transport such as buses/trams/trains, they wanted to learn more about costs and convenience.

- On cycles and scooters, infrastructure was a key consideration and interest.
- On air travel, the participants wanted to understand lower carbon options and cost impacts, incl. taxation.

– On the topic of heating, families with less exposure to new generation heating systems find it hard to visualise the heating world of the future – and, importantly, for some, this is possibly seen as 'distant future' with limited current requirements to engage. Points and observations raised **(CR433)**:

- Future changes expected to be driven by government (regulation) and the building industry (building regulations/greener construction/insulation etc.);
- Homes of the future will be heated by alternative heating systems and traditional methods will be obsolete/outlawed – but limited detailed knowledge;
- Electricity will be key to using alternative heat systems;
- Key concern regarding cost of electricity and increased demand (power cuts);
- Mid and older generations believe it expensive to heat the home with electricity; and
- Need to demystify and demonstrate affordability/reliability.

– The topic of "My Home" closely related to heating, differentiated by slightly more knowledge (some already making inroads into efficient energy use and the use of smart tech). Hence easier for some consumers to visualise the home of the future in this respect **(CR433)**:

- Like heating, some future changes will be driven by government (regulation e.g. pressure on landlords etc.) and the building industry (greener materials etc.), but more emphasis on the individual;
- Expect homes of the future will be powered by alternative energy with an emphasis on solar (although knowledge is limited);
- Some elements of home efficiency within reach/affordable. Some already adapting behaviour with evidence of smart tech/timers/sensors, the usage of green energy and remote control;
- Those in their 20s and 30s more confident and knowledgeable – may be driving behaviour change within the broader family;
- Some quick/affordable wins; often easier to make a personal difference here;
- Other elements of in home energy efficiency perceived to be expensive and out of reach;
- Cost of efficient gadgets and tech;
- Cost of solar (although perceived to be reducing in price and evolving in nature);
- Some dismissive comments associated with timers – Economy 7 and returning to the 70's from older generations; and
- Key barrier to adoption was understanding; regarding impact of changes (however small) what does this mean in terms of personal pocket and environmental benefit.

– Understanding of transport was linked to peer ownership of EVs or personal interest levels **(CR433)**. Lots of unknowns regarding how the tech works and personal impact/convenience:

  - Transport of the future focuses around electric cars, which feel more certain (vs. low carbon heating) given looming government deadline and increasing presence (consumers have seen EVs and charging points at homes/supermarkets);
  - Can see the link with of Northern Powergrid role via electricity use/costs and distribution of supply/network (charging); and
  - Perhaps more of a concern for rural consumers and those without alternative transport options. Older generation question if EVs will become affordable in their lifetime, mid aspire to own but cost barriers prevail and younger expect to own, feels out at reach at present but potential to be achievable in 5-10 years

- Participants can visualise some future transport options. **(CR433)** There is a weaker link to direct finances but potential for stronger impact on behaviours and look/feel of city centres:
  - Alternative transport options generated less discussion as barriers to use remain, particularly for mid generations (inconvenient, expensive). Younger more open to use, esp. if studying/living in city although buses/scooters may be seen as lacking prestige for some.
  - However, COVID-19 had sparked consideration with positive legacy regarding increased walking/cycling/working at home vs. concerns regarding group travel.
  - City centres a key area of focus (esp. for younger generations) – expectation of EV/bus/taxi/cycle/pedestrian only, but concerns regarding disruption/infrastructure/safety and access for vulnerable/disabled people. Needs careful consideration at local government level and wise use of funding alongside information and reassurance for the public.
  - Perceived to be a more local concern associated with communities/local councils; expect to go here for information and hence not associated with Northern Powergrid.
- There were mixed levels of understanding regarding wider environmental issues; they were regarded as a huge topic area associated with national/local government. Consumers find it difficult to articulate broader environmental issues without discussing the other topic areas already covered. However, knowledge had increased over recent years due to wider media/celebrity exposure. Small actions perceived as within individual control/affordable, creates feel-good regarding making an effort – but a key unknown was if they do really make a difference. **(CR433)**
- York and North Yorkshire LEP (with stakeholder input) had developed a bid for Community Renewal Fund to develop LAEPs within the LEP area and discussing potential work package with the Energy Systems Catapult (ESC). The funding has a short timeframe to be spent, therefore organising an early conversation to familiarise the key stakeholders with the proposal and facilitate a discussion. **(CR432)**
- ESC were interested how network companies could make use of LAEP data and process. **(CR432)**
- ESC were in process of developing Local Area Plans for Greater Manchester Combined Authority – datasets are produced for postcode districts as the most granular view. **(CR432)**
- ESC proposes modelling all relevant costs though they would be borne by different entities. Network costs in this case would be based on their assumptions and collaborative evaluation needed to agree on/correct differences. **(CR432)**
- ESC recommend that LAEP are updated every 3-5 years, which would carry an estimated to cost c.30% from the original project. **(CR432)**
- In the workshop, it was explained that Hull and East Riding region had appointed a consultant to support net zero scenario modelling in region and to then produce an Action Plan. The workshop stakeholders discussed regional feasibility for Hull and East Riding region as a step for forming an evidence base which would enable

engagement with stakeholders to allow action plan to be developed for prioritisation across its scenarios: System Transformation, Consumer Transformation and Leading the Way. **(CR421)**

- The decarbonisation scenarios are built around key elements of the National Grid's Future Energy Scenarios and Northern Powergrid's Distribution Future Energy Scenarios to understand the transition within Hull and East Riding region. *Leading the way* was the scenario roadmaps were based on, however the data was available for all scenarios. **(CR421)**
    - Scenario 1 (System Transformation): Hydrogen for heating, Consumers less inclined to change behaviour, Lower energy efficiency and Supply side flexibility
    - Scenario 2 (Consumer Transformation): Electrified heating, Consumers willing to change behaviour, High energy efficiency and Demand side flexibility
    - Scenario 3 (Leading the Way): Fastest (national) credible decarbonisation, Significant lifestyle change, Mix of hydrogen and electrification for heating
- At a meeting to discuss the launch of its decarbonisation action plan, West Yorkshire CA announced it had quantified what is required to transition the region to net zero by 2038 (c. £640m over the first three years) and created a draft action plan with specific initiatives. **(CR408)**
- The authority has eight priority themes for action (all of which are fair and inclusive for all). These are *leadership by the Mayor*, *cross cutting* (e.g. supporting local businesses, jobs, skills), *transport* (decarbonisation, car usage cut, more walking, cycling, public transport), *homes* (warm, healthy, affordable; energy efficient; low carbon power/heating), n*atural environment* (nature in recovery, biodiversity gains; protection and access to nature; local carbon and sustainable food production and consumption), *business and industry* (more efficient and circular processes; efficient workplaces; supporting transition to net zero), *energy generation*, supply and flexibility (local, clean and renewable; clean power) and to be *climate ready* (support flood risk management schemes; flood resilience in business areas). (**CR408)**
- The authority recognises that Northern Powergrid investment is a key part of regional decarbonisation. **(CR408)**
- The Mayor's August visit to Northern Powergrid (jobs pledge focus) was well covered in the media and WYCA is glad to have Northern Powergrid support. **(CR408)**
- One member of WYCA expressed frustration that Ofgem does not give more weight to local voices. **(CR408)**
- The WYCA wanted to create an LAEP and a commitment to energy efficiency from Northern Powergrid. **(CR408)**
- At the Transport for the North Steering Group, the project team provided overview of TfN's Electric Vehicle Charging Infrastructure Project aims, objectives and outcomes. The Group was informed that energy demand data had been requested from DNOs. **(CR409)**
- It was reported that TfN's Future Travel Scenarios have been updated based on COVID-19 trends (e.g. homeworking), including economic updates to reflect Office for Budget Responsibility forecasts and the Government's Transport Decarbonisation Plan. TfN scenario inputs are, and the model should be flexible enough to cope. **(CR409)**
- TfN holds the intellectual property for model and can share this with partners for their own use. Model outputs can be mapped/modelled using LA areas. The project outputs will support engagements with the TfN Board and local leaders and decision makers. **(CR409)**
- The Group questioned whether there is a risk of inducing demand through EV charging modelling and charging implementation. The TfN scenarios cover varying levels of vehicle use and will reflect this in the model outputs. **(CR409)**

- Climate emergency had been declared in Calderdale – and net zero target set for 2038, same as for West Yorkshire Combined Authority's region. Pathways analysis carried out for WYCA region show that this will lead to an electrical demand increase of +51% locally, therefore they were interested to understand what support is available to achieve that, and what information Northern Powergrid would need from them. **(CR439)**

- It was mentioned that a consultant was developing a study for West Yorkshire to understand the needs for EV infrastructure; it uses Northern Powergrid's DFES. **(CR439)**

- The council anticipated there would be more work carried out on the electricity network locally to make sure infrastructure is net zero ready, in contrast to a small number of schemes carried out in 2021. The council believed they had a good working relationship with the regional team and they would have these conversations about work programmes in due course. **(CR439)**

- The council mentioned that the network cost is a key barrier where they are looking to electrify waste lorries and installing transport depot EV chargers and where they have received high quotes and been struggling to find the funding for low voltage upgrades etc. in museums/council buildings for installing heat pumps. **(CR439)**

- Council agreed that the current barriers (including a cost barrier for Local Authorities action) were a matter for the central Government and their experience with cost barriers would need to be fed back to the Government, likely via the West Yorkshire Mayor and the Energy Hub. **(CR439)**

- Further discussion points raised included advancement of technology (e.g. autonomous vehicle uptake), local level accessibility targets for distances to on and off-street charging, van/LGV charging requirements, social exclusion elements of EV roll-out, and the horizon year to be applied to the model. **(CR409)**

- At the September Social Issues Expert Group meeting, proposals to support 5,000 customers year on year to ensure no-one is left behind during the transition to net zero were discussed. It was believed more thought was required on communications. **(CR411)**

- Northumberland County Council is the lead on behalf of Borderlands board. The consultants for the project were interested in how we could work together in the phase 2 of the project, which is to focus on developing a Local Area Energy Plans (LAEPs). The consultants believed we showed similar views/consistency with other DNO they had interviewed. **(CR443)**

- The Future Fairness Panel was asked to feedback on initial research from Box Clever and the Energy Savings Trust before it was extended to include vulnerable customers. The research had looked at what Northern Powergrid's communication strategy should be and focussed on decarbonisation in the home, as well as travel. **(CR417)**

- Crisis UK considered the research would be useful for staff who can share it, but that it would be hard to engage the homeless on this issue as they have more immediate concerns. Crisis UK were also concerned how decarbonising homes would be funded in the private rented sector. **(CR417)**

- Vonne shared a link to a website promoting VCSE sector actions (voluntary, community and social enterprise) related to climate change, with the aim of inspiring others to do the same (https://www.goinggreentogether.org/). Vonne staff would benefit from better knowledge of decarbonisation so they are better placed to pass on information to clients. **(CR417)**

- Homestart Richmondshire wanted leaflets to share with military families, who they believe needed advice about decarbonisation. **(CR417)**

- Newcastle Vision Support had suggestions around accessibility. For example: to cut down on the amount of pictures used in the research pre-task, to use a larger font, consider how to reach older people who are less likely to use Zoom, to use Word and not PDF. **(CR417)**

- Humankind believed that keeping people informed was the right way to go. E.G. Social housing installing heat pumps could cause alarm so staff would benefit from knowledge to reassure tenants. **(CR417)**

- At the industrial stakeholder webinar Industrial users stated they wanted their needs to be better represented in ED2 plan. **(CR416)**

- Northern Powergrid's plan should account for major new energy users in Humber and Teesside (part of BEIS' track 1 CCUS cluster selection) which are expected to come online in the mid-2020s. These companies will be enablers to regional decarbonisation and could be heavy energy users. **(CR416)**

- Industrial users should be strongly represented within the ED2 plan, including Distribution Future Energy Scenarios, to ensure the Northern Powergrid network is not a barrier to their decarbonisation. **(CR416)**

- One stakeholder wanted to know whether there were projects industrial users could have financially supported. They felt that the Green Recovery investment focused only on domestic demand. **(CR416)**

- There was interest in whether the internal process to support self-generation projects can be improved (experience was 5 months to get G99 approval; a short term barrier to entry). **(CR416)**

- Port of Tyne has undertaken work to understand their networks and their demand. Funding for infrastructure upgrades for shoreside power is the key issue and one for the Port of Tyne and the Government to work out. Northern Powergrid's ED2 plan is comprehensive in terms of support offered, but needs to ensure sufficient capacity to support decarbonisation of the port. **(CR416)**

- Concerning North Sea Oil Terminal, Teesside, network reliability is essential as a power interruption would bring down the terminal and impact offshore facilities. They are pleased to see investment in network resilience. The terminal is on a decarbonisation journey, with corporate targets that impact the wider company and measures to reduce their emissions profile, particularly combustions efficiency. They may also switch towards electrification in the future. Since the east coast cluster was identified for track 1 development, the terminal has been looking at carbon capture feasibility and how that may work for them. **(CR416)**

- One stakeholder was involved in several projects that require a significant amount of additional power but are unsure whether these would impact the local transmission system or Northern Powergrid. **(CR416)**

- Lack of capacity was a concern for another industrial stakeholder in relation to their plan to cut carbon emissions by 50% by 2032. The emissions are mainly related to energy use, but the stakeholder had limited space for new equipment and believed they cannot justify the economic case to upgrade local infrastructure. They felt that Northern Powergrid's ED2 plan did not appear to offer anything that would aid their plan. **(CR416)**

- The stakeholder believed industrial customers would benefit from having someone at Northern Powergrid they could touch base with; to discuss and resolve issues. Additionally, they thought this was a very good forum for discussion. **(CR416)**

- Another stakeholder wanted to understand the impact of mass adoption of EV charging and how those in terraced housing would be supported. Furthermore, they were interested in how the rollout would be funded (thinking in particular of communities who are dependent on cars to get around). **(CR416)**

- The industrial stakeholder webinar was well received by participants, who would welcome further, six-monthly meetings, to be kept informed on what is going on in the region, with ED2 and the impact of Northern Powergrid plans on industry. **(CR416)**

- The participants at the industrial stakeholder webinar were also asked to vote on some statements relating to perceptions of net zero and Northern Powergrid:

    - 'As a business, we have a clear route map to achieve net zero' = 3 strongly agree, 2 agree, 6 neither agree nor disagree, 0 disagree, 1 strongly disagree **(CR416)**

    - 'Northern Powergrid understands the needs of my business/sector' = 1 strongly agree, 3 agree, 4 neither agree nor disagree, 3 disagree, 0 strongly disagree **(CR416)**

    - ‘Northern Powergrid has kept me up-to-date on the development of their plan and what it means for my business/sector’ = 1 strongly agree, 2 agree, 5 neither agree nor disagree, 2 disagree, 0 strongly disagree **(CR416)**

- The representative from Durham County Council (DCC) was pleased decarbonisation is important to Northern Powergrid. They would like some elements of the plan to start before 2023. **(CR420)**

- Durham County Council would ideally like to see staffing support brought forward, particularly the local area energy champions. **(CR420)**

- North York Moors National Park noted that climate resilience was low down on the list presented and questioned if there had been specific modelling that led to this. They were also interested in prioritisation in terms of where upgrades will be rural areas (improvements to the grid or room for expansion (e.g. investment at lower voltage levels). **(CR420)**

- One stakeholder noted that whilst some technologies are available now (e.g. time of use tariffs for managing EV charging and/or heat pump use, and domestic appliances which ‘communicate’ with smart meters), they are not yet "consumer friendly”. **(CR420)**

- Citizens Advice Newcastle believed people need more information on the types of heating systems available for housing, so that they can start to think about these things. More information on smart meters would also be helpful (what they are for and the benefits, especially for those in fuel poverty). **(CR420)**

- One stakeholder noted there were a lot of questions posed in the plan but there wasn’t enough positivity overall (e.g. can the grid cope?). Whilst there are many unknowns about the future, some stakeholders will be look to the plan for a sense of hope about the achievability of regional decarbonisation objectives. **(CR420)**

- West Yorkshire CA believed some organisations need more support with terminology and for the plan to be communicated in layman’s terms. Other stakeholders agreed with this sentiment. **(CR420)**

- York & North Yorkshire LEP felt the plan was very “bigger picture” and more granularity was needed. Other stakeholders agreed with this sentiment. **(CR420)**

- LA representatives from Sunderland, York, Ryedale and Northumberland agreed the plan was aspirational but lacked detail on how the aims will be met. More specifics would help them understand how the plan will impact them and help them meet their targets. They wanted reassurance that Northern Powergrid could be responsive to their needs (both with regards to net zero but also more specific local plans and targets). **(CR420)**

- A representative from Leeds Teaching Hospital reported a concern about the plan not including enough considerations for advancements in heat technology. **(CR420)**

- Another stakeholder also noted the need to consider seasonal changes in electricity use, and people using more electricity at certain times of day such as in the morning. **(CR420)**

- Many LAs have more ambitious targets to achieve net zero than the Government 2050 target. There was slight concern (most notably York, Northumberland and Sunderland LAs, all of which have a 2030 target) that Northern Powergrid appears to be focussed on 2050 and they wanted reassurance Northern Powergrid would be able to help them meet their more ambitious, targets. **(CR420)**

- Hull Council said they were exploring charging hub solutions, particularly for areas without off-street parking. They are disappointed Northern Powergrid is not committing to contributing to the cost of those, as they’re a significant investment for a LA and will create data and design intelligence for Northern Powergrid in designing their own networks. **(CR420)**

- As a property developer said they are experiencing increased demand for serviced sites. Nearly all enquiries want extra power to provide EV charging points. Although assured by Northern Powergrid’s engineers that this

can be provided long term, there are "quick wins" to be had (e.g. Amazon want their last mile vans based at Melton to be electrically powered). **(CR420)**

- The stakeholder welcomed the hiring of more staff to assist in energy planning, but felt Northern Powergrid need additional wayleave officers and project engineers to speed delivery. **(CR420)**

- South Tyneside Council has noticed a shift in Northern Powergrid's attitude in recent years (lower prices and a more pragmatic approach). However, they would like to see a faster quotation process. Their projects can take years to plan and sometimes they need information quickly to put to committees. A faster quote process that would help enormously. **(CR420)**

- A renewables' developer said it was dissatisfied as every time they make contact with Northern Powergrid about a project, they are told that capacity is full. They are working with Northumbrian Water, which has a net zero date of 2027, but cannot move any projects forward as applications for more capacity are rejected. **(CR420)**

    - The stakeholder believed Northern Powergrid is rigid compared to other DNOs, who offer a meeting to discuss workarounds whenever there is a capacity issue.

    - It makes more sense for them to pay more and go off grid instead. They perceived the Northern Powergrid network was in need of investment.

    - When Northern Powergrid quotes investment figures, they want to know how this impacts them. For example, it does not matter if £3.2 billion is being invested into the grid if they still need to wait nine months for applications to be rejected. Ennoviga Solar is more interested in more interested in what the investment will mean for speed of processes and available capacity.

- South Tyneside Council was happy to see commitments to invest in asset renewal (their perception was that historically Northern Powergrid has under-invested in assets compared to ENW). **(CR420)**

- One stakeholder said has several clients that want to do large scale generation or battery storage, but currently find there is nowhere that can support this sort of capacity. They want to understand the scope for promising timescales on capacity increases, especially in Northumberland. **(CR420)**

- South Tyneside Council felt that Ofgem's 'minded to' position in terms of distribution of costs for reinforcement and the perception of this as balancing out so it is not just the renewable developer that pays for it, is a fair approach. **(CR420)**

- A local government representative questioned whether there had been any arguments against Ofgem's 'minded to' position on the socialisation of connections costs on electricity bills. They felt costs should also be socialised across the gas bill, as currently gas pays no costs towards decarbonisation of the network and since it this all done via the electricity bill, it means electrical solutions are ultimately more expensive. They believed this sent out the wrong message about decarbonisation. **(CR420)**

- West Yorkshire CA wanted to know more about the decarbonisation of industry. **(CR420)**

- LA representatives (mainly York and Northumberland) were unsure of Northern Powergrid's leadership intentions within their plans, particularly around collaboration with other organisations and EV infrastructure development in rural areas. **(CR420)**

- York LA wanted to know more about the Local Area Energy Advisors. They had tried to start something similar in the past, but didn't get very far because the plans lacked an organisation to take ownership. **(CR420)**

- One stakeholder wanted to know where the money for heat pumps was going to come from. **(CR420)**

- One stakeholder knew about plans nearby for a trial of hydrogen in the home. There was interest in this new technology but they were concerned issues may arise with developers who were perceived to be risk averse

with new technology. They were also interested to know how Northern Powergrid could encourage early adoption. **(CR420)**

- York and North Yorkshire LEP would like an open dialogue on LAEPs. **(CR420)**
- Another stakeholder was open to collaborating with Northern Powergrid on decarbonisation. For example, better data sharing and looking for efficiencies. **(CR420)**
- The Petrol Retailers Association, which represents most petrol retailers, was concerned about the electrification of transport and queried what Northern Powergrid planned in terms of increasing capacity to accommodate rapid chargers. In most cases this would require a substation to be fitted on site, which is difficult due to the hazards associated with petrol retail. **(CR420)**
- The Petrol Retailers Association was also interested in Northern Powergrid's own plans for fleet decarbonisation. **(CR420)**
- One stakeholder did not perceive action was being taken as a result of engagement. They would like to see more senior Northern Powergrid representation involved in stakeholder engagement and reported frustration with engagement with the Northern Powergrid innovation team. **(CR420)**
- York and North Yorkshire LEP wish to continue engaging with Northern Powergrid. **(CR420)**
- Newcastle Upon Tyne Hospital NHS Foundation Trust is interested in load level and is working with Northern Powergrid on this. They are coming to the end of a contract for a Combined Heat and Power system (CHP) and queried whether they might be useful to Northern Powergrid in terms of working flexibly. **(CR420)**
- A series of Zoom polls were asked at the beginning and end of the engagement and the results (raw counts) are as follows: **(CR420)**
    - Northern Powergrid understands the needs of my business/sector

      Strongly Agree = 4, Agree = 32, Neither Agree nor Disagree = 21, Disagree = 6, Strongly disagree = 1, Don't know = 16
    - Northern Powergrid has kept me up to date on the development of its plan and what it means for my business/sector

      Strongly Agree = 9, Agree = 30, Neither Agree nor Disagree = 21, Disagree = 8, Strongly disagree = 1, Don't know = 11
    - Northern Powergrid has made its ambitions clear in its business plan

      Strongly Agree = 11, Agree = 25, Neither Agree nor Disagree = 15, Disagree = 5, Strongly disagree = 3, Don't know = 21
    - Northern Powergrid's plans will help my decarbonisation journey

      Strongly Agree = 3, Agree = 16, Neither Agree nor Disagree = 11, Disagree = 1, Strongly disagree = 1, Don't know = 2
- After interviewing DNOs and reading their plans, UK100 said they think that the DNOs largely do proactive engagement with LAs and Local Governments in general. **(CR447)**
- UK100 presented a detailed analysis of what they thought would be required to enable Local Area Energy Plans and what they thought key stakeholder (incl. BEIS, MCHLG, Ofgem) positions on them were. **(CR447)**

- One of the DNOs believed that (local) planning was a key priority for the business and planning to establish LAEP engineer roles. **(CR447)**

- UK100 said they were undertaking a number of research studies: to assess the contribution LAs can make to Net Zero targets, assessing the economic case for LA Net Zero action, and organising a local net zero forum. **(CR447)**

- Energy Accelerator has a £200m worth of local low-carbon project pipeline; the majority of which are heat network projects using heat pumps. **(CR449)**

- To meet their net zero target by 2035, a housing association representative said they are planning to install a total of 50 MW solar PV target on their properties and switching to heat pumps. They are planning to equip a number of properties with solar PV and batteries, and to work with energy supplier and aggregator to sell exported power (excess from PV generation) to peer-to-peer markets/aggregators. **(CR450)**

- Humber Freeport is to be established around Humber Bank; they will be aiming for Net Zero by 2040 (targeting 68% reduction by 2030 and 78% by 2035). Key focus areas are offshore wind, hydrogen, electric mobility, and CCUS. They were interested to continue engagement with Northern Powergrid through a local steering group that will review the direction of this project to deliver economic growth in the region and discuss transitional issues of decarbonisation. **(CR451)**

- During the Transport for the North's EV Steering group meeting, North Yorkshire County Council representative expressed interest in the overlap between transport electrification and community energy, which we followed-up separately. North Yorkshire County Council have been undertaking an EV infrastructure study, which highlighted the need for additional 630 EV charging points to 2030. The study is still in progress and could merit from engagement with the DNO at a later stage; a stakeholder consultation will be launched in late 2021/early 2022. One of the main challenges is the rurality of the area – around 54% rural and over 16% very sparse/"super rural". This is followed closely by funding challenges as well as the need for on-street charging options. The council is keen to explore a range of ways to deliver the infrastructure, incl. partnerships with the community sector (community halls, churches, local interest groups) and/or private sector. **(CR452)**

- The North East Community Energy Research Study had concluded there was considerable support for and interest in community energy in the NE – 75 stakeholders engaged in the study, significantly more than the number of existing community energy groups in the area. A diverse range of individuals and organisations are interested in community energy (a wider range of voluntary organisations were surveyed, not only energy-focused groups), but they struggle in identifying project opportunities and getting started. **(CR455)**

- Additional support was required for CE groups: (1) to organise (2) early stage exploration and scoping (3) funding/feasibility. **(CR455)**

- More engagement with LAs required - and national policy is a complicated yet dynamic landscape to include CE groups in climate emergency plans locally, build a network for CE, support early stage exploration e.g. role of energy and CE, stablish a mechanism to support later stages of CE projects. **(CR455)**

- Local government representatives thought that measuring the estimated benefits and impacts from these actions would be critical to get local support. **(CR455)**

- Centre for Sustainable Energy believed that RCEF has been tailored to heat and electricity generation. It excludes urban, retrofit, car club, advisory, and services projects; less viable after the closure of Feed-in Tariff scheme. There had been no dissemination of RCEF learning outcomes, funded/failed projects so far. **(CR455)**

- Significant support/funding gap is help at an early stage for CE groups, which might include defining what is possible in energy system; help develop ideas or analysis and building carbon literacy, i.e. understanding group's/location's carbon footprint and what they can do to reduce it. **(CR455)**

- All of the Rural Community Energy Fund (RCEF) funding has been allocated in the NE and Yorkshire. Reallocation from hubs which have not spent all of their RCEF funds is being discussed between hubs and BEIS. **(CR438)**

- Describing the types of projects supported by the RCEF, the officers said large scale solar projects had been successful; there was not much belief in community heat network chances for success; a lot of groups purchased a community development (where developers struggle to get through funding, for example). **(CR438)**

- Asked about how Northern Powergrid could target any funding support, they said the funding gaps identified seem to be the early stage support: 1) to identify (1) projects and (2) sites. A lot of hyperlocal projects come through the RCEF (e.g. community halls). Equally, tools and knowledge of the network, guidance on how to use the network tools would be helpful. Also, support for setting up as a CE organisation as well as capital funding would be useful for CE groups. **(CR438)**

- Asked about whether Northern Powergrid's and NGN's Community Partnering Fund is appropriately sized for CE groups, they said that £5-10k per project make sense as a lot of modest requests have been submitted in relation to what RCEF offer; bigger projects don't struggle for funding. **(CR438)**

- A consultant had been appointed by the RCEF early on so that the CE groups can contact them directly and get free, unbiased advice - one of the key successes in RCEF delivery. **(CR438)**

- In the follow-up meeting to discuss the Community Energy in the North East research study, participants said that North of Tyne Mayor is keen on seeing Community Energy projects and schemes delivered in the region; Yorkshire & Humber Climate Commission have CE on their priority list. **(CR448)**

- Scale is important when considering a community energy network – and NE, Yorkshire & Humber Energy Hub offers existing governance, links into BEIS, and the legacy Rural Community Energy Fund (RCEF) learning, so it could be a place for hosting this network initially - with the aim that the network becomes more self-sufficient eventually. **(CR448)**

- BEIS are planning to employ a part-time host to look at regional networks in England. The new person is expected to have capacity to analyse and link the learning in CE sector; moreover, the North is one of BEIS' priority areas, therefore the new person might be able to play a part in further developing or supporting a CE network in the North East. **(CR448)**

- It was hoped that RCEF will be followed with another fund next year for supporting community energy projects. **(CR448)**

- In Community Energy Stakeholder Panel in August, opportunities for matching a volunteer from Northern Powergrid with a local community organisation were discussed. **(CR434)**

- In Community Energy Stakeholder Panel in November, stakeholders wanted to see a way for the groups funded by the Northern Powergrid and NGN Community Partnering Fund to link up with other organisations in the area doing similar work. One stakeholder felt that Northern Powergrid could offer carbon literacy training for community organisations. **(CR434)**

- Asked about what outcomes should Northern Powergrid aim for, or measure the success in, with regard to its support for community energy groups, the Community Energy stakeholder panel felt strongly that we should not focus only on measurable outcomes or metrics. Instead they believed that the most powerful outcome was case studies to demonstrate positive impact, good stories and CE engagement evidenced by images. They thought that case studies showcased in Forums have been very useful and inspiring. At the same time, they believed it was important to report what gaps of what is not working. **(CR454)**

- Stakeholders believed that change of awareness is also very important, although difficult to measure. Further suggestions included measuring the number of vulnerable people supported and carbon reduction. **(CR454)**

- All panellists believed Northern Powergrid had a role in brokering relationships with Local Authorities, where these had not been established by the local groups already. One panellist suggested that Northern Powergrid could join more local working groups e.g. on affordable warmth - part of several which are looking to establish greater membership. **(CR454)**

- Asked to prioritise potential and additional support measures for community energy groups in 2022-23 **(CR454)**, the panellists chose:
    - Direct funding (4 votes) e.g. new, additional funding for community energy groups; most likely to support new groups to set up.
    - Funding for regional network (4 votes) – building a CE regional network across the North East and Yorkshire had been considered for a while; establishing a CE network was also a key recommendation from the North East CE Research Study, conducted by Centre for Sustainable Energy. This would allow to join up the efforts by Local Authorities, Northern Powergrid, Local Enterprise Partnerships, Community Energy England, and others.
    - CE training sessions (3 votes) - more CE training sessions, like the two organised in 2021.
    - A regional study (2 votes) – a refresh on the previous study, which explored the contribution of 20 groups in 2019; now being aware of c.50 CE groups.
    - Peer-to-peer support (1 vote) - Northern Powergrid to seek to offer peer to peer mentoring/support.
    - Community Energy Engagement Strategy update (no votes).
- A participant felt that bridge funding and/or first project funding might be better than 'new group' grants - it's relatively easy to set up a group but hard to progress projects. Regional network would be very useful to help us get taken more seriously by regional players. **(CR454)**
- Another participant felt that feasibility funding was essential as it may or may not be provided by BEIS. Support networks are also vital, as shown by the North East Community Energy Study report. **(CR454)**
- At the Community Energy Forum *Community Renewables in a Climate Emergency* **(CR430),** stakeholders were split into breakout groups to discuss the more relevant topics which were of interest, with an experienced CE practitioner sharing their experience and taking questions in each group.

  In *Buying back existing projects* breakout group,
    - Stakeholders had little experience or knowledge of community purchase of existing renewable energy projects, but were interested in learning more or developing their own community renewable generation schemes.
    - Community energy representatives were interested in how they could engage with commercial developers at an early stage and explore options for community part-ownership, while there was also discussion of the benefits for a commercial developer of having community involvement.
    - Many stakeholders were unsure of the long-term viability of business models for community solar and wind, so were keen for more information to help them explore options, including developers, local authorities and DNOs that they could partner with to support projects.

  In *Partnering with local authorities* breakout group,
    - Most stakeholders didn’t have a strong relationship with their local authority, but wanted to partner on solar and wind projects at a larger scale as their small-scale village projects tend not to be viable.
    - They are interested in working with local authorities on decarbonising housing and community buildings but need much more support from central government. Stakeholders want a replacement of the Green Homes Grant, and for Northern Powergrid to help them get the levy on electricity bills moved to gas in their feedback to BEIS.

- Participants said that they would find templates useful for roof leases for PV and retrofit of community buildings.

- Stakeholders reported challenges with planning for wind sites that have been designated but are not near any suitable grid connection sites. Communities want a much more joined up approach with local authorities and communities collaborating to find the most sensible and impactful low carbon generation sites. Communities want Northern Powergrid to work with councils more on removing planning barriers for wind from central government.

- Communities reported grid connections for their projects as prohibitively expensive and running in some cases to six figure sums, making projects unviable, so they want Northern Powergrid to facilitate cheaper low carbon connections.

- Participants want tailored local solutions with joined up thinking and more collaboration.

In *Solar on schools* breakout group,

- Participants reported successful solar on schools projects which have been delivered, with strong community support and expertise to find the right scale of project and overcome barriers, with engagement vital to get buy in from schools.

- Stakeholders reported that solar is generally challenging since the Feed-in Tariff closure and very low export price, while changes to business rates have exacerbated this.

- Communities realise that there is a mismatch between highest period of generation and school holidays, meaning many PV systems are sized to maximise school consumption rather than roof size or generation, with no practical route to sell overspill locally. Stakeholders were interested in how microgrids or smart local energy systems could resolve this, and would be keen for Northern Powergrid to support these kinds of innovation projects.

– At the Community Energy Forum *Local Energy – Paving the way to net zero*, stakeholders reported significant success with community share offers for EV chargepoints, however there remain challenges to installing chargepoints, such as finding a suitable site due to highways ownership, while large fossil fuel corporations are trying to move into this area and taking locations where community-owned chargepoints could be installed. **(CR414)**

– Participants found that it was difficult to match generation, storage and EV charging because storage is still relatively expensive, and doesn't stack up commercially at present. However, community energy representatives like the idea of battery storage helping people to use more local generation, and want to explore this business model in the future when the market is ready. **(CR414)**

– Some community energy organisations have been reluctant to do an EV chargepoint project as servicing costs and legal issues are complex, while in some areas there are concerns over how many people will use these public chargepoints. **(CR414)**

– Community energy representatives wanted to know more about how community energy can use its collective voice to influence net zero policy, both at the national level, and approaching local councils. Stakeholders want Northern Powergrid and Community Energy England to continue engaging with Government and Ofgem, taking on communities' perspectives and advocating on their behalf. **(CR414)**

– Participants were concerned that, under current policy, the costs of net zero may be borne by those who are already struggling with energy bills and cannot afford extra. They want to see just transition principles at the heart of policy and regulation for net zero. **(CR414)**

– There was concern at the lack of guidance around planning regulations for retrofit, particularly in conservation areas. Stakeholders want more information on policy for retrofit and energy efficiency. **(CR414)**

- The majority of stakeholders wanted to see a community energy network across Northern Powergrid's region, however most aren't keen on actively helping run the network, preferring to participate and be kept informed. **(CR414)**

- Specifically on collaboration and training, the participants would like to see Northern Powergrid to facilitate partnerships between LAs and communities to develop low carbon projects, particularly around planning for wind, support local community energy organisations to develop networks and partnerships through sessions like this forum, invite participants onto the stakeholder panel, and hold a follow-up conversation to discuss the potential for a self-led network, run community energy organisation training on how to engage the non-usual suspects, consider a site-visit event for stakeholders on delivering a community-led whole house retrofit project and cover hydrogen at a future community energy forum in 2022. **(CR414)**

- The forum would like Northern Powergrid to inform BEIS/Ofgem about affordable grid connection challenges that communities have and explore community support options (e.g. tailored low carbon connection offerings) and to inform BEIS about the barriers communities face in developing onshore wind projects because of the planning regime. **(CR414)**

'Flexibility first' approach

- In a meeting with a flexibility services provider, they said they typically operate large assets (>10MW), providing services to the ESO. It was noted that typical DNO flexibility requirements are much smaller than the capacity of these assets. However, this was not a barrier to this provider participating in providing DNO flexibility services. Assets are modular and can therefore provide appropriately sized injections of flexibility. **(CR407)**

- This flexibility provider is aware of and supportive of the Flexible Power collaboration. They provide flexibility services to other DNO and have found Flexible Power easy to operate with when scheduling their services. The Flexible Power portal's API capability was called out as valuable. They have the ability to activate their assets remotely in response to signals from the Flexible Power API. **(CR407)**

- Flexibility Pricing: flat rate of £300/MWh was seen as a potentially attractive price. Anything above £200/MWh would be given consideration but there would be variation in acceptable pricing according to the specifics of the sites where flexibility is needed and the alternatives available. **(CR407)**

- Three key challenges were highlighted **(CR405)** as limiting the ability of this asset optimisation provider to participate in DNO flexibility markets:

    - Opportunity prioritisation: ESO markets like Dynamic Containment have proved very lucrative and they have focused most of their resourcing on supporting their clients in this space as the opportunities are greater at present.

    - Geographical focus: highly localised DNO markets again limit the size of the opportunity. Piclo Flex was highlighted as a very useful platform as it makes it easy for this service provider to register their assets and see quickly whether they are in zones where a competition is open.

    - Lead times: Time needed to engage with their clients and see if they want to participate in DNO markets, particularly as they are relatively new and clients may not be aware of them. Therefore, a long lead time ahead of a tender is helpful. They have been unable to participate in some tenders because they close too soon. Even a basic 'coming soon' signpost can be helpful to allow proactively raise client awareness.

- Asset optimisation providers are encouraged by projects like ENA Open Networks and Flexible Power as adapting to the 'fragmentation' of DNO approaches has been a challenge for them. They would like to see this kind of collaboration and standardisation continue and to grow. A standardised, central platform for procurement of DNO flexibility was mentioned as an example of where further standardisation would help them to participate more widely in tenders. **(CR405)**

- Progression towards shorter term flexibility trading was highlighted as a valuable industry development for as asset optimisation benefits. For some assets (e.g. batteries) participating in DNO flexibility can involve long contracts which locks them out of taking advantage of other opportunities such as ESO markets. IntraFlex was highlighted positively because it involves shorter term trading and also because it allows for stacking of DNO/ESO markets for client assets. In general, it was highlighted that ability to trade in near real time as important in maximising returns for their clients. **(CR405)**

- They don't have a standard approach to pricing for DNO flexibility; they assess each tender and each asset individually to determine an appropriate price to bid in at. **(CR405)**

- In a meeting with Ofgem, it was pointed out that no customer flexibility pricing was included in other plans, which was positive and interesting – Ofgem wanted to know how this was priced. Liked the cost vs FTE breakdown and the clarity it provides. **(CR436)**

- Number of actions for Northern Powergrid as a result of the meeting **(CR436)**:

    - It would be helpful to add more narrative about why deliverables meet the baseline expectations we have tagged them too.

    - It needs to be added into plans along with justification where we are meeting the minimum requirements.

    - It needs to be more explicit in the plan how we are looking to focus and address: third party data, the use of smart meter data and the use of data for secondary trading.

    - Further use cases for Open Data perhaps providing some examples in our plan if possible.

- Finally, Ofgem asked about whether the biggest gaps are on the development of metrics. We shared our thoughts that the metrics we have submitted are designed to provide wide coverage but it is hard to provide 'cast iron' metrics with no history of acting as a DSO in many of the areas. We reiterated we are supportive of standardisation but that Ofgem needs to co-ordinate a work package and lead on pulling industry in the same direction. **(CR436)**

- We discussed the different types of flexibility products and commercial arrangements. This flexibility provider indicated a clear preference for longer term contracts with fixed revenues. They need to justify investment in assets and their customers (e.g. local authorities) have low appetite for risk and/or participating in short term trading of energy/flexibility. Therefore high frequency of use (i.e. pre outage) products would likely be more attractive. **(CR445)**

- Uncertainty about the future potential of V2G was mentioned. The attitude of car manufacturers was highlighted as a key driver of the future scale of V2G – noting the coolness of Tesla towards V2G and its potential to degrade batteries. Other manufacturers (e.g. Nissan) have been more supportive of the concept and have included the functionality in their vehicles. Consumer confidence would also be key. **(CR445)**

- Clear support from provider **(CR445)** for the idea that consumer adoption of EV smart charging will be widespread given the typical mileage of an EV driver vs. time available to charge. Provided it is easy to adopt and low effort for consumers, widespread participation should follow. However, it was noted that the experience of the last few months for early adopters may have set progress back – e.g. users have experienced poor returns on the test tariff which was often been set at the maximum cap of 35p/kWh. This had created some negativity around smart charging/time-of-use tariffs which may lead to increased reluctance from consumers in the short to medium term.

- As a general comment on Smart Charging/V2G/EV adoption, it was noted that the benefits of enabling this flexibility are dispersed across multiple parts of the energy system and that co-ordinated government action may be needed to ensure they are fully realised. Similarities to the deployment of energy efficiency measures/smart metering were also noted. **(CR445)**

- Pricing was discussed; they noted that small flexibility contracts (e.g. less than one year, low volumes of dispatch) may not be attractive. Revenue streams need to be stable and significant. **(CR445)**

- A series of internal meetings and workshops were held within Northern Powergrid on the theme 'ensuring nobody is left behind' in the transition to net zero. Specifically on the decarbonisation proposition, it was reported that a 'benefits of a smarter flexible energy system' summary document is being developed with narrative being weaved in, highlighting that vulnerable customers will benefit most from increased reliability and the flexibility first approach that aims to keep bills affordable. Furthermore, the socially inclusive transition to net zero "wheel" was included in the DSO strategy 1.1 and it will be reviewed and added to the business plan. There is ongoing work on energy efficiency with new narrative on the benefits for the vulnerable customers. Where possible, vulnerable customers will be prioritised for this support. **(CR412)**

- Community energy stakeholders were wary that curtailment appears to undermine the market for flexibility, as it enables DNOs to get flexibility free, rather than paying for flexibility. Community energy organisations see value in flexibility and want to see that market mature, with longer term contracts. Communities were open to the possibility of shared access rights, however this has to favour the generation patterns of renewable energy schemes. **(CR437)**

Open data and digitalisation, and the transition to DSO

- Previous Executive Summary **(CR431)** states that more work needs to be done before the Technical Panel can provide a high level of assurance and that the focus Northern Powergrid needs to deal more thoroughly with issue of uncertainty and risk arising from supply of flexibility services and develop mitigation strategies. The Panel's view is that uncertainty and risk remain associated with the provision of flexibility services however, there is evidence of a significant number of initiatives in the document that are explicitly designed to address and minimise these areas of concern. For example, there is a considerable volume of material on data acquisition designed to provide more certainty in the system. While existing uncertainty remains, Northern Powergrid has put in place mitigation measures designed to reduce or mitigate associated risks. This is no longer the area of the strategy that causes the Panel concern. The overall strategy appears correct but there is room to strengthen it through improved quantification and justification and provision of evidence with improved clarity on relationship with other industry actors. The Panel therefore, has greater comfort than previously on Northern Powergrid's measures to address the issue of uncertainty and risk with regard to the DSO Strategy in ED2 Plan.

- However, some work remains to be done in a few areas. Some areas of the document are more detailed than others. Examples of those areas of the document that require further strengthening would include **(CR431)**:

    - Clarifying the relationship to the ESO and other industry actors;

    - Phasing of investment needs and setting out more clearly the logic of investments, timing and how the numbers are derived;

    - Providing greater detail on metrics and measurement for issues such as AI data and transparency;

    - Workforce resilience, up-skilling, recruitment needs greater clarity;

    - Greater detail on the ring fencing of DSO activities is required – may be more clarity from Ofgem as document moves to final version in December.

    - More explanation required for how the technical challenges associated with the roll-out of ANM for DER providing services from within an ANM area. This will be crucially important for Northern Powergrid to get to net zero.

- The session focussed on the submission of our DSO strategy, the key areas of focus were around our flexibility assumptions and our plans for delivery of the strategy. In particular, they wanted to understand how we might facilitate the market at LV level and the level at which we see network monitoring either via installed LV equipment monitoring or smart meters will impact how we manage our network. They also wished to discuss

our plans for the structuring of our business for DSO, however we timed out on developing a details discussion this matter. A follow up session was discussed but as of now, yet to be arranged. **(CR435)**

- We asked about key priorities for the ESO as DNO markets evolve. They thought that 'visibility is key' – meaning awareness of the flexibility services and/or resources operating on DNO networks. **(CR441)**

- On the topic of learnings from the ESO's experience **(CR441)** that could be applicable to the development of DNO flexibility markets the following was highlighted:

    - Maintaining careful consideration of provider needs and perspectives, adopting a provider-centric approach to processes and market participation. The ESO are looking to combine services on a single market platform.

    - Not 'railroading' providers, for example, by seeking to exclude them from other markets was also highlighted as a key area of consideration.

    - Sharing/advertising of price points was highlighted as key to advertising market opportunities. Typically provider/market interest is highest in data relating to commercial outcomes of tenders (e.g. volumes/price points) rather than, for example, technical data about provider reliability or response times. The ESO's investment in a market facing data portal was highlighted as important. Whilst it had taken time, money and effort to set up, it gives them the ability to share high volume and high frequency information with markets. This creates consistency and a single source of information. Market participants can also automate the extraction and processing of data from the platform (e.g. by API).

- We touched on the topic of ESO flexibility provider reliability. This is not generally an issue. ESO feedback was that providers are nearly always committed and that, if mistakes or errors are made, they are proactive in pointing them out and seeking resolutions. Competition in markets and data provision help in driving this culture – providers do not wish to be seen as unreliable and/or have mistakes exposed by their competitors. **(CR441)**

- We asked about CLASS – specifically the likely commercial outlook for the kinds of frequency services that DNOs could be positioned to provide. Whilst it was acknowledged that Dynamic Containment services have grown and attracted a lot of attention, the ESO will still have a need for balancing and slower response frequency services (e.g. STOR, Fast Reserve). The ESO's "Markets Roadmap" and "Operability Strategy" were highlighted as sources of information on likely future ESO product offerings and procurement opportunities. **(CR441)**

- Ensuring stackability, dynamic marketplace trading and ESO/DNO co-ordination were all highlighted as areas of focus to maximise utilisation of Distributed Energy Resources and prevent service conflicts in the future. Not new insight I know, but good confirmation on existing direction of travel in Open Networks etc. **(CR441)**

- On DSO Incentive Mechanism **(CR444)**:

    - Ofgem noted that they have been considering the mechanistic vs evaluative model and they can see the benefits of the mechanistic model where metrics can closely align to the outcomes.

    - However, a more evaluative panel assessment process has been considered similar to the ESO. This is because Ofgem are yet to see enough consistent metrics across DNOs that strongly align to all the DSO outcomes they don't have the confidence to progress a purely mechanistic approach. This is also the case where DNOs have provided feedback that not all baseline expectations map to metrics.

    - They also noted that the development of DSO over the next three to five years will be significant so a panel assessment process will give flexibility for any changes during ED2.

    - A blended version of an evaluative and mechanistic model is also being considered.

    - Next steps are to further develop the thinking and continue to engage in the SDI workgroups on the subject to have a more informed view.

- At a high level, Ofgem confirmed that further engagement will be happening on the DSO incentive mechanism over the coming weeks. Some slight tweaks might be made to the guidance but nothing material on what has already been provided. They feel that in the first part of ED2, the metrics might have a strong focus on Regulatory Reported Evidence (RRE) rather than quantitative until the progress of DSO can be better understood and developed – this will be discussed further in future SDI workgroups. **(CR444)**

- Ofgem used *Forecasting of Network Capacity* metric as an example of why the evaluative model is useful, as it can take into account any variables within year and therefore factor in things not within our control. Rationale behind this proposed metric is that forecasting is shared externally with stakeholders so they want to ensure that stakeholders are happy with the product and its accuracy. A change from a quantitative metric to a qualitative RRE metric that is 1 component of a wider metric suite the DSO is assessed against – aligns with our proposals. **(CR444)**

- On flexibility metrics (procured vs forecast, procured vs tendered, procured vs dispatched), Ofgem agreed with the concerns around having this as a quantitative metric and are proposing that this likely becomes a RRE. They want and think it's really important to measure the market development of flexibility and how it is being used and adapted. It may be the case over the course of ED2 that these metrics change from RRE to quantitative. **(CR444)**

- The purpose of the meeting was to discuss our DSO strategy with National Grid ESO and specific areas of potential collaboration between both networks. It was confirmed as part of the ISO consultation that the ESO does not want to become a DSO. However, it was also noted that as networks become more active at DNO level, more work may be needed by the ESO. **(CR442)** It was noted:

    - ESO had concerns about data to be exchanged between the parties and actions following the data exchange. A lot of data discussions are about what the DNOs/DSOs can share with the ESO. Further thought needs to be put into what extra data the ESO can provide the DSOs.

    - More work needs to be done on the development of a regional FES taking into the DFES data inputs. This can then be used for RDP assessments on a strategic level. ESO is leading on this.

    - More clarity is still needed on what is meant by third party interoperability and joint procurement.

    - Further thought needs to be given to timescales and anything further specific that needs to be added.

- The summary of recommendations from Community Energy Forums for Northern Powergrid should make more data available on suitable sites for wind and solar generation projects, including finding the most affordable connection options, local commercial renewable developments to help community energy organisations identify partnership opportunities, local energy models and their challenges, such as microgrids, storage and local supply, as well as create toolkits (and promote these for communities on wind, solar and retrofit projects). **(CR414)**

- Stakeholders acknowledged the Northern Powergrid's AutoDesign tool as useful to identify where to connect chargepoints on the network, although there are still problems in some places where whole villages don't have capacity. **(CR414)**

- At the Community Energy Forum *Local Energy – Paving the way to net zero*, the main theme that arose were the importance of collaboration and training, making more data available and communication with the Government. **(CR414)**

- The lines between first, second and third party information are becoming blurred. While a lot of stakeholders are looking at what digital information they could provide to, or get from, the customers in the context of service provision, looking at third party type information can give valuable insights for whole system benefit, e.g. traffic flow data provided by spatial applications can inform EV charging demand. **(CR446)**

- The LCT connections Local Working Group members working on the low voltage (LV) network highlighted barriers to installing on looped supplies relating to the connections process. **(CR415)**

- Questions were raised about new application processes and whether combining applications for multiple technologies would be made possible. Challenges of working with the time consuming approvals process of G98 and G99 applications formed part of this discussion. **(CR415)**

- Relating to the topic of isolator switches, working group members were in consensus about regulation of quality and safety concerns in the industry, once government OZEV subsidies are scaled back in March. **(CR415)**

- Several of the group shared experiences of struggling to engage with local authorities, especially for on-street charging installation. **(CR415)**

- Availability and format of data was raised as an important service for Northern Powergrid to provide, particularly for large installers. **(CR415)**

Collaborative whole energy system

- At the Community Energy Forum *Community Renewables in a Climate Emergency* **(CR430),** stakeholders were split into breakout groups to discuss the more relevant topics which were of interest, with an experienced CE practitioner sharing their experience and taking questions in each group.

  In *Community wind* breakout group,

  - Discussion centred on options for local supply and how to get a community wind project up and running, in light of planning barriers.

  - A stakeholder explained how there are routes to develop a wind project, so long as the impacts are acknowledged as part of the planning application, while public engagement from the outset is vital, with messaging around jobs needed for net zero.

  - Stakeholders were interested in how Northern Powergrid can support local energy systems and microgrids, and how these could help communities connect LCTs to the network.

  - Participants were keen to access data to help plan where a wind project could be located, and network data from Northern Powergrid could support that.

  In *Community microgrids* breakout group,

  - Stakeholders were disappointed to learn of the lack of viable business model for microgrids on existing assets, along with the lack of profit margin on new build microgrids. This stimulated discussion on the possibility of retrofitting microgrids to business parks and the role of community energy organisations in that.

  - Participants wanted more accessible information on why microgrids are only appropriate for new builds, as many stakeholders had previously seen microgrids as a viable local energy model for their community.

  - Participants want to help the network balance supply and demand at a local level to free up capacity to enable more low carbon generation to connect.

  In *Options for local supply* breakout group,

  - Stakeholders wanted local supply to help retain value and economic growth locally, pointing to the fact that Northumberland generates 15% of UK energy but most of it leaves the region, while it could help achieve community benefit and jobs.

  - Participants pointed to an issue that local area plans tend not to match with local infrastructure. They want to work with Northern Powergrid and others to invest in the future network.

  - Some stakeholders have experience of attempting to 'white label' an energy supply tariff, but faced too many issues. Tariffs that can support community, such as Energy Local, are niche and difficult to replicate.

  - There was an acceptance from stakeholders that community benefits from local generation may have to be from other means for now, such as community ownership or part ownership of renewables projects.

  - In the future there may be potential for communities to benefit from flexibility payments, with electrification of heat and transport, if these markets are accessible for them.

  - Stakeholders thought that the local electricity bill may reduce some of the barriers to becoming a licenced supplier but the issues with consumer protection and managing financial risk are likely to remain.

- The NEECCO Steering Group noted that seven local authorities in the north east (the LA7) have decided to form their own Net Zero proposal for the region. Regardless, the NEECCO wishes to continue covering the full 12 LAs in the region and needs LA input. The steering group broadly supported a proposal to create a form of citizen's assembly that could ensure legitimacy of the organisation. It could be used as a resource to test and challenge Northern Powergrid's decarbonisation thinking as well. **(CR413)**

- In the *Scenarios for decarbonisation* housing provider conference, there was recognition that collaborative action is needed to address the housing retrofit challenge – 80% of the 2050 building stock is what we have today. Retrofit is a classic whole system challenge and, as identified by the CCC in its June 2021 report to parliament, focus needs to be on the societal and people's behavioural change as much as it is on the technologies. There is a recognition that the range of solutions required have not all yet been adequately developed or tested and this innovation is required on housing solutions so that today's retrofits may be long-lasting and solutions then may be replicated. **(CR410)**

- The Technical Panel believed that, in general, Northern Powergrid is in a unique position in being able to tackle a number of whole system issues proactively rather than reactively as some other DNOs will be forced to do. However, the Panel felt that a number of questions remain to be addressed in the forthcoming period on the whole systems issue. The dialogue is ongoing and work will continue on the issue until final report. **(CR431)**

- The East Coast Hydrogen project is a collaboration between NGN, Cadent and National Grid to develop UK Hydrogen Network and simultaneously decarbonise a large proportion of UK's homes and industry. The project timings are tight (with a feasibility study intended before COP26). The parties involved want the DNOs involved to include and integrate the appropriate considerations for the electricity infrastructure (e.g. feasibility of location for steam methane reformers, use of hydrogen storage for resilience, co-location with renewable generation connections). There was also interest in the potential for this to complement existing Northern Powergrid work or engagement. **(CR419)**

- A series of internal meetings and workshops were held within Northern Powergrid on the theme 'ensuring nobody is left behind' in the transition to net zero. It was also noted that specific propositions where the vulnerability lens could be applied related to LAEP advisors and Microgrids. LAEP advisors will work with LAs to develop their LAEP. Furthermore, social indicator mapping will be made available to identify intervention opportunities to support the vulnerable (e.g. energy efficiency projects that can then be delivered by Regional Community Energy Advisors). In addition, Microgrids are being rolled out in areas of rural isolation (a vulnerability marker) and all Northern Powergrid substations have a vulnerability score which can be used when deciding where microgrids are rolled out first. **(CR412)**

- In the community energy event to discuss the impacts of the Significant Charging Review, it became evident that over the past few years, the main barrier to the deployment of community-owned renewable generation projects has been the cost of connecting to the distribution network. These organisations want to localise

energy generation and demand to help balance system use and retain economic value locally. Current regulation does not enable any direct financial value to be realised from balancing generation and demand at a local level. **(CR437)**

- Community organisations are disproportionately disadvantaged by current rules on network connection for generation. Due to their democratic governance structures, and often as non-expert volunteers, they tend to be slower to develop projects and apply for network connections than commercial developers. Community energy organisations are local by definition, so unable to move projects to less constrained parts of the network. **(CR437)**

- Community energy stakeholders have told us this is typified by the minded-to consultation using too much industry jargon, which prevents grassroots participation from communities who pay for the network through consumer bills, and will be heavily impacted by final SCR decisions. **(CR437)**

- Community energy organisations understand the conflict between 'least cost to consumer' and achieving net zero, but want BEIS and Ofgem to provide more leadership to enable a net zero transition which will be less costly than the impacts of climate change on communities and consumers in the longer term. On this note, many community energy stakeholders welcome the SCR's proposed move to a shallower connection boundary which could encourage networks to invest more strategically according to the net zero ambitions of local areas. This is particularly needed in rural villages with single phase connections, where communities are unable to afford the cost of upgrading the network to a three-phase connection, meaning these villages cannot decarbonise. **(CR437)**

- Communities and local authorities want to have more opportunity to engage in how, when and where strategic network reinforcement takes place, so that there is always scope for localities to increase their ambitions for low carbon technology schemes. **(CR437)**

- Community energy organisations want more detail on exactly how reinforcement costs of new demand connections will be socialised through DUoS charges on consumer bills. They want to see a fair system of achieving net zero so that costs are not disproportionately borne by consumers who can't benefit from new low carbon technologies such as EVs and may be facing fuel poverty. However, stakeholders strongly disagree with current arrangements that favour transmission connection costs, which are socialised, benefiting large scale fossil fuel and nuclear generators, and disadvantaging smaller distribution connections, particularly renewables. **(CR437)**

- Community energy organisations are concerned that time-profiled access could disadvantage renewable generation such as solar, which needs daytime access, while fossil fuel generation which is less time dependent could benefit. One solution this stakeholder group sees is for more dynamic curtailment arrangements, possibly linked to weather conditions, to allow renewable generation to export to the network at the best possible times. **(CR437)**

- The meeting with the local gas network operator (Cadent) again confirmed the shared interest in whole systems planning and continuing to develop a closer working relationship. **(CR440)**

- Cadent mentioned they were setting up a heavy industry decarbonisation consortium to explore fuel switching. **(CR440)**

- Gas network operator with another DNO had worked to develop a 'likely and balanced scenario' analysis for reaching Greater Manchester Combined Authority's 2038 net zero target and identifying the respective actions for the DNO, GDN and the CA. They are open to exploring development of a 'LAEP' approach and discussing similar project with other DNOs, who have differing appetites in engaging in this work. They agreed that some of the modelling required could have already addressed/carried out in our DFES. **(CR440)**

- At the Cross Utility Working session, NGN noted they thought collaboration was going to be increasingly important. They also felt Northern Powergrid's plan was ambitious and were interested in knowing how Ofgem responds. **(CR418)**

- NGN had explored LAEPs but struggled to know where to prioritise (in terms of locations) support for LAEPs and wanted to continue to collaborate with Northern Powergrid on this. They felt that area clusters may be the way forwards. **(CR418)**

- Yorkshire Water believe the link between hydrogen and sharing of EV infrastructure is practical and would like to see more debate about having the right solution in place. **(CR418)**

- Yorkshire Water noted more needs to be done to promote the benefits of decarbonisation (e.g. job creation, training and skills that can be brought to the region) rather than focus just on challenges like utility poverty. **(CR418)**

- Partnerships between public and private companies is the way forward. A focus on sub-regional clusters for partnerships was felt to be more efficient than bilaterals with individual LAs. Yorkshire Water has a structure in place that would allow this, citing regional level success from their Yorkshire Leaders Board and an openness to engage with Northern Powergrid here. **(CR418)**

- Northumbrian Water suggested that the Innovation Festival could present an opportunity for collaboration (with external organisations and stakeholders in attendance. **(CR418)**

- Regarding the Significant Charging Review, Yorkshire Water is concerned that the infrastructure required to accommodate EVs will be huge with changes for higher voltage, especially where generation supply points are overloaded. They believe SCR changes will make connecting worse for the fuel poor (who will fund the cost of large connections?). Even a small bill increase may be difficult in the current economic climate due to the large increases in UK fuel bills. Question was raised about modelling of overall cost impact to customers. Concerns were raised that if connections costs are socialised you could get people getting expensive and large connections in remote locations where solar and wind maybe aren't the best solution in that place. **(CR418)**

- Northumbrian Water has a commitment to be net zero by 2027. They are looking to install solar panels at its sites but currently there are communication blockers with Northern Powergrid. They generate power at plants and then put this back into the grid. All energy comes from the North Sea and is renewable. They have EVs, and charge points at some sites, but it is not mass scale. They are trialling use of gas from a plant to power some vehicles. All suppliers and contractors sign up to visions and values so align with strategy. **(CR418)**

- NGN's main focus is on reducing leakage as this has the biggest carbon impact. Another NGN initiative is EV fleet optimisation, and talks with Northern Powergrid are ongoing on how the two companies can collaborate on this. It also has an environmental action plan and is committed to planting 400,000 trees over the period (funded by shareholders). This is in response to customer feedback that NGN needs to improve air quality impacted by road works and digging holes. **(CR418)**

- There is an appetite for partnership working with Northern Powergrid around sustainability in the supply chain as NGN believes some parts of its supply chain will be the same as that of Northern Powergrid. **(CR418)**

- NGN believes that if hydrogen blending into the gas networks in 2023 were to progress, it might have an impact on the electricity network. They would like to discuss this with Northern Powergrid, especially on where might be the best places to implement it. **(CR418)**

- For Yorkshire Water, process emissions are its biggest footprint (65% of emissions, once electricity becomes renewable). Without new technology, they will need to rely on carbon offsetting to cover 35-30% of remaining emissions. However, there is uncertainty about the level of these emissions due to monitoring and measuring. **(CR418)**

- Yorkshire Water feels it is doing well on EVs, are it is looking to raise funds for the infrastructure needed. They want to work with utility companies to share this infrastructure to optimise the number of charge point installations. **(CR418)**

- Yorkshire Water is looking at smart metering to monitor consumption across all sites and is in phase 1 of a solar panel scheme. There are several schemes looking at process efficiency (e.g. installing inverters on site to

operate at high efficiency points). Leakage reduction is another focus, and ending the connection to large diesel generators in parallel with the network (these will remain as a back-up option but not used for mainstream generation). **(CR418)**

- Overall they feel they are making progress and do not need further support from Northern Powergrid. **(CR418)**
- Yorkshire Water uses diesel generation to prop up the grid and are exploring alternatives to it as we head towards net zero. Currently there is no alternative to emergency diesel on standby, though they are looking to see whether there is scope for a regional innovation project to resolve this. **(CR418)**
- Northumbrian Water also rely on back-up diesel generation and are penalized by Ofwat if supply is interrupted. They try to be proactive by monitoring cables at pumping stations to see if problems can be predicted before they happen. They could use hydrogenation to support with replacement of diesel generators (with hydrogenation on most reservoirs putting power into the grid, turbines could be synched to the grid, removing the need for diesel standby generator. **(CR418)**
- Yorkshire Water flagged a circuit HV power line that is prone to faults at a high profile treatment works. Consequently, they have looked into a large battery to level out fluctuations in supply, but would be expensive. **(CR418)**
- Reliability and availability of supply was another key out-take. Yorkshire Water has concerns about how this will be maintained as renewable generation increases. They are worried about sites going off supply, and want Northern Powergrid to maintain a balance between decarbonisation and resilience. **(CR418)**
- Fluctuations in supply are a big issue and perceived to be happening more often. When they do occur it can result in production going down for a whole day so communication and response from Northern Powergrid is critical. Yorkshire Water understands power fluctuations can also occur naturally and the impact is also related to a site's ability to respond. **(CR418)**
- NGN is most concerned about short term resilience and long term interaction with the gas network and peak demand, especially in winter. They also cited the updating of electric heating solutions which will increase over the coming years and gave an example of customers being without heating, if for example, there was an incident where 3,000 properties were off, the households were given electric heaters and the grid couldn't cope. **(CR418)**
- Yorkshire Water is keen to re-establish communications across cross-utility control rooms to understand others' needs and wants, as all differ slightly. There are important connections which could have a regional impact and would hit the news, so understanding that these connections exist is important. **(CR418)**
- NGN is also supportive of working communication between partners. **(CR418)**
- NGN wanted to know whether Northern Powergrid had been engaged on the hydrogen village trial. The stakeholder or customer experience will be significant as they have option of hydrogen or heat pumps as part of these trials. **(CR418)**
- With utility companies obliged to create environment action plans, NGN believe it would be sensible to consider what is reported each year to make sure there is a joined-up approach (it is the same customers affected). They would like to see data sharing on how this is reported. **(CR418)**
- NGN would like engagement on uncertainly mechanisms around net zero, in particular how this will be supported once the plan has been submitted. **(CR418)**
- Some of the key concepts like electrical load diversity, capacity, flexibility, and the relationship between them, are not well understood outside networks, signalling a need for building greater awareness inside and outside the electricity sector. **(CR453)**

Environmental Action Plan

Stakeholder engagement summary

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
EAP1 EP4	**Deliver a wide-ranging environmental action plan, which is ambitious, cost effective and clearly communicated** **Reduce oil loss to ground by 15%**	**Wave 1:** In the first wave of engagement, we conducted a range of panels, roundtables, surveys and reports, engaging 801 stakeholders on our evolving environmental action plan (EAP). Engagements were focussed on understanding which elements of the environment participants would like us to focus on. Overall feedback showed that stakeholders expressed support for a wide range of environmental protection measures. Reducing fluid loss was seen as important with many stakeholders advocating pre-emptive replacement of fluid-filled cables, although this was tempered with concerns for limiting any unnecessary financial burden on our customers. Stakeholders told us that flora and fauna protection should be prioritised, stressing the importance of this in the context of pollinator decline. It was suggested that our environmental protection proposals should be extended to non-designated landscapes on the fringes of areas of outstanding natural beauty (AONB) and national parks. Stakeholders also made specific comments related to undergrounding, highlighting the need to balance the potential environmental impacts of undergrounding with the benefits of removing overhead lines. Some interviewees also argued that we should mitigate its environmental impact where possible, and should avoiding using environmentally harmful materials or substances. Many participants felt that habitual and cultural changes, such as recycling and turning off appliances when not in use, may be of more benefit than low carbon technologies. Participants were largely supportive of our desire to introduce low or zero emission vehicles to our fleet, although there was some concern that costs might be passed on to consumers. Most agreed that the focus should be on replacing older vehicles as and when required rather than proactively replacing the entirety of the fleet in the short term ***Key wave 1 finding:*** *Stakeholders were supportive of protecting the environment and wanted to see a wide-ranging set of measure in our action plan.*	*E034* *E018* *E022* *E034*
		Wave 2: These insights led to the development of a more comprehensive set of propositions to deliver environmental improvement initiatives, including five levels of ambition which we then put forward to our stakeholders in wave 2 as part of our emerging thinking. When considering our draft propositions, stakeholders largely felt that our propositions met their expectations. The majority of stakeholders wanted to see some level of investment in reducing our own carbon footprint. Many customers were supportive of us reducing our environmental impact where possible and felt that we should 'lead by example'. Some stakeholders did opt for a less ambitious approach and cited concerns about increased bills, particularly given the economic impacts of the COVID-19 pandemic for their choice. Reducing fluid loss was cited as one of the most important areas for us to tackle. Conversely, monitoring emissions form our contractors was considered a low priority. The majority of stakeholders supported us in reaching net zero before 2050, due to concerns about the looming effects of climate change. However, a few were resistant to the idea of setting overly-ambitious targets for reducing our own emissions due to potential cost.	*E002* *E020* *E004* *E005* *E008*

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
		Several stakeholders were explicitly supportive of the proposal to use onsite renewable energy generation to power our offices and depots. However, some felt that this should be less of a priority due to the likelihood of more staff working from home in light of COVID-19. There was support to proactively replace equipment with high SF_6 emissions and to use alternatives where possible. There was support for undergrounding overhead lines in A ON B, although there was some concern about the potential disruption arising from undergrounding works. Investment in the creation of habitats for flora and fauna was largely seen as the least important area within environmental protection, however, it was generally considered a relatively cheap investment, relative to the positive impact that it has on the environment. ***Key wave 2 finding:*** *Stakeholders continue to support our environmental action plan and expected a high level of ambition with us leading the way in many areas.*	
		Wave 3: During the proposition finalisation stage, we tested and refined our plans and priorities wherever the feedback had been inconclusive; where we had differences of opinions, or where new areas had areas had emerged. This stage included our 2023-2028 business plan acceptability research. Stakeholders believe we should reduce emissions and set clear targets to reduce our internal carbon footprint. However, some were split on their willingness to pay for us to reduce achieve this. We have defined targets to further reduce our business carbon footprint, continuing to measure and manage our footprint while factoring in the government's net zero targets and timeline. Stakeholders suggested we work with our contractors to reduce waste, lower emissions and use of sustainable packaging, however they felt it was too expensive to bring them in line with our own targets. We will therefore continue to work proactively with our supply chain to promote environmental stewardship. Stakeholders recommended we further reduce leakage from fluid-filled cables. Nearly half of our own staff supported this. We will continue to manage and mitigate the environmental impact of our operations by committing to a further reduction in oil lost from underground cables. There was a clear desire for us to ensure that 'environmental' core commitments remain a very high priority within the business and that we aim to 'lead by example'. Stakeholders were supportive of investment in environmental protection and want us to raise awareness about its efforts. There was support for improvements in visual amenity by undergrounding cables and to increase the scope and scale of biodiversity programmes. We are fully committed to enhance our region's environment, setting ambitious undergrounding targets and enriching biodiversity of our sites. ***Wave 3 finding:*** *There was a clear desire for more visibility and awareness of our environmental improvements and that we show ambition to reduce our carbon and protect the environment.*	*E265* *E268* *E271* *E273* *E277*
		Acceptance research and findings: *The acceptance score for the EAP is 74per cent. Overall acceptance was high with trust (71 per cent) and relevance was highest for vulnerable customers at 78per cent. As acceptance is high from customers, this area will not be explored in further engagement around acceptance.*	*E325*

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
EP3	**Promote environmental management in our supply chain, achieving 90% compliance with our responsible procurement charter**	***Overall Wave 4 findings:*** The Citizen's panel was highly supportive of the NPg working with the supply chain to decarbonise. Following this, through a supplier engagement survey we found that just over half of the supply chain are planning to reach net zero by 2040 or sooner. This insight helped shape and set the level of ambition for the proposition describing responsible procurement that forms part of the Environmental Action Plan.	*CR456* *CR457*

WAVE 1 – open and formative engagement

In the first wave of engagement, we conducted a range of panels, roundtables, surveys and reports, engaging 721 stakeholders on EAP. Engagements were focussed on understanding which elements of the environment participants would like Northern Powergrid to focus on, as well as the development of the net-biodiversity agenda. Themes that were covered by the events:

- environmental action plan;
- biodiversity focus; and
- fluid leakage and gas emissions.

The 14 events where EAP was a specific sub-topic are listed below:

Engagement reference	Name	Subgroup	Method	Delivery Partner	No Engaged
E018	Roundtable - Environmental Protection	Future energy	Online roundtable	Traverse	14
E026	Northern Powergrid Online Consumer Panel	Consumers	Online panel	Traverse	57
E034	Consumer panel	Consumers	Online panel	Traverse	34
E054	Future customer insights report - College students	Consumers	Online workshop	Magpie	288
E056	Future Customers Insights Report	Consumers	Online research	Magpie	157
E101	Review of sustainable office supply requirements	Corporate interest groups	Online meeting	Northern Powergrid	3
E105	ENA SF6 Fluorogas Working Group Manufacturer Engagement Event	Corporate interest groups	Online workshop	Northern Powergrid	34
E106	7th Annual Berkshire Hathaway Sustainability Summit	Corporate interest groups	Online Workshop	Northern Powergrid	100
E107	ENA Environment Committee (Quarterly Meeting)	Internal Stakeholders	Round Robin Discussion	Northern Powergrid	11
E108	ENA Fluid-filled cable working group (Bi-annual Meeting)	Internal Stakeholders	Round Robin Discussion	Northern Powergrid	11
E109	Technical panel - Climate Change Adaption	Future energy	Online panel	Northern Powergrid	6

E110	On-line 'teams' meeting with the Environment Agency	Central government	'Round Robin' Discussion	Northern Powergrid	3
E146	On-line 'teams' meeting with the Environment Agency	Central government	Online meeting	Northern Powergrid	3
E210	Customer Survey with green doctors	N/A	N/A	Northern Powergrid	N/A

Environmental action plan

There was support for Northern Powergrid's approach to reducing air, noise and visual pollution and a desire for more communication with the community and external environmental bodies to reduce carbon footprint.

- The majority of participants in the Northern Powergrid online consumer panel (June 2020) expressed support for Northern Powergrid's environmental protection measures, and its approach to reducing air, noise and visual pollution specifically, although they wished to see more communication with local residents and external environmental bodies. Participants also supported a tailored approach to anti-pollution measures on the basis that a minimum standard would be enforced across all Northern Powergrid sites. **(E026)**

- In Northern Powergrid emerging thinking roundtable on environmental protection stakeholders made a range of comments about specific aspects of the environmental protection proposals, including suggestions that **(E018)**:

    - Flora and fauna protection should be prioritised at all 300 sites, with stakeholders stressing the importance of this in the context of pollinator decline.

    - Flora and fauna protection is relatively low cost and could have a positive visual impact that would clearly indicate Northern Powergrid community engagement.

    - Environmental protection proposals should be extended to non-designated landscapes on the fringes of AONB's and national parks; and the term 'protected landscapes' could be used to make it clearer when proposals are related to both AONB's and national parks.

    - Stakeholders also make specific comments related to undergrounding, including highlighting the need to balance the potential environmental impacts of undergrounding with the benefits of removing overhead lines; and questioning whether Northern Powergrid could incorporate biodiversity net gain targets into undergrounding projects.

- Stakeholders in rural areas expressed support for proposals that promote environmental sustainability within Northern Powergrid as an organisation and its connected supply chains. Questions related to this issue included: what role Northern Powergrid could play in promoting environmental protection throughout its supply chain? The extent to which the Covid-19 pandemic has led to more sustainable work practices? One stakeholder suggested that promoting environmental protections throughout supply chains is beyond Northern Powergrid's remit and should instead be achieved through government legislation. **(E022)**

- Most rural consumers expected Northern Powergrid to lead or participate in green energy initiatives, particularly with regard to the proliferation of renewable energy sources such as wind and solar power. Some interviewees also argued that Northern Powergrid should mitigate its environmental impact where possible and should avoiding using environmentally harmful materials or substances. This suggests that rural consumers across the Northern Powergrid region are concerned about the environmental impact of the energy industry, and place significant emphasis on reducing fossil fuel consumption. **(E022)**

- Participants of the consumer panel (February 2021) were aware, or had direct experience, of a range of methods for reducing their energy usage, with cavity wall insulation and smart meters being repeatedly referenced. Importantly, most stressed that financial, rather than environmental, concerns were the primary motivation for reducing their energy usage. Participants felt that they were doing all they could to reduce their

energy usage and argued that the government needs to take responsibility for driving wider structural change. **(E034)**

- Participants were willing to adopt low carbon technologies that have been proven to work, such as smart meters and cavity wall insulation. Some also felt that more could be done to encourage consumers to recycle and use public transport. There was less positivity around solar panels, and those participants who had experience with them reported low financial returns, maintenance costs, and negative impacts on house prices. **(E034)**

- Many participants felt that habitual and cultural changes, such as recycling and turning off appliances when not in use, may be of more benefit than low carbon technologies. They frequently bemoaned a modern 'throwaway culture' and the younger generations' dependence on devices, which was thought to contribute more to carbon emissions than their personal energy usage. **(E034)**

- Participants of the panel were largely supportive of Northern Powergrid's desire to introduce EVs to its internal fleet, although there was some concern that costs might be passed on to consumers. Most agreed that the focus should be on replacing older vehicles as and when required rather than proactively replacing the entirety of the fleet in the short-term, as this approach would reduce the likelihood of overspending, although some argued that Northern Powergrid could save money by buying EVs in bulk. Some participants were concerned that EV technology cannot yet cope with the demands of a company like Northern Powergrid, with the low mileage per charge being of particular concern, and so put forward alternative approaches such as converting Northern Powergrid's existing fleet to run on biofuel. **(E034)**

- According to the future customer insights report, young people think Northern Powergrid should be mindful of its impacts on the environment. Many young people would be happy to pay a surcharge to create a greener network. **(E054, E056)**

- Environment agency stakeholders felt investments in renewable and sustainable energy within our own property (offices and substations) set the example for others and should demonstrate our commitment to sustainable energy and our expectations that others should invest in renewable and sustainable energy. **(E110)**

Biodiversity focus

There was support for development of a net-biodiversity agenda.

- Rural consumers felt that the protection of local wildlife and biodiversity should be a priority for Northern Powergrid, in addition supporting the proliferation of green energy sources and reducing emissions to meet net zero. **(E022)**

- Rural consumers cared about protecting the natural environment, first and foremost. They identified protection of wildlife and biodiversity as an area in which Northern Powergrid could have a visible impact. While they recognised the importance of reducing Northern Powergrid's carbon footprint and working towards net zero, this was secondary to mitigating impacts on their local environment. This was in direct contrast to consumer panel participants in urban areas, who prioritised reducing emissions over protecting the natural environment. **(E022)**

- Most participants of the Northern Powergrid online consumer panel (June 2020) were supportive of Northern Powergrid's proposals to protect biodiversity and the natural environment. However, these measures were largely viewed as 'nice to have' and secondary to its core role of maintaining the network. **(E026)**

- Participants were largely supportive of undergrounding overhead lines wherever possible, especially in residential areas. There was however some concern about the high cost and potential for disruption associated with undergrounding overhead lines. **(E026)**

Fluid leakage and gas emissions

Once made aware, consumers are concerned about fluid leakages and SF6 gas emissions and feel these should be addressed.

- Participants of the consumer panel (February 2020) had little to no prior knowledge of fluid leaks, but most were alarmed by the quantity of fluid lost and the potential risk to drinking water. Some therefore advocated the pre-emptive replacement of all fluid-filled cables, although others were more concerned with limiting any financial burden on Northern Powergrid or its customers. There was some concern that replacement works may themselves have a negative environmental impact due to emissions from vehicles and equipment. **(E034)**

- Some participants of the panel found Northern Powergrid's fluid leakage statistics less urgent when seen in the context of other DNOs, while still wanting assurances that the issue would be addressed. Others felt that the amount of fluid lost was alarming even in context and suggested that Northern Powergrid could partner with other utilities companies to identify and fix leaks more quickly. **(E034)**

- Some participants were supportive of Northern Powergrid's current approach to cable replacement and opposed a more proactive approach on the basis that costs might be passed on to consumers. Others felt that Northern Powergrid's current approach does not reflect the severity of the issue and wanted assurances that a proactive approach would be taken to the replacement of fluid-filled cables. Overall, participants felt that this issue should be prioritised on the basis that it is entirely within Northern Powergrid's control, and that a reduction in leakages might positively impact the wider environment. **(E034)**

- Participants of the panel thought Northern Powergrid should prioritise fluid leaks over other environmental concerns and aim to reach a compromise between its current approach and a more ambitious, proactive cable replacement programme. **(E034)**

- Participants were largely in agreement that Northern Powergrid has a responsibility to reduce its carbon footprint and that, at the very least, it should aim to meet its self-imposed targets for decarbonisation. Some went further, arguing that Northern Powergrid should 'lead by example' and set more ambitious targets, while others suggested that Northern Powergrid should invest in this area to avoid any bad publicity that would arise from failing to meet its targets. **(E034)**

- Participants felt that Northern Powergrid should ensure that, as a minimum, it continues to meet its self-imposed targets for reducing its carbon footprint and investigate the feasibility of setting more ambitious goals. **(E034)**

- Participants were supportive of Northern Powergrid's drive to reduce its carbon emissions and wanted more information on the specific targets that Northern Powergrid has set for itself. Most also advocated for imposing financial penalties on Northern Powergrid should it fail to meet those stated targets, while some felt it was important to distinguish between Northern Powergrid's internal targets and the national net zero target of 2050. Participants wanted to see a detailed strategy and timeline for emissions reduction and suggested that Northern Powergrid should inform its customers of its emissions targets so that they can hold it to account. **(E034)**

- Participants demonstrated some awareness of carbon offsetting practices, although many were skeptical as to their efficacy. They felt that money invested in offsetting could be better spent on reducing overall emissions, and that offsetting should only ever be used to complement a wider reduction in emissions. Several participants argued that carbon offsetting was unrealistic or even dishonest without an accompanying reduction in overall emissions. **(E034)**

- Participants believed it was important to address contractors' emissions, particularly as they account for a significant proportion of Northern Powergrid's overall emissions, with many seeing this as a potential 'quick win' for Northern Powergrid in environmental terms. Most consumers felt that Northern Powergrid's contractors should be held to the same standards and targets as Northern Powergrid itself and that suppliers' contracts should include stipulations as to their carbon emissions, and some went so far as to suggest that Northern Powergrid should encourage its contractors to transition to electric vehicles. **(E034)**

- From a governmental perspective, on carbon, Environment Agency would support options that seek to improve regulatory performance at the same time as reducing carbon. So, if it is more cost and carbon effective or efficient to deploy the self-healing additive, therefore extending our existing cable network lifespan before eventual replacement when suitable (rather than accelerated) they would support this option. **(E110)**

- The government advocates focusing on the areas where investment will have the most reduction in carbon emissions. A focus down on our supply chain will drive carbon savings not only for ourselves but also for a wider subset of businesses and will encourage our supply chain to be aware of their own carbon and your carbon reduction expectations. **(E110)**

- According to customer survey with green doctors, 48 per cent of respondents think that UK government target date of reducing greenhouse gas emissions by 2050 is 'too slow', 8 per cent think it is 'a bit too slow', 33per cent believe that it is 'about right' and 1.61per cent believe that it is 'a bit too fast.' **(E210)**

- Northern Powergrid looks after all of the electricity cables and power lines in the region. Every year, it moves cables and power lines underground in areas of outstanding natural beauty (e.g. national parks) – and in the future, it is planning to extend this to other local beauty spots. In the customer survey with green doctors, we asked: Do you think it is a good idea? 46 per cent – 'Yes', 32 per cent – 'No' and 20 per cent – 'Not sure.' **(E210)**

WAVE 2 – testing our emerging thinking with costed levels of ambition

Our second wave of engagement was used to testing options generated through the first wave – gauging levels of customer ambition and defining our outcomes. Engagement was carried out with on domestic customers, partners, commercial customers, stakeholders, SMEs and future energy consumers. The results were split into:

  - Ambition (that Northern Powergrid should strive for): (most and least)

  - Priority (of an initiative to Northern Powergrid): (highest and lowest)

In total, we ran 135 events, engaging 15,475 stakeholders in wave 2. Of these 135 events, EAP was a specific sub-topic at 18 of them, covering >11,000 individuals.

The 18 events where EAP was a specific sub-topic are listed below:

Engagement reference	Name	Subgroup	Method	Delivery partner	No engaged
E002	Interviews with rural consumers across the Northern Powergrid area	Consumers	Telephone interview	Traverse	34
E004	Consumer panel (Leeds and Newcastle)	Consumers	Online panel	Traverse	52
E005	Consumer panel (Leeds and Newcastle)	Consumers	Online panel	Traverse	48
E008	SME Panel, meeting 5	Consumers	Online panel	Explain Research	20
E019	Net zero: Exploring pathways for decarbonisation	Corporate interest groups	Online roundtable	Traverse	29
E020	Sustainability workshop	Corporate interest groups	Online workshop	Traverse	24
E021	Willingness to pay Quantitative prioritisation research	Consumers	Research survey	Impact	549
E030	Consumer panel	Consumers	Online panel	Traverse	43
E050	Emerging Thinking consultation	Consumers	Survey	Explain Research	1,236

Engagement reference	Name	Subgroup	Method	Delivery partner	No engaged
E059	A force for good? Creating holistic sustainability strategies for the North	Corporate interest groups	Online workshop	Traverse	24
E100	ENA - EA Fluid-filled Cable Workshop Event	Expert Stakeholders	Workshop	Northern Powergrid	44
E102	Resource Efficiency & Sustainability discussion with YW & NGN	Utilities	Round Robin Discussion	Northern Powergrid	4
E103	Review of low air and noise emission generator initiatives	Future energy	Round Robin Discussion	Northern Powergrid	3
E104	Review of Leeds local authority environmental protection initiatives	Local interest groups	Round Robin Discussion	Northern Powergrid	2
E152	Emerging Thinking microsite	Customers / Stakeholders	Digital	Northern Powergrid	N/A
E153	Emerging Thinking microsite users	Customers / Stakeholders	Digital	Northern Powergrid	N/A
E154	Emerging Thinking - rural panel	Rural customers	Digital	Northern Powergrid	20
E207	Customer Survey	Consumers	Survey	Explain	9149

Responses varied, covering points on how Northern Powergrid should plan to integrate and embed targets in different sustainability areas, how ambitious Northern Powergrid should be in reducing fluid leakages and limiting gas emissions, and Northern Powergrid's support for biodiversity efforts.

Ambition and priorities

- Consumers in rural areas largely felt that Northern Powergrid's current offer met their expectations, with most praising the 43.7 per cent reduction in carbon emissions since 2015. **(E002)**

- Most of them felt Northern Powergrid should invest in replacing its existing fleet with electric vehicles, although a small number raised concerns about the associated costs. Installing renewable energy generation at new and existing substations was also a popular area for investment among interviewees. **(E002)**

- The majority of consumers in rural areas wanted to see some level of investment in reducing Northern Powergrid's carbon footprint. Many customers were supportive of Northern Powergrid reducing its environmental impact where possible and felt that it should 'lead by example'. Interviewees who opted for a less ambitious approach cited concerns about increased bills, particularly given the economic impacts of the COVID-19 pandemic. **(E002)**

- Most participants supported Northern Powergrid's ambition to meet its internal net zero target as soon as possible, with the anticipated annual increase of 64p seen as 'negligible'. However, a small number of customers expressed concern that an overly ambitious approach may lead to safety risks as a result of 'cutting corners'. **(E002)**

- Participants of the SME panel (September 2020) were shown a recap of each plan area discussed in previous SME panel meetings and asked to choose which three plan areas were most important to them as a business owner. The top three most important areas were reliability, safety and net zero/decarbonisation **(E008)**:

    - Reliability: 18 (90 per cent)

    - Safety: 15 (75 per cent)

- Net zero/decarbonisation: 7 (35 per cent)
- Community: 5 (25 per cent)
- Climate change adaptation: 4 (20 per cent)
- Environmental protection: 4 (20 per cent)
- Customer service: 2 (10 per cent)
- Openness and transparency: 2 (10 per cent)
- Connections: 2 (10 per cent)
- Business carbon footprint: 1 (5 per cent)

– A few participants questioned how Northern Powergrid plans to integrate and embed the targets in all three of the sustainability areas into its business decisions and objectives. It was suggested that aligning targets with the UN Sustainable Development Goals may improve the reach and potential impact of the proposals. In terms of where participants would like to see more ambition from Northern Powergrid, one participant suggested giving greater consideration to the idea of circular economies and carbon life cycles. **(E020)**:

  - The top three were (different for different groups): 'Replacing overhead power lines with underground cables in AONB to improve the views of the landscape'; 'Reducing the number of oils and fluids that leak from cables into the local environment'; 'Introducing more flexible, low-cost connections to the network so customers can easily change their energy consumption in response to network requirements'.
  - Bottom two: 'Replacing a small percentage of fleet vehicles each year with electric vehicles' and 'Monitoring the carbon emissions of Northern Powergrid contractors'.

Newcastle:

– Most participants at the consumer panel (October 2020) felt that economic sustainability should be the priority for Northern Powergrid, although many argued that the company's size suggested that it had already adopted a successful approach to this. **(E005)**

– Several participants also recognised the importance of environmental sustainability and argued that Northern Powergrid should ensure adherence to strict environmental standards throughout its supply chain. Some participants felt that this had already been covered in previous panel meetings. **(E005)**

– For customers in rural areas the highest priority is: Install renewable energy generation at new and existing substations **(E002)**

– For customers in rural areas lowest priority: Support contractors in reducing their own emissions to reduce the carbon footprint of Northern Powergrid's operations as a whole **(E002)**

– Most selected option among consumer panel participants: Option E – On track for net zero operations by 2035 **(E004)**

– Least selected option among consumer panel participants: Options A and C – net zero operations beyond 2050; on track for net zero operations by 2045. **(E004)**

– Most selected: Replace 65 fleet vehicles and a sizeable percentage of company cars each year with electric vehicles; Replace all leaking equipment with SF_6 alternatives**. (E004)**

- Least selected: Help contractors reduce their emissions by >15 per cent. **(E004)**

- Most participants felt that Northern Powergrid should 'lead by example' by adopting an ambitious approach to reducing its own emissions. Specifically, consumers felt that Northern Powergrid should invest in EVs and should require contractors to reduce their emissions at the same rate as Northern Powergrid itself. **(E004)**

- The majority of participants supported Northern Powergrid aiming to reach net zero before 2050, due to concerns about the looming effects of climate change. However, a few customers were resistant to the idea of setting an overly ambitious target for reducing Northern Powergrid's emissions, as they did not see why they should pay for Northern Powergrid to exceed the nationally mandated target of 2050. **(E004)**

- Several consumers were explicitly supportive of the proposal to use on-site renewable energy generation to power Northern Powergrid's offices and depots. However, some felt that this should be less of a priority due to the likelihood of more staff working from home in light of COVID-19. **(E004)**

- Most customers were supportive of Northern Powergrid investing in carbon offsetting, as they recognised that it would not be possible for Northern Powergrid to reach true net zero. However, they largely felt that any offsetting should be secondary to the goal of reducing Northern Powergrid's emissions. **(E004)**

Leeds:

- Highest priority: Install renewable energy generation at new and existing substations; Proactively replace all equipment with high SF_6 emissions **(E004)**

- Lowest priority: Support contractors in reducing their own emissions to reduce the carbon footprint of Northern Powergrid's operations as a whole; Increase the speed at which it replaces its fleet with electric vehicles. (E004).

- Most ambitious: Proactively replace all equipment with high SF_6 emissions. **(E004)**

- Least ambitious: Support contractors in reducing their own emissions, to reduce the carbon footprint of Northern Powergrid's operations as a whole. **(E004)**

- Most selected: Option C – on track for net zero operations by 2045. **(E004)**

- Least selected: Option A – net zero operations beyond 2050. **(E004)**

- Most selected: replace all leaking equipment with SF_6 alternatives. **(E004)**

- Least selected: replace 65 fleet vehicles and a sizeable percentage of company cars each year with electric vehicles. **(E004)**

- Consumers were divided over increased use of electric vehicles in Northern Powergrid's fleet, with some feeling that this would be an easy win that would reduce emissions; and others arguing that rapid adoption of EV technology would be expensive and unrealistic. **(E004)**

- While customers noted that the adoption of EVs would reduce fleet emissions, they also expected Northern Powergrid to continue to use heavy machinery (likely to run on petrol or diesel). They felt this would limit the impact of reducing emissions elsewhere. **(E004)**

Fluid leakages and gas emissions

- Reducing SF_6 emissions was seen by many customers as a priority for Northern Powergrid due to its potency as a greenhouse gas. Many participants were not previously aware of SF_6 and wanted to know more about its uses and the amount emitted on an annual basis. **(E004)**

- Most consumers expressed concern about leakages from fluid-filled cables due to the potential for water contamination. Many wanted to see an ambitious approach to replacing fluid-filled cables and widespread use

of self-healing technologies, although some expressed concern at being expected to pay for repairs to 'faulty' Northern Powergrid assets. **(E004)**

- Several consumers suggested that Northern Powergrid should work with its contractors to reduce waste and to ensure the use of sustainable packaging throughout its supply chain. **(E004)**

- Most consumers expressed concern about leakages from fluid-filled cables due to the potential for water contamination. Many wanted to see an ambitious approach to replacing fluid-filled cables and widespread use of self-healing technologies. **(E004)**

- Reducing SF6 emissions was generally the most important area for investment. Some respondents were shocked at the figures shared on the potency and impact of SF6. Respondents recognised that investment to reduce SF6 emissions would be costly but said that if investment was delayed, the real cost would be felt by future generations in terms of climate change. Respondents felt Northern Powergrid should be smarter with its equipment, replacing older kit with more environmentally friendly alternatives, as and when this technology becomes available. They also wanted to see Northern Powergrid proactively managing its subcontractors, ensuring they understand the SF_6 impact of the equipment that they supply. **(E008)**

- There was some discussion around the cost/benefit of faster decarbonisation (i.e., other plan areas that would have less of a focus), but the overall consensus was that Northern Powergrid should invest in decarbonising its operations as quickly as possible, ideally by 2035. It was expected that technological advancements would aid this transition too. Some respondents wanted further information on what Northern Powergrid would need, practically speaking, to achieve net zero as a business by 2035. As SMEs, participants felt their impact would be minimal but expected businesses like Northern Powergrid to be doing more (and, therefore, have a bigger impact). **(E008)**

- One group was enthusiastic about the idea that if Northern Powergrid brought forward investment to decarbonise quicker, it could support the regional economy (e.g., by creating new jobs). It was suggested that Northern Powergrid should borrow money now whilst it is 'cheap' to bring forward investment and create an economic benefit alongside an environmental one. **(E008)**

- Many of the Mural board comments about Northern Powergrid's environmental sustainability proposals focused on the issue of business carbon footprint. A few participants would like to see some of the business carbon footprint metrics shown as a percentage change rather than as standalone figures, in order to put the amount in context. For example, detailing the percentage of Northern Powergrid's fleet that 20 new electric vehicles would comprise, or the percentage of cabling being replaced. Some participants also requested further detail regarding the proposed 49per cent reduction in business carbon footprint, in particular, how this will be achieved and whether this includes scope 3 emissions. Participants offered a number of suggestions about Northern Powergrid's proposals for reducing its business carbon footprint. Suggestions included **(E020):**

    - reducing scope 3 emissions through purchasing equipment or services with low carbon footprints;

    - using alternatives to SF_6 gas; and

    - considering the carbon footprint of metals used in Northern Powergrid assets. One participant also suggested that it may be challenging for Northern Powergrid to require suppliers to use low carbon transport if its own fleet has not yet been fully electrified.

- Questions were raised about aspects of the proposals related to business carbon footprint, including how business carbon emissions are measured, whether Northern Powergrid has a plastics strategy and why the use of sustainable materials is not included in the proposals. A number of participants also asked questions about Northern Powergrid's plans to generate its own renewable electricity, including what renewable energy assets it already owns and what scale of energy generation is required for use on Northern Powergrid premises. One participant also questioned whether Northern Powergrid was investing in clean transport fuels such as H2 fuel cells. **(E020)**

- On climate change adaption, domestic customers had a strong preference for option E, with approaching a third [32per cent] selecting this service level. A similar proportion of around three in ten [31 per cent] within the business sample also chose option E. **(E050)**

- 22 per cent business customers selected option B and a similar proportion [21 per cent] preferred option C. Within the business sample, around two in five [21 per cent] preferred Option D and similar proportions chose option C [19 per cent] and option B [17 per cent], so opinions were dispersed relatively evenly amongst options B to D. **(E050)**

- Business carbon footprint: Both domestic and business audiences were most likely to support you being ambitious in reducing your business carbon footprint; 36per cent of domestic customers and a similar proportion [35 per cent] of business respondents preferred service level option E. **(E050)**

- We asked stakeholders what Northern Powergrid should focus on in the long term (2028 onwards) in terms of sustainability. Stakeholders were able to select up to three priority areas. 75 per cent voted for reducing our environmental footprint. 69 per cent voted for circular economy. 69 per cent voted for leading to achieve net zero targets. **(E059).**

Biodiversity focus

- Participants in Leeds and Newcastle:

    - Expressed support for undergrounding overhead lines in areas of natural beauty (AONB) although there was some concern about the potential disruption arising from undergrounding works. **(E004)**

    - Said investment in the creation of habitats for flora and fauna was the least important area within Environmental Protection, with many participants arguing that such activities did not fall within Northern Powergrid's immediate remit. **(E004)**

    - Were unfamiliar with the concept of 'green recovery'. However, once it was explained to them, most panel members expressed support for Northern Powergrid's involvement with this, on the basis that such an approach would provide benefits for all Northern Powergrid customers. **(E005)**

    - Valued investment in this area and some were surprised by the work that Northern Powergrid is already doing, suggesting that Northern Powergrid should seek to raise public awareness of these activities. **(E005)**

    - At an SME panel, biodiversity was generally considered important and a relatively cheap investment relative to the positive impact that it has on the environment. **(E008)**

    - Although respondents valued investment in this area, most wanted the cost to be kept as low as possible. In fact, one group commented that the cost of this should not be passed on to the consumer as there were alternative ways of doing this without paying much money (e.g., using local community groups like Scouts to plant areas). **(E008)**

WAVE 3 – refining and finalising our plan

In wave 3 we tested and refined our plans and priorities wherever feedback was inconclusive, where we had differences of opinions, or where new areas had areas had emerged. This stage included our business plan acceptability research with consumers and stakeholders. Themes covered by the events:

- decarbonisation and climate change; and
- areas for Northern Powergrid to prioritise.

In total, we ran 91 events, engaging 32,500 stakeholders in wave 3. Of these 91 events, environmental action plan was a specific sub-topic at 8 of them, covering 2,628 individuals.

The events where our environmental action plan was a specific sub-topic are listed below:

Engagement reference	Name	Subgroup	Method	Delivery partner	No engaged
E251	Willingness to Pay quantitative prioritisation – Choice Experiment research	Customers	Online survey	Impact	1,908
E265	Stakeholder Summit - Net Zero Energy Future for the North	Customers Stakeholders	Online conference	Traverse	140
E268	Intergenerational Research	Multi-generational customer groups	Online discussions	Gusto research	48
E271	Analysis of RIIO2 Stakeholder Survey Comments	Government, Ofgem, and industry representatives	Online survey	N/A	N/A
E273	Workforce Engagement: Sustainability research	Internal stakeholders	Online survey	Explain Research	165
E277	Sustainability Survey	Customers stakeholders	Survey	Explain Research	300
E296	Citizens' Panel, Round 6: Review of whole plan	Customers	Online panel	Explain Research	47
E297	Future consumer research	Customers	Online Forum	Gusto Research	20

Decarbonisation and climate change

- The environment is an emerging area of significance that must not be ignored, and customers would value investment in this area. **(E251)**.
- Panel discussion – 'how do we build back better for a decarbonised future?' The panel discussion featured a conversation on how we square the need for economic recovery, post-COVID, with decarbonisation and social justice. **(E265)**
    - There is momentum in this area (environmental action plan). COVID-19 has had an impact and various taskforces have been set up to deal with it. There has already been a published plan that involves building back a greener, more resilient, inclusive economy.
    - Many council groups have declared climate emergencies; pressure from activist groups played a role here. Holding public consultation is important, and councils like Durham County are providing EV charging points and using mine water to heat buildings.
    - Northern Powergrid's role is to be an active partner in facilitating development.

- A lot is going on due to a consensus in society that this is the right thing to do.
- The national picture is positive and there needs to be an interface between national, regional and local government.
- Need to deliver quickly and to scale. Closer coordination between organisations is required, with sharing of data and information, and coordinating investment plans.
- The big challenges are in heat and transport since the grid is a lot greener already. Second, organisations need to be in it together.
- Action is required, and important for organisations like us to collaborate and support local authorities. Northern Powergrid must think holistically and develop a network which fits entire decarbonisation programme – rather than focusing just on something like EVs and EV charging.
- The Council and Northern Powergrid should be symbiotic.
- Northern Powergrid could become a model for how this is done nationally. Configuration of energy infrastructure is a huge issue for the new home industry and that DNOs like Northern Powergrid should closely collaborate with the new home sector to help.
- Continued data and information sharing [is important]. There are tools on Northern Powergrid's website that share data, and we are working to do more in this particular field. We also need to know from stakeholders what particular data they would like to see and how quickly these projects should be developed.

– Opinion and interest in climate change and green energy differs by each generation. **(E268)**

  - Mid: Behaviour most motivated by affordability and cost impact. Most likely to be cost conscious. Pushing energy saving in the home e.g., no heating until 1 November, turning lights off – driven by saving money. More interested in green energy sources than other generations, such as heat pumps and solar panels but question if the initial outlay is worth the investment. Most likely to discount electric cars as too expensive/unreliable at present. Concerned about the future of the planet for their children. Busy lives, juggling priorities of work/children etc., convenience is also key for them. Mid generation primary motivation is saving money – engage in energy saving behaviors that will save them money.
  - Older: Behavior primarily driven by emotional and financial impact on future generations. Some influence from middle/younger generations and neighbors. Also influenced by media such as wildlife shows/David Attenborough. Can be flexible to trying new things if within their power and happy to do things they enjoy e.g. recycling/composting/allotments etc. Behavior is driven by 'doing it for the kids and grandkids'. Making a better world for future generations is highly motivating. However, affordability can be a concern and topic area found to be particularly complex for a minority. May have previously looked into low carbon techs/renewables but put off by large upfront cost and lack of incentive schemes.
  - Younger generation focus is on saving the planet and is more aspirational – moving to affordability focus as responsibility and reality of starting out begins.

– Stakeholders recognise the importance of financial benefits and the need for return on investment. They also commented that other benefits such as environmental benefits should be considered that money is spent wisely and that all options should be considered as an Innovation project is not always the most effective route to solving a problem (i.e. better training might solve the issue). **(E271)**

– Reactions to Northern Powergrid's plan suggest that the majority welcome biodiversity plans though tricky for some to identify personal benefit. **(E297)**

Areas for Northern Powergrid to prioritise

- When asked about proposed aspects of the 2023-2028 Sustainability strategy, colleagues scored potential strategy aspects with a 1 for 'strongly disagree' to a 5 for 'strongly agree' **(E273)**
    - Focus on reducing operational and office waste and limit our impact on the environment 4.5 Provide options for low carbon business travel and make improvements to our working premises and substations to be more energy efficient 4.4.
    - Integrate sustainability into our investment decisions 4.4.
    - Work with our suppliers and contractors to reduce their emissions and amplify positive outcomes 4.2.
    - Deliver tailored programmes of work to support the communities we serve – including our most vulnerable, promote volunteering 4.1.
    - Create opportunities for colleagues to learn about and to champion sustainability and low carbon transition 4.0.
- Amongst colleagues' comments shared in the online survey, recurring suggestions for Northern Powergrid to consider included; increase and sustain remote working opportunities; encourage the use of electric vehicles and car charging facilities; reduce the carbon footprint of offices and minimise paper use; recognise and avoid unnecessary travel; offer a Cycle to Work scheme and upgrade IT systems, to support the above. **(E273)**
- From the focus group, a key point of discussion was sustainable transport options. To reduce the number of journeys by car, colleagues suggested that Northern Powergrid facilitate the use of public transport and could support colleagues to understand what public transport options are available to them. In addition, colleagues suggested that Northern Powergrid bring electric vehicles into the company car scheme and introduce electric fleet vehicles. **(E273)**
- To reduce travel distances and save time, colleagues agreed that having more meetings online would be helpful, if they are between colleagues that are a long distance apart from each other. This was also suggested for training courses which could be done remotely. **(E273)**
- Another common point made by colleagues was that Northern Powergrid's workforce could be more sustainable by further investment into staff wellbeing. To do so, colleagues suggested raising further awareness of mental health and wellbeing support services available. One colleague suggested that Northern Powergrid should ensure this information is more easily accessible for field staff. Further, some colleagues' perceived staff shortages which they deemed unsustainable, as this contributed to high workloads. To prevent this, staff suggested implementing measures to replace staff more rapidly and improve workforce retention. **(E273)**
- For more sustainable on-site resource use, staff recommended reducing the amount of paper used in the office and investing in IT systems was a common suggestion to ease this transition. Staff also recommended encouraging the recycling of office waste. Further, colleagues suggested that Northern Powergrid invest in more sustainable infrastructure such as solar panels to power offices. Another suggestion made was or carry out controlled planting, to improve biodiversity and water management. **(E273)**
- To foster encourage staff engagement, colleagues recommended that Northern Powergrid provide opportunities to learn more about sustainability, and what it means for Northern Powergrid. In conjunction with this, some colleagues were interested in getting involved with steering groups to discuss how to make Northern Powergrid a more sustainable workplace, and they recommended that senior leadership get involved to implement relevant changes. **(E273)**
- On a scale of 1 to 5 with 1 being 'strongly disagree' to 5 being 'strongly agree', what do you think we should do in 2023-2028 and beyond to be more sustainable? [internal stakeholders] **(E273)**

  - Focus on reducing operational and office waste and limit our impact on the environment 4.5.
  - Provide options for low carbon business travel and make improvements to our working premises and substations to be more energy efficient 4.4.
  - Integrate sustainability into our investment decisions 4.4.
  - Work with our suppliers and contractors to reduce their emissions and amplify positive outcomes 4.2.
  - Deliver tailored programmes of work to support the communities we serve – including our most vulnerable, promote volunteering 4.1.
  - Create opportunities for colleagues to learn about and to champion sustainability and low carbon transition 4.0

- How important is it for you that Northern Powergrid is a sustainable business during 2023-2028 (2023-2028) and beyond? [Internal stakeholders] **(E273)**
  - 46 per cent gave 5 - Very high importance.
  - 38 per cent 4 - High importance
  - 14 per cent 3 - Neutral/either
  - 2 per cent 2 - Low importance
  - 1 per cent 1 - Very low importance
- In addition, we asked respondents: 'What additional ideas do you have that Northern Powergrid should consider to be a more sustainable business and to enable and support you to be more sustainable in your work, commute to work, and other activities?' We identified the following recurring themes in the comments: 'Increase and sustain remote working opportunity (25), Introduce EVs and charging facilities (22), Reduce carbon footprint of office and equipment (17), Reduce unnecessary travel (13), Offer a cycle to work scheme (10), Upgrade IT systems (10). **(E273)**
- As well as this, we asked respondents 'which companies do you know that are doing well in this area that we could explore their current practices?' The following companies were identified as examples to learn from: Amazon (3) - Local authorities (2) - Civil service (2) - Yorkshire Water (2). **(E273)**
- Reflecting the survey findings, all phase two participants agreed that sustainability was an important issue for Northern Powergrid to address in the 2023-2028 strategy and beyond. It can be asserted that this is to be expected, as the focus group attendees were recruited on a voluntary, opt-in basis and therefore likely had a prior interest in sustainability which encouraged them to take part. Nevertheless, it shows there is appetite for it amongst colleagues. **(E273)**
- When asked what sustainability meant to them from a business perspective, colleagues suggested that it was about the organisation operating responsibly, to ensure that people and the environment are viable into the future. **(E273)**
- A common perception was that Northern Powergrid could do more to improve the sustainability of the business, as participants were unsure what Northern Powergrid is currently working on in this area. This suggests that more could be done to effectively communicate and raise awareness of your sustainability practices amongst colleagues. **(E273)**
- A very common suggestion made by colleagues was to implement measures to reduce commuting distances, as working from home has become more common due to pandemic lockdown restrictions. As one colleague put it: 'we're getting more into this culture that we don't need to be in the office so much'. From this discussion,

colleagues suggested a number of ways to reduce mileage, including online meetings and training, as well as allowing staff to have a balance between working from home and in the office. **(E273)**

- A common suggestion was to encourage the use of public transport. For example, one colleague suggested engaging an expert external organisation to come in and speak to colleagues about public transport options and to support them in changing their travel habits, as 'people do what they're used to doing. If they've always driven, they don't know what the other options are'. As well as raising awareness of public transport options, there was the suggestion to incentivise the use of public transport. Colleagues cited reduction of carbon emissions as a reason for doing this, as well as reduction of safety concerns associated with long distance driving. **(E273)**

- We asked colleagues what could be done to make working practices more efficient. In line with the online survey findings, a key suggestion made by colleagues was in relation to upgrading IT systems and technology. According to some, this would be useful in reducing the amount of paper used in offices, for example reducing or ceasing use of paper job packs and would enable staff to share documents more efficiently. **(E273)**

- To ensure that Northern Powergrid work environments operate in a more environmentally sustainable way, colleagues suggested making improvements to waste management. For example, one colleague suggested taking measures to improve colleagues' attitudes to recycling waste correctly at work. **(E273)**

- Furthermore, colleagues suggested that Northern Powergrid consider the following measures to reduce or offset carbon emissions: 1) utilise renewable energy for powering offices and outdoor signage, such as solar panels. 2) Green roofs on offices. 3) Improve the energy efficiency of all sites and substations. 4) Rather than portacabins, provide units constructed with more sustainable materials and recyclable water collection for example. **(E273)**

- In addition, the following measures were suggested specifically in relation to water management: 1) Work with local stakeholders on land management and water management to reduce flood risk to Northern Powergrid sites. 2) Intentional planting for water management and generally improving biodiversity. **(E273)**

- Similar to the findings of our workforce resilience research in relation to workforce satisfaction, some colleagues perceived staffing levels to be unsustainable, believing that retiring or leaving colleagues were not replaced rapidly enough, which was impacting colleagues' workloads. To benefit team morale and staff retention longer-term, colleagues suggested filling vacancies more promptly. **(E273)**

- This may have implications for implementing wider sustainability practices, as it was suggested that high workloads can prevent colleagues from engaging with sustainability initiatives. When asked if they would be interested in being a sustainability champion at Northern Powergrid, some colleagues explained that their own high workload would prevent them from getting involved. **(E273)**

- To prevent perceived staff shortages by supporting retention, another suggestion was to invest in staff wellbeing. Within the focus group, colleagues discussed how The Grid (an online staff portal) was a useful medium to access support services and the employee assistance program. As one colleague put it: 'on The Grid, it's got useful numbers: telecoms, facilities, IT helpdesk'. Consequently, some colleagues agreed that it would be helpful for this portal to include contact details for wellbeing support services. In addition, it was recommended Northern Powergrid ensures that field colleagues outside of the office have access to this information through another channel, such as offline. **(E273)**

- We asked colleagues how they felt the sustainability conversation could be continued in the future. Amongst colleagues in the focus group, there was an interest in attending sessions to learn more about sustainability and what it means for Northern Powergrid. **(E273)**

- There was also an interest in becoming part of small steering groups for discussing ideas to foster a more sustainable work environment. For example, one colleague summarised that 'it's good to do sessions like this to pick people's brains in other areas of the business and come together collaboratively with ideas'. However, there was agreement amongst some colleagues that senior leadership needed to be involved to ensure that viable ideas are taken forward and implemented. **(E273)**

- A similar point raised was that Northern Powergrid had previously had sustainability champions and working groups, indicating that there is appetite amongst colleagues to get involved. However, based on their previous experience, one colleague implied that the company must play a role in ensuring that these groups continue to operate longer-term. **(E273)**

- In the online survey, the option to 'create opportunities for colleagues to learn about and champion sustainability' had support, particularly amongst female colleagues and those in office-based roles. However, to ensure that a diverse group of volunteers be involved, focus group attendees discussed having steering group participants from different depots and departments. **(E273)**

- To support greater awareness of sustainability groups and campaigns amongst Northern Powergrid colleagues in future, attendees suggested using alternative forms of communication to email. This could be done through offline or word-of-mouth methods such as meetings, seminars, or posters. Staff made this point on the basis that sometimes they are too busy to read all of their emails and that some colleagues don't have access to a Northern Powergrid email account. **(E273)**

- To encourage staff participation further, one colleague suggested providing incentives for staff to get involved: 'Provide employees with incentives to be part of these groups such as employee of the month, as everyone could argue they are too busy to take part'. With incentives in place this may appeal to some colleagues. **(E273)**

- Overall, the majority of respondents had heard of the term 'sustainability' before (92 per cent). **(E277)**

- A very high majority of SME customers had heard of the term before (97 per cent). **(E277)**

- A high majority (96 per cent) overall agreed that Northern Powergrid should have a focus on sustainability. **(E277)**

- In order to ensure that Northern Powergrid is a force for good for local communities, colleagues and the environment, respondents felt that they should invest in sustainability and green energy sources (75), promote customer, staff and community engagement (37), maintain a reliable power supply (29) and ensure to keep up/maintain current standards (20). **(E277)**

- Overall, a high majority (93 per cent) felt that the model made sense after their initial review. 96per cent of SME customers felt that the model made sense and 92per cent of domestic customers did. Though high, this, however, does indicate that there were some who did not feel the model made sense and therefore communication of the model could be improved further. **(E277)**

- Overall, the majority felt that nothing was missing from the [sustainability] model (81per cent). **(E277)**

- Overall support for the [sustainability] model was high at 93 per cent, with support consistent across both domestic (93 per cent) and SME (94per cent) customers. Again, although support was high, there were some respondents who did not support the model and therefore communication/explanation of the model could be improved to increase support. **(E277)**

- Overall 'reducing their business carbon footprint' was ranked as the most important environmental core commitment (mean score = 2.11), with 'enabling customers and communities to decarbonise' ranked as the least important (mean score = 2.71). Both domestic (mean score = 2.06) and SME customers (mean score = 2.28) ranked 'reducing their business carbon footprint' as the most important followed by 'minimising the impact of their business on the environment and encouraging biodiversity'. Next, domestic customers ranked 'protecting their assets against the impact of climate change and minimising the disruption to customers' as the most important commitments, with SME customers ranking 'enabling customers and communities to decarbonise' as more important. **(E277)**

- These results indicate that customers want to see Northern Powergrid focus on their own network and how they operate as a business before supporting customers and communities with the process of decarbonisation. **(E277)**

- Overall, the majority of respondents didn't feel that anything was missing. For those who did, key themes in responses included 'bill/cost impact' (9), 'more detail/transparency' (8) and 'more detail about wider impact' (3). **(E277)**
- Overall, the majority (90 per cent) said that their thoughts had not been influenced by the pandemic. A higher percentage of domestic customers (11 per cent) felt that their views were influence by the pandemic than SME customers (4 per cent). **(E277)**
- Overall, most respondents felt that the three themes in the model covered the most important aspects within the context of sustainability and therefore you should continue to develop your sustainability strategy under these three key themes (social, environmental and economic). **(E277)**
- Ensure that 'environmental' core commitments remain a very high priority within the business. **(E277)**
- Continue to ensure that Northern Powergrid aim to 'lead by example', for example by focusing on reducing its own carbon emissions before supporting customers and communities with decarbonisation. **(E277)**
- Consider ways in which Northern Powergrid can communicate with customers how the business is reducing its own carbon footprint so that Northern Powergrid can be seen as 'leading by example'. **(E277)**
- During Northern Powergrid citizens' panel, round 6: Review of whole plan, 95.5 per cent said they valued Northern Powergrid's proposed investment in this area. They were supportive of this proposal in principle but were concerned that it would take more than two regional energy advisors to make it work in practice. **(E296)**
- Consumers felt that Northern Powergrid should act more as a facilitator of this and work on an individual basis with the local communities. By doing this, consumers saw an opportunity for Northern Powergrid to also advertise themselves in the region. Consumers liked the idea of Northern Powergrid taking a role in encouraging biodiversity but felt that there need to be strong links established with the wider community in order for this to be effective. One example put forward by consumers was engaging school children about biodiversity and giving them seeds to plant. Consumers also suggested working closer with local councils, and other partners, as they felt that there is a collective responsibility to tackle climate change and make greener decisions. **(E296)**
- According to the future consumer research, common interest levels on topics in this area include Wildlife and green space an emotive topic esp. for those already informed re issues e.g. bees**. (E297)**
- Some see opportunity for community gardening/workshops, improved green spaces/aesthetics. Others more neutral but still generally receptive to concept**. (E297)**
- Overall plan acceptability: Potential to additionally communicate any community benefits to broaden appeal, and to also frame within wider environmental plans**. (E297)**
- Reactions to Northern Powergrid's plan: When reminded of potential bill impact, some keenness for proportionality vs energy reliability and customer service or wider investment in environment e.g. renewables. **(E297)**
- More of a focus on making sure the network is ready rather than the flexibility - good because might be some resistance or not much support to using electricity at different times of the day for example (working, urban, bill payer). **(E297)**
- Overall accepted, especially by those who are more environmentally conscious, providing spend is proportionate. **(E297)**

WAVE 4 – Finalising our plan

From July to December 2021, we finalised our plan, responding to queries, addressing gaps and testing overall acceptability. We engaged 10,091 customers and stakeholders overall and with detailed sessions on outstanding environmental action plan topics across 8 events.

The events where Environmental Action Plan was a specific sub-topic are listed below:

Code	Name	Subgroup	Engagement Type	Date	No Engaged
(CR418)	Cross Utility Workshop	Utilities	Meeting	20/10/2021	8
(CR456)	Citizens Panel	Consumers	Panel	13/09/2021	37
(CR457)	Supply survey (decarb journey)	Suppliers	Quant	Sep 2021	25
(CR426)	Citizens Panel (Bill impact)	Consumers	Panel	Sep 2021	37
(CR420)	ED2 stakeholder webinar	Regional Politics, Consumers, Future Energy	Meeting	03/09/2021	101
(CR465)	Business Plan Acceptability Testing	Consumers	Quantitative survey	Oct-Nov 2021	1,742
(CR466)	ED2 Acceptance Comms (winter awareness campaign mail-out)	Consumers	Quantitative survey	Nov 2021	8,141

Feedback in summary:

At the Cross Utility Working session, Northumbrian Water reported its commitment to be net zero by 2027. It wants solar panels at its sites but currently there are communication blockers with NPg. They generate power at plants and then put this back into the grid. All energy comes from the North Sea and is renewable. They have EVs, and charge points at some sites, but it is not mass scale). They are trialling use of gas from a plant to power some vehicles. All suppliers and contractors sign up to visions and values so align with strategy. **(CR418)**

- NGN's main focus is on reducing leakage as this has the biggest carbon impact. **(CR418)**
- Another NGN initiative is EV fleet optimisation, though it does not want to install charge points itself. Talks with NPg are ongoing on how the two companies can collaborate on this. It also has an environmental action plan and is committed to planting 400,000 trees over the period (funded by shareholders). This is in response to customer feedback that NGN needs to improve air quality impacted by road works and digging holes. **(CR418)**
- There is an appetite for partnership working with Northern Powergrid around sustainability in the supply chain as NGN believes some parts of its supply chain will be the same as that of Northern Powergrid. **(CR418)**
- For Yorkshire Water, process emissions are its biggest footprint (65% of emissions, once electricity becomes renewable). Without new technology, they will need to rely on carbon offsetting to cover 35-30% of remaining emissions. However, there is uncertainty about the level of these emissions due to monitoring and measuring. **(CR418)**
- Yorkshire Water feels it is doing well on EVs, are it is looking to raise funds for the infrastructure needed. They want to work with utility companies to optimise the number of charge points. **(CR418)**
- Yorkshire Water is looking at smart metering to monitor consumption across all sites and is in phase 1 of a solar panel scheme. There are several schemes looking at process efficiency (e.g. installing inverters on site to operate at high efficiency points). Leakage reduction is another focus, and ending the connection to large diesel generators in parallel with the network (these will remain as a back-up option but not used for mainstream generation). **(CR418)**

- Overall Yorkshire Water feels they are making progress and do not need further support from Northern Powergrid. **(CR418)**

- Yorkshire Water uses diesel generation to prop up the grid and they will rely increasingly on this as we head towards net zero. They believe it is difficult to make the financial case for ongoing diesel generation, compared to alternative sources like hydrogen or tidal, that are able to deliver an immediate switch on, so that customers can still be supplied. Currently there is no alternative to emergency diesel on standby, though they are looking to see whether there is scope for a regional innovation project to resolve this. **(CR418)**

- Northumbrian Water also relies on back-up diesel generation and is penalized by Ofwat if supply is interrupted. They try to be proactive by monitoring cables at pumping stations to see if problems can be predicted before they happen. They could use hydrogenation to support with replacement of diesel generators (with hydrogenation on most reservoirs putting power into the grid, turbines could be synched to the grid, removing the need for diesel standby generator. **(CR418)**

- Yorkshire Water flagged a circuit HV power line that is prone to faults at a high profile treatment works. Consequently, they have looked into a large battery to level out fluctuations in supply, but would be expensive. **(CR418)**

- With utility companies obliged to create environment action plans, NGN believe it would be sensible to consider what is reported each year to make sure there is a joined-up approach (it is the same customers affected). They would like to see data sharing on how this is reported. **(CR418)**

- The Citizens Panel convened to discuss EAP in September 2021 and reported mixed opinions on the level of ambition in Northern Powergrid's plan to reduce its carbon footprint. Whilst some thought the plan was ambitious enough, others wanted more to be done, though it was understood this may not be achievable. **(CR456)**

- Consumers who supported the plan were impressed that Northern Powergrid was aiming for net zero ten years ahead of the government's 2050 target. They also appreciated Northern Powergrid is considering its contractors/supply chain as part of emission reduction plans. **(CR456)**

- Several were impressed that Northern Powergrid had set its own target, but felt the Government was the main actor responsible for supporting the move towards net zero. **(CR456)**

- Further discussion on supply chain carbon footprint targets revealed that many agreed that the supply chain also has a responsibility to reduce emissions, although some argued that rather than dictating to smaller companies, Northern Powergrid should either support their contractors on the net zero journey, or that suppliers should unilaterally work towards this. **(CR456)**

- SMEs were divided on whether suppliers should be supported to reduce emissions. Some felt it was enough for Northern Powergrid to monitor achievement of targets. **(CR456)**

- Bespoke targets, proportionate to the size of the company and service provided, could be set, but Northern Powergrid should be mindful not to damage its supplier relationships or its services (e.g. what if a supplier did not meet a target but there was no alternative supplier?). **(CR456)**

- In terms of providing support, the panel was hesitant to use the word 'impose' and felt that Northern Powergrid should collaborate with suppliers when setting targets. **(CR456)**

- Northern Powergrid should lead by example, helping suppliers to calculate costs and benefits and make it easier for suppliers to understand how they can make the necessary changes. **(CR456)**

- Making Northern Powergrid 'reps' available to provide guidance to smaller companies, or adding messaging on vans ('working together with') would showcase collaboration and spread the word that Northern Powergrid is supporting smaller companies to reduce emissions. **(CR456)**

- SMEs suggested supplier should benefit from a points system where they received rewards based on the level of their carbon reductions. **(CR456)**

- The panel felt that suppliers should not be expected to reduce emissions at the same pace as NPg or necessarily have the same targets. **(CR456)**

- The panel was divided on prioritisation of supply chain emission reductions vs. other EAP initiatives (e.g. reducing SF6 losses or EV fleet transition). Those prioritising supply chain emissions had concerns emissions would otherwise be passed on to contractors. **(CR456)**

- The panel was willing to pay more to fund the reduction of emissions in principle, but wanted to know roughly how much it would cost before they could make a decision. Those who were not supportive did not believe it was the responsibility of NPg and its suppliers to carry the cost and responsibility of carbon emission reduction. **(CR456)**

- A supplier engagement survey was sent to Northern Powergrid suppliers to understand where they are on their journey to decarbonisation. The results showed that the just over half of the supply chain who responded (52%) will reach net zero by 2040 or sooner. **(CR457)**

- Nearly two-thirds (64%) of Northern Powergrid suppliers have set targets aligned to the Science Based target of an annual 4.2% reduction, with some committing to higher annual reductions. **(CR457)**

- Some 56% of suppliers expect to have 40% or more of their fleet low emission by 2028. **(CR457)**

- Whilst some of the supply chain is further ahead on their journey towards net zero than Northern Powergrid, others are at the very infancy on their decarbonisation journey and are likely to need considerable support to make the transition towards net zero a reality. **(CR457)**

Safety

Stakeholder engagement summary

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
S1	**Maintain our position as an industry leading safety performer delivering continued improvement by focussing on leading causes of injuries, and continuing to reduce exposure to high risk activities**	**Wave 1:** At the start of our engagement, we looked at the improvements in safety performance we have delivered since 2015. We explored how this could be further improved across the 2023-2028 period and consulted with domestic consumers, rural consumers and corporate interest groups, as well as colleagues. Overall feedback showed that stakeholders valued the improvement we have delivered in our safety performance. They also suggested that the COVID-19 pandemic will have an effect on how we approach our business operations and we should incorporate lessons learned from the pandemic. ***Key wave 1 finding:*** *Stakeholders would like us to be able to measure and quantify the impact and effectiveness of our safety messaging.*	*E022* *E054* *E190*
		Wave 2: These insights led to the development of a more comprehensive set of propositions to deliver improved safety performance, including five levels of ambition which we then put forward to our stakeholders in wave 2 as part of emerging thinking. Overall feedback suggested that consumers felt that our current safety performance exceeded their expectations. On vehicle safety there were some views that the technology driven improvements, such as artificial intelligence in vehicles, were not relevant or cost efficient and these were removed from the plan. ***Key wave 2 finding:*** *Stakeholders would like us to build on our current good safety performance by having ambitious targets but there was a trade-off where they expected this to be delivered for the lowest cost possible.*	*E003* *E007* *E009* *E023* *E028* *E030* *E031* *EO37* *EO50* *E152* *E153* *E154* *E193* *E200*
		Wave 3: During the proposition finalisation stage, we discussed more of the granular details around the propositions and specifics around acceptability with our stakeholders. Stakeholders regarded our safety performance as impressive and considered that we should continue to improve this performance. However, stakeholders felt that good safety performance was a hygiene factor and should be maintained but they did not value any additional activities. ***Key wave 3 finding:*** *Stakeholders regarded safety as a hygiene factor where they wanted a high level of performance maintained but they did not want to place a value on additional activities to deliver further improvement.*	*E241* *E251* *E252* *E265* *E273* *E296*
S2	**Ensure that our workforce is fit for the future by delivering health and well-being programmes that address the individual needs of our colleagues**	**Wave 1:** At the start of our engagement, we looked at the health and wellbeing priorities for our colleagues. We explored how this could be further improved across the 2023-2028 period and consulted with domestic consumers, rural consumers and corporate interest groups, as well as colleagues. Unsurprisingly the discussion focussed on the COVID-19 pandemic and how the impact of the pandemic and the learning points taken from this will be used to update the businesses' procedures and welfare arrangements. ***Key wave 1 finding:*** *Stakeholders would like to see that the lessons learned from the COVID-19 pandemic will be reflected in changes to business processes.*	*E022* *E054* *E190*

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
		Wave 2: These insights led to the development of a more comprehensive set of propositions to deliver improved health and well-being, including five levels of ambition which we then put forward to our stakeholders in wave 2 as part of emerging thinking. Engagement with the Health and Safety Executive identified their medium term priorities included improving mental health, working from home and musculoskeletal health. ***Key Wave 2 finding:*** *Rather than including improving health and well-being of our colleagues in the colleague safety proposition we separated this out into a separate proposition.*	*E003* *E007* *E009* *E023* *E028* *E030* *E031* *EO37* *EO50* *E152* *E153* *E154* *E193* *E200*
		Wave 3: During the proposition finalisation stage, we discussed more of the granular details around the propositions and specifics around acceptability with our stakeholders. Stakeholders regarded that our health and well-being plans were appropriate. Health, safety and wellbeing scored very highly in the Northern Powergrid resilience survey. Colleagues identified a number of priority areas where they feel they would benefit from. ***Key wave 3 finding:*** *Stakeholders would like to see a structured programme under the health and wellbeing proposition that addresses health and well-being improvement.*	*E241* *E251* *E252* *E265* *E273* *E296*
S3	**Maintain our position as a leading safety performer through collaboration with our contractors to improve their accident rate by 50per cent by the end of 2023-2028**	**Wave 1:** At the start of our engagement, we looked at the safety performance of our contractors for 2015-2023. We explored how this could be further improved across the 2023-2028 period and consulted with domestic consumers, rural consumers and corporate interest groups, as well as colleagues. ***Key wave 1 finding****: There were no specific findings that came from Wave 1 engagement on contractor safety performance.*	*E022* *E054* *E190*
		Wave 2: These insights led to the development of a more comprehensive set of propositions to deliver improved contractor safety performance, including five levels of ambition which we then put forward to our stakeholders in wave 2 as part of emerging thinking. Overall feedback suggested that stakeholders felt that contractors should be held to a higher safety standard than they currently do. Selecting contractors with a leading safety record was seen as a high priority. ***Key wave 2 finding****: Stakeholders would like us to ensure that our contractors are operating to the same high safety standards as we do given they are representing Northern Powergrid when they are working for us.*	*E003* *E007* *E009* *E023* *E028* *E030* *E031* *EO37* *EO50* *E152* *E153* *E154* *E193* *E200*
		Wave 3: During the proposition finalisation stage, we discussed more of the granular details around the propositions and specifics around acceptability with our stakeholders. Stakeholders regarded that our contractors safety performance should be improved to the same level we have achieved. However, stakeholders felt that good safety performance was a hygiene factor and should be maintained but they did not value any additional activities. ***Key wave 3 finding:*** *Customers regarded safety as a hygiene factor where the contractor's safety performance ought to be brought in line with Northern Powergrid's, but they did not want to place a value on additional activities to deliver further improvement.*	*E241* *E251* *E252* *E265* *E273* *E296*

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
S4	**Deliver targeted intervention and education programmes to our communities that will increase awareness of the hazards of electricity and will reduce the number of contacts with overhead lines**	**Wave 1:** At the start of our engagement, we looked at our community safety awareness programmes and the initiatives we deliver. We explored how these could be further improved across the 2023-2028 period and consulted with domestic consumers, rural consumers and corporate interest groups, as well as colleagues. Stakeholders were supportive of these programmes and agreed that we should continue to provide education and raise awareness of the safety issues in relation to the electricity network. There was also general agreement that we should continue to educate school age children and members of the public on the dangers associated with electricity. ***Key wave 1 finding**: Stakeholders would like us to continue to provide education and safety awareness programmes.*	*E022* *E054* *E190*
		Wave 2: These insights led to the development of a more comprehensive set of propositions to deliver improved community safety awareness programmes, including five levels of ambition which we then put forward to our stakeholders in wave 2 as part of emerging thinking. Stakeholder feedback was supportive of providing safety education to school age children and raising safety awareness on electricity with the general public. Many felt that we should continue our programme to target the higher risk sectors such as agriculture and road-haulage. The education of school age children was considered to be another area of high priority within our safety initiatives and one where we should be more ambitious in the number of children the programme engages. The initiative to add defibrillators to our fleet vehicles was an option considered by many stakeholders to be one where we should be ambitious on the roll out. This was seen as an initiative that could be very beneficial for vulnerable and rural customers. Some stakeholders considered that we should establish a safety awareness course for members of the public but this was not supported by the majority of stakeholders. ***Key wave 2 finding**: Stakeholders considered that we should continue to be ambitious in delivering the safety awareness education programme for children and that our awareness programmes should concentrate on high-risk sectors.*	*E003* *E007* *E009* *E023* *E028* *E030* *E031* *EO37* *EO50* *E152* *E153* *E154* *E193* *E200*
		Wave 3: During the proposition finalisation stage, we discussed more of the granular details around the propositions and specifics around acceptability with our stakeholders. Stakeholders regarded that our community safety awareness programmes should continue but the current level is acceptable. They considered that the roll-out of defibrillators was a quick win. ***Key wave 3 finding:** Stakeholders considered that we should continue to deliver the safety awareness education programme for children and that our awareness programmes should concentrate on high-risk sectors.*	*E241* *E251* *E252* *E265* *E273* *E296* *E325*
		***Acceptance research and findings:** The acceptance score for Safety is 73 per cent. Overall Acceptance was high for all customer groups, with SMEs most accepting at 82 per cent. Trust was also important for customers at 74 per cent. Customers found this area easy to understand and with high acceptance, no further acceptability testing is required in wave 4.*	*E325*
		***Overall Wave 4 findings:** The Citizen's panel and stakeholders supported our propositions to build on our strong health and safety performance: prioritising contractors and colleague and educating at risk groups, whilst harnessing innovation.	*CR426* *CR420*

WAVE 1 – open and formative engagement

In the first wave of engagement, we ran 103 events, engaging 4,762 individuals. Of these 103 events, safety was a specific sub-topic in three different forums, alongside bi-laterals and conferences.

Engagements were focused on:

- awareness;
- collaboration; and
- information sharing.

The three events where safety was a specific sub-topic are listed below:

Engagement reference	Name	Segment	Method	Delivery partner	No engaged
E022	Findings from interviews with rural consumers	Rural consumers	Phone interviews	Traverse	40
E054	Consumer panel	Consumers	Online panel	Traverse	50
E190	Health and Safety Executive (HSE) engagement	Corporate Interest Groups	Meeting	NA	2

Awareness

Safety remains a top priority.

- We ran three community safety awareness campaigns during wave one, for both consumers and corporate interest groups.
- Rural consumers were supportive of Northern Powergrid providing education and raising awareness of safety issues relating to the energy network. They felt that Northern Powergrid should focus on educating schoolchildren and members of the general public about the dangers associated with electricity. Some interviewees also expressed concern about cyber security and argued that Northern Powergrid should explore ways to protect the network against cyber-attacks and to raise awareness of these risks among its consumers. **(E022)**
- According to the future customer insights report, in terms of the highest priority segments for safety education and interventions. **(E054):**
    - 75 per cent young people and the general public;
    - 16 per cent agriculture;
    - 10 per cent lorry drivers.
- Health and safety executives (corporate interest groups) participating in face to face engagement (January 2020) welcomed the safety improvements in equal measure; however, they would like [Northern Powergrid] to put in a specific budget and assessment of impact for safety messaging in place to demonstrate the effectiveness of the investment. **(E190)**
- One specific topic of discussion related to safety was the coronavirus pandemic, its impact and learning from this event. Most consumers felt that the pandemic will impact business planning in some way. The area identified most often as having to be approached differently due to the pandemic was consumer safety. **(E190)**

WAVE 2 – testing our emerging thinking with costed levels of ambition

Our second wave of engagement was used to test options generated through the first wave – gauging levels of consumer ambition and defining our outcomes. Engagement was carried out with our domestic consumers, partners, commercial consumers, stakeholders, SMEs and future energy consumers. The results were split into:

- Ambition (that Northern Powergrid should strive for): (most and least)
- Priority (of an initiative to Northern Powergrid): (highest and lowest).

In total, we ran 135 events, engaging 15,475 stakeholders in wave 2. Of these 135 events, safety was a specific sub-topic at 14 of them, covering 4,552 individuals.

The 14 events where safety was a specific sub-topic are listed below:

Engagement reference	Name	Segment	Method	Delivery partner	No engaged
E003	Consumer panel (Leeds and Newcastle)	Domestic consumers	Online panel	Traverse	51
E007	Interviews with rural consumers	Rural consumers	Telephone interviews	Traverse	33
E009	SME Panel	Consumer (SME)	Online panel	Explain Research	20
E023	Consumer Panel	Consumers	Online panel	Travers	57
E028	Consumer panel (Leeds and Newcastle)	Domestic consumers	Online panel	Traverse	53
E030	Consumer Panel	Consumers	Online panel	Traverse	41
E031	Consumer Panel	Consumers	Online panel	Traverse	36
EO37	SME Panel	Consumer (SME)	Online panel	Explain Research	20
EO50	Emerging Thinking Consultation	Consumers and Stakeholders	Survey	Explain Research	404
E152	Emerging Thinking microsite	Consumers and Stakeholders	Digital	NA	N/A
E153	Emerging Thinking microsite users	Consumers and Stakeholder	Microsite	NA	3,600
E154	Emerging Thinking – rural panel	Consumers	Digital	NA	20
E193	Internal Colleague Survey	Employees	Online survey	NA	204
E200	Stakeholder Panel - end of year event	Stakeholders - various	Online workshop	Traverse	13

Responses varied, covering points on how Northern Powergrid addresses contractor, vehicle, and colleague safety as well as feedback from customers on Northern Powergrid's proposals to improve community safety through awareness campaigns.

Results from the emerging thinking consultations:

Wave 2 findings	A	B	C	D	E
Proposed levels of ambition for safety	'An industry leader in safety performance'	'Proactive interventions to further reduce safety risk in our operations'	'A champion for health and safety with our third-partycontractors, local communities, and sector partners'	'New technology-led safety measuresand further risk reduction'	'Artificial intelligence automation and robotics takes safety to new levels'

- Domestic customers, when asked about levels of consumer ambition for Safety during Emerging Thinking consultations (November 2020), were most likely to select option C. **(E050)**
- Business respondents were more likely to select the more ambitious Option D, with approaching a quarter [23per cent] choosing this option compared to one in eight [12 per cent] domestic consumers. **(E050)**
- Consultations found that approximately a quarter of both domestic consumers [23 per cent] and business respondents [24 per cent] chose Option B, preferring a slightly enhanced level of service for the same annual cost. **(E050)**
- The consumer panel covered contractor safety, vehicle safety, colleague safety and several community safety awareness campaigns. **(E003)**

Contractor safety

- The highest priority was imposing higher-than-statutory safety standards for contractors and conducting more audits/inspections. During SME panel (August 2020) respondents were also in agreement that contractors should work to the same high standards as Northern Powergrid, given they represent the company when they are working. **(E009)**

Vehicle safety

- In Leeds and Newcastle consumer panel (September 2020) there was a clear theme of steering away of technological innovation within the lowest priority and ambition **(E003):**
  - Lowest priority: Artificial intelligence driver assistance systems in all fleet vehicles (to reduce road risk).
  - Least ambition: Artificial intelligence driver assistance systems in all fleet vehicles (to reduce road risk).
  - Least selected: Trial self-driving vehicles in Northern Powergrid's fleet.
  - Most ambition: Carrying defibrillators in all their vehicles for public use.

Colleague safety

- Most consumers in both Newcastle and Leeds felt that Northern Powergrid's current safety offer exceeded their expectations. In both cases, they were particularly impressed at Northern Powergrid's record of just three recorded workplace accidents in 2019/20. **(E003)**
- Among SMEs in the SME panel (September 2020), the option of all fleets being equipped with defibrillators was well-received, but respondents commented that all staff should also be 'first aid trained' in order to use this. **(E009)**

- From a COVID-19 perspective, consumers in consumer panel held in Newcastle and Leeds (July 2020) were generally confident that by following government guidelines, Northern Powergrid would be able to keep their staff and consumers safe following COVID-19. When asked what further measures Northern Powergrid could take, consumers mentioned social distancing, additional PPE and working remotely where possible. **(E028)**

Community safety awareness campaigns

- The community safety awareness campaigns produced a range of quantitative data and findings.

- In the consumer panel (September 2020), the initiative deemed to be the most ambitious was the targeted safety awareness campaigns for higher-risk sectors like agriculture and construction. The most selected initiative was to further limit the number of overhead line contacts. **(E003)**

- Consumers in Leeds were largely supportive of Northern Powergrid's commitment to providing safety education for schoolchildren and raising awareness of the risks associated with electricity among the general public. However, many argued that this aspect of Northern Powergrid's work should be expanded by increasing its school outreach and conducting advertising campaigns. The highest priority was deemed to be extending school safety talks/lessons with the aim of reaching over 55,000 children. **(E003)**

- On this note, consumers in Newcastle largely prioritised expanding Northern Powergrid's school outreach programmes and targeting safety awareness campaigns at workers in the most-at-risk sectors. Several consumers were also in favour of the proposal to carry defibrillators in all Northern Powergrid vehicles, in fact, this was the area where consumers wanted Northern Powergrid to show the most ambition. In contrast, driver assistance measures such as AI were largely seen as both the lowest priority for Northern Powergrid and the area in which it should show least ambition. **(E003)**

- There was an additional finding during interviews with customers from rural areas (October 2020) that consumers said that further investment should be targeted at vulnerable consumers, on safety campaigns for high-risk sectors, and rolling-out defibrillators. There was, however, limited support for Northern Powergrid creating an accredited safety course, with many consumers unclear as to the purpose or benefits of such a course and some warning against the dangers of creating false confidence among course attendees. Some consumers also questioned whether it was Northern Powergrid's responsibility to provide safety training and raised concerns about the associated costs. **(E007)**

- Consumers in rural areas were largely supportive of the use of graphic imagery to raise awareness of electric shock, as they felt it would make Northern Powergrid's advertising campaigns more memorable, although some felt that definitions of graphic should vary depending on the target audience. A few interviewees argued against the use of such imagery, on the basis that it was unpleasant, ineffective and/or expensive. **(E007)**

- From an SME standpoint, educating the public and children about safety was the area where respondents wanted to see Northern Powergrid being the most ambitious, ideally reaching more than 55,000 children. There was also agreement that public awareness about the impact an electric shock was low, so 'shock tactic imagery' of electric shocks might be effective if utilised by Northern Powergrid, especially as we become more dependent on electricity as a society. Safety advice and information should also come from key experts. **(E009)**

- According to SME panel (August 2020), from an industry standpoint, although industries like agriculture and haulage should have higher-than-average awareness about the risks of coming into contact with electrical assets, Northern Powergrid should continue to focus their campaigns on these high-risk sectors. However, some respondents felt that construction and agriculture sectors are more difficult to educate about safety awareness, even with shock tactics, because they notoriously cut corners to save time/money. **(E009)**

- One specific innovation called out in internal colleague survey (November 2020) was What3Words: 93 per cent think this app would be beneficial to use to identify exact locations with feedback provided on instances this could support our service. **(E193)**

This was reinforced by the Future Energy consumers during our Stakeholder Panel at the end of the year (November 2020), when discussing how to increase engagement from consumers about calling out issues, using What3Words. This involves asking consumers to report any overhead line issues. **(E200)**

WAVE 3 – refining and finalising our plan

In third wave we tested and refined our plans and priorities wherever feedback was inconclusive, where we had differences of opinions, or where new areas had areas had emerged. This stage included our business plan acceptability research with consumers and stakeholders.

In total, we ran 91 events, engaging 32,500 stakeholders in wave 3. Of these 91 events, safety was a specific sub-topic at six of them, covering 2,473 individuals.

The six events where safety was a specific sub-topic are listed below:

Engagement reference	Name	Segment	Method	Delivery partner	No engaged
E241	Colleague engagement - Workforce Resilience Surveys	Northern Powergrid Colleagues	Online survey	Explain Research	165
E251	Willingness to Pay quantitative prioritisation – Choice Experiment research	Customers	Online survey	Impact	1,908
E252	Citizens' Panel, Round 1: Asset Resilience	Customers	Online panel	Traverse	48
E265	Stakeholder Summit - Net Zero Energy Future for the North	Stakeholders, Future energy	Online conference	Traverse	140
E273	Workforce Engagement: Sustainability	Internal Stakeholders	Online survey	Explain Research	165
E296	Northern Powergrid Citizens' Panel, Round 6: Review of whole plan	Customers	Online panel	Traverse, Explain Research	47

- According to workforce resilience surveys (January 2021) for health, safety and environment 'PPE' was ranked ahead of an 'app on fatigue management' with 'mental health' being in the middle**. (E241)**
- In Northern Powergrid citizens' panel (March 2021) some domestic consumers expressed some caveats, such as that risks should be kept to a minimum and that there should be a focus on safety, but overall were fine with the idea of short-term, calculated risk in return for positive wider benefits. **(E252)**
- Willingness to pay shows that to respondents, safety, reliability, and customer service are hygiene factors – a very high level must be maintained but customers do not value additional activities such as keeping Northern Powergrid staff safe or reducing power cuts by minutes over the year compared with the bold environment propositions. **(E251)**
- Results of 'willingness to pay' - quantitative prioritisation research (February 2021) shows that **(E251):**
  - Safety was ranked 12 out of 12 for domestic customers.
  - However, when talked about in the context of 'safe and reliable network' – it was a top priority.
  - Customers do not want/ think they should pay more for Northern Powergrid staff safety.
  - Education/ awareness of safety should continue but current level is acceptable.

    - Quick win for safety awareness and customer relations: defibrillators.

- According to Northern Powergrid workforce resilience survey (February 2021), health, safety and mental wellbeing scored 4.5 - importance on a scale of 1 to 5 with 1 being 'very low importance' to 5 being 'very high importance. **(E261)**

- When asked: 'What additional ideas do you have that Northern Powergrid should consider ensuring the health, safety, and mental wellbeing of our workforce?' respondents shared the following ideas: Help manage workload stress and fatigue, enhancement of wellbeing training and personnel, improve access to wellbeing resources, increase useful employee dialogue and feedback, ensure adequate staff resources, and improve the team morale and environment. **(E261)**

- At the Northern Powergrid Stakeholder Summit - Net zero energy future for the North, on the topic of health and safety **(E265)**:

    - What Northern Powergrid have done: 2020 has seen the delivery of an essential service continue during the pandemic, no recordable or loss of time accidents and physical and mental health of employees improved.

    - What stakeholders have said: Northern Powergrid's safety record is impressive but should continue to improve, help bring contractors' safety performance in line with Northern Powergrid's and prioritise engagement with schools and the agriculture sector.

    - What Northern Powergrid's plans are moving forward: A series of key objectives; Maintain a position as a leading safety performer; Ensure a workforce fit for the future with an effective health and well-being programme and reduce the number of vehicle accidents through training and vehicle technology; Drive a step-change in the safety performance of our contractors; Continue targeted intervention and education programmes to agriculture sector and schools.

- According to Northern Powergrid workforce engagement on sustainability (March 2021) the biggest lesson learned from handling the pandemic regarding safety and workforce is that major incident planning worked, and we could quickly establish a routine with command-and-control structure to manage the situation. The other major takeaway is that everything we did, and all the decisions made were in conjunction with the trade unions, who helped a lot. **(E273)**

- During the citizens' panel, round 6: review of whole plan, 42 consumers (93.3 per cent) felt that the business plan offers value for money. Despite this consensus, some consumers reiterated the importance of ensuring that it is also financially viable for vulnerable customers. **(E296)**

- Most consumers felt that the level of ambition of this business plan is suitable, and a number of consumers expressed that they 'can't fault it' and are massively impressed with Northern Powergrid's ambition. Several consumers added that whilst it is appropriately ambitious, it is also achievable, which they considered to be critical. **(E296)**

- Some consumers referred to Northern Powergrid's statement which lays out a commitment to 'ensure that no customer gets left behind'. These consumers queried how Northern Powergrid can ensure this, both in terms of business plan affordability and deliverability for vulnerable customers, and they suggested that a word such as 'endeavour' may be more appropriate. **(E296)**

- During the poll questions at the end of session two, 91.1 per cent of consumers said that they supported the level of ambition of the business plan, with 2.2 per cent (one consumer) saying they did not. The remaining 6.6 per cent did not answer the question. **(E296)**

WAVE 4 – Finalising the plan

From July to December 2021, we finalised our plan, responding to queries, addressing gaps and testing overall acceptability. We engaged 10,021 customers and stakeholders overall and with detailed sessions on outstanding safety topics across 5 events.

The events where Safety was a specific sub-topic are listed below:

Code	Name	Subgroup	Engagement Type	Date	No Engaged
(CR420)	ED2 Stakeholder Webinar	Regional Politics, Consumers, Future Energy	Meeting	03/09/2021	101
(CR426)	Citizens Panel (Bill impact)	Consumers	Panel	20th & 23rd Sep	37
(CR465)	Business Plan Acceptability Testing	Consumers	Quantitative survey	Oct-Nov 2021	1,742
(CR466)	ED2 Acceptance Comms (winter awareness campaign mail-out)	Consumers	Quantitative survey	Nov 2021	8,141

No new insights were gathered – the focus of discussions was around support for the plan.

Reliability and availability

Stakeholder engagement summary

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
		Wave 1: Our initial engagement established reliability and availability as one of the top priorities for stakeholders. Insights from our consumer panels, rural panels, focus groups and future customer panels all showed a view that we should invest in deliver a safe and reliable network. In particular, the impact that COVID-19 has had on their lives had shown them the importance of their power supply and that we should be prepared for changes in the needs of customers as a result of decarbonisation. However, stakeholders wanted to balance the drive for increased reliability with efficient investment that focused on creating a smarter network capable of delivering in future periods. In particular they valued the use of automation to deliver improvements that has a proven track record in reducing the length of power cuts below three minutes for customers. These insights allowed us to establish a direction from stakeholders on where we should focus our range of ambition and propositions in our emerging thinking. ***Key wave 1 finding:*** *Stakeholders want efficient investment that delivers a smarter, more reliable network to meet the needs of customers now and in the future.*	*E022* *E032* *E049* *E054*
RA1 RA2	**Deliver a 15 per cent reduction in the number of power cuts** **Deliver a 25 per cent reduction in the duration of power cuts**	**Wave 2:** Our engagement during wave 2 allowed us to further develop our propositions to prioritise the level of ambition and areas of improvement that stakeholders valued, as well as allowing us to refine the cost of initiatives that would achieve those outcomes. More than 60per cent of stakeholders wanted us to deliver a major improvement or more within our emerging thinking, customers who chose less ambitious options did so because they did not want to see a significant increase in their bill. In particular our stakeholders were supportive of investing now to deliver improvements in the technology on our network, with initiatives such as fault predictive technology and automation receiving a high degree of support, especially those that deliver a 'net zero ready' network. In our engagement customers commented favourably on the reliability of our network, however both domestic customers and SMEs believed the length of power cuts were too long and this should have a higher level of ambition in our propositions. However, as part of the feedback on our draft propositions, stakeholders noted that average performance was not necessarily representative of the level of service that customers received. Therefore we should target investment in areas with the worst performance across the network – this has been reflected in our strategy for the deployment of automation, which focuses on deployment on the worst circuits first, as well as in our other propositions. ***Key wave 2 finding:*** *Stakeholders support the need to invest in enhancing the technology on our network in order to deliver an improved level of service for customers - they want to invest now to be net zero read in the future.*	*E003* *E007* *E009* *E021* *E023* *E027* *E030* *E031* *E036* *E037* *E046* *E047* *E050* *E055* *E060* *E061* *E152* *E153* *E154* *E189* *E207*
		Wave 3: During the proposition finalisation stage, we worked with stakeholders on the detailed propositions and costs to refine our plan. There were big differences in prioritisation depending on how reliability was presented to customers, investment in micro-areas was not valued specifically; however the overall improvement of reliability was, with a focus on balancing cost and risk with the benefits. Reliability was regarded as a key area for us and that it was a fundamental requirement within our plan. We must deliver a high level of reliability performance for our customers. As such, customers were willing to pay the relatively small bill increase to achieve the significant performance improvements.	*E251* *E252* *E253* *E267* *E270* *E272* *E274* *E277*

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
		Customers felt that reliability would become increasingly important with the increase in low carbon technologies (LCTs) as well as changing behaviours. We should invest in order to offer a reliable service and not be a barrier to development. ***Key wave 3 finding:*** *Stakeholders were willing to pay for the significant improvement in service that we are planning, however we must ensure efficient expenditure and be ready to meet the needs of future customers.*	
RA3 RA4	**Reduce by 50 per cent the annual number of customers that experience a 12 hour power cut** **Reduce by 15 per cent the annual number of customers that experience a 6 hour power cut**	**Wave 1:** At the start of our engagement on long duration power cuts, we established that customers believed that 12 hours was too long to be off supply and that we should deliver a step-change in performance in this area. Stakeholders believed that the increasing importance of power supply for customers will mean that in future the impact of long duration power cuts will be higher and, in particular, would be a concern as the uptake of LCTs increases. As part of our initial research we utilised the feedback from customers through the Broad Measure of Customer Satisfaction (BMCS) surveys[6] and noted a significant reduction in the satisfaction of customers after six hours off supply. This also echoed the feedback received at stakeholder events, with some customers arguing that 12 hours for resolving power cuts lacked ambition; this led us to develop a more focused proposition to improve performance on power cuts that last more than six hours. ***Key wave 1 finding:*** *12 hours is too long for customers to be off supply and stakeholders were supportive of a high level of ambition in this area, as well as driving improvements reducing the duration of longer, more complex power cuts.*	*E022* *E032* *E049* *E054*
		Wave 2: When testing our propositions with stakeholders, they were supportive of a high level of ambition in our plan for 2023-2028, particularly for those customers who experience a significantly worse than average service, including those who experience long duration power cuts. Investment should be delivered in such a way that the worst areas of the network receive the most investment in order to deliver an equal level of service for all customers. As part of our engagement, the prevention of long duration power cuts for vulnerable customers was identified as a key issue and increasing the utilisation of generators to return their power supply should be considered as part of our reliability strategy, this has been reflected in the vulnerable customers section of our plan. Most stakeholders were supportive of our focus of reducing the length of power cuts as they considered the impact t was largely influenced by the length of a power cut. The overall feedback on long duration power cuts led us increase the ambition of our proposition. ***Key wave 2 finding:*** *Stakeholders wanted to see ambitious plans for delivering performance improvements for customers who experience the worst levels of service, in particular for vulnerable customers.*	*E003* *E007* *E009* *E021* *E023* *E027* *E030* *E031* *E036* *E037* *E046* *E047* *E050* *E055* *E060* *E061* *E152* *E153* *E154* *E189* *E207*
		Wave 3: In refining our plan, customers recognised that it is not always possible to provide an equal level of service to all customers at the same time but they felt that we should be ambitious in this area, especially as comparisons with other service providers demonstrated that a higher level of service could be achieved. Stakeholders felt that as decarbonisation gathers pace, reliability will become even more important given the increased reliance on electricity, such as the uptake of electric vehicles, electric heaters and an increase in the number of people working from home - the network will have to be reliable in order to support this.	*E251* *E252* *E253* *E267* *E270* *E272* *E274* *E277*

[6] The Broad Measure of Customer Satisfaction is common to all DNOs and is conducted by Explain on Ofgem's behalf, it allows customers to measure the service they received and give feedback.

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
		Key wave 3 finding: *Our ambition to significantly reduce the number of long duration interruptions was supported by stakeholders, particularly in regard to preparing for the future needs of customers.*	
RA5 RA6	**Ensure 99per cent of our customers do not experience more than 5 interruptions in a year** **Deliver £4m of targeted investment to improve network performance in rural areas**	**Wave 1:** In engagement conducted to establish our emerging thinking, our stakeholders fed back that they placed significant value on improving services for those customers who experience the worst level of service on our network. They believed that we should move their experience closer to those of the average, in both the number and duration of power cuts; this would in turn improve the overall average performance. Analysis of feedback from the BMCS surveys also showed customers felt strongly about reducing the number of interruptions that they experience, which was backed up in the reliability specific focus group. Using this feedback we established our multiple interruptions proposition, to ensure that the worst areas of the network were targeted alongside those that Ofgem define as worst serviced customers. Our engagement also indicated that the majority of customers did not think that power cuts of less than three minutes were an inconvenience and as such we should not focus our efforts on tackling these interruptions ahead of other key areas. This feedback from customers, alongside stakeholders' interest in utilising increased technology on the network, has led us to exclude short interruptions from our proposition. ***Key wave 1 finding****: We should target improvements for customers who experience a worse than average level of service across the network, however this should exclude short interruptions as these are not considered an inconvenience by the majority of customers.*	*E022* *E032* *E049* *E054*
		Wave 2: Stakeholders' feedback on our proposition was positive, they were strongly supportive of initiatives to tackle the worst performing areas of the network, particularly those that received traditionally lower levels of investment. There was a view that whilst current performance figures sounded good, the figures that the stakeholders saw for our overall performance were only averages and, as they had little experience of power cuts personally, they were concerned that others must be experiencing more outages. The feedback from stakeholders led us to refine our proposals for worst served customers, targeting areas of network that encompass 3,500 customers in rural areas and developing a specific investment scheme to target them. ***Key wave 2 finding****: Our stakeholders were supportive of the focus in our draft propositions of the specific schemes that targeted areas of the network that have traditionally received a lower level of investment. This allowed us to move to the next stage of development in refining our plan for delivering an improvement for these customers.*	*E003* *E007* *E009* *E021* *E023* *E027* *E030* *E031* *E036* *E037* *E046* *E047* *E050* *E055* *E060* *E061* *E152* *E153* *E154* *E189* *E207*
		Wave 3: Stakeholder feedback on our propositions was very positive regarding increasing investment for the worst served customers and most customers were happy to pay the increase in expenditure in our plan to improve the level of service these customers receive. Customers generally recognised that, while rural areas would always be behind urban areas in terms of reliability, we should ensure that the service they received was as equal as possible. Local politicians were also keen to see an increase in the interconnectivity and automation of parts of the network that were traditionally isolated so that we can restore power more effectively and ensure security of supply to these areas.	*E251* *E252* *E253* *E267* *E270* *E272* *E274* *E277*

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
		Key wave 3 finding: *When testing with stakeholders, they were supportive of our plans to tackle worst served customers and believed it was important to move towards all customers receiving a fair level of service.*	
		Acceptance research and findings: *The acceptance score for reliability and availability is 77 per cent. Overall acceptance was high with 79 per cent SME and rural customers were most accepting of the plan. Trust was important to customers (79 per cent) highest amongst rural, SME, and vulnerable customers.* *As acceptance is high from customers, this area will not be explored in further acceptability testing.*	*E325*
		Overall Wave 4 findings: *The citizen's panel supported the Reliability and Availability propositions highlighting a need to focus upon avoiding long-duration power cuts particularly for vulnerable customers and supported the increase in generator deployment to address this.* *There was also support for network improvements for worst served customers in rural areas, even for those who might not directly benefit through the use of green SilentPower vehicles and piloting innovative microgrids to improve reliability.*	*CR426* *CR420* *CR412*

WAVE 1 – open and formative engagement

In the first wave of engagement in total, we ran 103 events, engaging 4,762 individuals. Of those 103 events, reliability and availability was a specific sub-topic at four events, covering 491 stakeholders including rural and domestic consumers. Engagements were focused on understanding the level of importance customers placed on reliability and availability. Themes covered by the engagement are:

- reliability is a key responsibility for Northern Powergrid;
- frequency and duration of power cuts; and
- return on investment and cost.

The four events where reliability and availability was a specific sub-topic are listed below:

Engagement reference	Name	Segment	Method	Delivery partner	No engaged
E022	Findings from interviews with rural consumers across the Northern Powergrid area Round 1	Rural consumers	Phone Interview	Traverse	40
E032	Consumer Panel	Consumers	Online panel	Traverse	58
E049	Consumer Rescue	Consumers	Online research	Explain	44
E054	Future consumer insights report - College students	Consumers	Research interviews	Magpie	349

Reliability is a key responsibility for Northern Powergrid

Reliability of the network was viewed as a key responsibility and a top priority area for investment in 2023-2028. Stakeholders felt Northern Powergrid should prioritise maintaining substations and power lines to ensure the future reliability of the network.

- According to findings from interviews with rural consumers across the Northern Powergrid area (June 2020) showed that majority felt that any attempts to mitigate environmental impacts should be consistent with the primary aim of maintaining a resilient network. **(E022)**
- Most interviewees felt that maintaining the network and ensuring reliability should be the priority for Northern Powergrid. Other suggested priorities included incorporating environmental policies and keeping costs down where possible. **(E022)**
- Consumers in rural areas of the Northern Powergrid region clearly value a constant and reliable supply of power because they recognise it as a basic need. However, they also recognise the importance of protecting the environment, with many stating a desire to see Northern Powergrid move toward renewable energy. This could signal a shift in values, as consumers become increasingly aware of the risks associated with climate change. Several interviewees felt that the COVID-19 pandemic had emphasised the need to reduce emissions, as they had noticed a significant improvement in air quality during lockdown. **(E022)**
- Almost half of interviewees argued that maintaining a safe and resilient network should be the priority for Northern Powergrid. This was consistent with the findings from the consumer panels held in Leeds and Newcastle in February 2020. The remaining consumers were closely split between prioritising meeting consumer needs and environmental sustainability. **(E022)**

- Consumers in the consumer panel (April 2020) increasingly realised importance of power supply during COVID-19 which resulted in more positive and appreciative views of Northern Powergrid. **(E032)**

- As reliable electricity distribution was highlighted as increasingly essential during the pandemic, there was a clear consensus among consumers in the panel that Northern Powergrid colleagues should get recognised as key workers. **(E032)**

Frequency and duration of power cuts

Investment should be targeted at reducing longer restoration times ahead of reducing the frequency of shorter interruptions.

- Most rural consumers prioritised the maintenance of a safe and resilient energy network and expected to be provided with regular updates regarding power outages and maintenance works. **(E022)**

- Rural consumers argued that Northern Powergrid could meet consumers' needs by maintaining the network, providing regular updates, and providing support for vulnerable consumers during outages. **(E022)**

- The most common expectation among rural consumers with regard to the maintenance of a safe and resilient energy network was that Northern Powergrid should carry out regular maintenance of substations and power lines to ensure reliability. Interviewees also expected that Northern Powergrid would keep consumers informed of power outages and maintenance works, and that the network would be weather proofed to prevent disruptions as a result of storms or high winds. **(E022)**

- According to network reliability research, when asked how they would feel in a power cut situation, respondents suggested that they would feel worried, anxious, and annoyed. However, it was highlighted that this would be dependent on the time of day at which the power outage occurred, as a power cut in the evening would cause heightened negative emotions. **(E049)**

- In the same research, unanimously, respondents felt that electricity consumption (load) and inconvenience in a power cut were not correlated and therefore did not believe load was an accurate measure of the level of inconvenience experienced. Vulnerability and household demographics were suggested to feed alternative measures. **(E049)**

- Respondents were asked about complex unplanned power cuts, and what the guaranteed standard of service. Suggestions of time length ranged from 5 to 12 hours. When told it was currently 12 hours, views were split with most suggesting this was too long to be without power for. **(E049)**

- According to our emerging thinking network reliability research, respondents voted on a scale of 1 to 10, the extent to which they would value reducing GSOS from 12 hours to 9 hours. Responses were mixed, with the full spectrum of responses given. **(E049).**

    - On average respondents valued this improvement at 6.05 out of 10, suggesting that this improvement would be valued. When asked how much of their annual household bill they would be willing to commit to this improvement, on average respondents were willing to pay £4.08 per year.

    - Respondents were asked how they would value a reduction from 1.5 to 3 hours to 3 minutes for simple power cuts. The majority of respondents valued this improvement highly, as the reduction in length was considered significant. On average, respondents valued this service improvement at 7.76 out of ten and were willing to pay £4.85 more on their electricity bills per year for this service improvement. This suggests that this service improvement was of greater value to respondents and that they would be more willing to contribute financially towards increases in this service.

    - Respondents were asked for their views on short interruptions of three minutes or less. Several respondents explained that they caused minimal inconvenience but expressed that between two and five cuts of this length in one day would be too many and would give them concerns of more serious

problems. It was also highlighted those clear communications between Northern Powergrid, and their consumers would improve experience of power cuts of this length.

- The results of the future customer insights report done with college students show that **(E054)**:
  - 48 per cent of young people selected: Invest more today, to have fewer faults and power cuts in the future (but charge each consumer up to £7 more each year).
  - 68 per cent think 40 minutes is ok for a power cut.
  - 75 per cent of young people felt 2.5 power cuts per year was a good or very good performance.
  - 53 per cent favoured improving the average and, therefore, the network availability and reliability for consumers as a whole versus 47 per cent improving performance for those consumers who are currently receiving the worst experience.
- According to social legacy (May 2020), most young people (47per cent) felt that 40 minutes would be quite a long time, but they would be fine without it for 40 minutes. **(E058)**

Return on investment and costs

- Stakeholders want Northern Powergrid to provide clear information on size of any investment needed and comparisons and to balance investment in reliability against other priorities.
- Consumers participating in the consumer panel (April 2020) are aware of the relative reliability of their utilities, and highlight reliability as important. In the future, most consumers would prioritise the reliability of any future smart network over their personal energy costs. **(E032)**
- The majority of consumers argued that Northern Powergrid should aim to reduce both maintenance and reinforcement costs on the basis that both factors are equally important and that addressing both would produce the greatest impact in both the short- and long-term. **(E032)**

WAVE 2 – testing our emerging thinking with costed levels of ambition

Our second wave of engagement was used to testing options generated through the first wave – gauging levels of consumer ambition and defining our outcomes. Engagement was carried out on domestic consumers, SMEs, and future energy consumers. The results were split into:

- Ambition (that Northern Powergrid should strive for): (most and least)
- Priority (of an initiative to Northern Powergrid): (highest and lowest)

In total, we ran 135 events, engaging 15,475 stakeholders in wave 2. Of these 135 events, reliability and availability was a specific sub-topic at >20 of them, covering >15,000 individuals.

The events where reliability and availability was a specific sub-topic are listed below:

Engagement reference	Name	Segment	Method	Delivery partner	No engaged
E003	Consumer panel (Leeds and Newcastle)	Consumers	Online panel	Traverse	51
E007	Interviews with rural consumers	Consumers	Phone interview	Traverse	33
E009	SME Panel, meeting 3	Consumers	Online panel	Explain Research	20
E021	Quantitative prioritisation research	Consumers	Research survey	Impact	714
E023	Consumer Panel	Consumers	Online panel	Northern Powergrid	36
E027	Consumer Values Research	Consumers	Online panel	Gusto Research	20
E030	Consumer Panel	Consumers	Online panel	Traverse	52
E031	Consumer Panel	Consumers	Online panel	Traverse	36
E036	Findings from interviews with rural consumers	Consumers	Phone Interview	Traverse	39
E037	SME Panel, meeting 1	Consumers	Online panel	Explain Research	20
E046	Regional Political Engagement	Central government	Online meetings	Public Affairs Company	76
E047	Regional Political Engagement	Central government	Online meetings	Public Affairs Company	35
E050	Emerging Thinking consultation	Consumers	Online survey	Explain Research	1,236
E055	Future consumer insights report - University students	Consumers	Online workshops	Magpie	29
E060	Technical panel	Future energy	Online panel	Northern Powergrid	6
E061	Technical panel	Future energy	Online panel	Northern Powergrid	6
E152	Emerging Thinking microsite	Consumers and Stakeholders	Microsite	Northern Powergrid	N/A
E153	Emerging Thinking microsite users	Consumers and Stakeholder	Microsite	Northern Powergrid	3,600
E154	Emerging Thinking - rural panel	Consumers	Microsite	Traverse	20

Engagement reference	Name	Segment	Method	Delivery partner	No engaged
E207	Consumer Survey	Consumers	Survey	Explain	9,179

Responses varied, covering topics including the level of ambition customers wanted to see Northern Powergrid strive for in delivering a highly reliable service; support for predictive technology for fault detection and asset refurbishment initiatives and customer sentiment on power outage restoration times.

Specific feedback on options

- Responses from consumer panel in Leeds and Newcastle (September 2020) were strongly aligned: **(E003):**
  - Highest priority: Roll-out of innovative new technology that helps predict faults before they happen.
  - Lowest priority: Use smart meter data to improve services.
  - Most ambition: Roll-out of innovative new technology that helps predict faults before they happen.
  - Least ambition: Use smarter meter data to improve services
  - Most selected: Option E - levelling-up reliability across the network
  - Least selected: Option A - maintain a highly reliable service
  - Most selected: Wide roll-out of fault prediction technology
  - Least selected: Use of data analytics to manage Northern Powergrid's response to faults
- Consumers in Leeds largely felt that Northern Powergrid's reliability offer exceeded their expectations. Many consumers commented favourably on the 99.98 per cent availability of the network and supported the use of automatic power restoration technology. **(E003)**
- Option E (levelling-up reliability across the network) proved most popular among consumers in Leeds who said maintaining the reliability of the network was part of Northern Powergrid's core role and thought that improvements could be made at relatively little cost to consumers. Those consumers who chose less ambitious options did so on the basis that the network was already sufficiently reliable, and that they did not want to see a significant increase in their energy bills for relatively little benefit. **(E003)**
- While most consumers found the availability of the electricity supply, the average length of restoration times and the frequency of high voltage faults to be either 'good' or 'okay', there was a consensus that improvements could be made in all three areas and that Northern Powergrid should prioritise these for further investment. **(E003)**
- Option D (major improvements using technology) was the most popular choice among consumers in Newcastle who recognised the importance of investing in reliability but thought that option D provided similar benefits to option E at half the price. Consumers who selected option E did so on the basis that improving the reliability of the network should be Northern Powergrid's highest priority, while those who went for less ambitious options (e.g. options B, C and D) felt that they offered sufficient improvements while reducing the chance of overspending. **(E003)**
- Most consumers in Newcastle were impressed with the reliability and availability of the network, and many did not see the need for further investment in these areas. The average length of restoration times and the frequency of high voltage faults, meanwhile, were largely seen as just 'okay', and so there was a consensus that improvements could be made in these areas and that they should be prioritised for further investment. **(E003)**

- All consumers in Newcastle felt that a maximum of three short interruptions to their power supply would be acceptable, although most would be unhappy with more than two. The majority argued that any more than four interruptions would cause significant disruption to their home lives. **(E003).**
    - Highest priority: Introduce major programmes to replace and refurbish more assets, to enable the network to operate more reliably and lower future costs. **(E003)**
    - Lowest priority: Wherever possible, upgrade assets to make them ready for net zero in 2050. **(E003)**
    - Most ambition: Invest in technology to monitor assets and understand where investments in the network should be made, so that replacements and refurbishments can be made before power cuts happen. **(E003)**
    - Least ambition: Wherever possible, upgrade assets to make them ready for net zero in 2050. **(E003)**
    - Most selected: Option E – Investing now to lower costs from 2030 onwards. **(E003)**
    - Least selected: Option A – Similar network performance with increased risk. **(E003)**
    - Most selected: Major asset replacement programme to significantly improve long-term network performance; installing equipment that is 'net zero ready', monitoring all major assets in real-time, allowing for efficient targeting of investments; working with local authorities to plan long term network investments. **(E003)**
    - Least selected: Major asset replacement programme including underground assets. **(E003)**
- Consumers in Leeds largely felt that Northern Powergrid's current approach to maintaining the long-term condition of its network exceeded their expectations. They were particularly impressed with Northern Powergrid's extensive refurbishment and replacement of overhead lines and underground cables, as well as its commitment to inspecting and monitoring ageing assets. **(E003)**
- According to the 2023-2028 regional political engagement (January 2020), in terms of reliability, the Northeast and North of Tyne voted most strongly for E, potentially reflecting the more rural areas they cover which are likely to suffer more from power cuts. **(E046)**
- Responses in the emerging thinking consultations (November 2020) were also mixed. Approaching three in ten [29per cent] of business consumers chose option C, a similar proportion [28 per cent] selected Option B and a quarter [25per cent] opted for the most ambitious Option E. **(E050)**
- According to the 2023-2028 regional political engagement (January 2020), the picture was similarly mixed for the domestic audience; just over two in five [22 per cent] selected the most ambitious option E, but similar proportions chose option B [21 per cent], option C [21 per cent] and option D [20 per cent]. A small minority from both domestic [9 per cent] and business consumers [4 per cent] chose the cheaper option A. **(E046)**
- Emerging thinking consultations (November 2020) showed that for the long-term network condition, Long-term network condition: There was no preference for a particular service level option amongst the business sample; 22per cent selected option E and similar proportions preferred option C [22 per cent], option B [21 per cent] and option D [18 per cent]. **(E050)**
- Option E (investing now to lower costs from 2030 onwards) was the most popular choice among consumers from Leeds who thought that a significant short-term investment would yield major improvements and reduce costs to consumers in the long term. Those who selected less ambitious options largely recognised the importance of some investment in the long-term condition of the network but were concerned about the high costs associated with option E. **(E003)**

- While many consumers were initially unfamiliar with the concept of making something 'net zero ready', once this term had been explained to them, the majority were supportive of Northern Powergrid adopting such an approach as they anticipated this would lead to lower costs for consumers in the long term. **(E003)**

- Customer survey (October 2020) showed that 40.06 per cent (3,661) voted targeting investment at improving network availability and reliability for consumers as a whole and 59.94 per cent (5,477) voted prioritise improving performance for our most frequently impacted consumers. **(E207)**

- Consumers from rural areas were largely supportive of technology that would reduce emissions and enable decarbonisation, although there was some confusion around the term 'net zero' and the meaning of an asset being 'net zero ready'. **(E007)**

- They were divided about the appropriate level of ambition for the long-term condition of the network. While most consumers recognised the importance of proactively investing with a long-term view, some were concerned about the high costs associated with a more ambitious approach. **(E007)**

- Interviewees from rural areas largely supported Northern Powergrid making minor improvements to the reliability of its network, due to a general satisfaction with the current offer and concerns about overspending. **(E007)**

- Most rural consumers supported targeting investment at areas with less reliable electricity because they felt it was important to have an equal level of service across the Northern Powergrid region. However, a few consumers argued for improving the average reliability of the network, as they did not want to pay for improvements without seeing the benefits themselves. **(E007)**

Prediction technology and asset refurbishment

- Rolling-out fault prediction technology across the network was seen as Northern Powergrid's highest priority by the majority of consumers in Leeds, on the basis that it would be more cost effective to take a proactive approach to preventing faults than reacting to them as they occur. Several consumers also felt that Northern Powergrid should prioritise reducing the frequency and length of power cuts and improving performance for its worst-affected consumers. **(E003)**

- Rolling-out fault prediction technology across the network was seen as Northern Powergrid's highest priority by the majority of consumers in Newcastle, closely followed by reducing the number of consumers who experience power cuts lasting more than two hours. Using smart meter data to improve services was seen as the lowest priority and the area least in need of an ambitious approach, due to concerns that smart meters are not used widely enough to collect reliable data. **(E003)**

- Interviewees were also split about whether Northern Powergrid should take a proactive or reactive approach to refurbishing and replacing its assets. Many expressed concerns about the potential costs associated with a more proactive approach. Those who supported a more proactive approach did so on the basis that they anticipated increased reliance on electricity over the next decade. **(E007)**

- Most consumers in Leeds felt that Northern Powergrid's highest priority should be to extend its asset refurbishment and replacement programme, while many also argued that it should be ambitious in investing in technology to identify assets in need of pre-emptive replacement as this would facilitate a more proactive approach to network maintenance and may lead to reduced costs in the long term. **(E003)**

- Rural consumers felt that providing generators for vulnerable consumers during power cuts was the most important area for future investment. The use of fault prediction technology and smart meter data were also popular, as were commitments to reducing the frequency and length of power cuts, and significantly improving performance for the worst-affected consumers. **(E007)**

- Most rural consumers felt that Northern Powergrid's current approach to monitoring and maintaining the long-term condition of its network met their expectations, although some argued that Northern Powergrid was not ambitious enough in replacing ageing assets. **(E007)**

- Interviewees from rural areas were particularly supportive of using technology to monitor the health of assets and working with utility companies and local authorities to plan and deliver long-term investments. **(E007)**

Power cuts

- Most consumers in Leeds felt that a maximum of three short interruptions to their power supply per day would be acceptable, and that any more than this would cause disruption to their home lives. **(E003)**
- Most consumers in Newcastle felt that Northern Powergrid's reliability offer either met or exceeded their expectations, with many commenting favourably on the availability of the network and the use of automatic power restoration technology. **(E003)**
- Generally, participants of the SME panel (meeting in August 2020) had limited experience of power cuts from a business perspective. **(E009)**
- In the SME panel, rural areas were particularly highlighted as warranting attention, based on perceptions that rural consumers see more power cuts. **(E009)**
- Some respondents said that the impact of a power cut would be severe for them. For example, the acupuncturist would not be able to operate and would cancel appointments; the plasterer would have dead time on site; the leisure centre manager said it would impact swimming pool technology like filtration, chlorine and cleaning pumps; a respondent who provides online training courses said the impact could be 'catastrophic' and consumers in office-based roles said they not have access to systems, particularly now that many systems are cloud-based and not accessible without Wi-Fi. **(E009)**
- However, other respondents felt that the impact of a power cut would be minimal, as they work from remote devices like laptops and would be able to continue for a few hours or move elsewhere if needed. **(E009)**
- Quantitative prioritisation – Max Diff (August 2020) showed that overall, reliability is the key priority area for all consumer groups. **(E021)**
- Consumers in the Newcastle consumer panel (October 2020) agreed it was a good idea for Northern Powergrid to educate children on safety and that this should apply to adults too. **(E030)**
- A few consumers specifically commented on the importance of putting in place emergency resources to manage risks (such as flooding) to power supply. **(E030)**
- Increasing amount of information on what it means to keep the network reliable (i.e., replacing cables, how they can leak, being proactive, responding to emergencies) made consumers increasingly interested to learn more about reliability and availability as a business area. This demonstrates how information giving contributes to increased interest and supports the idea of engaging consumers in different business area although appetite for certain topics might initially feel low. **(E030)**
- However, in the SME panel (August 2020) respondents felt that the impact of a power cut would be minimal, as they work from remote devices like laptops and would be able to continue for a few hours or move elsewhere if needed. **(E009)**
- Ultimately, SME panel participants felt that the impact of a power cut would depend on its length and what they were doing at the time – but, generally, a power cut over one hour would be disruptive on their business. If the outage was less than an hour, they could, for example, send employees on their lunch/break. **(E009)**
- The two-hour 45-minute target for LV faults felt high for some participants of the SME panel however, if they were informed about the reason behind the prolonged outage, they would be understanding. One respondent had received a proactive text for a recent power cut which was good – but during a longer power cut, explaining the problem and why it might take longer to fix would be useful. **(E009)**

- Whilst current performance figures sounded good, some stakeholders in the panel flagged that the figures were only averages and, as they had little experience of power cuts personally, they were concerned that others must be getting more outages. This is hidden by the statistics **(E009)**

- According to future customer insights report (November 2020), students find it important to invest more today, to have fewer faults and power cuts in the future. They offered mixed support for a 20-year versus 45-year plan, with marginally more support for the 20-year plan. **(E055)**

- In emerging thinking (internal feedback September 2020) clear prioritisation was placed on reliability. Even short (under three minute) power cuts cause issues for consumers, especially those with electronic equipment without back-up supplies. **(E189)**

- Rural consumers during interviews (October 2020) largely felt that the current reliability of Northern Powergrid's network met or exceeded their expectations, with the 99.98 per cent reliability rate seen as particularly impressive. Many consumers also supported Northern Powergrid's investment in restorative technology, although a few argued that a 12-hour window for resolving power cuts was insufficiently ambitious. **(E007)**

Feedback on engagement

- Some consumers expressed concerns that the language used to explain Northern Powergrid's current approach to long-term network condition was overly technical and jargon-heavy (e.g., assets, net zero etc.) compared to other topic areas. **(E003)**

WAVE 3 – refining and finalising our plan

Our third wave of engagement was used to refine our proposals and gain endorsement for our final plans. The engagement was carried with consumers, future energy stakeholders, as well as regional politicians and local authorities. Themes covered by the engagement are:

- specific feedback on the options;
- comparisons with other DNOs;
- worst-served customers;
- generators and automation;
- power cuts;
- relationship with decarbonisation; and
- feedback on engagement.

In total, we ran 91 events, engaging 32,500 stakeholders in wave 3. Of these 91 events, reliability and availability of the network was a specific sub-topic at >9 of them, covering >3,000 interactions with domestic and future energy customers, regional politicians, and representatives of local authorities.

The events where reliability and availability was a specific sub-topic are listed below:

Engagement reference	Name	Segment	Method	Delivery partner	No engaged
E251	Willingness to Pay quantitative prioritisation – Choice Experiment research	Customers	Online research	Impact	1,908
E252	Citizens' Panel, Round 1: Asset Resilience	Customers	Online panel	Traverse, Explain Research	48
E253	Citizens Panel, Round 2: Reliability and Availability	Customers	Online panel	Traverse, Explain Research	47
E267	Stakeholder Summit	Future Energy	Online conference	Traverse	140
E270	2023-2028 Regional Political Engagement	Regional Politicians	Online meetings	The Public Affairs Co.	142
E274	Green Recovery Scheme Surgeries	Local Authorities	Online meetings	The Public Affairs Co.	80
E277	Sustainability Survey	Customers	Online Survey	Explain Research	300
E299	2023- 2028 Plan Website Survey Responses	Stakeholders / Customers	Survey	Northern Powergrid	242
E300	Colleague engagement survey – plan acceptance	Internal Stakeholders	Survey	Explain	204

Specific Feedback on the options

- Reliability and availability was ranked 10/12 for domestic customers. **(E251)**

- Reliability was seen as a hygiene factor by customers – must be a high level but not noticed unless it goes wrong. **(E251)**
- Current performance is already high and customers see less need for further investment. **(E251)**
- There were big differences in prioritisation depending on how it is presented to customers. **(E251)**
- Further investment in micro areas was not valued specifically i.e. the saving of minutes across a year. **(E251)**
- However, the concept of reliability is valued overall i.e. Investment in connection of substations. **(E251)**
- Many domestic consumers argued that they were unable to comment regarding prioritisation without first understanding the associated costs. SME consumers felt that there needs to be a carefully measured balance of risk, cost, and reliability. **(E252)**
- Most consumers stated that reliability is a key issue for them, with many arguing that reliability is the most important issue for Northern Powergrid. **(E253)**
- Consumers felt that Northern Powergrid should be as ambitious as possible in this area and that they would be happy to pay the 50p increase, or more, for improvements in this area. **(E253)**

Comparisons with other DNOs

- Most consumers felt that there is no need to compare Northern Powergrid's level of service in the reliability area with other DNOs as they were happy with the service they receive, so Northern Powergrid should continue delivering the service at its current standard. **(E253)**
- Most consumers felt that there is no need to compare Northern Powergrid's level of service in the reliability area with other DNOs. They felt that the service they receive is a good one and therefore drawing comparisons with others is not necessary. **(E253)**
- Some stated that 'the direction of travel' for the service standards was positive and that was more important than direct comparisons with other DNOs. **(E253)**
- Consumers also had queries about automation, acceptable levels of power outages and why Northern Powergrid falls behind other providers in terms of performance. **(E253)**
- Some consumers, however, did feel that comparisons with other areas are important, as it 'seems unfair' that some people experience a worse service than others, despite paying the same amount of money. **(E253)**
- A few SME consumers suggested that DNOs should share best practice with each other to improve levels of service across the country. **(E253)**

Worst-served customers

- Consumers felt that Northern Powergrid are right to focus on improving reliability for the worst served customers. **(E253)**
- [Customers] recognised that it is not possible to provide an equal service to all but felt that Northern Powergrid should be ambitious in this area, so Northern Powergrid should focus on improving reliability for worst served customers and try to ensure service is as equal as possible. **(E253)**
- Consumers living in rural areas expressed their understanding that rural areas will always be 'a bit behind' urban areas. **(E253)**
- Consumers felt that Northern Powergrid are right to focus on improving reliability for the worst served customers. They argued that they would be happy to pay a 50p increase if this meant that reliability would be

improved for those customers. Consumers recognised that it is not possible to provide an equal service to all but felt that Northern Powergrid should be ambitious in this area and aim to achieve as close to an equal service as possible. **(E253)**

- Some consumers spoke about the wider impact of improving reliability for the worst served customers, including improving digital accessibility for those living in rural areas. **(E253)**

Generators and automation

- Some participants had concerns about the environmental impact of generators, including concerns about noise and smell, and Northern Powergrid could disseminate information to allay these concerns. **(E253)**
- There were mixed views across the panel regarding the rollout of suitcase generators in a power cut. **(E253)**
- Some consumers recognised that whilst they may not need to use a suitcase generator in a power cut, other, more vulnerable, customers could benefit from them. **(E253)**
- Other consumers flagged concerns around cost, value for money, the environmental impact, and the logistics around distribution. Some consumers queried how 20 generators would be sufficient in a large power cut. **(E253)**
- Northern Powergrid should reiterate the exact process, including numbers and costs, for the roll-out and subsequent use of suitcase generators. **(E253)**
- While the level of understanding was high, consumers asked several questions, particularly of the Northern Powergrid experts in their groups, around the distribution of suitcase generators and the dispatch of support for vulnerable customers. **(E253)**
- SME consumers felt that automation [re: power restoration] 'makes sense' and felt that it was an employee-friendly option that will ease pressure on Northern Powergrid and their staff in severe circumstances. **(E253)**
- Some consumers in rural areas expressed that they felt that they could see automation working in their area, having experienced fewer, and shorter, power cuts in recent years. **(E253)**

Power cuts

- Some consumers during the citizen's panel said they found it difficult to engage in this topic because they rarely experience power cuts. **(E253)**
- Most consumers agreed that reliability is a key issue, with many arguing that reliability is the most important issue for Northern Powergrid. Consumers felt that Northern Powergrid should be as ambitious as possible in this area and that they would be happy to pay the 50p increase for improvements in this area. **(E253)**
- Some consumers acknowledged that they rarely experience power cuts but that others, particularly in rural areas, experience them more often and could benefit from automation. They felt that automation is a key area of the reliability issue, and they are happy to be guided by Northern Powergrid, who are the experts in this area. **(E253)**
- A stakeholder explained how he is originally from Zimbabwe and if they had one hour per week of electricity this was viewed as being very privileged. He said he was 'fascinated' by reliability in the UK and that Northern Powergrid was talking about improving reliability given that it is already so high. He thanked Northern Powergrid for its work in this area. **(E270)**
- A funding video and A3 funding showcard were all new to respondents taking part in a focus group. None had any idea of funding of a percentage of their bill going to Northern Powergrid. Residential customers were more accepting of the structure and more accepting of their lack of awareness – as long as the system worked, they

felt they didn't need to know. They also felt that £85 per year was really good value for such a reliable service. **(E272)**

Relationship with decarbonisation

- Consumers felt that as decarbonisation gathers pace, reliability will become even more important given the increased reliance on electricity. Consumers mentioned electric vehicles, electric heaters, and an increase in working from home and felt that the network will have to be reliable in order to support an increase of the above. **(E253)**

- There was a high level of interest in reliability [during the stakeholder summit]. Some stakeholders indicated the need for further improvements by identifying future demand concerns – particularly around electric vehicles (cars and buses) and hydrogen vehicles. Other concerns around likely future demands included: **(E267)**

    - How the grid will manage peak times with additional load requirements, with the significant infrastructure investments necessary will TNUoS and DUoS costs increase to support these;

    - Where funding for electric charging will come from especially in rural areas, and

    - How the impact of load changes on independent networks would be managed.

- A stakeholder said that EVs are popular in Sunderland because a lot of people work for Nissan. She said that the problem however is charging points, highlighting that before Christmas a lot of EV chargers across Sunderland were not working. **(E270)**

- Customers suggested Northern Powergrid consider ways to highlight and communicate the fact that a reliable supply of electricity will not be compromised because of wider Northern Powergrid initiatives such as the sustainability strategy. **(E277)**

- Regional politicians are particularly keen to identify locations where a lack of network capacity is restricting development and would bring forward projects that meet the key criteria of utilisation, deliverability, and value for money. **(E274)**

Feedback on engagement

- In feedback given in sessions consumers said the enjoyed the pre-work videos and felt they gave useful context. They felt they were interesting, engaging and easy to understand and were impressed by the level of service provided with Northern Powergrid. **(E253)**

- Consumers reflected that they are enjoying the new panel format. They like that the online activities are short but thought-provoking. Although they enjoy the new format of an information session followed by a more deliberative session, some felt that there could be more opportunities for discussion. **(E253)**

- Consumers felt that the information has been explained well and that they have been able to have informed discussions. **(E253)**

- Consumers also felt that they have been given plenty of opportunities to ask questions and to have them answered by Northern Powergrid experts, which they appreciate. **(E253)**

- According to the 2023-2028 plan website survey responses, 57.1 per cent of the participants said they ‘really like’ reliability and availability. **(E299)**

- During the colleague engagement survey – plan acceptance, overall acceptance of this business plan area was relatively high at 4.4 out of 5. Respondents rated their confidence in Northern Powergrid to deliver the commitments outlined as a 3.8 out of 5, on a scale of ‘not confident’ to ‘confident’. **(E300)**

- The comments around technological improvements needed showed that colleagues believe that to deliver the propositions outlined, technological improvements are needed throughout the organisation 'to allow the implementation of proposals to be delivered intended benefits, firstly the network records need to be reliable and up to date.' **(E300)**

- Literal comments around general positive reception within this theme showed that a proportion of colleagues surveyed are positive about the propositions being made and the likelihood of their delivery: 'The proposals are very well put across and straight to the point making them easy to understand and therefore making it easier to deliver the commitments across the area.' **(E300)**

Wave 4 – Finalising our plan

From July to December 2021, we finalised our plan, responding to queries, addressing gaps and testing overall acceptability. We engaged 10,043 customers and stakeholders overall and with detailed sessions on outstanding reliability and availability topics across 8 events.

The events where Reliability and Availability was a specific sub-topic are listed below:

Code	Name	Subgroup	Engagement Type	Date	No Engaged
(CR416)	Industrial workshop	Customers	Meeting	19/10/2021	13
(CR418)	Cross Utility Workshop	Utilities	Meeting	20/10/2021	8
(CR420)	ED2 Stakeholder Webinar	Regional Politics, Consumers, Future Energy	Meeting	03/09/2021	101
(CR412)	Vulnerable internal workshops (Ensuring nobody is left behind)	Internal stakeholders	Meeting	29/09/2021	1
(CR426)	Citizens Panel (Bill impact)	Consumers	Panel	20th & 23rd Sep	37
(CR465)	Business Plan Acceptability Testing	Consumers	Quantitative survey	Oct-Nov 2021	1,742
(CR466)	ED2 Acceptance Comms (winter awareness campaign mail-out)	Consumers	Quantitative survey	Nov 2021	8,141

Feedback in summary:

- At the industrial workshop, North Sea Oil Terminal, Teesside, raised network reliability is essential as a power interruption would bring down the terminal and impact offshore facilities. They are pleased to see investment in network resilience. **(CR416)**

- The P66 Humber Refinery can connect directly to Transmission network and bypass NPg's distribution. It is involved in several projects that require a significant amount of additional power but are unsure whether these would impact the local transmission system or Northern Powergrid. These projects include (1) a green hydrogen project intended for use on a refinery, (2) a project looking to increase refinery efficiency. They process used cooking oil and rely on steam, imported from power station next door (very inefficient). There are electrification projects to try and replace this that would need another 30-40 MW, (3) a carbon capture project underway (part of Humber Zero) that needs c.10-12 MW and (4) a carbon capture at the power plant next door (VPI). There are two options; one involving a 20 MW increase in power, the other involving a 70 MW increase. **(CR416)**

- KCOM wanted to understand the impact of mass adoption of EV charging and how those in terraced housing would be supported. **(CR416)**

- At the Cross Utility Working session, Yorkshire Water raised concerns about how reliability and availability will be maintained as renewable generation increases. They are worried about sites going off supply, and want NPg to maintain a balance between decarbonisation and resilience. **(CR418)**

- Fluctuations in supply are a big issue and perceived to be happening more often. When they do occur it can result in production going down for a whole day so communication and response from NPg is critical. Yorkshire Water understands power fluctuations can also occur naturally and the impact is also related to a site's ability to respond. **(CR418)**

- NGN is most concerned about short term resilience and long term interaction with the gas network and peak demand, especially in winter. They also cited the updating of electric heating solutions which will increase over the coming years and gave an example of customers being without heating, if for example, there was an incident where 3,000 properties were off, the households were given electric heaters and the grid couldn't cope. **(CR418)**

- At the ED2 Stakeholder webinar North York Moors National Park was interested in prioritisation in terms of where upgrades will be in rural areas (improvements to the grid) or room for expansion (e.g. investment at lower voltage levels). **(CR420)**

- Ideal Heating noted there were a lot of questions posed in the plan but there wasn't enough positivity overall (e.g. can the grid cope?). Whilst there are many unknowns about the future, some stakeholders will be look to the plan for a sense of hope about the achievability of regional decarbonisation objectives. **(CR420)**

- Ideal Heating also noted the need to consider seasonal changes in electricity use, and people using more electricity at certain times of day such as in the morning. **(CR420)**

- South Tyneside Council felt that Ofgem's mind to position in terms of distribution of costs for reinforcement and the perception of this as balancing out so it is not just the renewable developer that pays for it, is a fair approach. **(CR420)**

- An internal workshop on 'ensuring no one is left behind', was held to identify what activities each plan area was already doing in relation to vulnerable customers and whether any activities were being planned that might create barriers for customers in vulnerable situations and if so, what can be done to mitigate against this. Looking at the R&A proposition, the key narrative changes agreed **(CR412)** were:

- 'We are making automation and general reliability improvements, with vulnerability scoring applied as appropriate to inform decision making'.

- 'In the event of an unplanned power interruption, we are putting strategies in place to support vulnerable customers with technology including SilentPower and suitcase generators, and other welfare provisions'.

- Links to Customer Service were drawn (support for vulnerable customers in unplanned and planned power cuts) and Vulnerable Customers Strategy. **(CR412)**

- P&P feedback was that where propositions are PCDs, there are more reporting requirements by Ofgem and therefore explicit links to vulnerable customer support should be carefully considered. **(CR412)**

Asset resilience

Stakeholder engagement summary

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
AR1	**Enable an efficient long-term transition to net zero through maximisation of synergies between load-related and asset renewal expenditure**	**Wave 1**: In the open and formative engagement of wave 1, we heard from stakeholders that they want to see evidence of long term planning in order to support the transition to a low carbon future, but that any investment must be at fair cost to customers. The 'willingness to pay' prioritisation exercise showed that amongst both domestic and SME customers, asset replacement and refurbishment was an area they were least willing to pay more for, with decarbonisation investment amongst those considered higher priority for higher spend. When asked to rank initiatives being considered, their highest priority was 'reducing the risk or probability of equipment failure on Northern Powergrid's network, to improve long term network performance' (26per cent), and 20per cent wanted to see us *'proactively install equipment that is ready for a low carbon future'.* ***Key wave 1 finding**: Asset renewal was important to customers to improve long term network performance, but spend in this area was not a priority for customers. Consumers wanted to see proactive investment in readiness for low carbon, which stakeholders felt should be based on longer-term planning.*	*E032* *E147*
		Wave 2: A 'net zero ready' mentality was considered important and consumers wanted to see us adopt this approach, though again there were concerns expressed about costs for customers, suggesting efficiency was important. When presented with costed options, future energy consumers most commonly selected option D, offering a long term reduction in fault rates while delivering a net zero ready network, demonstrating appetite for ambition in this area. In the same survey, concerns were expressed around potential higher costs and what the more ambitious options could mean for customers' bills. ***Key wave 2 finding**: Net zero readiness was considered important but offset against efficiency, with asset monitoring and risk management still seen as priorities.*	*E005* *E024* *E036* *E046* *E062*
		Wave 3: In wave 3, consumers wanted to see Northern Powergrid 'move forward' and be more ambitious, particularly with regards to net zero. Many argued in favour of higher investment in the network on the basis that electricity use is likely to increase over the coming years, for example with the proliferation of electric vehicles. Alongside this we heard that it is important to consider affordability, it was emphasised that we should consider the cost of investment to consumers and consider affordability when making decisions. There was an expectation expressed that synergies would mean overall cost savings which was seen in a positive light. The impact of the ongoing COVID-19 pandemic was a particular consideration in terms of affordability, but also with an expectation that there will be an increase in remote working, making reliability of the network more important. When presented with four investment scenarios during the citizens panel engagement session, consumers saw option 3 (keep long term risk stable and think about net zero) as offering best value and an appropriate balance between improvements to the network, getting ready for net zero and the wider synergies possible, and were reassured by the stable long term risk profile associated with this option. Some wanted to see greater ambition, opting for option 4 (delivering the	*E251* *E252* *E271* *E274* *E299* *E300*

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
		highest levels of ambition, to deliver wider benefits including net zero), with SME consumers in particular supporting a more ambitious approach. There was acknowledgement amongst panellists of the need to act, but also to allow for adaptability to new technologies in the future. ***Key wave 3 finding**: Consumers wanted to see long term investment in the network in readiness for net zero, but us taking a balanced approach for longer term affordability. They supported an approach with stability of long-term risk at its core with consideration for net zero.*	
AR2	**Improve network health through efficient decision-making, optimisation of intervention mix and life of the asset, and deploying innovation**	**Wave 1:** Our initial engagement to shape our emerging thinking on asset resilience focused on reliability. Consumers and future energy consumers were engaged via panel events and most agreed that they had a duty to pay for long term improvements to the network. In the prioritisation exercise conducted, long term network condition (ensuring the condition of the network is maintained for future generations through regular refurbishment and upgrades of infrastructure) was ranked second amongst the plan areas, demonstrating it was considered very important by consumers. ***Key wave 1 finding**: Improvements to network health and maintaining the safety and reliability of the network over time were considered essential.*	*E032* *E147*
		Wave 2: In wave 2, it was clear that the consumers engaged wanted to see investment to reduce future faults and interruptions. It was expected that the network be maintained to a very high standard, however it was not considered a 'value add'. Option C (offering higher levels of investment to deliver a long-term reduction in fault rates), was the most popular choice amongst consumers when provided with a series of costed options. They wanted to see us take an active approach to improving network health, rather than waiting for things to go wrong. Consumers were also wary of high costs being passed on to them if an ambitious approach was chosen and were reluctant to spend more if current provisions were already effective -efficiency was important to them. ***Key wave 2 finding:** Network health and its reliability were important to consumers, but they wanted a balanced approach between ambition and cost.*	*E005* *E024* *E036* *E046* *E062*
		Wave 3: As in wave 2, those engaged during wave 3 told us that high standards of network maintenance were expected. Consumers, including SMEs, noted a preference for minimisation of risk rather than cost, but with a need to carefully consider affordability for all in decision making. Members of our citizen's panel told us that they were happy to trade-off slightly higher short term risk, if calculated and managed in such a way to realise longer term benefits. Aligned to this, rural and domestic customers supported investment in innovative systems to monitor asset health and tools to enable pre-emptive maintenance, to reduce both long-term costs and faults. Similarly, stakeholders who participated in our2023-2028 stakeholder survey wanted to see our innovation focus be on technology readiness levels (TRL) – their view was that lower TRL projects may result in higher benefits being delivered, at lower cost in the longer term.	*E251* *E252* *E271* *E274* *E299* *E300*

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
		***Key wave 3 finding**: The core objective for asset resilience, as consumers and stakeholders saw it, is making improvements to network health for the long term, while taking a considered and efficient approach.*	
		***Acceptance research and findings:** The acceptance score for asset resilience is 75 per cent. Acceptance was high for all customers with SMEs being the highest at 76 per cent. Trust was also important for customers at 73 per cent for this area.* *As customer acceptance is high for asset resilience, no further acceptance research as an individual plan area will be necessary for wave 4. Moreover this will be tested within the higher level theme of network performance and resilience with reliability and availability.*	*E325*
		***Overall Wave 4 findings:** There was overall support for the Asset Resilience propositions and the Citizen's panel endorsed the long-term investment plans proposed to maintain reliability whilst preparing for net zero, balanced with efficiency and affordability and wherever possible to use investments to support net zero.* *Stakeholders supported the marginal cost increase of upsizing equipment that will deliver net zero capacity benefits where possible, adopting a 'net zero ready' mentality in our plans.* *Customers felt we should continue to educate customers about asset resilience and report on investment decisions, particularly as it was a difficult area to understand.* *Through additional engagement with industrial customers, we gained a better understanding of their future plans as they consider their paths to net zero. This has helped us to balance their needs with our investment plan and will be supported by on going engagement as we create a network supported by a widespread investment programme that supports wider stakeholder objectives around the environment, safety and reliability.*	*CR416* *CR420* *CR426*

WAVE 1 – open and formative engagement

In the first wave of engagement, we held two panels engaging 64 consumers and future energy consumers. The engagements focused on understanding the level of importance customers placed on the resilience of the network equipment and assets.

Engagement reference	Name	Segment	Method	Delivery partner	No engaged
E032	Consumer Panel	Consumers	Online panel	Traverse	58
E147	Technical panel - Introduction and 2023-2028 Challenges	Future Energy	Online panel	Northern Powergrid	6

- Most consumers participating in consumer panel (April 2020) felt that they had a duty to pay for long term improvements to the network, although there was no consensus on this issue. **(E032)**

- Future energy consumers who took part in a technical panel on 2023-2028 challenges (June 2020) felt there was a requirement to demonstrate the approach to asset replacement and the underlying process for using condition-based risk management techniques. This should be achieved through a future conversation with the Panel. **(E147)**

WAVE 2 – testing our emerging thinking with costed levels of ambition

Our second wave of engagement was used to test options generated through the first wave – gauging levels of consumer ambition and defining our outcomes. Engagement was carried out with domestic consumers, SMEs and future energy consumers. The results were split into:

- Ambition (that Northern Powergrid should strive for): (most and least)

- Priority (of an initiative to Northern Powergrid): (highest and lowest)

In total, we ran 135 events, engaging 15,475 stakeholders in wave 2. Of these 135 events, asset resilience was a specific sub-topic at five of them, covering 234 individuals.

The five events where asset resilience was a specific sub-topic are listed below:

Engagement reference	Name	Segment	Method	Delivery partner	No engaged
E005	Consumer panel (Leeds and Newcastle)	Consumers	Online panel	Traverse	48
E024	2023-2028 Connections engagement	Consumers	Telephone interviews	Explain Research	65
E036	Findings from interviews with rural consumers across the Northern Powergrid area	Consumers	Telephone Interviews	Explain Research	39
E046	2023-2028 Regional Political Engagement	Regional Politics	Meetings	Public Affairs Company	76
E062	Technical panel - Losses & OHL	Future Energy	Online panel	Northern Powergrid	6

Responses varied, covering points on how information on losses was communicated by Northern Powergrid, and feedback from customers on how ambitious Northern Powergrid should be in their attempts to reduce losses.

Communication

- Consumers participating in consumer panel in Leeds (October 2020) were largely unaware of the amount of energy wasted across the network and the costs associated with losses. Many were surprised by the extent of these and highlighted further need for engagement. **(E005)**

- At the same event, most consumers reported that they did not usually consider the potential for electricity wastage and many felt that they would pay more attention to this in future **(E005)**

Ambition

- The majority of consumers participating in the panel argued that Northern Powergrid should adopt an ambitious approach to minimising losses in order to reduce costs to consumers. Furthermore, many argued that reducing losses would free up money that could be invested in other topic areas **(E005)**

- Reducing overall electricity usage was seen as the best approach to limiting wastage, although most consumers recognised that no single approach would work for all consumers. Some consumers said that consumers should not be expected to pay for more efficient appliances without financial support. **(E005)**

- Most consumers said that messaging intended to encourage consumers to reduce losses should focus primarily on cost savings to consumers, and that Northern Powergrid should highlight the wastage associated with using multiple appliances simultaneously. **(E005)**

- The majority of consumers in the consumer panel (October 2020) said that Northern Powergrid should adopt an ambitious approach to minimising losses in order to reduce costs to consumers. Furthermore, many argued that reducing losses would free up money that could be invested in other business plan areas. **(E005)**

- Incentivising consumers to use electricity at off-peak times was seen as the most suitable approach to reducing losses, although most consumers recognised that no single approach would work for all consumers. Some consumers said that consumers should not be expected to pay for more efficient appliances without financial support. **(E005)**

- Some consumers felt that reference to electricity 'loss' might confuse less informed consumers and suggested that Northern Powergrid should focus its messaging on reducing 'waste' instead. **(E005)**

- ICP respondents in the 2023-2028 connections engagement felt that it was key for Northern Powergrid to invest in their infrastructure so that the network was reinforced. They also felt it was key to look for flexibility in the network and maximise efficiencies where necessary. **(E024)**

- This was reinforced by a significant number of consumers in rural areas who were concerned that the network will be unable to support increased usage without significant investment in maintenance and upgrades. **(E036)**

- During the technical panel on losses and OHL it was pointed out that one issue is engaging consumers in this space, as utilities are not deemed interesting. When thinking about younger generations, stakeholders said we must work out how we educate the next generations on energy use and the challenges of the sector. **(E062)**

Questions at the Leeds consumer panel (E005):

Participants at the panel were asked the following questions specifically:

- Were you aware about electrical losses before today? Yes: 11 (37.9 per cent); No: 17 (58.6 per cent); Not sure: 1 (3.4 per cent)
- Relative to the 12 business plan areas that you have looked at previously, do you think reducing electrical losses should be a priority for Northern Powergrid: Yes definitely: 18 (62.1 per cent); Yes probably: 11 (37.9 per cent); Not sure: 0; No probably not: 0; No definitely not: 0.
- Most effective method of reducing losses: 'Explaining how much you (the consumer) can personally save.'
- Least effective method of reducing losses: 'Explaining how much money the region as a whole can save by reducing energy usage and losses.'

Questions at the Newcastle consumer panel (E005):

Participants at the panel were asked the following questions specifically:

- Were you aware about electrical losses before today? Yes: 6 (31.6 per cent); No: 9 (47.4 per cent); Not sure: 4 (21.1 per cent).
- Relative to the 12 business plan areas that you have looked at previously, do you think reducing electrical losses should be a priority for Northern Powergrid: Yes definitely: 13 (68.4 per cent); Yes probably: 5 (26.3per cent); Not sure: 1 (5.3 per cent); No probably not: 0; No definitely not: 0'
- Most effective method of reducing losses: 'Explaining how much you (the consumer) can personally save.'
- Least effective method of reducing losses: 'Focusing on some of the physical impacts of climate change (e.g., increased in flooding or the loss of wildlife).'

WAVE 3 – refining and finalising our plan

Our third wave of engagement was used to refine our proposals and gain endorsement for our final plans. The engagement was carried with domestic and rural consumers, SMEs, local authorities, as well as government, Ofgem and industry representatives. Themes covered by the engagement are:

- short and long-term risks;
- specific feedback on the options;
- engagement on asset resilience.

In total, we ran 91 events, engaging 32,500 stakeholders in wave 3. Of these 91 events, asset resilience was a specific sub-topic at six of them, engaging with >2,400 individuals.

The six events where asset resilience was a specific sub-topic are listed below:

Engagement reference	Name	Segment	Method	Delivery partner	No engaged
E251	Willingness to Pay quantitative prioritisation research – Choice Experiment	Consumers (domestic, SME)	Online survey	Impact	1,908
E252	Citizens' Panel, Round 1: Asset Resilience	Consumers (Urban, rural, SME)	Online panel	Traverse, Explain Research	48
E271	Analysis of RIIO2 Stakeholder Survey Comments	Government, Ofgem, and Industry	Meetings and online survey	N/A	N/A
E274	Green Recovery Scheme Surgeries	Local authorities	Meetings	N/A	80
E299	2023-2028 Plan Website Survey Responses	Consumers and Stakeholders	Survey	Northern Powergrid	242
E300	Colleague engagement survey – plan acceptance	Internal Stakeholders	Survey	Explain	204

- Domestic consumers participating in the 'willingness to pay' quantitative prioritisation (February 2021) ranked asset resilience 9 out of 12. **(E251)**

- Asset resilience was closely linked with reliability but far less understood by participants. The importance placed on long-term network condition varied across different engagement pieces. It was seen as essential to maintaining a safe and reliable network over time. Consumers expect the network to be maintained to a very high standard, but it is not considered a 'value add.' **(E251)**

Short and long term risk

- The majority of consumers said during Northern Powergrid citizens' panel, round 1 (March 2021) that they would prefer to minimise risk rather than cost. They felt that investing to minimise risk now could save money in the future. **(E252)**

- From the same event, the majority of consumers would be happy to trade off slightly higher short-term risk, if calculated and managed, in return for longer-term, wider benefits. **(E252)**

- Most consumers understood that decisions about investment in Northern Powergrid's network require detailed risk assessments and considerations of probability (i.e. cost of investment vs. risk of asset failure). **(E252)**

- Some consumers likened these considerations to taking out an insurance policy – the insurer will assess the level of risk and the consumer will decide how much of a premium they are willing to pay. **(E252)**

- Several consumers argued that replacing assets at higher upfront cost was a more financially sensible approach than continual maintenance, which amounted to 'throwing good money after bad.' **(E252)**

- Some consumers in the citizens' panel (March 2021) were concerned about the impact of Northern Powergrid's focus on net zero if other actors do not commit the same level of ambition. Others were conscious of the availability of new technology and raised some concerns about investing a lot of money in net zero now, when the next couple of years could bring technology that Northern Powergrid does not currently have. **(E252)**

- Some domestic consumers expressed some caveats, such as that risks should be kept to a minimum and that there should be a focus on safety, but overall were fine with the idea of short-term, calculated risk in return for positive wider benefits. **(E252)**

- Many consumers argued in favour of higher investment in the network on the basis that electricity use is likely to increase over the coming years thanks to the proliferation of electric vehicles and the increase in remote working due to the COVID-19 pandemic. **(E252)**

- Many domestic consumers argued that they were unable to comment without first understanding the associated costs. SME consumers felt that there needs to be a carefully measured balance of risk, cost, and reliability. **(E252)**

- SME consumers also prioritised minimising risk over cost, stating that they were happy to experience short term risk for long term gain. **(E252)**

- SME consumers felt encouraged that the risks had already been identified by Northern Powergrid as this means that they can be appropriately managed. They also suggested that if Northern Powergrid does not take calculated risks now, there will be a much shorter time to act, in terms of decarbonisation, if they wait until 2028 to take those risks. **(E252)**

- On the whole, domestic consumers participating in the citizens' panel (March 2021) felt that minimising risk is more important than minimising cost. They felt it was important that risks are addressed 'head on' as they could cost more to fix longer down the line. Whilst they felt that cost was important, most consumers agreed that minimising risk, with a 'forward-looking approach' is most important. A few consumers felt that whilst minimising risk was important, it also imperative to minimise costs to consumers whilst still considering net zero. **(E252)**

- The majority of consumers in the citizens' panel (March 2021) would be happy for there to be an increase in risk short-term if it meant that there would be wider benefits long term. **(E252)**

Specific feedback on the options

- SME consumers taking part in the citizens' panel (March 2021) instinctively supported a more ambitious approach than domestic consumers, although some felt that Northern Powergrid could take an 'opportunistic' approach to replacing assets, rather than being beholden to a strict timetable. **(E252)**

- The same consumers were largely in favour of an ambitious approach to network investment, with the majority expressing support for either option 3 (keep long term risk stable and think about net zero) or option 4 (delivering the highest levels of ambition, to deliver wider benefits including net zero). **(E252)**

- The majority of them were pleased with Northern Powergrid's preferred option (option 3: keep long term risk stable and think about net zero) and could understand the rationale behind it. **(E252)**

- Some were surprised that it was not the most ambitious option, but they could understand why it was chosen and were in support. **(E252)**

- Some SME consumers argued that Northern Powergrid should take the opportunity to invest in the network while interest rates are low and should explore options for securing external investment in research and development with a view to creating savings elsewhere in the long term. **(E252)**

- SME consumers felt that Northern Powergrid's decision making process is very comprehensive, pragmatic, and sensible and filled them with confidence. **(E252)**

- SME consumers referred to option 1 as 'false economy' and as a 'sticking plaster'. They felt similar about option 1 and option 2, namely that neither option was ambitious enough. **(E252)**

- SME consumers felt that option 2 was a slight improvement on option 1 but that it was still focussed on the short term rather than the long term, and not ambitious enough. **(E252)**

- SME consumers expressed similar concerns, but they also questioned whether option 4 is truly achievable. **(E252)**

- SME consumers were also surprised that Northern Powergrid's preferred option was not option 4 and felt that there must be an unexplained reason behind why Northern Powergrid has not selected the most ambitious option. These consumers also expressed a desire for Northern Powergrid to be more ambitious and select option 4. **(E252)**

- A majority of consumers were in favour of an ambitious approach to network investment, with most expressing support for either option 3 or option 4. **(E252)**

- Others suggested Northern Powergrid would be able to recover any costs associated with investment through savings arising from wider benefits. **(E252)**

- A minority of consumers advocated for a less ambitious approach to investment in the network, largely on the basis that it would be foolish to invest heavily given the economic uncertainty associated with the twin shocks of Brexit and the COVID-19 pandemic. **(E252)**

- Some consumers expressed reservations about paying for major investment in the network given that they would be unlikely to reap the benefits of this investment within their lifetimes. **(E252)**

- Northern Powergrid should be wary of the cost of investment to the consumer and consider affordability when making decisions. **(E252)**

- Some consumers in the citizens' panel (March 2021) recognised the need for investment in the network but argued that any associated costs should be borne by Northern Powergrid rather than consumers, on the basis that Northern Powergrid makes enough profit to cover these costs without any increase in consumers' bills. At the very least, consumers felt that any investments should be affordable for consumers. **(E252)**

- Domestic consumers saw this option (option 2) as being too similar to option 1. They felt that this could cost more in the long run and that it is too similar to option 1. Consumers acknowledged that it is 'cheap' but that that does not mean it is the best option. **(E252)**

- The majority of domestic consumers felt that there was 'no point' in looking at option 1 as it 'has no benefits other than cost'. Consumers felt that it makes more sense for Northern Powergrid to 'move forward' and be more ambitious, particularly with regards to net zero. **(E252)**

- Some consumers were extremely supportive of option 4. They felt that it offered a lot in terms of making the network more resilient, focusing on the environment, and creating jobs, all for the 'small cost' of £6.80. Other consumers felt that option 4 possibly goes too far and that it incorporates some 'unnecessary things'. Consumers discussed the affordability of this option, acknowledging that while £6.80 may not seem like a lot, it is important to consider affordability for the wider public, particularly given the economic circumstances borne out of the pandemic. **(E252)**

- All consumers across the citizens' panel selected option 3 or 4. **(E252)**

- After their discussions about the options, consumers were informed that Northern Powergrid's preferred option is option 3. **(E252)**

- Some domestic consumers felt surprised that Northern Powergrid had not selected option 4, the most ambitious, but said that they could understand why Northern Powergrid had made this choice. **(E252)**

- There were a few consumers who had originally supported option 4 but fell more in line with option 3 after hearing Northern Powergrid's rationale behind choosing this option. There were some consumers who remained in support of option 4. A unifying theme was that consumers felt confident that Northern Powergrid are experts and that they trust Northern Powergrid with these decisions. **(E252)**

- Consumers across the citizens' panel (March 2021) saw option 3 as 'the right balance'. They felt that there were little to no negatives and that this option provides 'better value'. Consumers were reassured by the stable long-term risk as well as the ambition of option 3 in terms of making improvements to the network and moving

towards net zero. A few consumers felt that if this Northern Powergrid went for this option, they would need to 'tread carefully' because technology changes fast. **(E252)**

Engagement on asset resilience

- Urban, rural and SME consumers thought Northern Powergrid should continue to educate and inform about the regulatory process and how investments are funded, and what the implications for consumer bills are. **(E252)**

- Many consumers in the citizen's panel (March 2021) found Northern Powergrid's car analogy helpful when thinking about options for investment as it mitigated the amount of jargon used when discussing the topic. A few, however, disagreed on the basis that it 'muddied the waters' and suggested Northern Powergrid felt the need to 'dumb down' the topic for discussion with consumers. **(E252)**

- Having recapped the first session, consumers felt they understood Northern Powergrid's process of decision making in the area of asset resilience. Some commented that it 'made sense' and that Northern Powergrid 'know their priorities' **(E252)**

- Some Domestic consumers expressed support for Northern Powergrid's decision making process in this area. They felt it makes sense and were happy that Northern Powergrid are 'taking consumer needs seriously when discussing risk factors'. Some consumers said that they did not think that Northern Powergrid should replace everything before it needs to. **(E252)**

- TRL/innovation process: Stakeholders participating in the 2023-2028 business plan stakeholder survey (January 2021) commented that the innovation focus should be on all TRLs, as lower TRL projects may results in higher benefits being delivered and lower cost in the longer term. The need for clarity on requirements (e.g. calls for Innovation), longer term roadmaps and the ability to resubmit ideas following initial feedback were also highlighted. **(E271)**

- According to Green Recovery Scheme surgeries engagement (May 2021) stakeholders felt that projects need to be 'shovel ready' and able to be delivered within the next two years. Key to the deliverability will be questions of land ownership and wayleaves. **(E274)**

- During the 2023-2028 plan website survey responses, 41.56 per cent of the participants to the survey said they 'really like' the asset resilience plan. **(E299)**

- According to the colleague engagement survey – plan acceptance, overall acceptance of the business plan area amongst colleagues was rated at 4.5 out of 5 on a scale of 'not acceptable' to 'very acceptable', which is a relatively high overall score, suggesting this plan area was well received by colleagues. **(E300)**

- The comments around improving clarity of information contrast with the mean score for clarity, with colleagues stating that they need more detail to fully understand the plan area. They need to have better and more detailed information to map the phasing of materials required from our suppliers so they can meet critical milestones in projects. **(E300)**

- Participant comments showed that colleagues currently have concerns about potential future issues for the propositions outlined: 'There are some new technologies listed in the proposal and we need to understand the effectiveness of all of them in order to commit to them making a significant benefit to what we want to achieve. In principle they do that however the practicalities may prove different.' **(E300)**

- Literal comments around concern about suitability of assets showed that a proportion of colleagues surveyed were concerned about how assets will be suitable for future implementation: 'Why don't we chip our assets so we can download the data onto an iPad to populate relevant data also use on inspections for ground clearance so we can run reports on assets that haven't had access so we have a follow up system. I also think we need to take into consideration that our new assets and cables installed are of a good standard and installed correctly by our contractors or developers as we eventually adopt these assets so if not installed correctly become our problem further down the road.' **(E300)**

WAVE 4 – Finalising the plan

From July to December 2021, we finalised our plan, responding to queries, addressing gaps and testing overall acceptability. We engaged 10,042 customers and stakeholders overall and with detailed sessions on outstanding asset resilience topics across 7 events.

The events where Asset Resilience was a specific sub-topic are listed below:

Code	Name	Subgroup	Engagement Type	Date	No Engaged
(CR416)	Industrial workshop	Customers	Meeting	19/10/2021	13
(CR418)	Cross Utility Workshop	Utilities	Meeting	20/10/2021	8
(CR420)	ED2 Stakeholder Webinar	Regional politics, Consumers, Future Energy	Meeting	03/09/2021	101
(CR426)	Citizens Panel (Bill impact)	Consumers	Panel	20th & 23rd Sep	37
(CR465)	Business Plan Acceptability Testing	Consumers	Quantitative survey	Oct-Nov 2021	1,742
(CR466)	ED2 Acceptance Comms (winter awareness campaign mail-out)	Consumers	Quantitative survey	Nov 2021	8,141

Feedback summary

At the industrial stakeholder webinar Industrial users stated they wanted their needs to be better represented in ED2 plan. **(CR416)**

- NPg's plan should account for major new energy users in Humber and Teesside (part of BEIS' track 1 CCUS cluster selection) which are expected to come online in the mid-2020s. These companies will be enablers to regional decarbonisation and could be heavy energy users. **(CR416)**
- Industrial users should be strongly represented within the ED2 plan, including Distribution Future Energy Scenarios, to ensure the NPg network is not a barrier to their decarbonisation. **(CR416)**
- Port of Tyne has done work with UKPN to understand their networks and their demand. Funding for infrastructure upgrades for shoreside power is the key issue and one for the Port of Tyne and the Government to work out. Northern Powergrid's ED2 plan is comprehensive in terms of support offered, but needs to ensure sufficient capacity to support decarbonisation of the port. **(CR416)**
- Concerning North Sea Oil Terminal, Teesside, network reliability is essential as a power interruption would bring down the terminal and impact offshore facilities. They are pleased to see investment in network resilience. **(CR416)**
- The P66 Humber Refinery can connect directly to Transmission network and bypass NPg's distribution. It is involved in several projects that require a significant amount of additional power but are unsure whether these would impact the local transmission system or Northern Powergrid. These projects include (1) a green hydrogen project intended for use on a refinery, (2) a project looking to increase refinery efficiency. They process used cooking oil and rely on steam, imported from power station next door (very inefficient). There are electrification projects to try and replace this that would need another 30-40 MW, (3) a carbon capture project underway (part of Humber Zero) that needs c.10-12 MW and (4) a carbon capture at the power plant next door (VPI). There are two options; one involving a 20 MW increase in power, the other involving a 70 MW increase. **(CR416)**
- Lack of capacity is a concern for Croda and its decarbonisation ambitions. Croda has a ten year plan to cut carbon by 50% by 2032 (mainly related to energy use). They are looking at enzyme technology to produce what they need longer term, but this is 15 to 20 years away. Most of Croda sites are landlocked, with limited space for

new equipment. They want to install new analytical machinery at HQ near Goole, but there is no capacity. This is the same for EV chargers. Generally the local infrastructure is not ready and Croda cannot justify the economic outlay to address this. They feel they are really held back by the infrastructure. Northern Powergrid's ED2 plan did not appear to offer anything that would aid Croda's ten year plan. **(CR416)**

At the Cross Utility Working session:

- NGN believes that if hydrogen blending into the gas networks in 2023 were to progress, it would have a significant impact on the electricity network. They would like to discuss this with NPg, especially on where might be the best places to implement it. **(CR418)**

- Reliability and availability of supply was another key out-take. Yorkshire Water has concerns about how this will be maintained as renewable generation increases. They are worried about sites going off supply, and want NPg to maintain a balance between decarbonisation and resilience. **(CR418)**

- NGN is most concerned about short term resilience and long term interaction with the gas network and peak demand, especially in winter. They also cited the updating of electric heating solutions which will increase over the coming years and gave an example of customers being without heating, if for example, there was an incident where 3,000 properties were off, the households were given electric heaters and the grid couldn't cope. **(CR418)**

- At the ED2 Stakeholder webinar, North York Moors National Park revealed they were interested in prioritisation in terms of where upgrades will be rural areas (improvements to the grid) or room for expansion (e.g. investment at lower voltage levels). **(CR420)**

- Ideal Heating noted there were a lot of questions posed in the plan but there wasn't enough positivity overall (e.g. can the grid cope?). Whilst there are many unknowns about the future, some stakeholders will be look to the plan for a sense of hope about the achievability of regional decarbonisation objectives. **(CR420)**

- LA representatives from Sunderland, York, Ryedale and Northumberland agreed the plan was aspirational but lacked detail on how the aims will be met. More specifics would help them understand how the plan will impact them and help them meet their targets. They wanted reassurance that NPg could be responsive to their needs (both with regards to net zero but also more specific local plans and targets). **(CR420)**

- A representative from Leeds Teaching Hospital reported a concern about the plan not including enough considerations for advancements in heat technology. **(CR420)**

- Ideal Heating also noted the need to consider seasonal changes in electricity use, and people using more electricity at certain times of day such as in the morning. **(CR420)**

- Many LAs have more ambitious targets to achieve net zero than the Government 2050 target. There was slight concern (most notably York, Northumberland and Sunderland LAs, all of which have a 2030 target) that Northern Powergrid appears to be focussed on 2050 and they wanted reassurance Northern Powergrid would be able to help them meet their more ambitious, targets. **(CR420)**

- South Tyneside Council was happy to see commitments to invest in asset renewal (their perception was that historically Northern Powergrid has under-invested in assets compared to ENW). **(CR420)**

- Ennoviga Solar also perceived the Northern Powergrid network was in need of investment. **(CR420)**

- South Tyneside Council felt that Ofgem's mind to position in terms of distribution of costs for reinforcement and the perception of this as balancing out so it is not just the renewable developer that pays for it, is a fair approach. **(CR420)**

- The Petrol Retailers Association, which represents most petrol retailers, was concerned about the electrification of transport and queried what NPg planned in terms of increasing capacity to accommodate rapid chargers. In most cases this would require a substation to be fitted on site, which is difficult due to the hazards associated with petrol retail. **(CR420)**

- Newcastle Upon Tyne Hospital NHS Foundation Trust is interested in load level and is working with Northern Powergrid on this. They are coming to the end of a contract for a Combined Heat and Power system (CHP) and queried whether they might be useful to Northern Powergrid in terms of working flexibly. **(CR420**

Climate resilience

Stakeholder engagement summary

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
CR1 CR2	**Maintain flood defence resilience at all major substations** **Reduce the impact of storms on our network through a comprehensive programme of Vegetation Management**	**Wave 1**: Our initial engagement regarding climate resilience established the subject as a high stakeholder priority and one where stakeholders asked Northern Powergrid to take an ambitious approach in protection of network assets. In roundtable sessions and events, stakeholders asked us to be ambitious in our approach to adapting our network based on worst case scenarios and predicted potential future risks. In initial 'willingness to pay' focus groups and surveys, climate change was identified as a concern that many wanted to address. Reliability was identified as the top priority in wave 1 by customers, and climate resilience was seen as very closely linked. However, in a climate change roundtable, some stakeholders also expressed concern about the potential environmental impact of construction and diversion schemes and highlighted the need for natural processes to augment hard engineering solutions. For example, vegetation can reduce water ingress whilst also increasing biodiversity. ***Key wave 1 finding:*** *Stakeholders support an ambitious approach for climate resilience, looking for a balance between hard engineering and natural solutions.*	*E017* *E018*
		Wave 2: In wave 2 our engagement focussed on presenting a range of investment options and propositions to stakeholders in order to refine down to their preferred levels of service and cost. When presented with service levels A to E, across the consumer, rural and SME panels, customers supported an ambitious approach to climate resilience. This level of ambition was also supported by local interest groups and stakeholders. There was a mix of appetite for ambition in response to the emerging thinking consultation survey, supporting a balanced approach in our investment. In the rural panel, customers specifically highlighted flood defences and vegetation management as top priorities within climate resilience. Consumers and rural panellists agreed that this activity should be targeted at the areas of highest risk. In our 'willingness to pay' survey, reducing the percentage of major sites at risk of flooding through mitigation measures was chosen as the highest priority in the climate resilience plan. Overall, flooding was highlighted as a key consideration across stakeholders, supporting the need for defences at major substations. ***Key wave 2 finding:*** *Stakeholders support a balanced approach between ambition and cost, targeting investment at those areas most in need of mitigation with a particular focus around flooding.*	*E004* *E043* *E050* *E002* *E043* *E010*
		Wave 3: Climate resilience is a consistently valued area which consumers link to reliability and therefore they supported our efforts to further enhance storm resilience. ***Key wave 3 finding:*** *Stakeholders continue to support targeted improvements in reliability and resilience.*	*E251*
CR3		**Wave 1:** Our initial exploratory engagement quickly identified collaboration as being important for stakeholders to develop resilient infrastructure through an efficient and coordinated approach. Stakeholders highlighted that this was essential due to interdependencies that exist across industry, supply chain and asset relocation and hardening.	*E017* *E029*

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
	Improve resilience through collaborative work on interdependencies to reduce the risk of cascade failures across systems	***Key wave 1 finding:*** *Stakeholders felt a collaborative approach across utilities and partners was essential.*	
		Wave 2: Collaboration continued to be highlighted as a priority for stakeholders. In particular the consumer panel selected investing in cross-sector utility projects as the highest priority within climate resilience. Customer feedback and that of the rural panel further supported this prioritisation. In the SME panel collaborative work between Northern Powergrid and the Environment Agency on flood alleviation programmes was received very positively. ***Key wave 2 finding:*** *All stakeholders continue to strongly support collaborative work to manage interdependencies and activities such as flood risk management.*	*E004* *E002* *E010*
		Wave 3: Collaboration was again highlighted as an area of key importance. At a local authority forum, the importance of working together across the region was flagged as vital, with focus drawn to the creation of the Yorkshire Climate Commission, although rural consumers at the citizen's panel urged caution to prevent duplication of the work of other organisations. Stakeholders also highlighted procurement and the supply chain as an area of concern for interdependencies. ***Key wave 3 finding:*** *Stakeholders support a coordinated regional approach to resilience and are concerned about the potential impact of interdependencies.*	*E255* *E262*
CR4	**Maintain operational resilience and embed long-term resilience across our asset programmes, working with others to better understand future risks**	**Wave 1:** Our wave 1 engagement with stakeholders highlighted the need for a coordinated approach with other utilities to understand future risks, climatic scenarios and strategies. There was also discussion around the assumptions used for the scenarios that Northern Powergrid had developed, for example specific increases in global temperature. In the wave 1 prioritisation exercise conducted with consumers, increasing network reliability through interconnection of substations was highlighted as the top priority (out of a list of 17) in order to maintain a network that is resilient to the growing threat of severe weather events. ***Key wave 1 finding:*** *As well as looking for an ambitious approach, stakeholders wanted us to consider a range of future scenarios in their planning, using operational strategies to mitigate risk.*	*E017* *E018* *E029*
		Wave 2: As noted previously, stakeholders support climate resilience investment, seeing this as essential given that severe weather events are occurring more regularly. In the rural panel, customers were particularly supportive of increased interconnection of substations and moving substations away from at risk areas. Rural and SME panels discussed the need for a coordinated response to severe weather incidents, supporting cross agency simulation exercises to test run responses to these type of incidents. ***Key wave 2 finding:*** *Stakeholders prioritised operational resilience and highlighted the necessity of a co-ordinated response to any incidents.*	*E002* *E004* *E043* *E050* *E043* *E010*
		Wave 3: Consumers link climate resilience to reliability and therefore they supported efforts to further enhance our operational response. Supply chain interdependencies were highlighted, supporting our approach to embed resilience into our policies and specifications. Support for the Yorkshire Climate Commission again reinforces the support for a regional approach. Stakeholders at the local authority sessions highlighted the need to engage senior management and embed resilience throughout the organisation.	*E251* *E262*

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
		Key wave 3 finding: *Stakeholders support a fully embedded approach to resilience.*	
		Acceptance research and findings: *The acceptance score for climate resilience is 69per cent. Trust was high at 73per cent for all customers. Overall acceptance was highest with rural customers who were most accepting of the plan (85per cent). For customers with lower levels of acceptance, more information on deliverability is important to them. Further testing, including acceptance, will be held in wave 4 providing detail on our plan approach.*	*E325*
		Overall Wave 4 insights: *Customers represented by our Citizen's panel supported the focus and ambition of the Climate Resiliance propositions asking us to ensure we consider climate mitigation and adaptation in the widest sense including natural solutions such as land management.* *Stakeholders wanted us to continue to collaborate to mitigate flood risks, asking us to work with partners and also in our Cross-utilities engagement, there was further support for a collaborative approach to climate resilience.* *We have made this an explicit commitment in our plan alongside the plan to share local level resilience data and plan collaborative exercises along with enduring Cross-utility engagement.*	*CR418* *CR420* *CR426*

WAVE 1 – open and formative engagement

In the first wave of engagement we ran 103 events, engaging 4,762 individuals. Of these 103 events, Climate Resilience was a specific sub-topic at five, covering 150 future energy customers and representatives from utilities and local authorities.

The five events where climate resilience was a specific sub-topic are listed below:

Engagement reference	Name	Subgroup	Method	Delivery partner	No engaged
E017	Emerging Thinking: Roundtable - Climate Resilience	Expert Stakeholders	Online focus group	Traverse	14
E018	Emerging Thinking Roundtable - Environmental Protection	Expert Stakeholders	Online focus group	Traverse	14
E029	Emerging Thinking Stakeholder Engagement Roundtables	Local Authorities / Utilities / Health	Online focus group	Traverse	55
E109	Technical panel - Climate Resilience	Future Energy	Online panel	Northern Powergrid	6
E210	Customer Survey with Green Doctors	Domestic	Survey	Northern Powergrid	61

- Out of those participating in emerging thinking climate resilience (February 2020) who expressed a preference, most stakeholders either chose level E or suggested a combination of level D and E. Reasons given included stakeholders view level E as a necessity in the long term and that climate resilience should be developed based on the predicted effects of worst case scenarios. **(E017)**

- Out of those who expressed a preference, most stakeholders either chose Level E or suggested a combination of level D and E. Reasons given included stakeholders view level E as a necessity in the long term and that climate resilience should be developed based on the predicted effects of worst case scenarios. **(E017)**

- Stakeholders at Northern Powergrid emerging thinking roundtable on environmental protection (January 2020) wanted to see ambitious environmental protection targets from Northern Powergrid, with all supporting Service Level D or above. A few stakeholders would like to see targets that go further than those detailed within Service Level E, asking what 'Level F' might look like. **(E018)**

Climate resilience

Climate resilience and compound events were tangible concerns, especially for those who in vulnerable locations or areas prone to flooding.

- One stakeholder participating in the roundtable on climate resilience commented that flood defences often rely on power themselves, suggesting that this secondary impact of power outages caused by climatic events should be considered within resilience evaluations. A few stakeholders also raised questions about flood defences, including whether the risks posed by coastal flooding and erosion have been considered in relation to Northern Powergrid's coastal assets and whether assets are designed based on assessment of current risk or predicted future levels of risk. Stakeholders also discussed the extent to which consumers may be sensitive to price increases, with a few stressing the importance of messaging around this issue. **(E017)**

- Stakeholders in the environmental protection roundtable also discussed the extent to which consumers are sensitive to price increases and a few stakeholders suggested that consumers are becoming more environmentally aware and that this may foster greater support for price increases related to environmental protection. **(E018)**

Building resilient infrastructure

Collaboration was viewed as necessary to develop resilient infrastructure due to interdependencies that exist across industry, supply chain and asset relocation and hardening.

- During the climate resilience roundtable some stakeholders expressed concern about the potential environmental impact of construction and diversion schemes. Others commented that they felt the proposals fail to recognise the role that vegetation can play in flood mitigation. Stakeholders suggest that natural processes can often compliment 'hard engineering' solutions; vegetation can reduce water ingress whilst also increasing biodiversity; and 'green infrastructure' can work well in urban areas where there is a high risk of surface water flooding. Questions included whether Northern Powergrid used a cost/benefit analysis tool to understand the environmental impacts of increased flood protection and other engineering works. **(E017)**

- Question were raised about the extent to which Northern Powergrid collaborates with other utility providers regarding environmental investment, with suggestions that this could save money and promote a more coordinated and consistent approach. **(E017)**

- Stakeholders participating in the Northern Powergrid stakeholder engagement roundtables (May 2020) said: *'Collaborating to contribute to mitigating flood risk at a catchment scale benefits many more stakeholders than simply focusing on adapting individual assets.'* **(E029)**

Understand future risks

Northern Powergrid should consider land use change as part of climate risk assessments and collaborate to understand how adaptation technologies may add more stress to the grid.

- A few stakeholders in the roundtable on climate resilience stressed the importance of collaboration between infrastructure companies when managing climatic risks and developing resilience strategies, with suggestion that increased collaboration and coordination can often lead to more efficient working in this area. One stakeholder suggested that one to one meetings tended to lead to the development of practical solutions, in contrast to larger stakeholder meetings where 'you have a lot of people in one room, but not a lot actually gets done.' Stakeholders (Yorkshire Water and North Yorkshire County Council) suggested specific areas for collaboration, such as promoting priority customer schemes in areas at risk of flooding. Other suggestions included a regional climate resilience forum. One stakeholder questioned whether collaboration could be facilitated by national government. **(E017)**

- A few stakeholders expressed support for the inclusion of climatic events other than flooding within the proposals, such as droughts and temperature increases. Questions related to climate change scenarios included: whether the proposals had been developed with a particular climate change scenario in mind, in terms of degrees of warming; and how climate change scenarios are incorporated into engineering specifications or design standards, in terms of the level of prescription and guidance given. **(E017)**

- According to the customer survey with Green Doctors, on a scale from one to 10 the average number selected by respondents to reflect how worried they are about climate change was six. **(E210)**

WAVE 2 – testing our emerging thinking with costed levels of ambition

Our second wave of engagement was used to test options generated during the first wave – gauging levels of customer ambition and defining our outcomes. Engagement was carried out with domestic customers, partners, commercial customers, stakeholders, SMEs and future energy consumers. The results were split into:

- Ambition (that Northern Powergrid should strive for): (most and least)

- Priority (of an initiative to Northern Powergrid): (highest and lowest)

In total, we ran 135 events, engaging 15,475 stakeholders in wave 2. Of these 135 events, climate resilience was a specific sub-topic at 11 of them, covering 5,008 individuals.

The 11 events where climate resilience was a specific sub-topic are listed below:

Engagement reference	Name	Subgroup	Method	Delivery partner	No engaged
E002	Interviews with rural consumers across the Northern Powergrid area	Rural Consumers	Telephone interviews	Traverse	36
E004	Consumer panel (Leeds and Newcastle)	Consumers	Online panel	Traverse	52
E010	SME Panel, meeting 4	Consumers	Online panel	Explain Research	20
E020	Sustainability priorities	Corporate interest groups	Online workshop	Traverse	24
E043	Emerging Thinking: roundtable - Climate Resilience	Local interest groups	Online focus group	Traverse	14

E045	Regional Political Engagement	Regional politics	Online meetings	Public Affairs Company	12
E048	Emerging Thinking: Roundtable - Environmental Protection	Future energy and expert stakeholders	Online focus group	Traverse	14
E050	Emerging Thinking consultation	Consumers	Online survey	Explain Research	1,236
E152	Emerging Thinking microsite	Consumers Stakeholders	Digital	Northern Powergrid	N/A
E153	Emerging Thinking microsite users	Consumers Stakeholders	Digital	Northern Powergrid	3,600
E154	Emerging Thinking - rural	Rural Consumers	Digital	Northern Powergrid	N/A

Responses varied, covering topics including the level of ambition customers wanted to see Northern Powergrid strive towards in strengthening the network's resilience to natural hazards, enhancing the network and communities' adaptability to changing climate conditions and building resilient infrastructure and understanding future risks.

Ambition and prioritisation

- According to customers participating in consumer panel in Leeds and Newcastle: **(E004)**
  - Highest priority is investing in cross-utility sector (project across gas, water, electricity sectors for example) projects to build new or strengthen existing flood and wind defences in shared locations, with organisations including Northumbrian Water, Yorkshire Water and Northern Gas Networks.
  - Lowest priority: Relocating equipment in anticipation of climate change impacts (e.g. moving major substations located in future tidal flood plains).
  - Most ambitious: Investing in cross-utility sector (project across gas/water/electricity sectors for example) projects to build new or strengthen existing flood and wind defences in shared locations, with organisations including Northumbrian Water, Yorkshire Water and Northern Gas Networks.
  - Least ambitious: Increasing vegetation (branches, leaves etc.) clearance to protect overhead lines from tree damage during storms and strong winds.
  - Most selected: Option E – Cross-sector response to climate change.
  - Least selected: Options A and B – Maintaining current levels of network resilience and Enhanced collaboration and investment.
  - Most selected: Major sites at risk of a 1 in a 1,000 flood event; relocate major substations located in future tidal flood plains; relocate or change assets in hard-to-access locations (e.g. in rural fields or at high altitudes); relocate assets in areas likely to experience changing land use to enable the low carbon transition (e.g. new woodland or wetlands).
  - Least selected: Major substations with enhanced resilience to severe wind events = 100 per cent.
  - Only a handful of respondents had experienced a power interruption caused by a severe weather event: a farmer experienced a two-day power cut caused by the 'beast from the east'; a couple of respondents had experienced flooding, including a shop owner who installed flood shutters as a result; and the geospatial engineer's business focused on climate change and responding to weather events.

  - Those with experience were complimentary of Northern Powergrid's response. Generally, respondents felt that the electricity network was reliable during severe weather events and their perception was that in these circumstances, there was little that Northern Powergrid could do.

  - No particular weather event was noted as being of particular concern, though flooding was a recurrent theme in discussions and one respondent flagged this as being a particular concern for the North East and Yorkshire compared to the rest of GB. Respondents' greatest practical concerns related to the disruption of their business and the potential to lose business in the event of an extended power cut. Therefore, quick restoration, effective communication and reliability were seen as key.

- Among local interest groups, stakeholders want to see ambitious targets from Northern Powergrid in relation to climate resilience, with most participants expressing support for service levels D or E. **(E043)**

- Comments about cost varied in the emerging thinking climate resilience engagement (October 2020), from those who felt the costs involved seemed relatively low to those worried about price conscious customers. Stakeholders suggested that messaging around why bills are increasing will be important. **(E043)**

- At the emerging thinking consultation, climate resilience saw a varied level of responses with no clear preference for a service level. Although option E emerged as the favourite across a number of the areas consulted, this was only by very small margins with no clear preference, for example 32 per cent of domestic customers preferred the most ambitious option E however 22 per cent opted for option B and 21 per cent for option C. **(E050)**

  - Out of 12 respondents, Option A -0, B-2, C-4,D-1, E-5 **(E152)**

  - Out of 38 respondents, Option A -3, B-7, C-5,D-9, E-14 **(E153)**

  - Out of 15 respondents, Option A -1, B-1, C-4,D-3, E-6 **(E154)**

Climate resilience

- Consumers in the rural areas largely felt that Northern Powergrid's current climate resilience offer met their expectations. They were particularly supportive of the focus on improving flood defences and working with other utilities to coordinate emergency responses. Flooding was frequently cited as interviewees' primary concern when discussing the impacts of climate change. **(E002)**

- Most participants opted for some level of investment in climate resilience, with those who advocated for major investment raising concerns about the increased frequency of severe weather events. A few consumers recognised the importance of investing in Climate Resilience but opted for minor investment due to concerns about increased costs. **(E002)**

- The majority of interviewees felt that Northern Powergrid's climate resilience measures should be targeted at areas perceived to be most at risk from severe weather events, particularly those locations known to be prone to flooding. A few, however, felt that adaptation measures should be spread evenly across the region due to the unpredictability of severe weather events. **(E002)**

- Most participants of the consumer panels (Leeds and Newcastle) were supportive of Northern Powergrid adopting an ambitious approach to Climate Resilience. Many consumers noted that the effects of climate change 'will only get worse' and that, simultaneously, reliance on the electricity network is expected to increase in the coming years. They, therefore, argued that investment in network resilience should be a priority for Northern Powergrid, although a small number expressed concerns about the associated costs to consumers. **(E004)**

- Consumers were largely in favour of focusing climate resilience measures on high-risk areas, as they recognised that not all parts of the region would be affected equally. Coastal areas in particular were seen to be in need of significant investment in Climate Resilience measures. **(E004)**

- Participants were divided over whether Northern Powergrid should target at-risk areas or adopt a blanket regional approach to climate resilience. While some recognised that not all areas would be equally affected, others expressed concern about paying for improvements that would not benefit them personally. **(E004)**

- Respondents in one breakout room of the SME panel would have liked Northern Powergrid to mention how it would mitigate the environmental impact of the severe weather defences themselves. For example, vegetation clearance could impact wildlife living in trees. There was a consensus that Northern Powergrid should work with relevant organisations to protect wildlife (e.g. Woodland Trust). **(E010)**

- There was a consensus amongst respondents that their views as a business leader were aligned with their 'domestic consumer' views on climate resilience. **(E010)**

- Stakeholders in the emerging thinking climate resilience engagement would like to see broader proposals, that consider climate challenges other than flooding, and also that utilise natural solutions to climate resilience, such as the use of vegetation to protect against flooding. **(E043)**

- Flooding is a huge issue for the area. Northern Powergrid had done some good work in flood hit areas in moving some of the substations to higher ground. **(E043)**

Building resilient infrastructure

- According to interviews with rural consumers across the Northern Powergrid area (September 2020) the most popular areas for investment were relocating equipment to less at-risk areas, increasing electrical interconnection between substations and increasing vegetation clearance. **(E002)**

- Respondents in the SME panel (October 2020) were in agreement that Northern Powergrid should work collaboratively with relevant stakeholders/agencies (e.g. DEFRA, Rivers Trust, Young Farmer' Association). Test exercises should be cross-agency in a full-scale simulation exercise to iron out any issues and, specifically, to test the effectiveness of communication between agencies. **(E010)**

- Respondents in the panel generally agreed that as severe weather events are likely to increase in frequency, Northern Powergrid should invest in flood defences to improve the resilience of its network, above and beyond regulations. However, they were not necessarily supportive about paying more to fund this investment. A couple of respondents were less enthusiastic in their support: one person wanted to see Northern Powergrid analysing available data all the time to assess if further investment was needed, or if that money could be better spent elsewhere. Another respondent questioned if the assets would still be needed in future, given the move towards green energy. **(E010)**

- The consensus was that the responsibility to invest in protecting the power supply should be shared between Northern Powergrid and other impacted utility companies, with the ultimate goal being protecting the end customer. **(E010)**

Understanding future risks

- Most interviewees from rural areas supported minor investment in Climate Resilience measures due to concerns about increased costs and a widespread feeling that this was the least important of the four topics discussed in this section of emerging thinking. **(E002)**

- Flooding was seen by most customers in the customer panel in Leeds and Newcastle (October 2020) as the primary threat to Northern Powergrid's network so they were largely supportive of investing in flood defenses and relocating assets away from tidal flood plains. Several participants also expressed support for ensuring Northern Powergrid's substations are resilient to severe winds. **(E004)**

- Respondents in the SME panel viewed collaboration between Northern Powergrid and, for example, the Environment Agency on flood alleviation programmes positively. They felt that collaborative working would bring about improvements and efficiencies. However, support for wider flood alleviation schemes need not be financial; some respondents suggested that Northern Powergrid's contribution could be its valuable expertise and knowledge. **(E010)**

WAVE 3 – refining and finalising our plan

Our third wave of engagement was used to refine our proposals and gain endorsement for our final plans. The engagement was carried with consumers, future energy stakeholders, as well as regional politicians and local authorities. Themes covered by the engagement are:

- specific feedback on the options; and
- feedback on investment in climate resilience.

In total, we ran 91 events, engaging 32,500 stakeholders in wave 3. Of these 91 events, climate resilience was a specific sub-topic at seven of them, covering 2,318 individuals including customers, regional politicians and local authorities.

The seven events where climate resilience was a specific sub-topic are listed below:

Engagement reference	Name	Subgroup	Method	Delivery partner	No engaged
E251	Willingness to Pay quantitative prioritisation survey – Choice Experiment	Customers	Online survey	Impact	1,908
E255	Citizens' Panel, Round 4: Environment and Communities	Customers	Online panel	Explain Research	46
E259	Northumberland County Council	Regional politicians	Meeting	--	4
E262	Northern Powergrid Local Authority Forum: Collaborating for a local green recovery	Local authorities	Online workshop	--	20
E268	Intergenerational Research	Family groups	Online discussion	Gusto Research	40
E272	Northern Powergrid focus group summary	Customers	--	--	--
E277	Northern Powergrid Sustainability Survey	Customers	Survey	Explain Research	300

Specific feedback on the options

- According to 'willingness to pay' quantitative prioritisation **(E251)**:
  - climate resilience was ranked 4 out of 12 [in priority] for domestic customers;
  - a consistently valued area, which increases in value as understanding increases;
  - for customers climate resilience is often tied in with reliability;
  - substation connectivity is a key CCA initiative that customers understand and value the benefit of; and
  - some discrepancy on who should pay. It is valued and important but some initiatives may be seen as being Northern Powergrid's corporate responsibility.

Feedback on investment in climate resilience

- Consumers in the panel felt that Northern Powergrid should consider clarifying why the environmental initiatives they have proposed have been chosen and making clearer to consumers the reasons behind those decisions. **(E255)**

- Several SME consumers in the panel felt that it was important for larger organisations such as Northern Powergrid to 'lead the way' by adopting ambitious environmental strategies. **(E255)**

- Rural and SME consumers were largely in agreement that Northern Powergrid should prioritise reducing its environmental impact, and felt that larger companies such as Northern Powergrid should 'lead the way' on this issue. **(E255)**

- There were mixed opinions among urban consumers as to the importance of reducing Northern Powergrid's environmental impact, with some arguing that it should not be a priority for Northern Powergrid and expressing concern about increased costs to consumers. **(E255)**

- There was consensus among consumers that the materials provided were clear and easy to understand, and therefore that they had a good understanding of the topic. **(E255)**

- Some rural consumers expressed concern that Northern Powergrid might duplicate work being done by other organisations, and suggested that it might be more efficient for Northern Powergrid to support existing work in this area rather than appointing dedicated staff of their own. **(E255)**

- Many SME consumers supported Northern Powergrid going 'above and beyond' with this proposal, and felt that Northern Powergrid could lead the way for other companies looking to improve their community impacts. **(E255)**

- Most consumers felt that it is very important for Northern Powergrid to be involved in their local communities, particularly to communicate with consumers and to increase visibility of the work they do. A few rural consumers suggested that Northern Powergrid should recruit community ambassadors who could act as another point of contact between the community and Northern Powergrid. **(E255)**

- The need to engage senior management, councilors and to embed sustainability in all decisions was highlighted during Northern Powergrid engagement with regional politics stakeholders (January 2021). **(E262)**

- Regional politics stakeholders also thought that working together across the region is vital – a Yorkshire Climate Commission has been announced with potential for Northern Powergrid to be involved. **(E262)**

- They highlighted resourcing as a key barrier to local action: Local government resourcing and funding from central government was raised as an issue preventing action by local authorities – with austerity and COVID-19 having a significant impact on delivery. **(E262)**

- Local authorities discussed low success rates in accessing central government funding competitions. **(E262)**

- COP 26 was raised as a driver for local authority action, although there needs to be a shift from talk to action. **(E262)**

- There was a discussion on using procurement as a route to creating social value and deliver decarbonisation – on how to embed green recovery, sustainable development and co-benefits into a business case for decarbonisation action that delivers a circular economy. **(E262)**

- Local authorities are considering how to decarbonise heat and whether hydrogen or heat pumps are a feasible option. **(E262)**

- According to Intergenerational Research (February 2021), opinion and interest in climate resilience and green energy differs by each generation. **(E268)**

- During the Northern Powergrid focus group engagement (March 2021), climate resilience was confusing to very small minority but quickly explained with extreme weather incidents. **(E272)**

- In the Northern Powergrid sustainability survey (January 2021), when asked what sustainability meant to them, key themes were 'preserving resources' (71), 'looking after the health of the planet and environment' (58) and 'looking out for future generations' (54). **(E277)**

WAVE 4 – Finalising the plan

From July to December 2021, we finalised our plan, responding to queries, addressing gaps and testing overall acceptability. We engaged 10,029 customers and stakeholders overall and with detailed sessions on outstanding climate resilience topics across six events.

The events where Climate Resilience was a specific sub-topic are listed below:

Code	Name	Subgroup	Engagement Type	Date	No Engaged
(CR418)	Cross Utility Workshop	Utilities	Meeting	20/10/2021	8
(CR420)	ED2 Stakeholder Webinar	Regional Politics, Consumers, Future Energy	Meeting	03/09/2021	101
(CR426)	Citizens Panel (Bill impact)	Consumers	Panel	20 & 23 Sep	37
(CR465)	Business Plan Acceptability Testing	Consumers	Quantitative survey	Oct-Nov 2021	1,742
(CR466)	ED2 Acceptance Comms (winter awareness campaign mail-out)	Consumers	Quantitative survey	Nov 2021	8,141

Feedback in summary:

At the Cross Utility Working session, Yorkshire Water has concerns about how reliability and availability of supply will be maintained as renewable generation increases. They are worried about sites going off supply, and want NPg to maintain a balance between decarbonisation and resilience. **(CR418)**

- Fluctuations in supply are a big issue and perceived to be happening more often. When they do occur it can result in production going down for a whole day so communication and response from NPg is critical. Yorkshire Water understands power fluctuations can also occur naturally and the impact is also related to a site's ability to respond. **(CR418)**

- NGN is most concerned about short term resilience and long term interaction with the gas network and peak demand, especially in winter. They also cited the updating of electric heating solutions which will increase over the coming years and gave an example of customers being without heating, if for example, there was an incident where 3,000 properties were off, the households were given electric heaters and the grid couldn't cope. **(CR418)**

- NGN raised the importance of ongoing communications around emergency events, especially if they are likely to be more frequent due to climate related risks. **(CR418)**

- At the ED2 Stakeholder Webinar, North York Moors National Park noted that climate resilience was low down on the list presented and questioned if there had been specific modelling that led to this. They were also interested in prioritisation in terms of where upgrades will be in rural areas (improvements to the grid) or room for expansion (e.g. investment at lower voltage levels). **(CR420)**

Physical and cyber resilience

Stakeholder engagement summary

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
PC1	**Protect our customers' information**	**Wave 1:** At the start of our engagement we looked at what we currently deliver as part of our physical and cyber security programme, as well as considering feedback from our annual priorities research. We explored which areas could be expanded or further embedded across the 2023-2028 period and consulted with domestic customers, rural customers, technical and expert stakeholders, as well as our colleagues. Overall feedback showed that stakeholders recognised the growing importance of this subject. Customers suggested that this area was the most in need of an ambitious approach to ensure the security of all IT platforms and facilitate the automatic detection of and response to cyber threats. They anticipated a significant increase in cyber-attacks over the next business planning period. ***Key wave 1 finding:*** *Stakeholders want us to prioritise this area to future-proof against cyber-attacks ensuring security of supply and of data. Customers were particularly supportive of our commitment to recruit and train cyber security experts to respond to cyber threats.*	*E022* *E026* *E032* *E063* *E064*
		Wave 2: These insights led to the development of a more comprehensive set of propositions to deliver physical and cyber initiatives, including the five levels of ambition that we then put forward to our stakeholders as part of our emerging thinking. When considering our draft propositions, whilst stakeholders continued to support investment in expansion of physical and cyber security, customers were generally reluctant to choose between protecting personal data and preventing disruption to the network, as they were both seen as equally important. However, when prompted, the majority of customers felt that disruption to the network would have a greater impact than the theft of personal data, though many felt it depended on the sort of data held we held. ***Key wave 2 finding:*** *Stakeholders continue to support ambition in physical and cyber security but challenged us to further consider whether increases in open access to data will increase cyber risk if not sufficiently secured.*	*E003* *E007* *E050* *E152* *E153* *E154*
		Wave 3: During the proposition finalisation stage, we discussed more granular details around the physical and cyber propositions with our stakeholders and the specifics around deliverability in response to their earlier challenges. Our stakeholders recognised the threats and high levels of sophistication and complexity, suggesting that we should engage with specialist to provide a heightened level of assurance. In response, we worked with industry approved cyber security experts to ensure our plans adequately identify and mitigate the posed risks, this is in addition to continued participation in national cyber security forums. ***Key wave 3 finding:*** *Customers and stakeholders support our ambition and our plans to grow our capabilities in this area to make sure security keeps up with changes to increase data sharing. Our customers expect us to protect their information and work with industry experts to ensure we are prepared for an increase in cyber-attacks on the network.*	*E251* *E273* *E300*

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
PC2	**Protect our customers' power supply from cyber attacks**	**Wave 1:** At the start of our engagement, we reviewed our provision to support the network from cyber-attacks, as well as industry knowledge and expertise. We explored how our approach should be developed and embedded across the 2023-2028 period and consulted with domestic customers, rural customers, SMEs, future customers and expert stakeholders, as well as colleagues. Customers were surprised to understand about the growing risks of cyber-attacks, as they had not considered the potential impact on the energy network and resilience of supply. They did however recognise the increasing frequency of hacking and data breaches in other industries and were therefore were supportive of our focus on this area. ***Key wave 1 finding:*** *Stakeholders want us to be ambitious when protecting the network from current and future cyber threats and work with industry experts to share knowledge.*	*E022* *E026* *E032* *E063* *E064*
		Wave 2: These early insights ensured that during wave 2 we could appropriately frame our propositions, including the r scope and scale with stakeholders. When considering our emerging proposals, overall, feedback showed that our stakeholders recognised the importance of prioritising this area. Customers were generally reluctant to choose between protecting personal data and preventing disruption to the network, as they were both seen as equally important. However, when prompted, the majority of customers felt that disruption to the network would have a greater impact than the theft of personal data, though many felt it depended on the sort of data held we held. As a result of this feedback, we reviewed the initiatives in this area to ensure that we equally prioritise protecting personal data and protecting our customers' power supplies. ***Key wave 2 finding:*** *Many customers engaged felt that protecting personal data should be considered, alongside initiatives developed to continue to protect the network from cyber-attacks that would impact power supplies.*	*E003* *E007* *E050* *E152* *E153* *E154*
		Wave 3: During the plan finalisation stage, we refined this proposition with stakeholders in response to their feedback. They were supportive of our chosen outcomes, placing protection of their power supply marginally above protection of information, while recognising our obligations to meet applicable regulations. Stakeholders recognised the threats and high levels of sophistication and complexity, suggesting that we engage with specialist to provide assurance. The majority of customers participating in our consumer panel were concerned about the potential impact and increasing frequency of cyber-attacks, and most believe that we have a responsibility to minimise cyber threats that arise as a result of the transition to a smart network. In response we have worked with National Cyber Security Centre Cyber Assessment Framework (NCSC CAF) approved vendors to ensure our plans adequately identify and mitigate the posed risks, this is in addition to continued participation in national cyber security forums. Our plans also take account of the likely increase in threats, ensuring that we can meet the challenge through evolving levels of sophistication in our cyber defence and response. ***Key wave 3 finding:*** *Stakeholders support investment in this area as they recognise the threats and high levels of sophistication and complexity. They suggested that we engage with specialists to provide assurance.*	*E251* *E273* *E300*

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
PC3	**Protect our customers' power supply from physical attacks at our major substations**	**Wave 1:** At the start of our engagement, we assessed existing consumer feedback on physical security and industry best practice. We consulted widely with domestic customers, rural customers and our colleagues. Most participants of our consumer panel, were concerned about the potential for damage to our assets which could potentially negatively impact customers, either in terms of cost or disruption to supply. There was an expectation from customers that effective security measures should already be in place to minimise this risk, with already extensive investment. We have therefore focussed on maintaining existing levels of security and applying technology to help improve the reliability of our response. ***Key wave 1 finding**: Stakeholders want us ensure we have effective security measures in place to protect assets such as substations from vandalism and physical attack which could impact security of supply.*	*E022* *E026* *E032* *E063* *E064*
		Wave 2: During this wave our propositions engagement focused on defining the scope and scale of the initiative and identifying potential options to mitigate physical attacks on major substations. Stakeholders supported the principles of these propositions, suggesting that physical security measures such as barriers were the most effective. A proportion of customers felt that the primary function of security measures should be to detect trespassers once they are onsite, whilst others on our panel felt that trespassers should be deterred from entering in the first place, a balance between physical preventative controls and intrusion detection has been chosen. ***Key wave 2 finding**: In general our customers were supportive of a balanced approach to mitigate security at major substations with a balance between physical preventative controls and intrusion detection.*	*E003* *E007* *E050* *E152* *E153* *E154*
		Wave 3: During the final stage of engagement, we refined our proposals recognising that there is a range of views from stakeholders, for example customers from the rural areas were supportive of more intelligent CCTV, but there was concern that these would be ineffective without physical responses from police or private security contractors. In response, our proposal will consider more verifiable technologies, such as CCTV to increase the likelihood of police attendance for genuine intrusion events. ***Key wave 3 finding:** Building on investment already made, our customers expect us to protect their power supply from disruption and to visibly deter trespassers from our assets.*	*E251* *E273* *E300*
		***Acceptance research and findings:** The acceptance score for physical and cyber resilience is 73 per cent. Overall acceptance was high with customers and trust was important to them at 73 per cent. As acceptance from customers is high for physical and cyber resilience, this area will not be explored further in wave 4 acceptance testing.*	*E325*
		***Overall Wave 4 findings:** In Wave 4 the majority of stakeholders and customers continued to support the most ambitious proposals for Physical and Cyber Security. *There was an acknowledgement by stakeholders and customers of the importance of working with industry cyber specialists to ensure future service design and system integrations are underpinned by best practice, industry standards to ensure resilience of power and safeguarding of customer information- and data sharing.*	*CR420* *CR426*

WAVE 1 – open and formative engagement

In the first wave of engagement, we ran 103 events, engaging 4,762 individuals. Of these 103 events, physical and cyber resilience was a specific sub-topic at five of these, covering 227 customers, stakeholders, cyber experts and representatives of central government.

Themes covered by the engagement:

- risk from digitalisation;
- engagement with experts; and
- targeted investment priorities.

The events where physical and cyber resilience was a specific sub-topic were:

Engagement Reference	Name	Subgroup	Method	Delivery Partner	No Engaged
E022	Findings from interviews with rural customers	Rural Customers	Telephone interviews	Traverse	40
E026	Consumer panel	Customers	Online panel	Traverse	57
E032	Consumer panel	Customers	Online panel	Traverse	58
E063	OFGEM-NISD Advisory	Central government	Workshop	N/A	36
E064	Stronger Together - Cyber Resilience in the Energy Sector	Central government and industry	Seminar	Central Government	36

Risks from digitalisation

Stakeholders were concerned about the potential impact from increasing frequency of cyber-attacks. They wanted an action plan for communicating any cyber security risks and mitigations associated with digitalisation including security of transferring smart meter data.

- While many customers from the rural areas were previously unaware of the risk of cyber-attacks, they recognised the potential for disruption and expressed gratitude to Northern Powergrid for investing in this area. **(E022)**
- Many rural panel customers were surprised about the risk of cyber-attacks, as they had not considered the potential impact on the energy network. They did however recognise the increasing frequency of hacking and data breaches in other industries, and therefore were supportive that Northern Powergrid had chosen to prioritise this area. Overall, rural customers were most concerned with maintaining a continuous supply of electricity to their homes, as they viewed power as an essential need. Again, this was likely due to their living in areas that are more isolated and prone to power cuts. **(E022)**
- Cyber security was also identified by participants as being an increasing priority given the role of the internet, especially during the pandemic. **(E022)**
- When considering the physical security of Northern Powergrid's assets like substations, most participants of the Northern Powergrid online consumer panel (June 2020) were unconcerned with the potential for privacy breaches associated with sharing CCTV footage as this would largely affect those engaged in criminal activity. **(E026)**

- In summary, the majority of customers participating in the consumer panel (April 2020) are concerned about the potential impact and increasing frequency of cyber-attacks, and most believe that Northern Powergrid have a responsibility to minimise cyber threats that arise as a result of the transition to a smart network. **(E032)**

Engagement with industry cyber experts

Stakeholders want Northern Powergrid to engage with specialists in this area as there are high levels of governance, with available best practices. They were pleased to understand the following approach:

- Northern Powergrid's assessment of risks associated with operational IT that has formed a basis of the cyber plan has been independently by external auditor, PwC to ensure rigour.

- Northern Powergrid will continue to engage with an appointed cyber expert (NCSC CAF approved) supplier Cap Gemini to provide challenge and input into Northern Powergrid's plans, with focus on ensuring that risks are effectively and regularly addressed.

- Northern Powergrid continues to engage with the Ofgem cyber security advisory team and actively participate in national regional focus groups, which also includes the Energy Sector Cyber Security Group, E3CC.

Targeted Investments to improve physical security of Northern Powergrid sites

Customers wanted Northern Powergrid to focus on sites with a history of theft and vandalism, especially those where there is potential for wider corruption across the network.

- Most participants of the Northern Powergrid online consumer panel (June 2020) were concerned about the potential for damage to Northern Powergrid's assets to negatively impact customers in terms of either cost or disruption, but there was an expectation that effective security measures should already be in place to minimise this risk. **(E026)**

- Physical security barriers were widely believed to be most effective. Participants in Leeds felt that the primary function of security measures should be to detect trespassers once on-site, while those in Newcastle felt they should be deterred from entering in the first place. **(E026)**

- The majority of interviewees from the rural areas were supportive of more intelligent CCTV, but there was concern that these would be ineffective without physical responses from police or private security contractors. **(E022)**

- 'Stronger Together' engagement (April 2020) and OFGEM-NISD Advisory found that with regard to the cyber plan, the choice of solutions costs must be justified, including researched and costed solutions and how we plan to procure. **(E063, E064)**

WAVE 2 – testing our emerging thinking with costed levels of ambition

The second wave of engagement was used to testing options generated through the first wave – gauging levels of customer ambition and defining priorities and outcomes. Engagement was carried out with domestic customers, partners, commercial customers, stakeholders, SMEs and future energy customers. The results were split into:

- Ambition (that Northern Powergrid should strive for): (most and least)
- Priority (of an initiative to Northern Powergrid): (highest and lowest)

In total, 135 events took place, engaging 15,475 stakeholders and of these 135 events, physical and cyber resilience was a specific sub-topic at six of them, covering 4,940 customers.

The six events where physical and cyber resilience was a specific sub-topic are listed below:

Engagement reference	Name	Subgroup	Method	Delivery Partner	No Engaged
E003	Consumer panel (Leeds and Newcastle)	Customers	Online panel	Traverse	51
E007	Interviews with rural customers	Customers	Telephone interviews	Traverse	33
E050	Emerging Thinking consultation	Customers	Digital survey	Explain Research	1,236
E152	Emerging Thinking microsite	All groups	Digital survey	Northern Powergrid	N/A
E153	Emerging Thinking microsite users	All groups	Digital survey	Northern Powergrid	3,600
E154	Emerging Thinking - rural panel	Rural customers	Digital survey	Explain	20

Possibly due to the complexity of the subject, responses varied, covering topics from the level of ambition customers wanted to see Northern Powergrid strive for in protecting the network from physical and cyber risks, to the impacts of digitalisation

Ambition and prioritisation

- Consumer panel participants in Leeds largely felt that Northern Powergrid's current approach to physical and cyber resilience either met or exceeded their expectations. This was particularly true with regards to cyber security, with many participants praising the maintenance of cyber defences and the recruitment of cyber security experts. **(E003)**
- Most customers in Leeds felt that Northern Powergrid's highest priority, and the area most in need of an ambitious approach, should be to ensure the security of all IT platforms and facilitate the automatic detection of and response to cyber threats, as they anticipated a significant increase in cyber-attacks over the 2023-2028 period. **(E003)**
- Most customers in Newcastle felt that Northern Powergrid's current approach to maintaining the physical and cyber security exceeded their expectations, and were particularly supportive of Northern Powergrid's commitment to recruiting and training cyber security experts to respond to cyber threats. **(E003)**
- According to the consumer panel in Leeds and Newcastle **(E003)**:
    - Highest priority: Ensure all IT platforms are secure and that any cyber threats can be easily detected and responded to automatically.

  - Lowest priority: Install artificial intelligence technology to enhance Northern Powergrid's response to potential security events.
  - Most ambition: Ensure all IT platforms are secure and that any cyber threats can be easily detected and responded to automatically.
  - Least ambition: Ensure Northern Powergrid's systems are ready for more digitisation, such as the widespread sharing of energy consumption data.
  - Most selected: Option E – Detection and cyber controls for decarbonisation.
  - Least selected: Option A – Strong controls against physical and cyber-attacks.
  - Most selected: Ensure all IT systems are ready for further digitisation of the network.
  - Least selected: Install smart artificial intelligence control systems.

- In the emerging thinking consultation (November 2020) opinions on the best service level option for physical and cyber security were polarised amongst both audiences. Within the business sample, 30 per cent chose option B at no additional bill impact, whilst the same proportion [30 per cent] preferred the most ambitious option E. **(E050)**

- Similarly, within the domestic sample approaching a third [32 per cent] chose option E and just over one in five [22 per cent] selected option B. **(E050)**

- Option E (detection and cyber controls for decarbonisation) was the most popular choice among customers participating in the consumer panel in Leeds due to a high level of concern about the potential for cyber-attacks and the relatively low costs associated with this option. Those who advocated for less ambitious options did not see the need for significant spending in this area, and some explicitly opposed the use of artificial intelligence. **(E003)**

- Many interviewees from rural areas supported increasing the security of Northern Powergrid's physical assets through wider usage of motion sensors, as well as installing AI technology to enhance its response to cyber threats. Some customers were also in favour of Northern Powergrid working with other industries to identify best practice and training staff to operate in a 'cyber-safe' manner. While they tended to conceptualise security in physical terms, participants were more concerned about cyber security overall. **(E007)**

Risks from digitalisation

- The majority of customers in Leeds trusted Northern Powergrid to handle their personal information in addition to their energy consumption data and were happy for this data to be shared with other DNOs, the UK government and regulatory bodies such as Ofgem. **(E003)**

- The majority of customers in Newcastle said that Northern Powergrid's highest priority, and the area most in need of an ambitious approach, should be to ensure the security of all IT platforms and facilitate the automatic detection of, and response to, cyber threats, as they anticipated a significant increase in cyber-attacks over the next business planning period. **(E003)**

- When it came to physical and cyber security, customers in Newcastle were divided between option C (advanced protection of Northern Powergrid's high-risk sites) and option D (roll-out of next generation technology). **(E003)**

- In the emerging thinking consultations (November 2020) customers were generally reluctant to choose between protecting personal data and preventing disruption to the network, as they were both seen as equally important. However, when prompted, the majority of participants felt that disruption to the network would have a greater impact than the theft of personal data, though many felt it depended on the sort of data held by – and potentially stolen from – Northern Powergrid. **(E050)**

Targeted investment

- Customers in the customer panel said the language used to explain Northern Powergrid's current approach to physical and cyber security was overly technical and jargon-heavy. The reference to international security standard ISO27001 was particularly off-putting to many participants. There was also some concern that Northern Powergrid's descriptions of the potential areas for future investment did not provide sufficient detail on how such changes would be implemented. **(E003)**

- The majority of interviewees from the rural areas argued for either minor or major improvements to Northern Powergrid's security offer. Those who supported a less ambitious approach were largely concerned about increased costs, while a few also expressed misgivings about the use AI technology. **(E007)**

WAVE 3 – refining and finalising our plan

In wave 3, priorities and plans were further tested and refined wherever feedback was inconclusive, where there were differences of opinions, or where new areas had areas had emerged. This stage included our business plan acceptability research with customers and stakeholders.

In total, we ran 91 events, engaging 32,500 stakeholders in wave 3. Of these 91 events, physical and cyber resilience was a specific sub-topic at three of them, covering 2,277 individuals.

The events where physical and cyber resilience was a specific sub-topic are listed below:

Engagement reference	Name	Subgroup	Method	Delivery partner	No engaged
E251	Willingness to Pay quantitative prioritisation research	Customers	Online research	Impact	1,908
E273	Northern Powergrid Workforce Engagement: Sustainability	Customers	Online survey	Explain Research	165
E300	Colleague engagement survey – plan acceptance	Internal Stakeholders	Survey	Explain Research	204

- According to 'willingness to pay' quantitative prioritisation choice experiment (February 2021) **(E251):**
    - Physical and cyber security was ranked 7 out of12 [in priority] for domestic customers.
    - Customers may not understand the complexity of security and how it affects them, leading to a variability in its value for customers.
    - This topic was often tied in with reliability which customers value.
    - In discussion, security is highly valued, but when compared with other ambitious initiatives it is ranked lower than other plan areas.
    - Cyber security has a higher value than physical security but this may be due to lack of awareness of the effect of a physical attack.
- Participants in the Northern Powergrid workforce engagement on sustainability (March 2021) thought that the information/operational resilience was easy to understand as a title but the business group felt it could be better titled once they had read the description. They felt it was better titled as Data and Property Security. **(E273)**

- The majority of respondents (67per cent) in the Northern Powergrid colleague engagement survey – plan acceptance (June 2021) stated that they would not be directly involved with the propositions outlined for this business plan area. **(E300)**
- Across the scaled questions, the internal stakeholders scored this plan area relatively highly in comparison to others. In particular, colleague commitment to deliver the outlined propositions within their role (directly or indirectly) was scored at 9.3 out of 10 overall. **(E300)**
- Cyber and physical resilience had an overall acceptability rating of 4.7 out of 5, which is the highest out of all the plan areas provided to colleague respondents. It is important to note than six respondents chose the 'don't know' option for this question. **(E300)**
- The comments regarding 'staff training for IT systems needs to be up to date' showed that a proportion of colleagues felt that staff training on IT systems needs to be up to date to help deliver these propositions. One participant stated: 'I'm concerned in this area that the business has some catching up to do in terms of ensuring there are enough people with the right skills in place to deliver what's required'. **(E300)**

WAVE 4 – Finalising the plan

From July to December 2021, we finalised our plan, responding to queries, addressing gaps and testing overall acceptability. We engaged 10,021 customers and stakeholders overall and with detailed sessions on outstanding physical and cyber resilience topics across five events.

The events where Physical and Cyber Resilience was a specific sub-topic are listed below:

Code	Name	Subgroup	Engagement Type	Date	No Engaged
(CR420)	ED2 Stakeholder Webinar	Regional Politics, Consumers, Future Energy	Meeting	03/09/2021	101
(CR426)	Citizens Panel (Bill impact)	Consumers	Panel	20th & 23rd Sep	37
(CR465)	Business Plan Acceptability Testing	Consumers	Quantitative survey	Oct-Nov 2021	1,742
(CR466)	ED2 Acceptance Comms (winter awareness campaign mail-out)	Consumers	Quantitative survey	Nov 2021	8,141

No new insights were gathered – the focus of discussions was around support for the plan.

Customer service

Stakeholder engagement summary

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
CS1	**Deliver a personalised, pro-active service which provides even greater choice in how and when our customers do business with us**	**Wave 1:** As part of wave 1 engagement, we focussed on what we currently deliver to support our customers, reviewed priorities and sought to explore areas where we could expand or improve upon to offer an even higher customer experience. This included educating our customers across a range of panels to demonstrate what we currently offer, providing the opportunity to understand further and enabling them to provide informed feedback on our future service offering. We engaged externally and internally, whilst also undertaking industry research and working with the Institute of Customer Service to understand what 'best in class' service looks like and the anticipated changes in customer expectations in the future. Overall customers were happy with the existing level of service. They fed back on areas they where they thought we could improve, including giving them more choice in how they contact us by expanding our range of contact channels and enabling more self-service, flexibility in how and when they do business with us, pro-active communications and personalising our service by providing the option to speak with a person. They recognised that different customer groups have different needs and we should offer a range of options to support our diverse range of customers. Building trust with customers was an important topic to come out of industry research. Overall, feedback shows that customers valued a high level of customer service and thought what we offered currently was really good, however, they did highlight that not everyone may be aware of us. ***Key wave 1 finding:*** *Customers could see the benefits of the greater use of digital contact channels, as well as a wider offering of appointment times when planning works and a personalised service by maintaining the option to speak with a person when required. We can build trust through transparency across our communication channels.*	*E022* *E039* *E056* *E065* *E067* *E070* *E073* *E074* *E075* *E150* *E158* *E160*
		Wave 2: The insight from our wave 1 engagement led to the development of our propositions that deliver on the requirements of our customers for us to be proactive, personalised and provide greater choice. We developed the five levels of ambition that we presented to our stakeholders through our emerging thinking engagement. Most customers were happy with the current levels of customer service and support. There was support for greater use of digital channels, expanding into new areas, extending appointment times and greater telephony support where this was a preference. Although there was a consensus towards ambition level C 'major upgrade' customers were feeding back a preference for enhanced service across a range of the options, which we used to further define our propositions. ***Key wave 2 finding:*** *Customers supported continued enhancements to our customer service, highlighting that choice was important as requirements and preferences differ across our customer base. There was continued support for greater digital channels with an additional communication route expanding our approach to use what3words. Although customers were supportive of greater convenience in appointments, they were unsure whether they would want to pay extra. Personalised contact is important to our customers when they need further support.*	*E001* *E006* *E023* *E027* *E028* *E036* *E038* *E050* *E068* *E193* *E207*

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
		Wave 3: As part of the proposition finalisation stage, we discussed the more granular detail of our propositions with a range of stakeholders to test our thinking and ensure our offering was aligned to the feedback we had received. We further tested the contact channels, human contact and proactive on-site support elements of our propositions to explain our thinking and hear from our customers directly. As part of the 'willingness to pay' exercise there was an emphasis on keeping costs low, with customer service being seen as a 'hygiene' factor or baseline expectation, rather than priority area where customers will pay significantly more. ***Wave 3 finding:*** *Overall customers were supportive of our propositions and felt that the information presented was clear and easy to understand. Our SME customers at the citizen's panel did voice that proactive onsite response would be of greater use to those most vulnerable.*	*E250* *E251* *E257* *E267* *E272*
CS2	**Improve the speed of complaint resolution**	**Wave 1:** At the beginning of our engagement we were seeking to understand the areas our customers thought we should prioritise in order to improve our service. Our customers told us that being proactive was important, as was a swift resolution if something did not go to plan. Customers also provided feedback on the importance of building trust, which was reinforced through our industry research. Our early engagement focussed on enhancements to service, not what we would do if it did not go to plan, but these reflections resulted in us building in some specifics actions to improve complaint resolution. ***Key wave 1 finding:*** *If something does not go to plan, we need to ensure we have a strong recovery of service to support our customers and build trust.*	*E070* *E072* *E073* *E074* *E075* *E150* *E158* *E168*
		Wave 2: The early insight we received during wave 1 allowed us to frame our positions for our wave 2 engagements and emerging thinking. Engagement showed that customers value us being proactive and 'on top' of any issues, informing them in advance of activity wherever possible. If issues do occur, customers expect us to take responsibility and rectify any problems quickly and efficiently. Another key attribute identified by customers was managing expectations, they expect us to explain why there has been a problem and keep customers informed, be timely in our communications and actions and be very clear on next steps. Customers generally think our performance is very good and benchmarking shows we perform well when compared against external organisations. However, we should continue to look to improve and personalise our service. ***Key wave 2 finding:*** *We should continue to focus on providing excellent customer service and ensure that when something does not go to plan, we take responsibility and resolve the situation quickly and efficiently.*	*E001* *E006* *E023* *E027* *E028* *E036* *E038* *E050* *E068*
		Wave 3: We did not specifically test this as part of the finalisation stage within the 'willingness to pay' exercise as this proposition is an enhancement of existing processes and there will be no cost increase to deliver continual improvement. We discussed greater regional ownership as part of our proactive onsite response and how we could utilise this approach for greater customer care during a power cut to resolve dissatisfaction onsite and provide great understanding for our customers. ***Key wave 3 finding:*** *Customers endorse proactive support which will include resolution of any dissatisfaction onsite caused by a power cut, and also provide greater regional resource with localised understanding.*	*E251* *E257* *E272*

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
CS3	**Support customers in the transition to net zero**	**Wave 1:** As we commenced our engagement on customer service, we were initially focussed on those aspects which were common customer service focus areas as contained within CS1. It soon became clear however, that we could not adequately support the decarbonisation agenda if this was not a key feature of our customer service offering, as this is central to our plans, regional ambition and the energy system as a whole well beyond 2028. We worked internally to understand the potential impact on our customers and where we can add value in support through our contact with our customers. We developed a series of customer personas to visualise a future world and tested them with our panels to gain some greater insight on customer expectations. ***Key wave 1 finding**: Customers generally have a low understanding of decarbonisation and require support to bring to life what we mean and how their use of energy may change in the future, before they are able to articulate and understand how their expectations may change.*	*E022* *E032* *E039* *E056*
		Wave 2: During wave 2 our engagement focussed on further defining our decarbonisation and net zero support for customers. We built on what we already knew but also sought to understand how we could best support our customers. We continued to visualise how use of energy may change in the future and used our existing panels to understand what support they would find beneficial. Decarbonisation support was a key area the customer engagement group (CEG) wanted to see us draw out, to understand how we will evolve and best support our customers. Customers see a clear role for us to provide energy efficiency advice to support them in reducing costs. As we are impartial, they felt we were best placed to provide support. They see us as potential independent experts on flexibility and low carbon technologies. Understanding of decarbonisation as a concept is relatively low but they could see how we could support them with energy efficiency and educate them about how they can participate in the transition to net zero. ***Key wave 2 finding**: Our customers are supportive of us educating and providing information and support to help in the transition to net zero. However, it is necessary to engage with some more informed customers as we moved forward.*	*E001* *E006* *E023* *E027* *E028* *E036* *E038* *E050* *E068*
		Wave 3: In the final stage of engagement, we took a slightly different approach to this topic, exploring the views of families across three generations to understand the different views on support and focus in the future. We also engaged with early adopters of low carbon technologies via our community group who have experience across our regions. We outlined our propositions and the support we envisaged providing, to seek feedback and develop our thinking. Our intergenerational research highlighted the varying degrees of understanding across generations and the need for us to focus on the issues relevant to domestic customers. Our early adopters research highlighted energy efficiency, flexibility and using data as the key areas of focus. This drew out some interesting points relevant to not just our customer service propositions, but more widely across Northern Powergrid including support for vulnerable customers; use of smart meter data; supporting net zero related behavioural change through impartial advice; facilitating flexibility and an expectation of good quality, free and open data. There was an emphasis to keep costs low for customer service. ***Key wave 3 finding:** Customers expect us to support them in their net zero aspirations, believing we are best placed to do so. They think that we should do more to build awareness of the services we offer and proactively communicate information and guidance.*	*E251* *E267* *E268* *E272*

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
		Acceptance research and findings: *The acceptance score for customer service is 77 per cent. Customer service scored the highest for ease of understanding 71 per cent and for trust (73 per cent) out of all business plan areas. As acceptance is high for customer service, this area will not be explored in further acceptability testing.*	*E325*
		Overall Wave 4 findings: *There was overall support for the Customer Service propositions, with a request from customers and stakeholders to ensure that our colleagues and contractors are well trained and able to give advice, particularly in relation to decarbonisation and net-zero.* *Customers supported the aim of providing flexible appointment options with 79% of customers in favour of evening and weekend appointment slots available.* *They also welcomed greater convenience such as extending appointments for planned services into evenings and weekends.* *Customers supported more options offered for communications and the option of 100% human contact service available.*	*CS1.1* *CS1.3* *CS1.4* *CS1.5* *CS2.1* *CR412* *CR420* *CR426* *CR459*

WAVE 1 – open and formative engagement

Our first wave of engagement was used as a chance to shape and define our options. In total, we ran 103 events, engaging 4,762 in wave 1. Of these 103 events, customer service was a specific sub-topic at 13, covering >1,100 stakeholders. The themes covered by the events:

- personalised service;
- flexible options; and
- digital tools

The 13 events where customer service was a specific sub-topic are listed below:

Engagement reference	Name	Subgroup	Method	Delivery partner	No engaged
E022	Findings from interviews with rural consumers	Rural Consumers	Telephone interviews	Traverse	40
E039	Student Consumer Group Insight	Consumers	Online workshops	Magpie	8
E056	Future Customers Insights Report	Consumers	Research	Magpie	15
E065	Customer Focus Groups - Journey Mapping	Consumers	Focus groups	Northern Powergrid	42
E067	Dimension Data - 2019 Global Benchmarking Report	Consumers	Research	Northern Powergrid	1
E070	Institute of Customer Service (ICS) Conference	Central government expert speakers	Conference	ICS	9

E072	Institute of Customer Service Research	Consumers	Research	ICS	1
E073	Broad Measure of Customer Satisfaction Surveys	Consumers	Survey	Explain	875
E074	Internal Customer Service Engagement	Internal stakeholders	Survey	Northern Powergrid	78
E075	SME Panel - Customer Service discussion	SMEs	Online panel	Northern Powergrid	20
E150	Connections Customer Service customers	Connections customers	Survey	Explain	36
E160	Power Cuts Customer Service customers	Consumers	Survey	Explain	44
E198	Customer experience deliberations	Stakeholders	Online	Traverse	8

- Rural consumers highlighted communication as important. They stressed the importance of keeping customers updated during power cuts and providing detailed information about costs. **(E022)**
- Customer focus group (April 2019) on the topic of planned and unplanned power cuts felt that: **(E065)**
    - the service is in-line with expectations;
    - communications should be 'to the point' with essential information provided;
    - some enhancements required to current communications;
    - there should be additional consideration of small businesses;
    - raise awareness of communication channels as there is a general lack of knowledge;
    - communications should be accurate, clear and to the point;
    - there needs to be choice of contact to support vulnerable and those less technologically advanced;
    - barriers to useability of the power cut map;
    - accurate restoration times;
    - more tailored information on the reason; and
    - there should be more notice
- At the Institute of Customer Service Conference, trust was the big-ticket item and was very much a theme throughout the day. Build trust so that customers readily share information. Namely, customer trust is at the heart of decarbonisation. **(E070)**
- Treat every customer as a friend, reduce customer effort, answer the question asked, never guess, solve the problem and escalate systematic problems. **(E070)**
- The overwhelming theme when engaging participants on power cuts is communication was the area requiring improvement, accounting for 38per cent of responses. Keeping customers updated during a power cut, updates to quotes and applications, getting more communication internally from onsite staff and use a variety of methods to communicate with our customers were all mentioned. The remaining responses all related to

accuracy of information and efficiency, receiving an equal number (23per cent) of the remaining responses, and keeping our promises receiving 1 response. Having a single point of contact for customers and receiving more contact from works coordinators were some efficiency suggestions. **(E150)**

Personalised service

Several key benchmarking reports identified customers supported the use of data to improve the service. Customers supported personalised service offering options in contact, but also at our customer's convenience via a wider offering of appointment times for services.

- Rural consumers defined excellent customer service as efficient, transparent and accessible, and felt that Northern Powergrid should remove financial barriers to the renewable energy market and provide information on renewable energy initiatives. **(E022)**

- Rural consumers in the Northeast, Yorkshire and Northern Lincolnshire demonstrated a high degree of awareness of Northern Powergrid because of the prevalence of power cuts in their local area. Most interviewees understood Northern Powergrid's role within the wider energy network, either because they had previously contacted Northern Powergrid or because they had received text message alerts from them during power cuts. Those who were unaware of Northern Powergrid's role still tended to recognise the name, having seen vans or engineers out and about in their local area. **(E022)**

- This was in contrast to consumer panel participants in Leeds and Newcastle, who had been largely unaware of Northern Powergrid prior to the initial workshop. This suggests that power outages are significantly more common in rural parts of the Northern Powergrid region than in urban areas. **(E022)**

- According to the future customer insights report, young people prefer direct forms of contact, and interaction, with Northern Powergrid. For example, in emergencies they would prefer to pick up the phone and talk to someone. **(E056)**

- Attendees of the Institute of Customer Service conference said the customer journey should be: FAST-FLAWLESS- FRICTIONLESS- FRIENDLY **(E070)**

- At the SME panel on customer service (May 2020), SMEs suggested they would value investment in 100per cent per cent human contact. There was a consensus that automated bots or pre-recorded messages on the phone requiring customers to select multiple options provided poor service. This would help Northern Powergrid differentiate their service offering. **(E075)**

- Knowledgeable customer service representatives who can liaise internally with relevant people to problem solve is important to customer service. Customers do not want to be passed from pillar to post. **(E075)**

- 50per cent per cent of all responses related to the way we communicate with our customers, with half of those comments suggesting that there should be more proactive communication. The remaining comments centre around the information we send to our customers that it should be detailed, accurate and informative, with less industry jargon used. The remaining responses were around customer service, we should be helpful, friendly, polite and efficient. We should make every contact count and keep our promises. **(E158)**

- Participants of the customer experience engagement from local councils felt their customers were generally not aware of Northern Powergrid, unless they had experienced an event such as flooding where Northern Powergrid was part of the response. All stakeholders stated that excellent customer service involved resolving as much as possible at first point of contact, 'Getting the right outcome first time, every time'. This involved staff being proactive and empathetic, and this culture needs to be embedded across the organisation, including with sub-contractors. Excellent customer service is everyone's responsibility and those who don't usually deal with customers are often where this falls down. Other factors that contribute to excellent customer service include managing expectations about activity timelines, 'under promise and over deliver' and providing accurate information. **(E198)**

Flexible options

Customers wanted flexible options on ways / channels to interact with Northern Powergrid, including social media, website and app technology.

- Interviewees in rural areas emphasised the importance of proactive communication during power outages and argued that their geographic isolation should entitle them to priority communications at such times. **(E022)**

- Stakeholders on the SME Panel for customer service felt that providing flexible appointments is important to business owners as they do not want to take time out of work unnecessarily. Suggested evening and weekend would be valued as well as choosing an appointment time within a shorter 2-hour time slot. **(E075)**

- According to customer experience engagement (February 2020), many of the barriers identified by stakeholders were related to silos and staffing. Stakeholders find it challenging that staff at their organisations work in silos. For a long time, siloed staff have been regarded as efficient and focused. To address this barrier there will need to be a cultural shift in organisations. In order to put the customer first, staff will have to accept some of the inefficiencies of working 'outside their remit'. Although one stakeholder used this language, this barrier can also be addressed by restructuring how work is done, enabling staff to work collaboratively across a variety of business areas. **(E198)**

Digital tools

Digital technology was seen as valuable by customers and internal colleagues alike (e.g. appointment booking, engineer tracking, planned notifications, and restoration time changes).

- Among SMEs in the panel on customer service (May 2020), there were mixed views on the development of an app as they didn't think they'd need to contact Northern Powergrid regularly. In terms of trade-offs would rather have flexible appointments than an app. However, there was some interest in Northern Powergrid collaborating with suppliers for an integrated app. **(E075)**

- At the Institute of Customer Service conference (March 2020) participants felt that in a digital world, the role of humanity is more important than ever. **(E070)**

- According to internal customer service engagement (May 2020) 36per cent said network connections would benefit from great use of technology from automated payments to design and delivery improvements. **(E074).**

- According to student consumer group insight (April 2020), students felt that Northern Powergrid could hugely improve their digital presence and generally communicate more effectively by employing much more relevant and wide-ranging channels – especially focusing on use of social media. **(E039).**

- SMEs felt that a variety of contact channels is important to give customers choice in how they interact. There was, however, less enthusiasm for TikTok and Instagram. **(E075)**

- Based on connections customer service engagement expanding web-chat and enabling online booking services for connections requests were the most popular suggestions, both receiving 27per cent of suggestions made. Another popular suggestion was to make better use of social media for the connections team, receiving 18per cent of suggestions. The same number felt that there should be proactive contact made from the connections team once an appointment/ application has been made, with the remaining response suggesting more use of text messaging to confirm appointments and payments. **(E150)**

- Half of all participants feel that improving the use of technology and increasing online channels will improve the overall experience by giving more choice, easier and more convenient communication options and reducing the time customers spend on communication. 40per cent feel that greater online engagement will make the customer experience better as they can access information online without waiting to speak to someone. Accessing site plans online will speed up the customer wait times and auto design, incorporating all aspects of

connections enquiries were mentioned within this category. The remaining responses related to reduced call traffic, leading to shorter call waiting times for those customers who need to speak to someone. **(E150)**

- The key barriers identified seem to be knowledge gaps and inconsistencies in the updates we provide to our customers. Of the improvement suggestions here, communication is once again the theme; internal communications to allow better updates to be issued to customers via various communication channels, providing clear and informative updates and understanding the customers perspective and individual needs all feature as areas for improvement. **(E150)**

- 30per cent of responses in GE customer service engagement suggest increasing the use of social media. Social media is increasing in popularity and is a simple way for us to post live updates, while customers can ask a question or raise an issue without having to call in and speak to someone. A further 8per cent of suggestions relate to new emerging digital platforms, like TikTok. **(E158)**

- 22per cent of all responses suggest that web chat be extended to other departments, and that more people should have access to this, so they chat to only one customer at a time. 19per cent percent of agents surveyed believe that live, face to face contacts, like video calling and making the most of available online channels would help customers make the most of our services, with live engineer updates and online appointment booking being among the comments. The remaining suggestions centred around texting, with the theme being more proactive contact in relation to power cuts and expanding this to cover LV incidents. One respondent left no suggestion. **(E158)**

- That said, over half of all responses to this question feel that all appropriate communication channels are covered, and that current channels should be expanded to cover all departments to improve efficiency. Of the remaining responses, the majority suggest more online based content, with the creation of an App, use of VR/AI, video chat and WhatsApp groups being popular suggestions. One respondent suggested use of handwritten cards delivered onsite for updates of on-going outages. **(E158)**

- Focusing on Northern Powergrid's power cuts customer service, the main barriers identified here, each receiving an equal number of comments are poor IT systems, inconsistent updates and inaccurate information or ETR's. Fewer common suggestions included lack of knowledge, duplication of information and the reliability of the network. Of the specific comments here, there is some mention that due to onsite changes, ETR times can be changed frequently, and that information can take some time to be relayed back to contact centre staff for them to send updates. This could also lead to agents giving incorrect information over the phone. It is suggested that following a call structure can also lead to customers being asked irrelevant questions or repeating information they may have provided already, leading to frustration for the customer. **(E160)**

- To illustrate what proactivity looks like, one stakeholder during customer experience engagement explained how geographic information can be connected to phone numbers to make customers feel special. If there is an outage, Northern Powergrid should be able to tell if a phone call is coming from within the affected area. When picking up the phone, the staff member can open with, 'You must be calling about the outage…' and then proceed to give clear information about actions Northern Powergrid is taking and clear timeline expectations. **(E198)**

- To illustrate what inclusivity looks like, several stakeholders talked about having a variety of communication channels. One stakeholder is conducting research on how different channels are interdependent. Another stakeholder is co-producing their organisation's communication material with customers. Several mentioned principles of design that focus on mobile phone use – 'rethink don't shrink!' – was a phrase used to describe how desktop and mobile sites should be built. To be truly inclusive, Northern Powergrid needs to maintain tried and true communication channels, like a free telephone line. This point was emphasized by a stakeholder who represents vulnerable customers. **(E198)**

- In customer experience engagement stakeholders identified two issue areas that Northern Powergrid should keep front of mind in their transition from DNO to DSO: 1) increasing complexity and 2) encouraging behaviour change. **(E198)**

- One stakeholder, who represents vulnerable customer groups, pointed out that customers already have a difficult time understanding their bills. These bills will likely become more complex with changing tariffs and distribution structures. Northern Powergrid needs to think deeply about how to communicate this increasing complexity. Furthermore, Northern Powergrid will have to think about communicating different types of information to customers in the future. Right now, their points of contact are straightforward – sharing information about network updates and outages. As a DSO, Northern Powergrid will need to proactively communicate energy use information to customers. **(E198)**

WAVE 2 – testing our emerging thinking with costed levels of ambition

Our second wave of engagement was used to testing options generated through the first wave – gauging levels of customer ambition and defining our outcomes. Engagement was carried out on domestic customers, SMEs and future energy consumers. The results were split into:

- Ambition (that Northern Powergrid should strive for): (most and least)
- Priority (of an initiative to Northern Powergrid): (highest and lowest)

In total, we ran 135 events, engaging 15,475 stakeholders in wave 2. Of these 135 events, customer service was a specific sub-topic at 16 of them along with analysis of the additional BMCS surveys we regularly conduct, covering 14,544 interactions.

The 16 events and BMCS where customer service was a specific sub-topic are listed below:

Engagement reference	Name	Subgroup	Method	Delivery partner	No engaged
E001	Consumer panel (Leeds and Newcastle)	Consumers	Online panel	Traverse	56
E006	Interviews with rural consumers across the Northern Powergrid area	Consumers	Telephone interview	Traverse	36
E023	Northern Powergrid Consumer Panel	Consumers	Online panel	Traverse	57
E027	Customer Values Research	Consumers	Research	Gusto research	20
E028	Consumer panel (Leeds and Newcastle)	Consumers	Online panel	Traverse	53
E030	Consumer panel	Consumers	Online panel	Traverse	41
E031	Consumer panel	Consumers	Online panel	Traverse	32
E036	Findings from interviews with rural consumers across the Northern Powergrid area	Consumers	Telephone interviews	Traverse	39
E038	SME Panel, meeting 2	Consumers	Online panel	Explain Research	20
E050	Emerging Thinking consultation	Consumers	Survey	Explain Research	1,236
E068	Consumer panel	Consumers	Online panel	Traverse	32
E152	Emerging Thinking microsite	Consumers Stakeholders	Digital	Northern Powergrid	N/A
E153	Emerging Thinking microsite users	Consumers Stakeholders	Digital	Northern Powergrid	3600
E154	Emerging Thinking - rural panel	Rural consumers	Digital	Northern Powergrid	71

Engagement reference	Name	Subgroup	Method	Delivery partner	No engaged
E193	Internal Colleague Survey	Internal Stakeholders	Survey	Northern Powergrid	72
E207	Customer Survey	Consumers	Digital survey	Explain	9179

Responses varied, covering topics from the extent to which customers would like to receive a personalised service to the speed of which customers would like to see service channels being digitalised.

- In the consumer panel (September 2020) consumers were generally happy with Northern Powergrid's current customer service offer, although they supported an ambitious approach in this area on the basis that big improvements could be made with minimal cost to consumers. **(E001)**
- Most consumers said they were largely happy with the current service provided by Northern Powergrid and, while they understood that there was room for improvement, did not see the need for significant investment. **(E001).**
- Consumers were largely in agreement that Northern Powergrid should offer a wide range of contact channels and allow customers to choose the one that is most suitable for them. **(E001)**
- According to the consumer panel (September 2020), most preferred customer service option E (personal, fast, flexible and best in class). Least preferred customer service option A (a great service every day). **(E001)**
- Domestic respondents in the emerging thinking consultation (November 2020) were more likely to choose the most ambitious Option E, with around three in ten [29per cent] selecting this. This aligned with the views of business respondents where 25per cent chose option E **(E050)**
- Opinions were more polarised amongst the business sample as a similar proportion of around a quarter [24 per cent] selected option B **(E050)**
- The ability to contact Northern Powergrid and book appointments outside normal business hours i.e. 9-5, Monday-Friday was seen as valuable by the majority of consumers in consumer panel (September 2020). **(E001)**
- There was some concern among consumers that a lack of public awareness of Northern Powergrid would limit the effectiveness of its improved customer service. It should do more to publicise its role and services. **(E001)**
- Consumers agreed that Northern Powergrid should provide efficiency and emissions advice, on the basis that they are seen as more impartial than energy providers. **(E001)**
- Participants of the Northern Powergrid consumer panel (August 2020) initially did not see the immediate need for Northern Powergrid to prioritise customer service, or for themselves to learn more about it. Participants argued they currently have a direct relationship with their supplier - not their DNO. However, participants generally felt there is a need for Northern Powergrid to advertise ways to get in touch (for example the 105 number). If Northern Powergrid increases awareness of reasons why and how to get in contact, customers might prioritise this area of business higher. **(E023)**
- Stakeholders in the consumer panel (August 2020) support the 10/10 service now - Advice on how to manage a longer lasting power cut on your own – and necessary support for those who might not be able to do so. **(E068)**
- Participants also wanted to have the option to provide feedback or stay in touch following a power cut, especially in more severe cases of power cuts. **(E068)**

- According to customer survey (October 2020), 73.22 per cent (6,581) of respondents think that the Customer Service team should prioritise the provision of energy efficiency advice (how to reduce energy consumption) and 26.78 per cent (2,407) voted for decarbonisation advice (how to reduce carbon emissions). **(E207)**

- According to customer survey (October 2020), 78.8 per cent (7,194) respondents voted 'Yes' for extending our appointment times for planned works (e.g. moving an electricity meter) beyond the current offer (between 9am-5pm, five days per week) into evenings and weekends (9am-8pm, seven days per week) and 21.2 per cent (1,936) voted 'No.' **(E207)**

Personalised service

- Consumers liked the idea of a personalised approach to customer service, as they did not feel that a 'one size fits all' approach would be suitable for all customers' needs. **(E001)**

- Most consumers were supportive of proposals for the majority of inbound calls to Northern Powergrid to be answered by humans but did not feel that this would be necessary for 100 per cent of calls. **(E001)**

- According to Dimension Data - 2019 Global Benchmarking Report (August 2020), customer Analytics was a recurring theme, highlighting the importance of the customer experience. Customers support personalisation of service, customising interactions to become more pro-active. **(E067)**

Flexible options

- Overall, customers felt that Northern Powergrid should invest in providing 100 per cent human contact for in-bound calls and providing flexible appointment times, seven days a week. **(E001)**

- In consumer panel held in Leeds and Newcastle (July 2020) a 24-hour phone line was viewed as a very important aspect of customer service. Easily accessible customer service was also emphasised. **(E028)**

Digital channels

- Participants in the consumer panel generally believed increasingly digital customer service to be inevitable in the next ten years. They emphasised the need for additional support to enable all consumers to manage this transition. **(E028)**

- Across both Leeds and Newcastle, there was support for increased use of digital customer service tools. This was largely due to a widespread assumption that such mediums and platforms would be easy to use and would allow rapid, direct communication between Northern Powergrid and its customers. **(E028)**

- Some participants expressed a degree of interest in an Northern Powergrid app, with some arguing it would facilitate direct two-way communication between Northern Powergrid and its customers and act as a one-stop shop for information about Northern Powergrid; others challenged that customers would not install it and maintain for use unless they were part of an on-going relationship like the Priority Service Membership. **(E028)**

- Participants were supportive of more ambitious options, such as the possibility to book appointments seven days a week. They also largely felt that digitalisation of customer service would come with positive impacts. **(E028)**

- Participants were supportive of online and live chats and social media, particularly for quicker updates. This was viewed as innovative. **(E028)**

- Interviewees from rural areas were supportive of digitalising Northern Powergrid's customer service offer in principle, but many expressed concerns at the potential for digitalised services to replace human contact. **(E036)**

- More than half of participants from rural areas felt that video chats and online chatbots would enhance Northern Powergrid's customer service offer due to their ease of use. However, some reported frustrating experiences with chatbots and warned against relying on them at the expense of a person to speak to. Those

interviewees who did not support video chat or online chatbots were often uncomfortable with the technology and would prefer to use alternative mediums. **(E036)**

- According to survey with internal colleagues (November 2020), 73per cent recommending reply SMS as the number one priority to expand channels, followed by direct messaging (WhatsApp) and video chat. **(E193)**

WAVE 3 – refining and finalising our plan

Our third wave of engagement was used to refine our proposals and gain endorsement for our final plans. The engagement was carried with consumers, future energy stakeholders, as well as regional politicians and local authorities. Themes covered by the engagement are:

- specific feedback on the options;
- communication channels;
- service;
- feedback on engagement; and
- impact of the pandemic.

In total, we ran 91 events, engaging 32,500 stakeholders in wave 3. Of these 91 events, customer service was a specific sub-topic at 11 of them, covering 3,411 individuals including domestic and future energy consumers, regional politicians and representatives of local authorities.

The 11 events where customer service was a specific sub-topic are listed below:

Engagement reference	Name	Subgroup	Method	Delivery partner	No engaged
E250	Citizens' Panel on Customer Service (session 3), rounds 1 and 2	Customers	Online panel	Traverse	47
E251	Willingness to pay quantitative prioritisation survey – Choice Experiment	Customers	Survey	Impact	1,908
E257	Northern Powergrid Citizens' Panel, Round 3: Customer Service	Customers	Online panel	Traverse	47
E267	Northern Powergrid Stakeholder Summit	Stakeholders Customers	Online conference	Traverse	120
E268	Intergenerational Research	Family groups	Online discussion	Gusto Research	40
E272	Early Adopters Research	Community Energy	Online forum	Regen	20
E274	Green Recovery Scheme Surgeries	Local Authorities	Online meetings	--	40
E277	Customer flexibility survey	Customers	Survey	Explain Research	800
E297	Future consumer research	Future Customers	Online Community	Gusto research	29
E299	2023-2028 Plan Website Survey Responses	Stakeholders Customers	Survey	Northern Powergrid	242
E300	Colleague engagement survey – plan acceptance	Internal stakeholders	Survey	Northern Powergrid	118

Specific feedback on options

- No gaps emerged between customers expressed needs and preferences and the Northern Powergrid propositions in these two areas of customer service. **(E250)**
- Overall willingness to pay (February 2021): Domestic: £21.46 / SME: £424.48. **(E251)**
- According to willingness to pay quantitative prioritisation engagement (February 2021) **(E251)**:
    - Customers and SME's value an improved level of service across the 12 business plan areas (when given the choice 75per cent chose an improvement over the current scenario).
    - Safety, reliability, and customer service are hygiene factors – a very high level must be maintained but customers do not value additional activities such as keeping Northern Powergrid staff safe or reducing power cuts by minutes over the year compared with the bold environment propositions.
    - Customer service ranked 11/12 for Domestic Customers.
    - Importance of customer service decreased over research stages.
    - When discussed directly, customers place more importance on customer service.
    - In the company of bolder ambitions such as the environment, it is not a priority.
    - Continued support of vulnerable, accessibility to service, flexibility and communication (especially for power cuts) are key activities.

Communication channels

- In the citizens' panel on customer service (April 2021), the importance of using multiple contact channels to meet different customers' preferences was reinforced. **(E250)**
- Moreover, the importance of being able to phone and quickly speak to someone on urgent matters was important to stakeholders. (E250) Also, strong support for prioritising the needs of vulnerable customers was expressed. **(E250)**
- Very little recent experience of service interruptions among participants of the Citizens' Panel meant that there was little 'real world' experience to inform responses to questions about onsite support. **(E250)**
- Customers are not good at predicting their future needs in a more electrified' society. **(E250)**
- SME customers participating in the panel do not think they require the level of onsite support that Northern Powergrid is planning to offer. Key for them is timely and accurate information about time to restoration and notice of planned power cuts – but Northern Powergrid's standard of 10-14 days is more than 'I only observed the SME breakout group, so my observations are slanted towards this group. Among this group there was a strong (and rather admirable) sense of 'others are more important than us during a powercut'. **(E250)**
- According to Northern Powergrid citizens' panel, round three on customer service (April 2021) **(E257):**
    - Contact channels: The majority of consumers would prefer to speak to a human in most situations but would be happy to use other channels. They recognise the necessity of providing a wide range of contact channels and appreciate that they have options when getting in contact with Northern Powergrid.

- Onsite support: Most consumers felt that a 6-hour timeframe for onsite support in case of an unplanned power cut was about right, whilst recognising that vulnerable groups may need support prior to that.

- During session 1 Initial opinion on human contact: Some domestic consumers expressed a personal preference for human contact but felt happy that there is a wider range of contact channels to choose from. They felt that Northern Powergrid's proposals in this area are 'perfect' in terms of giving people options.

- Most domestic consumers felt that they would prefer to speak to a human if they were in an emergency, such as a power cut late at night, but were happy to use alternative channels in other circumstances.

- SME consumers expressed similar sentiments. There were mixed views regarding contact channels but general consensus that Northern Powergrid providing a mix of channels would be beneficial to customers from different demographics, some felt that Northern Powergrid should use both WhatsApp and Facebook Messenger, rather than just one or the other.

- During session two: Introduction of new channels: Most consumers were supportive of Northern Powergrid introducing additional contact channels. However, many domestic consumers argued that Northern Powergrid should first improve its visibility as they were unaware of the company prior to their involvement in the Consumer Panel, and thus would not have known to contact them in the event of an interruption to their electricity supply.

- During session 2: Contact channels: WhatsApp was the most popular suggestion for a new communication channel across all consumer groups, while the idea of providing an online Live Chat was also very popular. Many consumers also expressed interest in the idea of a dedicated Northern Powergrid app, although they wanted more information about its potential uses and any associated costs.

- Overall, consumers preferred to speak to a human rather than navigate an automated system. This was due to a concern that automated communication channels would include multiple steps (i.e., 'press 2 for__, now press 1 for__', etc.) and therefore that it would take longer for problems to be resolved.

- Several domestic consumers expressed concern about whether vulnerable customers would be able to navigate automated communications channels and argued that such customers should be able to speak directly to a human.

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- Several domestic consumers expressed concern about whether vulnerable customers would be able to navigate automated communications channels and argued that such customers should be able to speak directly to a human.

– According to the future consumer research 14 day long online community forum: **(E297)**

  - Social media, WhatsApp and video chat options for contact liked – some keen for responses to be from a human rather than automated.

  - Ability to speak to a human at any point is important.

  - Text (key), email and possibly social media communication/information online is expected during power cut, number available to call, info re timescales. Advance notice where possible.

  - Introduction of new contact channels is appreciated although anticipate that education will be needed to raise awareness of these.

  - What3words less well known.

- Some participants during the colleague engagement survey – plan acceptance showed that some colleagues believe that the use of technology to assist customer service would be helpful: 'WhatsApp and direct messaging is definitely going to be very useful'. **(E300)**

- Some participants during the colleague engagement survey – plan acceptance showed that some colleagues believe that that to improve customer service, timeframes for restoring power need to be improved: 'To achieve 90per cent complaints resolution improvements will be required to restoration times, connections delivery and contractor performance'. **(E300)**

- Some participants during the colleague engagement survey – plan acceptance showed that a proportion of colleagues think that workload and staffing needs need to be improved to enhance customer service: 'Customer care is very difficult if you are not able to manage your workload, this has a direct effect on customer care, all engineers within the zone should experience the challenges of connections'. **(E300)**

Service

- According to Northern Powergrid citizens' panel, round 3 on customer service (April 2021) **(E257)**

  - Service: Some consumers felt that Northern Powergrid should use WhatsApp and Facebook Messenger rather than just WhatsApp. Perhaps Northern Powergrid can consider this when assessing contact options.

  - Service: A few consumers suggested that additional to the hot drinks, meals and support provided by customer service vehicles, Northern Powergrid could also provide small power sources to enable people to charge phones, tablets, and laptops, particularly if they are working from home. Others suggested that torches would also be a useful provision.

  - Urban consumers and consumers across the panel agreed that the onsite support currently provided by Northern Powergrid, particularly with reference to customer service vehicles, meets or exceeds their expectations.

  - Most consumers felt that a 6 hours timeframe for onsite support in case of an unplanned power cut was about right, whilst recognising that vulnerable groups may need support prior to that.

  - Urban consumers and consumers across the panel agreed that the onsite support currently provided by Northern Powergrid, particularly with reference to customer service vehicles, meets or exceeds their expectations service.

  - Customer Service vehicle preferences: Most consumers expressed support for the work that customer service vehicles currently do and commented that this service is already beyond what they would expect from Northern Powergrid. They felt that providing hot drinks, a microwave and being visible on site already meet their expectations.

  - A few consumers felt that significant investment in improving Northern Powergrid's customer service is unnecessary given their strong record in this area.

  - Onsite support: Most consumers agreed that a providing onsite support for unplanned power cuts after six hours was acceptable, although they expressed concern that vulnerable people may need support sooner.

  - The majority of consumers were supportive of Northern Powergrid providing onsite support during the first hour of a planned power cut, although there was concern that vulnerable customer may also require support beyond this period.

  - There was a consensus among all consumer groups that Northern Powergrid should provide affected customers with text updates throughout the lifetime of a power cut.

  - Some domestic consumers, particularly those in rural areas, did not see the need for Northern Powergrid to provide personal support to customers the day after a power cut, with many arguing that this would be a wasted trip for Northern Powergrid staff. However, consumers largely agreed that this would be a suitable service for vulnerable customers who may require additional support to reset their appliances, check their Wi-Fi connection, etc.

  - All SME consumers said they would not necessarily need on-site support, particularly from a business perspective, especially compared to priority groups, but they reflected that this could change when it comes to greater reliance on electricity in the future.

- According to intergenerational research (February 2021), customer satisfaction levels are now over 90per cent and climbing. **(E268)**

- Stakeholders in the Northern Powergrid citizens' panel, round 3 on customer service (April 2021) felt that customer service needs focus on education and must be generationally targeted: younger generation essential to engage through…social media. Primary channel/where they get their news Instagram key, also Facebook, Netflix/iPlayer. **(E257)**

- According to Northern Powergrid sustainability survey, overall, 'keeping downward pressure on costs by being efficient and fair and advocating for fairness' was ranked as respondents' highest economic priority (mean score = 2.21), which was ranked as the top priority by both domestic (mean score = 2.23) and SME customers (mean score = 2.10).'Working with the right organisations to address household poverty and home energy efficiency' was ranked as the least important economic commitment across both domestic (mean score = 2.63) and SME (mean score = 2.87) customers. **(E277)**

- Also, when asked if anything was missing from the list of economic core commitments, the majority answered that there was nothing missing. For those who did, themes in responses included 'ensuring costs are fair for non-vulnerable households' (10) and 'more detail and transparency' (9). **(E277)**

- All respondents in the sustainability survey were then presented with a list of all the core commitments that had been presented and explained throughout the survey (under the social, environmental, and economic themes) and were asked to pick which core commitment they feel is the overall priority for Northern Powergrid. Overall 'keeping downward pressure on costs by being efficient and fair and advocating for fairness' received the highest percentage of votes (15 per cent), particularly amongst SME customers (22per cent). Equally as high of a priority for domestic customers was 'playing their part in a socially inclusive transition to net zero (13per cent). **(E277)**

- According to the future consumer research 14 day long online community forum. **(E297)**

  - power cut support plans welcomed; and

  - respondents were unsure how decarbonisation may affect power cut support required in future.

- During the colleague engagement survey – plan acceptance, clarity of commitments for the customer service plan area was rated highly for this plan area at 4.5 out of 5. Overall acceptance for this plan area was rated at 4.5 out of 5 across all colleagues surveyed, with three respondents selecting the 'don't know' option for rating acceptability. **(E300)**

Feedback on engagement

- According to Northern Powergrid citizens' panel, round three on customer service (April 2021**) (E257):**
    - Session 1: Level of understanding: Consumers felt that the information shared was clear and easy to understand. Most participants felt that they did not need any further information or any clarifications in the second session.
    - A few consumers asked for clarifications: around the number of people who get in contact with Northern Powergrid per day, about the emergency 105 number, and whether this number was truly accessible to those who looked for it, particularly elderly relatives. Some consumers said they found it difficult to find this number when looking online.
- Stakeholders also advised to consider more subtle/repeated imagery and positive messaging – to build knowledge and understanding and to inspire/empower to investigate further. Within schools and universities, climate change/protecting the environment is an important element of standard education. This needs to be fun, engaging and age appropriate. **(E257)**
- Other engagement opportunities **(E257)**
    - Letting agencies/consultations for first-time buyers. When begin to pay bills energy use more front of mind.
    - It was advised to utilise university/public and private lettings/house buying opportunities to educate.
    - Stakeholders thought apps with helpful energy saving tips/advice/information create a visible prompt/trigger to engage.
- Northern Powergrid citizens' panel, round 3 on customer service (April 2021) participants felt customer service needs focus on education and must be generationally targeted. Mid - and to some degree older generations - more likely to have direct contact with Northern Powergrid. Engage through: **(E257)**
    - Northern Powergrid and their website;
    - Information/education online is expected, but the challenge is that customers are unlikely to visit Northern Powergrid website unless directly prompted/linked;
    - Closer working with utility retailers;
    - Customers welcome more information about where their money goes/how it is spent;
    - Provide objective information;
    - Dispel myths (e.g., re renewable energy and low carbon tech).
    - Position Northern Powergrid as an objective expert who are for the people and the environment.
- Business customers in Northern Powergrid focus group (March 2021) were more concerned that they had not been informed of the reduction in charges. **(E272)**
- According to the future consumer research 14 day long online community forum. **(E297)**
- Pleasantly surprised re 105 number and support in place for vulnerable customers
- According to the 2023-2028 plan website survey responses, 49.7 per cent of the participant to the survey said they really like customer service. **(E299)**

Impact of the pandemic

- Overall, many respondents said that their thoughts had not been influenced by the current pandemic (84 per cent). **(E277)**

- It was advised to consider ways in which to address wider concerns customers have as a result of the COVID-19 pandemic within the sustainability strategy/model, particularly when considering costs that are passed back to customers. **(E277)**

WAVE 4 – Finalising the plan

From July to December 2021, we finalised our plan, responding to queries, addressing gaps and testing overall acceptability. We engaged 10,082 customers and stakeholders overall and with detailed sessions on outstanding customer service topics across 9 events.

The events where Customer Service was a specific sub-topic are listed below:

Code	Name	Subgroup	Engagement Type	Date	No Engaged
(CR412)	Vulnerable internal workshops (Ensuring nobody is left behind)	Internal stakeholders	Meeting	29/09/2021	1
(CR459)	Stakeholder panel interviews	Various stakeholders	Quant	May-Jul 2021	60
(CR420)	ED2 Stakeholder Webinar	Regional Politics, Consumers, Future Energy	Meeting	03/09/2021	101
(CR426)	Citizens Panel (Bill impact)	Consumers	Panel	20th & 23rd Sep	37
(CR465)	Business Plan Acceptability Testing	Consumers	Quantitative survey	Oct-Nov 2021	1,742
(CR466)	ED2 Acceptance Comms (winter awareness campaign mail-out)	Consumers	Quantitative survey	Nov 2021	8,141

Feedback summary

- A series of internal workshops were held within Northern Powergrid on the theme 'ensuring nobody is left behind' in the transition to net zero. Specifically on the Customer Service proposition, the key narrative changes agreed were to include 'vulnerable' or other agreed relevant wording within the opening narrative, 'We will use our interactions with customers, *including those most vulnerable*, to support our journey to decarbonisation…" and to include wording around the 'digitally excluded' and that there will be 'flexibility of choice' for those who prefer human contact. **(CR412)**

- Links were drawn to the other plan areas, specifically to Vulnerable Customers (a clear link and cross reference) and to Connections (the application process and particularly upskilling colleagues to recognise vulnerability and support people in relevant ways through the process). **(CR412)**

- From the stakeholder panel quantitative survey, it was reported that satisfaction with Northern Powergrid (using a 1-10 scale, where 1 is very unsatisfied and 10 very satisfied) were 63% for "Satisfaction with the relationship with NPg" and 62% for "Satisfaction with the ease of doing business with NPg". In both cases the figure quoted is the proportion giving a rating of 8, 9 or 10. **(CR459)**

- Stakeholders were also asked to state their level of agreement with three attitudinal statements relating to their perception of NPg (1-10 scale, figures shown are the proportion scoring 8, 9 or 10): These were 61% for "NPg is

continuously improving its services"; 52% for "I feel NPg make it clear how they have used feedback in their plans" and 55% for "NPg keeps me up-to-date on their investment plans". **(CR459)**

- The three most common topics of engagement that stakeholders reported having with Northern Powergrid across the three month period were: Investing in the future, cleaner, greener and more efficient services (51%), Local community involvement (37%) and Environment e.g. reducing carbon footprint (33%). **(CR459)**
- The three words used most often to describe Northern Powergrid were: Reliable (45%), trustworthy (30%) and Focused (29%). **(CR459)**

Vulnerable customers

Stakeholder engagement summary

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
VN1	**Undertake targeted recruitment of vulnerable customers to our PSM[7], contacting all PSM customers every two years to refresh our records**	**Wave 1:** Customers and wider stakeholders identified the complexity, scope and scale of the vulnerabilities across the communities we serve and highlighted the need for targeted and tailored approaches to recruitment. All stakeholders proposed increasing awareness through the use of multiple channels, including digital campaigns and the need to work with trusted third sector partners to reach those most in need. They suggested we should improve our targeting of priority service membership (PSM) recruitment to develop a better understanding of why customers are on it and develop a system to prioritise needs. We also interviewed vulnerable customers in this early wave to understand barriers to PSM sign-up to shape our detailed plans. ***Key wave 1 finding:*** *PSM recruitment should be tailored and targeted to different needs and vulnerabilities.*	*E022* *E034* *E058* *E151* *E209*
		Wave 2: Local council stakeholders who took part in deliberative stakeholder engagement sessions recognised the work that went into the PSM and suggested improvements that we could make with regards to targeting and raising awareness. The consumer panels continued to support the need for targeted recruitment and emphasised the importance of partnerships to achieve this. ***Key wave 2 finding:*** *PSM recruitment should be targeted to different needs and vulnerabilities with third-sector and other trusted partners playing a key role.*	*E069* *E001*
		Wave 3: Our Social Issues Expert Group (SIEG) challenged our propositions, suggesting that we should refresh our data more frequently than once every three years as was proposed. ***Key wave 3 finding:*** *We should be contacting PSM customers every two years.*	*E256*
VN2	**Provide enhanced support to vulnerable customers during power cuts including temporary restoration and proactive communications**	**Wave 1:** Across stakeholder groups there were varying levels of understanding and support for offering enhanced services to vulnerable customers in the event of a power cut. Whilst the majority recognised the need to support vulnerable customers in the event of a power cut, some consumer groups felt that the services on offer already go above and beyond our core responsibilities and that our services should support all customers. They also challenged the broad scope of vulnerabilities within the PSM suggesting that services need to be targeted at those most in need e.g. medically electrically dependent, health issues on a case by case basis. All customers, stakeholders and vulnerable customers highlighted regular communication as the core service to be delivered. Additional services suggested included generation (temporary restoration) and the potential to develop a one-stop shop app for all customers. ***Key wave 1 finding:*** *Communication and regular updates are the core service we should deliver and wider services should be targeted at the most vulnerable.*	*E022* *E029* *E034* *E039* *E074* *E158*
		Wave 2: In wave 2 we provided more information about our role and the services we provide during a power cut to support our customers. Following this further detail, the majority of customers felt that supporting vulnerable customers was a core aspect of our remit, and that we should explore options for expanding this support where possible.	*E001* *E028* *E031* *E038* *E043* *E063*

[7] In light of stakeholder feedback, we are referring to the priority services register as the priority services membership.

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
		The quantitative prioritisation supported this with the top priority being 'providing support for vulnerable consumers during a power cut, prioritised according to individual needs'. An app was discussed again within rural, consumer and colleague engagement - there were differing views, highlighting that the value of this relates largely to customers with whom we already have an ongoing relationship e.g. PSM customers. ***Key wave 2 finding:*** *Support for vulnerable customers is a core part of our remit and we should explore an app for PSM customers*	*E069* *E105*
		Wave 3: Our SIEG and future fairness panels assessed and supported our propositions. We then went out to further test specific aspects of our services with vulnerable customers, including development of the app and our enhanced onsite welfare support. Vulnerable customers supported our welfare support above the development of the app and suggested support services which prioritised regular updates and generation. ***Wave 3 finding:*** *Our support services should focus on regular communication, generation and the development of a PSM app.*	*E248* *E256* *E275*
VN3	**Use data and partnerships to enhance our support for vulnerable customers, sharing information with trusted partners to access hard-to-reach customers**	**Wave 1 to 3:** Through all stages on engagement and across all stakeholder groups, the role of data and working with trusted partners has been a core theme and essential to delivering all our vulnerable customer propositions. The theme was mentioned consistently in relation to understanding vulnerable customers and communities, PSM recruitment, energy efficiency and fuel poverty advice, vulnerable customer support, data sharing and reaching the hardest to reach. Through our engagement we were able to identify new partners from stakeholder suggestions which emphasised health, social care, social landlords, local authorities, parish councils and the third sector which will be incorporated into our partner mapping and recruitment plans. ***Key wave 1 to 3 findings:*** *Partnerships and data are fundamental to understanding vulnerabilities and delivering all of our vulnerable customer propositions.*	*E058* *E209* *E256* *E275* *E330*
VN4	**Support customers in fuel poverty with affordability services, targeting 100,000 customers to unlock up to £25m of benefits**	**Wave 1:** Early engagement sought to identify the needs of customers experiencing fuel poverty in order to further develop our existing services, with a particular emphasis on barriers to accessing support. We heard that people experiencing fuel poverty have complex vulnerabilities so there is no 'one size fits all' service. We need a coherent network of trusted partners, in addition to our own services and campaigns, which offer debt advice and support, benefits realisation, energy efficiency advice and can be tailored to address other underlying vulnerabilities through direct support or referrals. Our services need to offer both emotional and practical support. ***Key wave 1 finding:*** *Fuel poverty is a complex issue which requires a coherent programme of different services and interventions delivered through multiple channels and partners.*	*E002* *E209*
		Wave 2: Whilst recognising the scale of fuel poverty in our region, this was not an area of priority with wider stakeholders at our annual Stakeholder Summit. The expert stakeholders who took part in our future fairness panel assessed our initial proposition and supported the overall approach, suggesting that we include information regarding retrofitting old social housing; develop a training course for local organisations so that support workers are fully trained in helping customers in fuel poverty and consider support for customers who privately rent and those who manage their energy through pre-payment meters. The experts also advised that we should consider how we could identify which of our customers are in acute fuel poverty and chronic fuel poverty in order to better target services. ***Key wave 2 finding:*** *We need to ensure we are targeting those customers who may be unable to easily access or act upon advice.*	*E267* *E275*
		Wave 3: Our propositions were tested and challenged by our SIEG who were pleased with the level of ambition and supported our delivery approach of using a blend of partnerships and formal arrangements with targets and metrics, thereby scaling up our current implementation model. They suggested considering a model of partnership bespoke to each region, their local partnerships and needs. Suggestions to offer fuel poor services to all PSM customers led us to test our affordability proposition with over 600 PSM customers.	*E267* *E275* *E330*

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
		There were some mixed views in the focus groups – as some questioned whether this was within our remit - but the majority of respondents felt that Northern Powergrid should be doing everything possible to help fuel poor households, suggesting that we prioritise partnerships with social services, local charities and energy partners. ***Key wave 3 finding:*** *The level of our ambition is largely supported by our customers and stakeholders.*	
EVN5	**Work with partners to put in place initiatives that overcome barriers to the smart energy transition and support a socially inclusive transition to net zero, targeting 25,000 interventions**	**Wave 1:** We began engaging with stakeholders around a socially inclusive transition in 2019 and worked with our SIEG, drawing on work produced by industry experts to improve our understanding of how a smart, flexible energy system may provide most benefit and avoid disadvantaging customers in vulnerable situations. As a result we drafted and engaged on a draft strategy for a socially inclusive transition to DSO that goes beyond statements of intent. It outlined seven key themes and described practical steps that could be taken to ensure they become a reality. We received positive feedback on the approach from stakeholders, which was reiterated at our workshop with the NEA and at early roundtable discussions. Through this engagement, expert stakeholders identified additional risks and considerations in relation to system changes, self-disconnections and self-rationing, lack of consumer protections and rural and urban differences. They made multiple recommendations for us to consider that included our own actions, collaborations and advocacy roles. We also heard that inclusive support to decarbonise is a key aspect of providing a consistent 10/10 customer experience for vulnerable customers. ***Key wave 1 finding:*** *Our socially inclusive transition model is the right approach but we need to consider specific risks and practical support within this and develop advice for customers in decarbonising.*	*E029* *E034* *E057* *E209*
		Waves 2 and 3: We developed our 'nobody left behind' approach and this was assured by our future fairness panel, which we established to ensure that our vulnerability strategy encompasses all current vulnerabilities in our region and to help us to identify new and emerging issues. They suggested that we look at ways to apply this approach to innovation and the development of new services. At our vulnerable customer strategy workshop stakeholders discussed the introduction of community energy advisors, noting that in addition to being skilled in decarbonisation advice, they would need to receive training for communicating with vulnerable customers to ensure they do not discriminate and can effectively communicate complex ideas in an accessible way. They also highlighted the importance of trusted partners in delivering decarbonisation advice. ***Key wave 2 and 3 findings:*** *Our 'nobody left behind' approach should be applied to new service developments and innovation and we should consider introducing energy advisors and partners to deliver inclusive decarbonisation advice.*	*E045* *E248* *E275*
VN6	**Embed vulnerability across our business operations**	**Waves 1 to 3:** We discussed deliverability of our overall consumer vulnerability strategy with the future fairness panel and SIEG. They were comfortable with our approach including senior accountability, governance and reporting. They emphasised that training all staff in communicating with vulnerable customers and being able to cross refer for further support around fuel poverty, energy efficiency and decarbonisation was a core part of ensuring that everyone is responsible for and able to support our vulnerable customers. ***Key wave 1 to 3 findings:*** *Training in communication with and supporting vulnerable customers is key.*	*E256* *E275*
		Acceptance research and findings: *The acceptance score for vulnerable customer support is 67 per cent. Customers who gave a lower acceptance score want more information about the new service offer for vulnerable customers, who can benefit from this offer and how it has been developed. This will therefore be explored further in wave 4 through dedicated research with both domestic and vulnerable customers and a targeted acceptance testing exercise.*	*E325*

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
		Overall Wave 4 feedback: *The Citizen's panel and partners supported the vulnerability propositions presented.* *Following additional engagement with customers in Wave 3 to test support for the PSM app, we retested this proposition, with the Future Fairness panel and Citizen's panel who highlighted the importance of involving vulnerable customers and their representatives in the development and communication of the app.* *Stakeholders and customers continued to emphasise the importance of ensuring that no one is left behind during the energy transition, particularly in the backdrop of increasing energy bills.*	*CR411* *CR412* *CR417* *CR420* *CR427* *CR456* *CR426*

WAVE 1 – open and formative engagement

In the first wave of engagement, 103 events took place, engaging 4,762 individuals. Of these 103 events, vulnerable consumers was a specific sub-topic at >10, covering >325 stakeholders including consumers, local interest groups, corporate interest groups and internal stakeholders. Themes covered by the engagement are:

- understanding vulnerable consumers;
- engagement with vulnerable consumers;
- socially inclusive transition to a low carbon future; and
- fuel poverty fairness.

The events where vulnerable customers was a specific sub-topic are listed below:

Engagement reference	Name	Subgroup	Method	Delivery partner	No engaged
E002	Addressing fuel poverty in-depth interviews	Fuel poor customers and experts	Telephone interviews	BoxClever	30
E022`	Findings from interviews with rural consumers	Rural consumers	Telephone Interview	Traverse	40
E029	Stakeholder Engagement Roundtables	Corporate interest groups	Online workshop	Zoom	55
E034	Consumer panel	Consumers	Online panel	Traverse	34
E039	Student Consumer Group Insight	Consumers	Face to face	Magpie	8
E057	Ensuring an inclusive transition to DSO for all people in our region	Local interest groups	Face to face	Traverse	20
E058	Social Legacy roundtable	Local interest groups	Online workshop	Traverse	12
E074	Internal Consumer Service Engagement	Internal Stakeholders	Online	Survey Monkey	76
E096	Social Issues Expert Group	Internal Stakeholders	Online Meeting	Northern Powergrid	4
E151	Connections Smart Metering insight	N/A	N/A	N/A	N/A
E158	Consumer panel	Consumers	Online panel	Traverse	34
E159	GE Smart Metering and PSR	N/A	N/A	N/A	N/A

Engagement reference	Name	Subgroup	Method	Delivery partner	No engaged
E206	Community Energy Research	Local interest groups	Online research	Regen	20
E209	Fuel Poverty Fairness workshop	Future Fairness Panel	Online workshop	Northern Powergrid	17

- Some interviewees from rural areas (June 2020) felt that Northern Powergrid's commitment to ensuring the welfare of communities and vulnerable individuals went above and beyond its core remit as a DNO. **(E022)**

- Rural consumers felt that Northern Powergrid should prioritise their vulnerable consumers during a power cut and ensure that vulnerable consumers are provided with regular updates via their preferred method of communication. **(E022)**

Supporting vulnerable customers:

- The protection of vulnerable consumers was important to many interviewees, often because they identified a vulnerable relative or neighbour who would be impacted in the event of a power cut even if they would not be personally affected. This suggests that while rural consumers trust Northern Powergrid to restore power quickly in the event of a power cut, they have concerns about the impact that even a short power cut may have on vulnerable people. **(E022)**

- Many rural consumers emphasised the importance of preventative measures in providing support for vulnerable consumers. Having an up-to-date list of the names and addresses of vulnerable consumers was thought to be of paramount importance, as this would allow Northern Powergrid to contact them in the event of a power cut and provide appropriate support where necessary. Interviewees also stressed the importance of a detailed emergency response plan and suggested that Northern Powergrid could tap into local support networks to access hard-to-reach vulnerable consumers. Furthermore, some interviewees suggested that Northern Powergrid should provide a back-up power supply for use during power cuts. **(E022)**

- The majority of interviewees expressed concern that vulnerable people living alone in rural areas would be disproportionately impacted by lengthy power cuts. Many such consumers are dependent on electricity for heating their homes, operating medical equipment, and powering audio-visual devices that help relieve isolation. Several interviewees felt that Northern Powergrid should do more to raise awareness of its role supporting vulnerable consumers during power cuts. **(E022)**

- Consumers in the panel held in Newcastle (February 2020) largely demonstrated a good understanding of vulnerability, although some did not immediately see the relevance to Northern Powergrid. Vulnerability in this context was understood to mean 'those who can't do without', with elderly and medically vulnerable people, especially those reliant on electrical medical equipment, being mentioned by all groups. Some consumers also referred to people with young children and those living in rural areas as potential Customers in Vulnerable Situations (CIVS), although this received some pushback from others who felt the term was being applied too broadly. **(E034)**

- Consumers agreed on the importance of providing support to the most vulnerable consumers (i.e., those who are elderly, isolated, and/or disabled), but again there was some concern that the PSR is too broad and does not account for individual context. In most cases, they did not feel it was Northern Powergrid's responsibility to provide support that could just as easily come from family members or the local community. Consumers felt that Northern Powergrid's primary duty during power cuts is to provide updates to its consumers and to ensure that people know where to go for further support, and that other provisions should only be offered on a case-by-case basis. **(E034)**

- Consumers felt it was important to provide regular updates to any vulnerable consumers during power cuts, and that engineer visits should also be offered where necessary. However, they disagreed with the majority of provisions offered by Northern Powergrid, which they feel go above and beyond Northern Powergrid's

responsibilities as a DNO and encourages consumers to rely on Northern Powergrid rather than taking responsibility for their own needs. **(E034)**

- Consumers in Newcastle (February 2020) believed that Northern Powergrid should operate a power cut helpline and provide information packs to its most vulnerable consumers, and some wanted Northern Powergrid to provide power cut education workshops for young people in the region. Others felt that Northern Powergrid should create a dedicated CIVS team to proactively approach vulnerable consumers during outages and, similarly, that it should create teams with a specific local focus that can respond quickly and effectively to localised issues. **(E034)**

- Consumers found Northern Powergrid's current approach to CIVS to be very ambitious and felt that the majority of provisions on offer were unnecessary. There was some concern that Northern Powergrid's ambitious approach is just setting itself up for failure in the event of a large-scale power cut, as resources would be spread very thin, and that involving organisations such as the Red Cross in cases where it is not absolutely necessary would constitute a waste of valuable resources. **(E034)**

- According of internal customer service engagement (May 2020) **(E074):**

  - Two thirds believe that consumers are not clear on what being a Priority Service Member (PSM) actually means and require clearer communications at the point of registration.

  - Dedicated PSM representatives on customer support vehicles (CSV) would further support our consumers.

  - The majority said vulnerable consumers were wanting or expected guaranteed generation.

  - Advertising required to promote PSM.

  - 15 per cent per cent thought the name was misleading [1]

  - An overwhelming majority did not feel we should provide more support for financial vulnerability other than maybe referrals to appropriate third parties for support.

- According to fuel poverty fairness engagement (March 2020), 50 per cent per cent rated Northern Powergrid's approach to supporting vulnerable consumers as 'good' and 40 per cent per cent rated it as 'excellent', while 10 per cent per cent rated it as 'fair' **(E209)**

Understanding vulnerable consumers

- Northern Powergrid should improve its targeting of Priority Service Membership (PSM) recruitment to develop a better understanding of why consumers are on it and developing a system to prioritise needs.

- Interviewees from rural areas (June 2020) argued that Northern Powergrid should employ a broad definition of 'vulnerability' to ensure that additional support is provided to all who need it. **(E022)**

- Most interviewees defined vulnerable consumers as being elderly, disabled, or with long-term health conditions. Those living alone were felt to be particularly vulnerable, but some interviewees also expressed concern about institutions such as care homes, hospitals, and sheltered accommodation. **(E022)**

- Stakeholders participating in consumer panel (February 2020) thought that Northern Powergrid should clearly communicate its reasons for designating certain consumers as vulnerable and avoid devaluing the term through overuse. **(E034)**

- Consumers felt that Northern Powergrid should push for a review of the PSM registration system so that individual consumers' level of vulnerability can be assessed and Northern Powergrid's response to power cuts prioritised accordingly. **(E034)**

- According to social legacy engagement (May 2020), it is important to work closely with partners to understand communities and their vulnerabilities. **(E058)**

- Almost 60 per cent of all stakeholders participating in connections smart metering and PSM engagement felt that in the future we will be recognising more vulnerability and providing more reassurance to our vulnerable consumers. 21 per cent believe we will have more resources and be able to offer more support. The remaining responses suggest providing more updates to vulnerable consumers, a more personalised service and making enhancements to our network. **(E151)**

- 90 per cent per cent of all responses to this question were affirmative, with a third of those offering further comments. Of the additional comments, there was some consensus that consumers have an adequate choice of ways to sign up, although some people may still be unsure of what the service is. Only one negative response was received for this question with the respondent believing that consumers may be unsure how to complete the registration. **(E151)**

Engagement with vulnerable consumers

Stakeholders wanted Northern Powergrid to ensure that those who are most in need are reached. They believed that those in vulnerable situations often did not know what help was available or how to access assistance.

- One of the stakeholders participating in Northern Powergrid stakeholder engagement roundtables (May 2020) said: 'I think it is important to see Northern Powergrid as one of the organisations that should take some level of responsibility for vulnerable individuals and support them to keep the lights on.' **(E029)**

- Alternatively, some consumers in the consumer panel (February 2021), felt that getting essential information out to all consumers was more important than building relationships with individuals, and suggested that Northern Powergrid should do more to advertise the PSM and its social responsibility initiatives, for instance by targeting advertisements directly to vulnerable customers via third parties such as health and social care providers. **(E034)**

- According to GE Smart Metering and PSM engagement, 29 per cent per cent of respondents believe that there is a lack of awareness of the PSR service, with a further 24 per cent believing that those who do know about it could be put off registering following an internet link as they may not have access to technology or may not feel comfortable using it. The remaining responses suggest that there is generally a lack of advertising surrounding the PSR campaign, and this could be improved by advertising on all available platforms. GDPR is another popular suggestion, with respondents suggesting that people may not be clear on why we need the data and what we will do with it. Communication issues are also suggested to pose a barrier; blindness was specifically mentioned, as the respondent was unsure if we offer publications in Braille. **(E159)**

- Two thirds of the overall respondents believe that consumers are not clear or have an incorrect impression of what being on the PSM register actually means. From believing that their power will be restored 'as a priority' before their neighbours or having unrealistic expectations regarding provision of generation or that there should be more support available. With the affirmative responses to this question, there is the caveat that this is dependent on how the consumer registered for the service. For consumers who have signed up through their supplier or online they may not have registered their needs and may need further explanation when contacted. Improvement suggestions advertising to give consumers a clear expectation of what help is available, provide more detail in the welcome pack or send a letter or text to the consumer upon registration to ensure needs are recorded. Only 17 per cent per cent of respondents believe that the current welcome pack is sufficient. **(E159)**

- The main theme coming through this question is that consumers want more communication and greater reassurance that they will be supported, and their needs accommodated. 14 per cent of responses suggested some kind of individual care plan to enable quicker and more accurate support during a power cut. Suggestions of having more PSM coordinators, guaranteeing generation for the most vulnerable and medically dependent and being proactive in our contact to PSR consumers have been put forward as ways to improve the consumer experience. 18 per cent of respondents felt unable to answer this question. **(E159)**

Socially inclusive transition to a low carbon future

Stakeholders expected Northern Powergrid to protect vulnerable consumers, the fuel poor and rural consumers during the transition to DSO. Affordability and accessibility were viewed as barriers that vulnerable consumers are likely to experience. They felt there was a need to clearly communicate the decarbonisation.

- Stakeholders who took part in the Northern Powergrid stakeholder engagement roundtables (May 2020) felt that communication is key for navigating decarbonisation and bridging the gap for vulnerable clients to understand what their options are in relation to this. **(E029)**

- One stakeholder in the consumer panel (February 2021) said: 'Lots of food bank clients make decisions about either eating or heating. This is a big concern - most vulnerable consumers are affected by payment cards and payment meters and the fact they have to pay more for fuel. Being poor and having to use metres which means it costs more to heat' **(E034)**

- In order to test Northern Powergrid's own internal analysis on the risks that new sources of risks and opportunities that will emerge as part of a changing energy system, and the related responsibilities of electricity network as it transitions to DSO will pose, in partnership with National Energy Action, a workshop was held with 20 stakeholders and two breakout sessions. The first breakout session tested Northern Powergrid's work to identify system changes and the risks and opportunities associated with these changes, and the second tested the Northern Powergrid thinking around what could be done to control risk and capitalise on opportunities. Below are the main insights captured from each session **(E057)**

- Through the first workshop, participants offered many new system changes, risks and opportunities for Northern Powergrid to consider in their planning becoming a socially inclusive DNO for all people in their region. Northern Powergrid should consider the following:

- System changes that were not considered in the initial analysis completed by Northern Powergrid:

    - increased requirement for flexibility in the system;

    - climate change affecting demand; and

    - decentralisation of energy

- The risk of fuel-poor customers self-disconnecting, or self-rationing in the case that price signals for flexibility come in the form of financial penalties.

- The different ways in which system changes affect rural and urban areas.

- The ways in which a lack of consumer protection for new business models, smart technologies and district heat networks presents a risk for certain sets of consumers.

- Breakout Session 2: New responsibilities arising for the energy networks – conclusions and recommendations Through the second workshop, participants offered many new ways in which Northern Powergrid and other actors could manage the risks and maximise the opportunities that come with predicted system changes. In the main, these were split into four distinct categories:

    - actions that Northern Powergrid could take on their own;

    - actions that Northern Powergrid could advocate others to make;

    - actions for Northern Powergrid to work collaboratively with other organisations; and

- actions that go beyond Northern Powergrid's remit.

– Within each of these categories, there are tangible recommendations for Northern Powergrid, as shown in the table below.

Category	Action
Actions that NPg could take on their own:	Ensuring that NPg flexibility markets are simple enough and designed in such a way as to encourage participation from a number of different sources, including social housing providers. NPg should also signpost the need for flexibility in constrained areas as soon as possible.
	Joining up data protection and demonstrating the benefits of data-sharing.
	Ensuring that tariffs are fair by performing distributional analysis to understand impacts on different types of consumers.
	Building a better understanding of what network build is needed and proactively investing in network development where the price control allows.
	Adapt the DFES to reflect single occupancies and ensure that related vulnerabilities are included in PSR categories
	Adapt a 'Climate change adaptation strategy' and ensure that the DFES reflects changes in supply and demand that may arise from climate change.
Actions that NPg could advocate others to make:	'Whole Systems' to play a greater role in RIIO-ED2.
	Government to provide funding for renewables, energy efficiency and advice.
	Government and the regulator to work together to ensure that policies and regulations are in place to allow peer-to-peer trading.
	A fair distribution of energy policy costs.
	Consumer protection for new technologies, especially where new business models disrupt the incumbent regulatory regime.
	Financial literacy training, and programmes to ensure that community trainers are of good quality.

Category	Action
Actions for NPg to work collaboratively with other organisations:	Working with local authorities to: • Inform them of NPg's advocacy positions and work with them to ensure that mutual advocacy works well for the end consumer. • Educate the local authorities on the benefits that flexibility can have for their constituents so that LAs can go on to build awareness with households. • Provide information and training on internet literacy to households.
	Working with manufacturers of smart products, EVs and autonomous vehicles to ensure that the design of their products is inclusive.
Actions that go beyond NPg's remit:	Ofgem and BEIS should ensure that consumer protection is more consistent across the energy market.
	Government should work with housebuilders and the car industry to ensure that EV chargers are standard in new home.
	Consumer advocates should continue to raise issues surrounding market fragmentation with the regulator.
	Government and local authorities could explore opportunities with other fund holder for maximising synergies between carbon, affordability and health challenges.
	Consumer advocates should investigate how smart meter data could be used to identify customers who could benefit from new offers without changing their behaviour.

Questions asked during fuel poverty fairness engagement

Participants were asked the following questions specifically: **(E209)**

- What do you see as the future priorities to enable Northern Powergrid to provide a consistent 10/10 consumer experience for vulnerable consumers?
    - ease of communications – multi-channel, parity in payment costs;
    - clarity – when do consumers speak to Northern Powergrid/supplier?
    - content/message clear;
    - not hard to reach – remove barriers;
    - data sharing with partners – Northern Powergrid does not have a relationship with consumers;
    - Helping homes with transition to new tech use plus, the most vulnerable included;
    - PSR being a 'one stop shop' for other support – link to EST portal; and
    - Shared PSR with gas and water.
- What support services should we offer in the future? What services are most valued by our consumers and on what scale should these be offered?
    - information made available at the point of house sale/rental;
    - more relationship with local councils and information via the council;
    - develop an Northern Powergrid app;
    - multi-channel communications – inclusive all types of vulnerability;
    - ambassadors in community – trusted;
    - fuel debt advice;
    - emergency to pups and follow up support;
    - fuel poor homes having retrofit action plans;
    - SMART grid support to Off gas areas – decarbonising heat – tie in with PSR priorities;
    - grant availability advice/list to consumers; and
    - tick box on PSR form for data sharing with partners – one local contact per area for cascade.
- What will great consumer service look and feel like in the future for those consumers with vulnerabilities?
    - consumers' needs will change depending on circumstances;
    - Northern Powergrid to become more visible and have clearly defined routes to support;

    - anticipating consumer issues and preventing crisis, not waiting for requests;
    - able to provide PSM consumers more than just a quick reconnection – i.e., wrap around services and referrals – post power cut services;
    - proactive and effortless;
    - consistent, non-discriminatory communications across multiple channels, which gives all consumers clear routes to support;
    - centralised data – one PSM database;
    - enabling easy cascade of other referrals; and
    - Identifying multiple needs.

- What will great consumer service look and feel like in the future for those consumers with vulnerabilities?
    - awareness is low – 50 per cent sign up is good – in many other areas, it is less;
    - third party organisations/partners;
    - raising brand awareness of PSM and DNOs in general;
    - single PSR for all utilities;
    - hardship Hub – one stop shops for the NE – IT 'portal of advice' for the sector/workers only;
    - information needs to be user friendly;
    - low in key clients – what power cuts?
    - Northern Powergrid not known. PSM for disconnected?
    - destitution – lengthy support needed;
    - clients self-disconnecting; and
    - crisis intervention increasing e.g. food banks.

- What is the current level of consumer awareness and understanding of the PSM? How do we increase this going forward?
    - awareness is low – 50 per cent per cent sign up is good – many other areas, it is less;
    - third party organisations/partners;
    - raising brand awareness of PSR and DNOs;
    - single PSM for all utilities;
    - hardship hub – one stop shop for the NE – IT 'portal of advice' for the sector/workers only;
    - information needs to be user friendly;
    - low in key clients – what power cuts?

    - Northern Powergrid not known. PSR for disconnected?
    - destitution – lengthy support needed;
    - clients self-disconnecting; and
    - crisis intervention increasing e.g. food banks.

- What are the barriers or triggers that would prevent or encourage a consumer to sign up to the PSM?
    - people do not want to identify as being 'vulnerable' – change in language;
    - 'register' use different language – benefits, help
    - do not want to be a nuisance;
    - fear of disclosure - scam?
    - sharing information – GDPR scared;
    - lack of awareness of DNO;
    - health professionals/GP surgeries etc;
    - clients in crisis – PSM not relevant/immediate;
    - lack of knowledge about PSR;
    - mental health issues/suspicion, data security; and
    - do not want to be vulnerable.
- What are the optimal channels through which we should be engaging consumers aligned to the specific consumer vulnerabilities?
    - Word of mouth from others they trust
    - Positive outcomes
    - Digital channels – communicate with friends/families of vulnerable consumers
    - Multi-agency/partnerships
    - Local plans pulling information together
    - 1:1 direct work with consumers
    - Partner working essential
    - Front line contact works
    - NHS contact points
- How do consumer need, wants and expectations vary depending on their vulnerability and duration of the power cut?
    - health;

- uncertainty – context … Is it just me? Length?
- living alone – not knowing who/where to ask for help;
- single parents with young children;
- door knocking not always appropriate – language barriers – mental health issues, hard of hearing;
- very vulnerable – support system dependent on electricity – electrically medically dependent;
- communication needs;
- dementia friendly;
- knowing what to do in the short term;
- rural versus urban;
- less prepared – need knowledge; and
- storage heating – overnight not charging – cold the next day.

– What are the optimal channels through which we should be engaging consumers aligned to the specific consumer vulnerabilities?

- neighbourhood watch – getting to know your neighbours – what is going on?
- schools;
- hospitals, GPs, NHS England;
- LAs, town and parish councils;
- social prescribers;
- Disabled services (local authority);
- suppliers – appliances;
- energy officers;
- mobility scooters suppliers;
- homebuyer packs – new build/estate agents/lettings;
- frailty teams (GPs);
- DWP – disability/budget support, benefit claimants;
- private renters/landlord associations/select licensing.

– How do you see technology being used to enhance our consumer experience in the future and being simple for all to use?

- text message;
- sign-up for information messages (need to find the balance – targeted messages);

- social media;
- local radio;
- power cut map;
- rural connections;
- simple websites – apps not favoured;
- signpost to face to face support;
- digitally enabled – what per cent have no support, not able to connect/reach an office;
- utilities charities;
- initiatives to raise awareness of PSM;
- awareness of organisations that can support and how we put people in touch with the right person(s);
- assess PSM on hourly cut (MC) profile; and
- contact centre – check PSM needs and assess 1-3, 3-6, 6+ hours support.

– What are our consumers' needs and requirements for a holistic support service to help alleviate the impact of fuel poverty?

- circumstances –universal credit/renting etc. – support;
- no consistent joined up delivery of services - how joined up are our partnerships?
- minimise the numbers of people knocking on doors;
- should offer all services, rather than some doing some and others doing other bits;
- if supporting on fuel debt – should be supporting all areas of debt/ or prioritising – not just fuel;
- partnership working - issue with funding – what happens when the funding runs out? How is it distributed?
- aware they are in fuel poverty and what help is available;
- strong local network of help options (multiple agencies); and
- data sharing agreement (GDPR).

Exploring digital platforms to provide additional support for vulnerable customers

– Over half of all general enquiry service customers feel that all the appropriate communication channels are covered, and that current channels should be expanded to cover all departments to improve efficiency. Of the remaining responses, the majority suggest more online based content, with the creation of an App, use of VR/AI, video chat and WhatsApp groups being popular suggestions. One respondent suggested use of handwritten cards delivered onsite for updates of on-going outages. **(E158)**

- 3 out of 4 of stakeholders participating in our recent consumer panels expressed a degree of interest in Northern Powergrid developing an app.

- Stakeholders suggested that it would facilitate direct two-way communication between Northern Powergrid and its customers.
- The app would act as a one-stop shop for information and would remain accessible even during power cuts.
- Some stakeholders felt that apps were standard and that Northern Powergrid should 'get with the times'.
- Customers based their support on positive experiences with other company apps e.g. British Gas
- Stakeholders believed that a dedicated app would be a useful support tool for vulnerable customers

– Research outcomes investigating the digital communication needs of customers with sight loss, hearing and speech loss and limited English language (February 2020).

- Many customers with communication needs are already using apps to manage accounts and energy bills.
- Most of the customers we interviewed could see the benefits in having the ability to report, track and receive updates with regards to a power cut.
- We must meet the needs of customers with communication difficulties better via digital solutions.

– Fuel poverty research to understand from those individuals living in fuel poverty, what the ideal service model would be to meet their needs – 30 interviews conducted March 2020 (6 expert and 24 customer) **(E002)**

- Interlinked vulnerabilities have significant impact on finances.
- Affordability real issue – not just fuel but every area of life.
- Barriers to access support are both physical and emotional, with emotional being the most significant hurdle – verbal encouragement from known sources vital to prompting action.
- Where customers do seek help it is usually as a result of a life change that has created additional uncertainty or due to hitting a crisis point – important to consider ways to engage/educate before crisis point is met.
- Although services and support are available at present, more is required, especially at earlier/preventative stages. Northern Powergrid is felt to have a primarily indirect role, partnering with and supporting grassroots organisations.
- Biggest opportunities for intervention lie in partnership with suppliers (first point of contact for those who haven't yet reached tipping point - and often also those who have) and with local communities and networks.
- Elements of both emotional and practical support will be vital in achieving successful interventions.
- And in terms of channel, a role exists for a variety of communication channels to deliver support/intervention due to varying needs of customers. Appetite for holistic assessment of circumstances and intervention that supports needs of individual demands some flexibility here.

Future consumer panel – 52 diverse students who are part of the student insight panel at Leeds University

– Participants were asked the following questions specifically:

- What is excellent customer service in relation to the following; communication, vulnerable customers, regular touch points, technology and innovation.
- Meaningful and regular contact with vulnerable consumers.
- Broad knowledge of range of languages, or translators to be able to support consumers where English is not the first language of the household.
- Must be disability-friendly and be aware of 'hidden' disabilities.
- Demonstrate a genuinely personal service to the customers.
- Identify high-risk customers when they sign up, not just vulnerable consumers.
- Vulnerable consumers should be prioritised and have a fast response.
- Non-English-speaking customers should be able to access web information, particularly for emergency/ urgent services.
- Customers who depend on electricity e.g. disabled, life support, and kidney dialysis should be placed on a high-alert list, which should be monitored and updated constantly.

– How well do you think Northern Powergrid raise awareness and educate people about their services for vulnerable customers?

- The group had a very low awareness of Northern Powergrid and the wider services offered to vulnerable customers.
- When the services were demonstrated to the group, all agreed that it was a vital service and that these service should be given a much higher profile.
- They felt that more should be done with landlords so they could provide information to help educate their tenants.
- PSM information should be accessible to all through multiple channels.
- The creation of a Northern Powergrid app would be very useful and could be utilised for multiple purposes including, electricity usage and cost information as well as updates on issues.
- Participants felt that Northern Powergrid should hugely improve its digital presence and communicate much more effectively by employing much more relevant and wide ranging channels.

WAVE 2 – testing our emerging thinking with levels of ambition

Our second wave of engagement was used to testing options generated through the first wave – gauging levels of consumer ambition and defining our outcomes. Engagement was carried out with on domestic consumers, partners, commercial consumers, stakeholders, SMEs, and future energy consumers. The results were split into:

- Ambition (that Northern Powergrid should strive for): (most and least)
- Priority (of an initiative to Northern Powergrid): (highest and lowest)

In total, 135 events were undertaken, engaging 15,475 stakeholders and of these 135 events, vulnerability was a specific sub-topic at >10 of them, covering >950 individuals.

The events where vulnerable customers was a specific sub-topic are listed below:

Engagement reference	Name	Subgroup	Method	Delivery partner	No engaged
E001	Consumer panel (Leeds and Newcastle)	Consumers	Online panel	Traverse	56
E020	Sustainability workshop	Corporate interest groups	Online workshop	Traverse	24
E021	Quantitative prioritisation research	Consumers	Survey	Impact	549
E023	Consumer Panel	Consumers	Online panel	Traverse	36
E248	Future Fairness Panel	Vulnerability Experts	Online panel	Northern Powergrid	17
E028	Consumer panel (Leeds and Newcastle)	Consumers	Online panel	Traverse	53
E031	Consumer panel	Consumers	Online panel	Traverse	36
E105	Internal colleague survey	Colleagues	survey	Northern Powergrid	479
E063	Rural panel	Consumers	Telephone interviews	Traverse	36
E038	SME Panel, meeting 2	Consumers	Online panel	Explain Research	20
E045	Regional Political Engagement	Regional politics	Bilateral and online meetings	Public Affairs Company	12
E046	Regional Political Engagement	Central government Regional politics	Bilateral and online meetings	Public Affairs Company	74
E069	Deliberative Stakeholder Engagement	Consumers	Interviews and focus group	Northern Powergrid	8
E097	Social Issues Expert Group	Internal Stakeholders	Online panel	Northern Powergrid	4

Responses varied, including the level of ambition customers wanted to see Northern Powergrid strive for in supporting vulnerable customers and support for a community fund initiative.

Ambition and prioritisation

- Consumers in Leeds and Newcastle (September 2020) felt that Northern Powergrid does a lot to support vulnerable consumers, but they agreed that it should explore options for expanding this support where possible. **(E001)**

- They also felt Northern Powergrid should provide additional support to vulnerable consumers during power cuts and promote the Priority Services Membership (PSM). **(E001)**

- Consumers felt that supporting vulnerable consumers was a core aspect of Northern Powergrid's remit, and that it should explore options for expanding this support where possible. **(E001)**

- Quantitative prioritisation – Max Diff (August 2020) showed that top two priorities: 1) Providing support for vulnerable consumers during a power cut, prioritised according to individual needs 2) Working with our consumers to connect more renewable energy sources like solar and wind power and to support the uptake in electric vehicles. **(E021)**

- For SMEs in the SME panel (meeting two in August 2020), the main priority would be providing tailored support and ensuring continuity of supply to vulnerable consumers who are heavily reliant on power. **(E038)**

- In the 2023-2028 regional political engagement (November 2020) there was a recognition of the need to consider those in fuel poverty and for whom climate change will not be an issue they are considering. **(E045)**

- From local councils, stakeholders in deliberative stakeholder engagement (October 2020) recognised the work which went into the PSM however, felt Northern Powergrid could improve it is targeting on the PSM and that consumers should always be aware of what support is available so they can ask for it. **(E069)**

Developing a community fund to support vulnerable community projects

- Consumers during emerging thinking consultation expressed concern that the proposed £50,000 community fund may be too small to have much impact whilst also questioning what kind of projects the fund will cover. One consumer suggested that the idea of 'legacy', in terms of what is left behind in a community after a project is finished, may be a useful way to think about project impact. There was a question from one consumer about how the Priority Service Register could be better promoted and updated, whilst another consumer suggested that Northern Powergrid should aim to provide quality advice to consumers. One consumer also queried what is meant by 'guardians of equality.' **(E050)**

- Bottom two priorities: 1) Speaking at schools and colleges to encourage pupils to study STEM subjects while working with the higher education sector to improve the marketing of technical and engineering courses 2) Administering a community energy fund which offers grants of between £1,000 and £10,000 to help community energy projects get off the ground. **(E021)**

Services and communications

- Some participants expressed a degree of interest in an Northern Powergrid app, with some arguing it would facilitate direct two-way communication between Northern Powergrid and its customers and act as a one-stop shop for information about Northern Powergrid; others challenged that customers would not install it and maintain for use unless they were part of an on-going relationship like the Priority Service Membership. **(E028)**

- Our consumer panel, rural panel and colleague survey highlighted mixed views on whether Northern Powergrid should develop an App as you do not have regular contact with us. This was not seen as a priority however, customers could see the potential benefits for vulnerable customers and planned works. **(E028, E031, E063, E105)**

Just transition

- Our future fairness panel was established to ensure that our strategy encompasses all current vulnerabilities in our region and to help us to identify new and emerging issues. They assured our 'nobody left behind approach' suggesting we look at practical ways to apply this to innovation and the development of new services. **(E248)**

WAVE 3 – refining and finalising our plan

Wave 3 tested and refined plans and priorities wherever feedback was inconclusive, where there were differences of opinions or where new areas had areas had emerged. This stage included our business plan acceptability research with consumers and stakeholders. Areas highlighted included:

- supporting vulnerable customers;
- ensuring that vulnerable customers can reach us; and
- scoping the role and remit of energy advisors

In total, 91 events took place, engaging 32,500 stakeholders and of these 91 events, vulnerability strategy was a specific sub-topic at >6 of them, covering 6,195 individuals.

The six events and previous summary of focus groups where vulnerable customers was a specific sub-topic are listed below:

Engagement reference	Name	Subgroup	Method	Delivery partner	No engaged
E248	Future Fairness Panel Agenda	Community Interest Groups	Online panel	Northern Powergrid	20
E256	Social Issues Expert Group	Customers, Social issue experts	Online panel	Northern Powergrid	10
E267	Stakeholder Summit - 2023-2028 questions	Customers (including vulnerable)	Online conference	Traverse	140
E272	Northern Powergrid focus group summary	Customers	Online	Impact	N /A
E275	Future Fairness Panel: Vulnerable Customer strategy workshop	Vulnerable customers	Online workshop	Explain Research	10
E330	Priority Services Membership Application engagement	Vulnerable customers and experts	On-line survey	Explain Research	6,015

Supporting vulnerable customers

- Stakeholders at the Northern Powergrid future fairness panel (February 2021) saw lots of good sense in Northern Powergrid vulnerability support model - they want to see practically what it would mean on the ground and how you would feedback what you have heard and what you are going to do about it and any changes and anything we cannot do that people have asked for. This would garner trust and encourage some people to be a bit more available. **(E248)**
- Stakeholders at the same event felt that isolation and loneliness should be a focus for collaboration with councils and Age UK. They were happy the services cover the whole of York. It was highlighted that a lot of services users do not have internet or cannot leave the house and thought it was good people can sign up over the phone or by post, as long as there is consent. **(E248)**
- Participants in the Social Issues Expert Group targeted recruitment thought **(E256)**:
  - Using parish councils could be a good option. This would form part of the partnership mapping. **(E256)**
  - On services to vulnerable customers, they thought: Once a customer is on the PSM are they offered further support e.g., Citizens Advice or Green Doctors? PSM contact centre team will be trained on available support services so they can make those referrals.

  - Smart use of data: Refresh every three years - does the data refresh need to be more frequent? Boston Spa smart meter data can increase energy efficiency in each home. The approach we are trying to take is to reflect every project to see how it benefits vulnerable customers.
  - Smart use of data: data cleansing links with local authority 'tell us once'. Is Northern Powergrid receiving info from this?
  - Affordability services: We will be looking at where opportunities are available and how we can help to leverage those to support VCs.
  - Enhance support for power cuts: internal conversation- we are operating within constraints of general licence conditions which say that we cannot positivity discriminate any particular customer group. These services are available for everyone, but we will prioritise those who need it most.
  - Fuel poverty: Northern Powergrid sounds ambitious. How does it translate into actual delivery? A blend of partnerships and formal arrangements with targets and metrics and levelling it up across the region. Scaling up current implementation model. Potential to discuss the model of partnership bespoke to each region. Try to translate ambition to how it would work. What other organisations can deliver our objectives, dependent on profile of region.
  - Ensuring no one is left behind: Ambitions are high, thought behind it is clear. Clear link between initiatives, good mix of challenging and realistic targets.

- Northern Powergrid Stakeholder Summit found (January 2021) that we have some of the highest levels of vulnerability in the UK within our region, including above average levels of fuel poverty. What further support should we provide for our vulnerable customers? There was a low level of interest in this area. Concerns from stakeholders centred on the likely increase in the number of people in fuel poverty this winter with the pressures of lockdown. **(E267)**
- One suggested solution for fuel poverty was to retrofit old social housing so people have a more energy efficient home, which is both warmer and leads to lower bills. **(E267)**
- According to Northern Powergrid focus group summary (March 2021), vulnerability strategy was misread by some to mean the network was vulnerable and some recommended re-titling it as 'vulnerable customer strategy.' **(E272)**

Ensuring vulnerable customers can reach us

- Several participants of Future Fairness Panel: vulnerable customer strategy workshop (April 2021) noted that the idea of developing an app to provide additional support for vulnerable customers would need to have other features embedded into it to ensure it is used regularly, rather than only being used to report a power cut. **(E275)**
- Participants in the workshop highlighted that many vulnerable customers would be excluded from this initiative if they did not have access to a smartphone. Further, even if vulnerable customers did have access to a smartphone, they may not be able to afford the data required for the app to function or may not engage with mobile applications at all. **(E275)**
- Participants in the workshop questioned that if the self-service app were designed to improve ease of access to the contact centre for vulnerable customers, would the contact centre staff be receiving specialist training in communicating with vulnerable customers? If so, would it be all of the staff, or would there be a designated point of contact for vulnerable customers? Effective Northern Powergrid staff training was considered important. **(E275)**
- Participants highlighted that the app would have to be very easy to use. It would need to be easy to navigate, with clear, simple language and large, relevant icons. **(E275)**

- Participants of the workshop stated that they would be keen to collaborate with Northern Powergrid on the design of the app to ensure that the vulnerable groups they represent would be able to use it. As well as this, they commented that the groups they represent could act as focus groups for pilot models of the app before it is released for wider use. **(E275)**

- Participants commented that, though the app would be beneficial for non-vulnerable customers, overall, they did not see value in the app for vulnerable customers based on the information they had heard. **(E275)**

- Participants of vulnerable customer strategy workshop (April 2021) discussed how the level of service from the Citizens Advice Bureau (CAB) varies across different locations and it is very difficult to access them. Therefore, participants suggested that Northern Powergrid could partner with smaller local organisations that are more integrated in the local vulnerable communities to disseminate information. **(E275)**

- Participants also suggested that Northern Powergrid could develop a training course for local organisations or the CAB to take part in so that support workers are fully trained in helping customers in fuel poverty. **(E275)**

- It was noted that the initiative will not be so beneficial for those that privately rent and especially not for those in shared properties, where many vulnerable customers reside. **(E275)**

- Further, there are many vulnerable customers who manage their energy through pre-payment meters. These disadvantages the vulnerable as they are more expensive and exclude them from the proposed affordability services. **(E275)**

- Participants discussed how Northern Powergrid could identify which of their customers are in acute fuel poverty and chronic fuel poverty. Due to the cyclical nature of fuel poverty, it would be important to target initiatives towards both groups as well as identifying and targeting the root cause of fuel poverty. **(E275)**

- It was noted that customers with neurological conditions do not receive financial support fast enough, which leads to them entering fuel poverty. This is due to the sudden onset of such conditions and the numerous assessments that have to be completed. An emergency option for quick financial support would greatly benefit these customers. **(E275)**

- Participants in the vulnerable customer strategy workshop endorsed this proposal as vulnerable customers would benefit from increased support, particularly those who may also be financially vulnerable. **(E275)**

Would a proposal to put in place energy advisors be valued?

- Participants of vulnerable customer strategy workshop (April 2021) discussed how it would be beneficial to increase the proposed number of regional community energy advisors, to increase awareness and engage the public. **(E275)**

- Participants also commented that the regional community energy advisor roles could be developed as apprenticeships to promote training and development opportunities for local young people. **(E275)**

- Further, they discussed how the advisors would need to have excellent training on decarbonisation as it is a complex topic, impacting people in many different ways. **(E275)**

- Importantly, participants commented that the advisors will need to have communication training for communicating with vulnerable customers to ensure they do not discriminate and can effectively communicate complex ideas in an accessible way. **(E275)**

- Participants supported the principles of this proposal, though they suggested that there be more investment into the regional community energy advisors to ensure everyone can receive their support. **(E275)**

- Participants also commented that the best way to engage with vulnerable customers is through local charities and organisations that support the vulnerable groups. They discussed how they are more likely to engage with

information from a trusted source. The best channels to use via the local organisation would be sending out physical and digital newsletters, online forums, online surveys and discussion groups and on social media. **(E275)**

Priority Services Membership services engagement

- In order to further test support for the development of the PSM app, our affordability service proposition and our proposition to provide enhanced welfare support for unplanned power cuts exceeding 6 hours we conducted further engagement through the distribution of a survey, two additional focus groups with customer and in-depth interviews with expert groups. 6,010 customers participated in the survey. **(E330)**

Priority Service Membership app

- 71 per cent per cent of customers would be 'somewhat' or 'very' likely to use the 'all in one' app. It scored a mean score of 4.0 out of 5 in terms of support for the proposition. Nearly all respondents in the focus group would be willing to use the app in future, particularly for reporting/receiving updates on power cuts. **(E330)**

- Suggestions for what could be provided on the 'all in one' mobile app, included a live chat function (104), live updates on power cuts including restoration times (65), the ability to ask for urgent help if required (39), links to other organisations for help/support e.g. emergency services and local charities (35) and the ability to request alternative sources of power if required (34). **(E330)**

- All thought that the app was a good idea, but that it was key that other lines of communication remain in place as there was a consensus that the app will only benefit some customers; mostly the younger computer literate audience and less likely the elderly. **(E330)**

- There were some comments about the app working most successfully if it is developed across DNOs – some respondents felt that it would become a barrier if customers would need different apps if living or staying in different areas of the country. **(E330)**

- Key groups of customers that may benefit from the app included; those with speech difficulties, those medically dependent on electricity, those who didn't speak English as their first language, those with mental health issues. **(E330)**

- Key things that respondents felt Northern Powergrid need to consider when developing the app to make it as accessible as possible included;

    - Ensuring the app is available in multiple languages.
    - Ensuring all language used within the app is easy to read.
    - Consider colour usage for those with visual impairments.
    - Consider the use of symbols rather than words.
    - Consider ways to make the app accessible to those who only read sign language.

- All felt that it is important that the app is tested amongst individuals across a broad range of vulnerabilities as a 'one size fits all' approach will not work. **(E330)**

Enhanced on-site welfare support

- Customers were asked to what extent they agreed/disagreed with statements around enhanced welfare support, the mean score was 4.2 out of 5 demonstrating support for the idea. **(E330)**

- When asked what else we could be providing in terms of on-site power cut support, the following themes were suggested; providing more regular updates on restoration times (77), provision of a back-up power supply (73), more consideration of individual needs of vulnerable customers (72), providing communication via multiple

channels (69), providing alternative access to heating (61), providing compensation (42), providing hot food and water and providing a charging point for electronics (38). **(E330)**

- Most customers agreed that unplanned power cuts are more problematic than planned power cuts due to the inability to plan for things such as meals, activities for children etc. All felt that power cuts become 'problematic' prior to the 6-hour mark, but most felt that this was a reasonable point in terms of providing face-to-face support, as long as some support was delivered (e.g. updates etc.) prior to the 6 hour mark **(E330)**.

- All agreed that providing on-site support during unplanned power cuts is a higher priority than during planned power cuts. **(E330)**

Affordability services

- There were some mixed views in the focus groups with some feeling that this was outside Northern Powergrid's remit however, the majority of respondents felt that Northern Powergrid should be doing everything possible to help fuel poor households, suggesting partnerships with social services, local charities and energy partners **(E330)**.

- All respondents were asked how much they value this proposal on a scale of 1-10, where 1 was not valuable and 10 was extremely valuable. Overall, a mean score of 6.9 was observed (10 respondents). This score suggests that this proposal was considered valuable to an extent, although less so than the 'all in one' app and on-site support proposals **(E330)**.

WAVE 4 – Finalising the plan

From July to December 2021, we finalised our plan, responding to queries, addressing gaps and testing overall acceptability. We engaged 10,134 customers and stakeholders overall and with detailed sessions on outstanding vulnerable customer topics across 21 events.

The events where Vulnerable Customers were a specific sub-topic are listed below:

Code	Name	Subgroup	Engagement Type	Date	No Engaged
(CR411)	Social Issues Expert Group	Vulnerability	Meeting	02/09/2021	7
(CR412)	Vulnerable internal workshops (Ensuring nobody is left behind)	Internal stakeholders	Meeting	30/09/2021	7
(CR417)	Future Fairness Panel	Vulnerability	Panel	19/10/2021	7
(CR420)	ED2 Stakeholder Webinar	Regional Politics, Consumers, Future Energy	Meeting	03/09/2021	101
(CR427)	Vulnerable customers F2F engagement	Consumers	Focus Groups	01/03/2021	40
(CR456)	Citizens Panel	Consumers	Panel	07/05/2021	37
(CR454)	CE Stakeholder Panel	Consumers	Panel	05/11/2021	5
(CR464)	Future Fairness Panel	Vulnerability	Panel	04/11/2021	10
(CR426)	Citizens Panel (Bill impact)	Consumers	Panel	20th & 23rd Sep	37
(CR465)	Business Plan Acceptability Testing	Consumers	Quantitative survey	Oct-Nov 2021	1,742
(CR466)	ED2 Acceptance Comms (winter awareness campaign mail-out)	Consumers	Quantitative survey	Nov 2021	8,141

Feedback in summary

- At the September SIEG meeting it was revealed that NPg will support 5,000 customers year on year to ensure no-one is left behind during the transition to net zero, but more thought is required on communications. In context, UKPN has said they will support 500,000 with information and help. A session is needed to review that proposition. **(CR411)**

- Based on the Ofgem response to Northern Powergrid's SECV submission, Northern Powergrid consulted the CEO of the Centre for Sustainable Energy (CSE), whose opinion was similar to that of the Ofgem panel. NPg recognises it must revisit its Customer Vulnerability strategy to make sure it is owned by the business, has ambition and has scaled up targets with tangible support for programmes. **(CR411)**

- The SIEG thought Social Return on Investment is important and supported NPg's decision to work with CSE. However, it should be treated as a business planning process, not just stakeholder engagement and NPg needs to get better at demonstrating and articulating impact and outcomes. **(CR411)**

- In relation to the Northumberland Off-Grid Task Force (set up by Community Action Northumberland to offer support to households that are not connected to the electricity grid and to focus efforts on helping to get them connected in one way or another), a video was produced to highlight the challenges of people living off-grid and to change peoples' perceptions. **(CR411)**

- Most people living off-grid use generators which reduce air quality, are expensive to run and not carbon neutral. Off-grid living can mean a basic existence (e.g. challenges with refrigeration of food). EVs are not an option. **(CR411)**

- The cost of connecting to the grid was raised (the task force believes it should be VAT free). **(CR411)**

- If the Northumberland Off-Grid Task Force succeeds in connecting more people to the grid in Northumberland, the initiative could be rolled out nationally. **(CR411)**

- A series of internal workshops were held within Northern Powergrid on the theme 'ensuring nobody is left behind' in the transition to net zero. Specifically on the decarbonisation proposition, it was reported that a 'benefits of a smarter flexible energy system' summary document is being developed with narrative being weaved in, highlighting that vulnerable customers will benefit most from increased reliability and the flexibility first approach that aims to keep bills affordable. Furthermore, the socially inclusive transition to net zero "wheel" was included in the DSO strategy 1.1 and it will be reviewed and added to the business plan. There is ongoing work on energy efficiency with new narrative on the benefits for the vulnerable. Where possible, vulnerable customers will be prioritised for this support. **(CR412)**

- Also for decarbonisation, it was also noted that specific propositions where the vulnerability lens could be applied related to LAEP advisors and Microgrids. LAEP advisors will work with LAs to develop their LAEP. Furthermore, social indicator mapping will be made available to identify intervention opportunities to support the vulnerable (e.g. energy efficiency projects that can then be delivered by Regional Community Energy Advisors). In addition, Microgrids are being rolled out in areas of rural isolation (a vulnerability marker) and all Northern Powergrid substations have a vulnerability score which can be used when deciding where microgrids are rolled out first. **(CR412)**

- Specific propositions where the vulnerability lens could be applied within decarbonisation were Open Data (the narrative can be pulled out about how access to data will support local authorities with things like retrofitting social housing, thus benefitting the vulnerable) and Customer Flexibility. In the future customer flexibility will rely on smart devices that can support to shift peak demand automatically, to make the best use of time of use tariffs (though it will likely to be the affluent who can invest in the latest technology and smart equipment). Proposition W4.2 is about collaborating with organisations that will supply this equipment, to find solutions so all customers, including the vulnerable, can access time of use tariffs. **(CR412)**

- In relation to Reliability and Availability, the key changes agreed for its proposition were 'we are making automation and general reliability improvements, with vulnerability scoring applied as appropriate to inform

decision making' and 'In the event of an unplanned power interruption, we are putting strategies in place to support vulnerable customers with technology including SilentPower and suitcase generators, and other welfare provisions'. **(CR412)**

- Links to Reliability and Availability were drawn to Customer Service (the on-site support for vulnerable customers in unplanned and planned power cuts) as well as a cross reference to vulnerable customers. **(CR412)**
- Feedback from P&P was that where propositions are PCDs, there are more reporting requirements by Ofgem and therefore explicit links to vulnerable customer support should be carefully considered. **(CR412)**
- Specifically on the Community proposition, it was agreed that the within the opening narrative, wording would be used to demonstrate that the approach to community support will have a vulnerability focus too, for example, through use of data and vulnerability profiling. **(CR412)**
- Links were drawn to the plan areas for vulnerable customers (a clear link and cross reference) and to connections (the application process and particularly upskilling colleagues to recognise vulnerability and support people in relevant ways through the process). **(CR412)**
- Specifically on the Connections CN1 proposition, it was reported that the summary will be aligned to the following messaging: **(CR412)**
    - The connections team will be upskilled to identify and recognise customers in vulnerable circumstances, and provide tailored support through the end to end connections process. Northern Powergrid will also ensure that digital platforms are accessible.
    - The outcomes and therefore impact of training will be tracked, in order to measure, in terms of the number of vulnerable identified and supported through the enhanced processes
- With regards to the CN2 proposition, the summary will be aligned to the following messaging: **(CR412)**
    - In extension to the service NPg has developed in ED1, it will tailor bespoke services in the Connections space, for example the enhanced 'ask the expert' service.
    - It will use vulnerability data to inform investment decisions, to ensure it doesn't become a barrier to local energy scenarios, in conjunction with regulatory requirements/obligations. To measure this, NPg will identify the no. of projects this has been applied to. The impact will be measured based on the type of schemes, linked to SROI of investment schemes (meeting certain criteria).
- Links were drawn **(CR412**) to the business plan areas for:
    - Customer Service (Contact Centre training, including identification of those in vulnerable circumstances)
    - Data & Digitalisation (the development of digital tools and customer-facing processes),
    - Decarbonisation (provision of LCT and energy efficiency guidance, where appropriate as part of the connections application process, and ensuring the Connections process does not create barriers for LCT uptake in areas with levels of consumer vulnerability)
    - Communities where, as part of long term investment planning scenarios, the number of vulnerable customers supported will be considered, resulting in prioritisation of investment where it can support social housing development.
- Specifically on the Communities proposition, the key narrative changes agreed were within the opening narrative, where wording would be used to demonstrate that the approach to community support will have a vulnerability focus too, for example, through use of data and vulnerability profiling. **(CR412)**

- Specifically on the Customer Service proposition, the key narrative changes agreed were to include 'vulnerable' or other agreed relevant wording within the opening narrative, 'We will use our interactions with customers, *including those most vulnerable*, to support our journey to decarbonisation…" and to include wording around the 'digitally excluded' and that there will be 'flexibility of choice' for those who prefer human contact. **(CR412)**

- Links were drawn to the other plan areas, specifically to Vulnerable Customers (a clear link and cross reference) and to Connections (the application process and particularly upskilling colleagues to recognise vulnerability and support people in relevant ways through the process). **(CR412)**

- A vulnerability lens was also applied to the selection and evaluation of innovation projects. In particular, a framework will be developed that takes into account the following when reviewing potential innovation projects (could the project introduce any disbenefits or barriers for vulnerable customers and, if so, how these can be mitigated; could the project produce any benefits for vulnerable customers and if so, can this be forecasted and a value assigned?). **(CR412)**

- Similarly, the following will be taken into account when evaluating an innovation project (did the project introduce any disbenefits barriers for vulnerable customers and if so how can these be mitigated; did the project produce any potential benefits for vulnerable customers and if so, can these be forecasted and a value assigned; and can vulnerable customers be prioritised in the roll out? (E.g. the use of vulnerability scores to decide which areas or substations innovation projects are rolled out first). **(CR412)**

- The October Future Fairness Panel was asked to feedback on initial research from Box Clever and the Energy Savings Trust before it was extended to include vulnerable customers. The research had looked at what NPg's communication strategy should be and focussed on decarbonisation in the home, as well as travel. **(CR417)**

- Crisis UK considered the research would be useful for staff who can share it, but that it would be hard to engage the homeless on this issue as they have more immediate concerns. Crisis UK were also concerned how decarbonising homes would be funded in the private rented sector. **(CR417)**

- Vonne shared a link to a website promoting VCSE sector actions (voluntary, community and social enterprise) related to climate change, with the aim of inspiring others to do the same (https://www.goinggreentogether.org/). Vonne staff would benefit from better knowledge of decarbonisation so they are better placed to pass on information to clients. **(CR417)**

- Homestart Richmondshire wanted leaflets to share with military families, who they believe needed advice about decarbonisation. **(CR417)**

- Newcastle Vision Support had suggestions around accessibility. For example: to cut down on the amount of pictures used in the research pre-task, to use a larger font, consider how to reach older people who are less likely to use Zoom, to use Word and not PDF. **(CR417)**

- Humankind believed that keeping people informed was the right way to go. E.G. Social housing installing heat pumps could cause alarm so staff would benefit from knowledge to reassure tenants. **(CR417)**

- The panel collectively agreed that incentives for taking part should take the form of vouchers for food/pre-payment meters, not money. **(CR417)**

- At the ED2 Stakeholder webinar Citizens Advice Newcastle stated that people need more information on the types of heating systems available for housing, so that they can start to think about these things. More information on smart meters would also be helpful (what they are for and the benefits, especially for those in fuel poverty). **(CR420)**

- From the face to face vulnerable customers engagement amongst participants there was a mixed level of awareness about the Priority Services Membership. Those who were aware of the PSM all described themselves as members and some had been made aware of the service through their involvement with community groups. The remainder discussed being added to the PSM through ad-hoc contact with other companies (often energy suppliers). (**CR427)**

- Those who were unaware of the PSM before the engagement expressed interest in the scheme, seeing it as a service that could be valuable to them. **(CR427)**

- Several barriers to becoming a PSM member were raised. In some cases participants needed to feel fully informed about Northern Powergrid and the PSM before they would commit to signing up. Others simply did not consider themselves as vulnerable, or in need of additional help, or were concerned that if they joined, this might prevent others (who they perceived to be more in need) from accessing the help and support they needed. **(CR427)**

- Rather than focussing on perceived vulnerability, the benefits of the scheme and the extra sense of security that membership brings, should be emphasised. (**CR427)**

- There a strong sense across all focus groups that awareness of PSM should be increased by active advertisement of the service, ensuring that the benefits of membership were clearly expressed. **(CR427)**

- Some participants felt that the best way to find out about PSM would be through written information (post or email), i.e. information sent in addition to bills or annual energy statements. For others, they relied on community groups to make them aware of information. Community groups were seen to act as 'trusted voices' and were hugely important in helping people identify and access help and support. Active outreach to community groups was therefore considered to be a very important way by which awareness of PSM could be increased amongst vulnerable people **(CR427)**

- Overall, participants found the help that could be made available through PSM to be reassuring and to meet their needs. However for some, useful addition to the PSM service would be for it to advise people members what could be a useful 'emergency kit' to have in the case of a prolonged emergency power cut. **(CR427)**

- For all respondents, existing forms of information sharing regarding power cuts through the post or telephone were seen as acceptable. However, some mentioned the sheer volume of phone messages that can be received daily and concerns were raised that messages from Northern Powergrid would not be read or would be assumed to be fraudulent. Participants suggested the use of official branding or texts coming from a recognised number to ensure that this did not happen. **(CR427)**

- There were mixed views about the prospect of a dedicated PSM app. Those in favour felt it would be easier to communicate in this way as they often found communication with people to be challenging. Those who were not in favour of the app had general concerns about technology. **(CR427)**

- To overcome barriers to the use of an app, the PSM should be made as intuitive as possible. For example, participants discussed finding WhatsApp easy to use, in particular being able to quickly identify when there was a new message. They felt that if the PSM app had similar notification features (i.e. when there was information to be shared about a power cut) they would be more likely to use it. **(CR427)**

- Within the app, and arguably all Northern Powergrid communication, accessibility of information was discussed as critically important. For example, for some participants, written communication was challenging and information explained within video format was considered much easier to understand and incorporate. **(CR427)**

- Participants largely welcomed receiving advice on energy affordability and efficiency. For some groups, rising prices were already starting to be an issue for their communities. For others, communication within the group revealed a clear desire for information on how domestic bills could be reduced. **(CR427)**

- Any advice given should be focused on the potential impact of small changes. This is because, for some, there was a sense of helplessness that there was anything they could do to reduce their fuel consumption and thus their bills. Being aware of individual PSM member circumstances when delivering affordability advice was also highlighted as important. For example, some participants lived in accommodation with prepaid meters and used regular over-payment on cards to help them budget. For them, this routine was highly important in helping them live independently. **(CR427)**

- All participants felt that living in a more environmentally sustainable manner was a very important and largely welcomed the idea of Northern Powergrid providing PSM members with information and advice about how to do this. However, this was caveated by some that for this to information to be trusted, it was important to know that there was no profit seeking agenda underpinning it. **(CR427)**

- People discussed feeling powerless in the face of the international changes required to make significant reductions to carbon emissions. Others were frustrated that many of the plans regarding future low carbon technologies seemed to have very little practical focus that made sense in the context of everyday life. **(CR427)**

- The fifth session of the Citizens Panel had mixed views about the appearance of the vulnerability strategy document. While some found it visually appealing and easy to digest, others would have liked to see it structured so it read less like a manifesto. **(CR456)**

- Headline figures or 'key takeaways' in the vulnerability strategy document would make it more accessible for vulnerable customers with low levels of literacy. Some customers felt the language used was too corporate and jargonistic, and the document too text heavy. **(CR456)**

- The document was considered quite comprehensive and most panellists were unable to suggest other initiatives that NPg could commit to. One person suggested offering energy credit to vulnerable people to incentivise them to seek help, or join a vulnerability list. **(CR456)**

- Some felt it was not specific enough as to what NPg is committing to, lacking concrete examples of measurable actions. **(CR456)**

- A minority would like NPg to name which groups it would be working with to deliver its vulnerable customers strategy. The document would also benefit from a definition on customer vulnerability (as some struggled to differentiate between fuel poor and vulnerable customers). **(CR456)**

- Cost was highlighted as likely being the main barrier to LCT uptake, especially for the fuel poor and the vulnerable. Other barriers included cultural norms, existing infrastructure, lack of motivation and lack of knowledge. **(CR456)**

- At the November Community Energy Stakeholder Panel it was suggested that Northern Powergrid should be measuring the number of vulnerable people supported and carbon reduction, as well as raising awareness of community energy groups. **(CR454)**

- Northern Powergrid has a role in helping local groups to build relationships with Local Authorities and could also join more local working groups (e.g. on affordable warmth). **(CR454)**

- The November Future Fairness Panel discussed the Priority Services Membership. They felt materials should be written in a way that people with neurological conditions and learning conditions can interpret correctly, because their comprehension skills are under-developed. **(CR464)**

- Simplifying materials would be beneficial to other customers (e.g. those with autism, poor vision, or stroke victims). An example simplified subject matter; what happens before, during and after a power cut. **(CR464)**

- The panel further advised that contacting the PSM by telephone might not always be successful for some member types. For example, arbitrary phone calls to those with a neurological condition might not be answered and vulnerable customers generally rely more on landlines and may not answer unrecognized numbers. (**CR464**)

- The PSM is a good tool for charity staff to share information about. Training charities so they are then able to promote the services offered, would be worthwhile. **(CR464)**

- A concern was raised in regards to homeless young people and families whose lives are transitory. It is important to keep PSR member details up-to-date, especially phone numbers. **(CR464)**

- The PSM booklet would benefit from inclusion of the regional NHS mental health number. **(CR464)**

Our communities

Stakeholder engagement summary

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
CO1	**Deliver tailored social impact programmes when we are undertaking major investment works**	**Wave 1:** At the start of our engagement, we looked at what we currently deliver in the 2015-23 period as part of our social programme as well as feedback from our annual priorities research. We explored which of these areas could be expanded or further embedded across the 2023-2028 period and consulted with domestic customers, rural customers, future energy and expert stakeholders, as well as colleagues. Overall, feedback showed that stakeholders recognised and valued the importance of the work we deliver in the communities across our region and the partnerships that we have in place but that they were not always aware of all of the social initiatives and programmes that we deliver. Ensuring greater awareness of our work was identified as an important improvement area. They also suggested that to create greater social impact, we should look to expand and have further collaboration with local charities, community centres and possibly local businesses to deliver tailored social impact programmes. ***Key wave 1 finding:*** *Stakeholders want to see further collaboration with local charities, community centres and local businesses to deliver tailored social impact programmes in their areas.*	*E032* *E034* *E147* *E091* *E096* *E147*
		Wave 2: These insights led to the development of a more comprehensive set of propositions that we then put forward to our stakeholders in wave 2 as part of emerging thinking. When considering our draft propositions, whilst stakeholders continued to support expansion of our social impact programme overall, some stakeholders challenged whether it was our role to support communities in our role as a network operator. Other stakeholders who were supportive, wanted to see increased levels of ambition and reach in the programme, alongside greater clarity as to what benefits would be delivered for customers at a local level. Stakeholders commented that it was important to ensure we worked through local partners who were well networked locally and ensure that we align and partner rather than duplicate existing support provision. ***Key wave 2 finding:*** *Stakeholders support our proposals to expand our social impact initiatives but challenged our level of ambition and reach across our regions. We should provide further clarity on the benefits they deliver for customers and how they would align with the existing support programmes we have in place, delivered by local authority and third sector partners.*	*E001* *E006* *E035* *E038* *E045* *E046* *E047* *E050* *E059* *E069* *E092* *E097* *E152* *E153* *E154* *E206*
		Wave 3: During the proposition finalisation stage, we took stakeholders through some of the more granular details around our propositions and specifics around deliverability to respond to their earlier challenges. Stakeholders highly valued regionality and the expansion of the local partnerships that we already have in place. Stakeholders saw benefit in broadening social programmes, linking them with education, aspiration raising and preparations (at a community level) for decarbonisation. It was noted that it is important to strike the right balance, recognising the very real support needs of communities post pandemic and the economic impact on the fuel poor. ***Key wave 3 finding:*** *There is clear desire for more visibility and awareness of social impact programmes delivered in communities and schools. Stakeholders recommend that we develop and deliver an ambitious programme, with tailored and targeted support and work with local partners to reflect the differing needs of the diverse communities across our region.*	*E219* *E251* *E256* *E270* *E277*

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
CO2	**Support our communities to promote STEM subjects and careers**	**Wave 1:** At the start of our engagement, we looked at the education and outreach provision we currently deliver as part of our social programme, as well as feedback from our annual priorities research and industry best practice benchmarking. We explored how our service offering should be developed and embedded across the 2023-2028 period and consulted with domestic customers, rural customers, SMEs, future customers and expert stakeholders, as well as colleagues. Stakeholders supported volunteering in local communities, with widespread support for our existing school outreach and aspiration raising programmes. Investing in educating young people and encouraging them to study science, technology, engineering and maths (STEM) subjects, as well as raising awareness of net zero, was important to us and the regions we serve. Our early engagement focused on proposals to increase the uptake of STEM subjects across primary and secondary pupils and using partners to support this deliverable. Stakeholders were largely supportive of us being part of STEM conversations but wanted us to promote energy careers more and involve Northern Powergrid colleagues in the promotion of STEM and volunteering more generally. ***Key wave 1 finding:*** *Be ambitious when supporting education schemes (e.g. launch a dedicated skills programme in schools to engage with children and build STEM and future energy skills).*	*E032* *E034* *E147* *E091* *E096* *E147*
		Wave 2: These early insights ensured that during wave 2 we could appropriately frame our propositions and explain the scope and scale to our stakeholders. When considering our emerging proposals, overall, feedback showed that stakeholders recognised that raising aspirations and developing the new skills ready for the energy transition is a priority for educational support. Stakeholders also wanted us to focus on those in more deprived areas who might not have access to the same support from businesses. The Customer Engagement Group (CEG) were vocal in their support of this emerging STEM focused initiative but felt that there needed to be more definition around the level of involvement we would have with pupils. Our stakeholders also challenged the level of ambition, stating that a 1,000 pupils is not a high enough number to be reaching in terms of promoting STEM skills in schools. They thought it might be a better investment to engage with a smaller number of children at numerous points in their school life rather than 1,000 students only once, as this could have a greater long-term impact. This feedback led to a review of targets and metrics associated with the proposition, focusing on pupils in areas of deprivation and increasing the numbers of pupils we will reach as part of the education proposition. ***Key wave 2 finding:*** *Many of the customers we engaged felt that investing in educating young people and encouraging the uptake of STEM subjects was important for the future of both the region and Northern Powergrid itself. A consideration of the impact and scale of support was critical to the success of this initiative.*	*E001* *E006* *E035* *E038* *E045* *E046* *E047* *E050* *E059* *E069* *E092* *E097* *E152* *E153* *E154* *E206*
		Wave 3: During the plan finalisation stage, through discussions with stakeholders, we refined this proposition to include a careers development element as well as considering how Northern Powergrid colleagues could share their knowledge and expertise directly with pupils across the region. Stakeholders supported an anticipated increase in volunteering in schools, with widespread support for our school outreach and proposed aspiration raising programmes. ***Key wave 3 finding:*** *There is support for investing in additional and expanded programmes to educate young people to encourage them to study STEM subjects and in turn, increase their awareness of net zero in preparation for the energy transition.*	*E219* *E251* *E256* *E270* *E277*

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
CO3	**Offer Community Energy advice to support our communities on the path to decarbonisation**	**Wave 1:** At the start of our engagement, we assessed stakeholder feedback on what support was required for communities regarding decarbonisation, as well as what we currently deliver around energy efficiency within our existing social programme. We explored what kinds of support could assist communities to take initial steps to decarbonise and how we ensured that disadvantaged areas of our communities were not inadvertently left behind during the early stages of the transition. We consulted widely with domestic customers, rural customers, community energy, third sector partners and social issue expert stakeholders, as well as colleagues. Stakeholders asked us to be clearer on the focus of community decarbonisation support and explain the support would focus on households, local authorities, SMEs or community energy groups. ***Key wave 1 finding**: Stakeholders want us to clearly communicate the decarbonisation process, particularly for vulnerable customers, so they understand what their support options are.*	*E032* *E034* *E147* *E091* *E096* *E147*
		Wave 2: During this wave of engagement our propositions engagement focused on defining the decarbonisation support offer, reviewing the scope and scale of the emerging proposition. We particularly concentrated on understanding the role we should play as a network operator in supporting communities to decarbonise. We also looked at defining the role of the community energy advisors, a largely new service proposition at this point. Stakeholders supported the principles of this proposal, though they suggested that there should be more investment into the regional community-based energy advisors to ensure that a wider range of communities can receive their support. However, feedback was mixed as some stakeholders believed that this should not be a primary responsibility for us, whilst others thought we should be really ambitious and practically help many more customers given our position in the industry. Our social issues expert group (SIEG) and community energy stakeholder panel were instrumental in helping review the proposition in more detail and offering to support the development of the deliverability model. ***Key wave 2 finding**: In general our customers were supportive of advisor roles to support communities to decarbonise and that they are regionally based - but some challenged us on the level of ambition and scale of these roles.*	*E001* *E006* *E035* *E038* *E045* *E046* *E047* *E050* *E059* *E069* *E092* *E097* *E152* *E153* *E154* *E206*
		Wave 3: During the final stage of engagement, we explored the differing views between stakeholders on the scale of the programme. Through these discussions we refined our thinking on the type of support, the focus of the support and where it would have greatest impact at this stage of the transition. It was agreed that we should pilot the programme, starting with two advisors to develop the partnerships and network, but would look to quickly increase the scale based on community appetite and uptake. ***Key wave 3 finding:** Stakeholders support our proposal to establish dedicated advisors to support the energy transition and to do more to educate the public on the decarbonisation changes such as energy efficiency and decarbonisation of transport and heat.*	*E219* *E251* *E256* *E270* *E277*
		***Acceptance research and findings:** The acceptance score of communities is 70 per cent. Customers trust that we will deliver the communities propositions with a joint score of 71 per cent for acceptance and trust. As acceptance is high from customers for the communities' propositions, this area will not be explored in further acceptability testing.*	*E325*
		***Overall Wave 4 findings:** Our Citizen's panel and Community Energy Panel were supportive of the Community propositions broadly but challenged the scope and level of ambition for the Community based Energy Advisor proposition. Due to the pace of decarbonisation and the region's footprint, they felt there was a need to be clearer about the positioning of these roles, the number of roles and they also underlined the importance of working collaboratively with public bodies such as Local Authorities to optimise resources for decarbonisation.*	*CR411* *CR412* *CR417* *CR464* *CR456* *CR420* *CR426* *CR434*

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
		This feedback was taken on board and we will recruit six community energy advisors that will give us more capacity to deliver decarbonisation support for our customers.	

WAVE 1 – open and formative engagement

In the first wave of engagement, 103 events were undertaken, engaging 4,762 stakeholders. Of these 103 events, communities were a specific sub-topic at six of them, covering 149 individuals. Engagements were focussed on:

- community engagement;
- delivering Social impact in our region and communities with greatest need; and
- collaboration and partnership working with Northern Powergrid.

This phase included a range of panels, round tables, webinars, and research projects, for a mix of domestic customers, future energy customers and expert stakeholders.

The six events where communities was a specific sub-topic are listed below, which included 149 individuals.

Engagement reference	Name	Segment	Method	Delivery partner	No engaged
E032	Findings from interviews with rural customers	Customers	Phone Interviews	Traverse	58
E034	Consumer Panel	Domestic customers	Online panel	Traverse	70
E147	Technical panel - Introduction & 2023-2028 Challenges	Future Energy	Online panel	NA	6
E091	Social Impact Roundtable	Expert Stakeholders	Online roundtable	NA	9
E096	Social Issues Expert Group	Expert Stakeholders	Online panel	NA	6
E143	WISE Webinar: Independent research in schools: How you can impact STEM uptake	Internal Stakeholders	Online webinar	NA	N/A

Community engagement

- While most interviewees from rural areas (June 2020) felt that Northern Powergrid's commitment to meeting customers' and community needs matched their expectations, some were pleasantly surprised about Northern Powergrid's close links with schools and charities, as well as the prioritisation of vulnerable populations. Several interviewees felt that this consideration of the welfare of communities and vulnerable individuals was unusual for a large company, and that Northern Powergrid was going above and beyond its core remit as a DNO. **(E022)**
- Most customers participating in the consumer panel held in Newcastle (February 2020) wanted Northern Powergrid to focus on direct interactions with customers within vulnerable communities such as face-to-face meetings, although some recognised that this may not be feasible. Panel members felt that localised engagement with affected communities was of more value than a broader, higher level approach and argued that any interactions with customers should be community-specific, tailored to the needs of the affected

customers and/or communities, and last for the entire duration of Northern Powergrid's investment works. **(E034)**

- Consumer panel members wanted Northern Powergrid to build closer partnerships with energy suppliers and other infrastructure providers, for example, to increase its visibility among the general public, to promote specific social responsibility initiatives, and to streamline provisions and optimise support services provided for communities. **(E034)**

- According to the consumer panel in Newcastle and Social Impact roundtable (May 2020), customers feel that capturing the views of the local community in an early investment planning phase is essential, collaborating with a balance of local authorities and local infrastructure organisations as well as particular vulnerable support groups to identify a particular community's needs. On this note, including net zero and decarbonisation awareness and support at a community level - as part of the plans - is vital and aligning with the overarching plans of the local authorities. **(E034, E091)**

Community social impact programmes

Northern Powergrid should collaborate with local charities, community centres and even SMEs, to identify, develop and deliver tailored social impact programmes in the area.

- Customers participating in consumer panel in Newcastle (February 2020) demonstrated an awareness of social responsibility as a concept but had little to no prior knowledge of specific Northern Powergrid initiatives in this area. Some did not understand how this work relates to Northern Powergrid's responsibilities as a DNO, and others struggled with the distinction between Community Partnerships and Social Impact Programmes. **(E034)**

- They felt that Northern Powergrid should ensure that customers understand how and why social responsibility fits within its duties as a DNO, and clearly define the differences between community partnerships and social impact programmes. **(E034)**

- Most customers in the panel did not feel that social responsibility was a core element of Northern Powergrid's duties as a DNO and were therefore pleasantly surprised by the range of initiatives supported by Northern Powergrid. Alternatively; some argued that Northern Powergrid has a responsibility as the sole provider for the region to leave a positive legacy for its customers. Importantly, customers responded differently to community partnerships and social legacy programmes. Most agreed with the intention behind Community Partnerships but had doubts about their efficacy in practice and were therefore concerned that they may have limited impact on the ground. With regard to social impact programmes, customers felt that this went above and beyond the DNO's obligations and were impressed by its ambitious approach. **(E034)**

- Customers in the panel felt that Northern Powergrid should continue to be mindful of its social responsibility and should ensure continued investment in social impact programmes, due to their wider impact and higher level of visibility. **(E034)**

- Customers were also more supportive of social impact programmes on the basis that they can better respond to the needs of individual communities, and that they allow Northern Powergrid to align its social responsibility initiatives to where it has a material impact. The wider impact and increased visibility of Social Impact Programmes was also popular with customers. **(E034)**

WAVE 2 – testing our emerging thinking with costed levels of ambition

Our second wave of engagement was used to test options generated through the first wave – gauging levels of consumer ambition and defining our outcomes. Engagement was carried out with customers, internal stakeholders, expert stakeholders. The results were split into:

- opportunities to give back to the communities;
- maximising the impact of Northern Powergrid's social impact programmes;
- education and creation of new jobs;
- STEM education (science, technology, engineering, and mathematics); and
- engagement with localised energy plans.

In total, 135 events were undertaken, engaging 15,475 stakeholders and of these 135 events, communities were a specific sub-topic at 16 events, covering 5,367 individuals.

The 16 events where Communities was a specific sub-topic are listed below:

Engagement reference	Name	Segment	Method	Delivery partner	No engaged
E001	Consumer panel (Leeds and Newcastle)	Customers	Online panel	Traverse	56
E006	Interviews with rural customers across the Northern Powergrid area (ET1)	Customers	Phone interviews	Traverse	36
E035	Local Authority forum	Customers	Online engagement	Regen	13
E038	SME Panel, meeting 2	Customers	Online panel	Explain Research	20
E045	2023-2028 Regional Political Engagement	Various	Bilaterals	Public Affairs Company	62
E046	2023-2028 Regional Political Engagement	Various	Bilaterals and online engagement	Public Affairs Company	76
E047	2023-2028 Regional Political Engagement	Various	Bilaterals and online engagement	Public Affairs Company	34
EO50	Emerging Thinking consultation	Various	Research and consultation	Explain Research	1,236
EO59	A force for good? Creating holistic sustainability strategies for the North	Third Sector partners	Online deliberative engagement	Traverse	25
EO69	Deliberative Stakeholder Engagement	Various	Online deliberative engagement	NA	8

Engagement reference	Name	Segment	Method	Delivery partner	No engaged
E092	Annual informal feedback discussions with current Workforce Renewal colleagues	Internal Stakeholders	Face to Face Online	NA	141
E097	Social Issues Expert Group	Third sector partners	Online panel	NA	6
E152	Emerging Thinking microsite	Customers and Stakeholders	Microsite	NA	3,600
E153	Emerging Thinking microsite users	Customers and Stakeholder	Microsite	NA	N/A
E154	Emerging Thinking - rural panel	Customers	Microsite	NA	36
E206	Community Energy Research	Community energy	Online survey	NA	18

Responses covered Northern Powergrid's school outreach programmes, social impact programmes, and feedback from customers on how ambitious Northern Powergrid should be when it comes to job creation and educational outreach.

Giving back to the communities

- The idea that Northern Powergrid should give back to local communities was popular with customers participating in the consumer panel in Leeds and Newcastle (September 2020), who appreciated its commitment to going above and beyond its obligations. **(E001)**
- Most customers supported Northern Powergrid's school outreach programmes and felt that more could be done to encourage uptake of STEM subjects among young people in the region. **(E001)**
- Customers largely regarded the creation of jobs, including apprenticeships, as a core aspect of Northern Powergrid's responsibility to local communities. **(E001)**
- Customers regarded the provision of support for vulnerable customers as another core aspect of Northern Powergrid's responsibility to local communities. **(E001)**
- A minority of customers were unconcerned about Northern Powergrid's community role, and instead felt that it should focus on its core remit of maintaining and operating the energy network. **(E001)**

Maximising the impact of Northern Powergrid's social impact programmes

- Among customers participating in the consumer panel, most preferred was community option E (regional leader in sustainable development). **(E001)**
- Least preferred community option A (targeted support for those most in need) / option D (an integrated 'social impact' model). **(E001)**
- Most 'bolted on': Ensure all customers benefit from changes to the energy system through a 'just transition.' **(E001)**
- Least 'bolted on': Demonstrate significant growth in the impact of Northern Powergrid's social programmes. **(E001)**

- Most selected basis for Northern Powergrid to decide on where to target its community energy or social impact projects is by calculating the community benefit associated with each project and taking forward those with the biggest impact. **(E001)**

- Least selected basis for Northern Powergrid to decide on where to target its community energy or social impact projects is by focusing on areas where it is already doing work e.g. upgrading a substation. **(E001)**

- During emerging thinking consultations (November 2020) domestic customers most commonly chose service level option E for the community plan area, with 26 per cent preferring the most ambitious option. Business respondents' views closely aligned with this and 24 per cent chose option E, though a similar proportion [23 per cent] preferred option C. **(E050)**

- Surprisingly, community was the plan area in which the highest proportion of domestic customers selected option A, with one in five [20per cent] opting for a bill reduction to maintain the same level of service. **(E050)**

- According to Northern Powergrid online consumer panel (June 2020), among corporate interest groups C and E service levels were the most attractive. Large investment around STEM and decarbonisation was also proposed. Four new propositions: affordability, workforce, decarbonisation, and financial with KPIs sitting beside them. **(E206)**

Education, aspiration raising and creation of future careers

- Consumer panel in Leeds and Newcastle (September 2020) showed that most customers saw the creation of apprenticeships with Northern Powergrid as a positive that would provide young people in the region with meaningful career opportunities and felt that more should be done to advertise such opportunities in schools. **(E001)**

- Many customers regarded the creation of jobs and apprenticeships as an investment in the future for both local communities and for Northern Powergrid itself. **(E001)**

- Some customers felt that the provision of support and advice, particularly for vulnerable customers, was an important aspect of Northern Powergrid's community role. **(E001)**

- Many customers in the panel identified the creation of jobs and skills as a key area for future investment, with many citing the economic challenges presented by COVID-19 and Brexit. The provision of apprenticeships was highly valued because of the opportunities this gives to younger people in the region. **(E001)**

- While some interviewees expressed initial confusion at the term 'STEM', many customers felt that investing in educating young people and encouraging the uptake of STEM subjects was important for the future of both the region and Northern Powergrid itself. **(E001)**

- Customers participating in the interviews with rural customers across the Northern Powergrid area (September 2020) were split as to whether Northern Powergrid's primary role within local communities should be to create jobs and skills or to provide advice and support. Investing in communities was overwhelmingly regarded as 'nice to have' but was not seen as a necessary aspect of Northern Powergrid's service. **(E006)**

STEM Education (science, technology, engineering, and mathematics)

- While some interviewees from the rural areas expressed initial confusion at the term 'STEM', many customers felt that investing in educating young people and encouraging the uptake of STEM subjects was important for the future of both the region and Northern Powergrid itself. **(E006)**

- Respondents attending the SME panel (May 2020) seemed to expect large companies like Northern Powergrid to be involved in the kind of things outlined but would like to see more money invested in the community energy fund as the current levels of funding are insufficient to get community energy projects off the ground. **(E038)**

- SME panel participants felt that 1000 pupils are not a high enough number to be reaching in terms of promoting STEM skills in schools although it might be a better investment to engage with a smaller number of children at numerous points in their school life rather than 1000 students only once, as this could have a greater long-term impact. **(E038)**

WAVE 3 – refining and finalising our plan

The third wave of engagement was used to refine proposals and gain endorsement for final plans. The engagement was carried with domestic and rural customers, SMEs, vulnerable customers, future customers as well utilities and government representatives. Themes covered by the engagement are:

- environment strategy;
- new communities proposition; and
- feedback from the sustainability survey.

In total 91 events took place, engaging 32,500 stakeholders and of these 91 events, communities was a specific sub-topic at seven of them, covering 2,551 individuals.

The seven events where communities was a specific sub-topic are listed below:

Engagement reference	Name	Segment	Method	Delivery partner	No engaged
E219	Northern Gas Networks - follow up on Sustainability Roundtable	Utilities	Online meeting	NA	2
E251	Willingness to Pay quantitative prioritisation – Choice Experiment research	Customers (domestic, SME, vulnerable)	Interviews and survey	Impact	1,908
E256	Northern Powergrid Social Issues Expert Group	Third sector partners	Online Panel	NA	5
E270	2023-2028 Regional Political Engagement Report	Regional Politics	Bilaterals and online meetings	The Public Affairs Co.	131
E277	Northern Powergrid Sustainability Survey	Customers	Survey	Explain Research	300
E279	NG Bailey - follow-up on Sustainability Roundtable	Utilities	Online meeting	NA	1
E300	Colleague engagement survey – plan acceptance	Internal Stakeholders	Survey	Explain	204

Sustainability strategy development

- Over the last five years, Northern Gas Networks (NGN) have created an environment strategy, involving about 500 colleagues. Internal engagement started before the COVID-19 pandemic and carried out by in-person drop-in sessions where company provided breakfast, internal surveys with prizes, by attending operative staff meetings and setting up a stall at operative staff conferences, with mixed feedback, two-way comms in GD2 plan briefings and ask for feedback - with mixed success, engaging with tools e.g. issuing solar-powered phone chargers to operational staff. **(E219)**

- According to the follow up on sustainability roundtable (January 2021), NGN have seen colleagues have become much more engaged on sustainability since remote working was introduced during the lockdown and can participate in these conversations with greater ease as travelling to a meeting is not required. They have set up an Environmental champions' network, a volunteer board and hold meetings online. **(E219)**

- NGN have aligned to UN Sustainable Development Goals (SDGs) - last February/March published report outlining commitments, created by 'support the goals' - six priority goals identified with four clear ambitions for each. **(E219)**

- On engagement with supply chain, a 'meet the buyer' event is being held biweekly. **(E219)**

- According to 'willingness to pay' quantitative prioritisation (February 2021), this topic was ranked 5 out of 12 for domestic customers; other sector and utilities research over past year has seen a slight increase in the value of community. **(E251)**

- During the sustainability Roundtable follow up (January 2021) the participant said that NG Bailey will be setting science based targets for carbon reduction and are keen to understand how Northern Powergrid is engaging with this process and what carbon targets Northern Powergrid will expect from its supply chain. **(E279)**

- NG Bailey have worked with (consulted by) 'Support the goals' to align with the United Nations Sustainable Development Goals (SDGs) and rank FTSE companies - 6 priorities identified and are reporting their progress on supporting these goals annually. **(E279)**

- A number of different sustainability projects have been delivered by NG Bailey. Projects are pitched by demonstrating the benefit to the business on a case-by-case basis. **(E279)**

- Sustainability projects NG Bailey have delivered have been pitched by demonstrating benefit to the business including efforts focused on re-using waste/plastic reprocessing, training being carried out - half-day with employees and franchisees and rainwater harvesting at remote substations - to harvest water for toilets. **(E279)**

New communities' propositions

- Willingness to pay quantitative prioritisation (February 2021) showed that although customers are impressed with efforts, added value community activities largely viewed as a 'nice to have' and lower levels of ambition acceptable. Support for vulnerable customers remains valued and an opportunity to go above and beyond. There is a view for opportunity to tie community activities in with the transition to net zero and value in tangible investment schemes that have a social benefit. **(E251)**

- Social Issues Expert Group (April 2021) reviewed new communities propositions: stakeholders thought we should pair back the plans, so we have acted on that 10-12 social programmes since Bradford. Specific focus on vulnerable has been changed to wider community. These plans have landed well with internal and external stakeholders. **(E256)**

- Feedback from social issue experts: 'A lot of info, sounds great, need a bit of time to come back with more specific comments'. 'General direction of travel sounds good'. [Referring to:] 'Leveraging opportunities, we are we maximising lots of information, labelling communities can be a risk (e.g. deprived people live in affluent areas)'. **(E256)**

- The Social Issues Expert Group felt that inclusivity needs to become a powerful point. Example: push on solid wall insulations in rural properties is important. Need to consider the asset rich and cash poor, has postcode data on fuel poverty. **(E256)**

- They felt there is a need to treat certain communities as what they are (rural fuel poverty is different to urban areas), the need to not over stigmatise communities and to not assume a community holds one characteristic. **(E256)**

- On the communities' social impact: having positive impact in communities. Helping all sorts of customers to decarbonise. We need a mechanism to help all customers to decarbonise. **(E256)**

- According to 2023-2028 regional political engagement reporting (January 2021), stakeholders were keen to work on a joint communications approach with Northern Powergrid and the gas supplier to provide energy efficiency advice to homeowners to improve their knowledge in this area. **(E270)**

- Stakeholder was very complementary of the PSR, although she did not confirm if her experience was in Northern Powergrid's area. She explained that her daughter had had a kidney transplant and was on dialysis and that it had 'literally been a life saver'. **(E270)**

Developing a sustainability approach

- According to the survey (April 2021), overall 'making a positive contribution to local communities' was ranked as the most important social core commitment (mean score = 1.96), with 'playing their part in a socially inclusive transition to net zero' being ranked as the least important (mean score = 2.02). **(E277)**

- Differences were observed between domestic and SME customers, with SME customers ranking 'developing a skilled and inclusive workforce to meet the decarbonisation challenge' (mean score = 1.85) as the most important social core commitment. **(E277)**

- The majority answered that there was nothing missing. For those who did, themes in responses included 'environmental impact and energy use' (21), 'commitments to continue to provide a service' (12), 'cost and billing impact' (9) and 'more detail and transparency' (9). **(E277)**

- Overall, most respondents said that their thoughts had not been influenced by the ongoing pandemic. A higher proportion of domestic customers (18per cent) felt that their thoughts had been influenced by the pandemic than SME customers (8 per cent). **(E277)**

- The survey showed that Northern Powergrid should consider ways in which it can provide more detail/explanation about each core commitment under the social, economic, and environmental themes to increase understanding and support for the approach. **(E277)**

- It was felt that Northern Powergrid should continue to highlight the importance of sustainability in communications, particularly in terms of educating local communities about it. **(E277)**

- According to the employee survey in June 2021, the majority of colleagues surveyed said that they would not be directly involved in delivering the Communities propositions as outlined in the business plan summary, with 30per cent stating that they would be directly involved. **(E300)**

- Colleague commitment to their role in delivering the propositions was lower than other business plan areas analysed so far, which may reflect the low perceived direct involvement of colleague respondents in delivery of this business plan area. **(E300)**

- The overall acceptability for this business plan area was rated at an average of 4.5 out of 5 across respondents, with four respondents selecting the 'don't know' option for this question. **(E300)**

- The comments within the theme 'more awareness of community plans is needed' showed that some colleagues believed that more awareness of the community initiatives that Northern Powergrid is proposing should be raised with one participant stating: 'Education of what we do is good for the community and also for us the employees to see both sides of the fence'. **(E300)**

- The comments within the theme 'Northern Powergrid need to deliver upon promises' showed that a proportion of respondents believed that the organisation needs to act upon the promises being made with one participant stating 'I hope that we do try to commit as much resource as possible to some of these schemes and go beyond doing it as an obligation. It will benefit trust in our brand and could create opportunities for local communities'. **(E300)**

- Literal comments within the theme 'staff concerns with volunteering' showed that a proportion of colleagues believed that they would not have time to be involved with volunteering with one participant stating: 'All staff should be given the chance to support the company at trade fairs/shows, I have always been too busy to take part, the same staff always attend'. **(E300)**

WAVE 4 – Finalising the plan

From July to December 2021, we finalised our plan, responding to queries, addressing gaps and testing overall acceptability. We engaged 10,296 customers and stakeholders overall and with detailed sessions on outstanding communities' topics across 19 events.

The events where Communities was a specific sub-topic are listed below:

Code	Name	Subgroup	Engagement Type	Date	No Engaged
(CR411)	Social Issues Expert Group	Vulnerability	Meeting	02/09/2021	7
(CR412)	Vulnerable internal workshops (Ensuring nobody is left behind)	Internal stakeholders	Meeting	29/09/2021	1
(CR417)	Future Fairness Panel	Vulnerability, Consumers	Panel	19/10/2021	7
(CR464)	Future Fairness Panel	Vulnerability, Consumers	Panel	04/11/2021	10
(CR456)	Citizens Panel	Consumers	Panel	16/09/2021	37
(CR420)	ED2 Stakeholder Webinar	Regional Politics, Consumers, Future Energy	Meeting	03/09/2021	101
(CR426)	Citizens Panel (Bill impact)	Consumers	Panel	20th & 23rd Sep	37
(CR455)	Summary of two meetings: 1. External meeting organised to discuss NE Community Energy Research Study outcomes (13 July) and a 2. Follow-up on the study outcomes with Centre for Sustainable Energy (30 July)	Future energy stakeholders; Regional politics	External event – meeting; Meeting	13/07/2021 and 30/07/2021	10
(CR438)	Meeting with Rural Community Energy Fund officers	Future energy stakeholders, Regional politics	Meeting	25/08/2021	2
(CR458)	External meeting - follow-up on the community energy in the North East research study	Future energy stakeholders, Regional politics	External event – meeting	26/10/2021	6
(CR434)	Community Energy Stakeholder Panel	Future energy stakeholders	Panel	06/08/2021	4
(CR454)	Community Energy Stakeholder Panel	Future energy stakeholders	Panel	05/11/2021	5
(CR430)	Community Energy Forum - Community Renewables in a Climate Emergency	Future energy stakeholders	Forum	17/06/2021	51
(CR414)	Community Energy Forum: Local Energy – Paving the way to net zero	Future energy stakeholders	Forum	16/09/2021	34
(CR465)	Business Plan Acceptability Testing	Consumers	Quantitative survey	Oct-Nov 2021	1,742
(CR466)	ED2 Acceptance Comms (winter awareness campaign mail-out)	Consumers	Quantitative survey	Nov 2021	8,141

Feedback summary

- At the September SIEG meeting it was revealed that NPg will support 5,000 customers year on year to ensure no-one is left behind during the transition to net zero, but more thought is required on communications. In context, UKPN has said they will support 500,000 with information and help. A session is needed to review that proposition. **(CR411)**

- In relation to the Northumberland Off-Grid Task Force (set up by Community Action Northumberland to offer support to households that are not connected to the electricity grid and to focus efforts on helping to get them connected in one way or another), a video was produced to highlight the challenges of people living off-grid and to change peoples' perceptions. **(CR411)**

- Most people living off-grid use generators which reduce air quality, are expensive to run and not carbon neutral. Off-grid living can mean a basic existence (e.g. challenges with refrigeration of food). EVs are not an option. **(CR411)**

- The cost of connecting to the grid was raised (the task force believes it should be VAT free). **(CR411)**

- If the Northumberland Off-Grid Task Force succeeds in connecting more people to the grid in Northumberland, the initiative could be rolled out nationally. **(CR411)**

- A series of internal workshops were held within Northern Powergrid on the theme 'ensuring nobody is left behind' in the transition to net zero. Specifically on the community proposition, it was agreed that the within the opening narrative, wording would be used to demonstrate that the approach to community support will have a vulnerability focus too, for example, through use of data and vulnerability profiling. **(CR412)**

- Links were drawn to the plan areas for vulnerable customers (a clear link and cross reference) and to connections (the application process and particularly upskilling colleagues to recognise vulnerability and support people in relevant ways through the process). **(CR412)**

- The October Future Fairness Panel was asked to feedback on initial research from Box Clever and the Energy Savings Trust before it was extended to include vulnerable customers. The research had looked at what NPg's communication strategy should be and focussed on decarbonisation in the home, as well as travel. **(CR417)**

- Crisis UK considered the research would be useful for staff who can share it, but that it would be hard to engage the homeless on this issue as they have more immediate concerns. Crisis UK were also concerned how decarbonising homes would be funded in the private rented sector. **(CR417)**

- Vonne shared a link to a website promoting VCSE sector actions (voluntary, community and social enterprise) related to climate change, with the aim of inspiring others to do the same (https://www.goinggreentogether.org/). Vonne staff would benefit from better knowledge of decarbonisation so they are better placed to pass on information to clients. **(CR417)**

- Homestart Richmondshire wanted leaflets to share with military families, who they believe needed advice about decarbonisation. **(CR417)**

- Newcastle Vision Support had suggestions around accessibility. For example: to cut down on the amount of pictures used in the research pre-task, to use a larger font, consider how to reach older people who are less likely to use Zoom, to use Word and not PDF. **(CR417)**

- Humankind believed that keeping people informed was the right way to go. E.G. Social housing installing heat pumps could cause alarm so staff would benefit from knowledge to reassure tenants. **(CR417)**

- The panel collectively agreed that incentives for taking part should take the form of vouchers for food/pre-payment meters, not money. **(CR417)**

- The November Future Fairness Panel discussed the Priority Services Membership. They felt materials should be written in a way that people with neurological conditions and learning conditions can interpret correctly, because their comprehension skills are under-developed. **(CR464)**

- Simplifying materials would be beneficial to some customers (e.g. those with autism, poor vision, and stroke victims). An example of a simplified subject matter would be what happens before, during and after a power cut. **(CR464)**

- The panel further advised that contacting the PSM by telephone might not always be successful for some member types. For example, arbitrary phone calls to those with a neurological condition might not be answered and vulnerable customers generally rely more on landlines and may not answer unrecognized numbers. **(CR464)**

- The PSM is a regarded as a good tool for charity staff to share information about. Northern Powergrid should consider training charities so they are then able to promote the PSM services. **(CR464)**

- A concern was raised in regards to homeless young people and families whose lives are transitory. It is important to keep PSR member details up-to-date, especially phone numbers. **(CR464)**

- The PSM booklet would benefit from inclusion of the regional NHS mental health number. **(CR464)**

- The Citizens Panel (wave 4, Round 1) included a discussion about community-based energy advisors. This initiative was broadly supported in principle, though concerns were highlighted about the initial number of advisors proposed (two and then six). Others felt that it was admirable for NPg to include community-based energy advisors in its plan, but that the onus should be on the Government to deliver this kind of initiative. **(CR456)**

- The North East Community Energy Research Study had concluded there was considerable support for and interest in community energy in the NE – 75 stakeholders engaged in the study, significantly more than the number of existing community energy groups in the area. A diverse range of individuals and organisations are interested in community energy (a wider range of voluntary organisations were surveyed, not only energy-focused groups), but they struggle in identifying project opportunities and getting started. **(CR455)**

- Additional support was required for CE groups: (1) to organise (2) early stage exploration and scoping (3) funding/feasibility. **(CR455)**

- More engagement with LAs required - and national policy is a complicated yet dynamic landscape to include CE groups in climate emergency plans locally, build a network for CE, support early stage exploration e.g. role of energy and CE, establish a mechanism to support later stages of CE projects. **(CR455)**

- Local government representatives thought that measuring the estimated benefits and impacts from these actions would be critical to get local support. **(CR455)**

- Centre for Sustainable Energy believed that RCEF has been tailored to heat and electricity generation. It excludes urban, retrofit, car club, advisory, and services projects; less viable after the closure of Feed-in Tariff scheme. There had been no dissemination of RCEF learning outcomes, funded/failed projects so far. **(CR455)**

- Significant support/funding gap is help at an early stage for CE groups, which might include defining what is possible in energy system; help develop ideas or analysis and building carbon literacy, i.e. understanding group's/location's carbon footprint and what they can do to reduce it. **(CR455)**

- All of the Rural Community Energy Fund (RCEF) funding has been allocated in the NE and Yorkshire. Reallocation from hubs which have not spent all of their RCEF funds is being discussed between hubs and BEIS. **(CR438)**

- Describing the types of projects supported by the RCEF, the officers said large scale solar projects had been successful; there was not much belief in community heat network chances for success; a lot of groups purchased a community development (where developers struggle to get through funding, for example). **(CR438)**

- Asked about how Northern Powergrid could target any funding support, they said the funding gaps identified seem to be the early stage support: 1) to identify (1) projects and (2) sites. A lot of hyperlocal projects come through the RCEF (e.g. community halls). Equally, tools and knowledge of the network, guidance on how to use the network tools would be helpful. Also, support for setting up as a CE organisation as well as capital funding would be useful for CE groups. **(CR438)**

- Asked about whether Northern Powergrid's and NGN's Community Partnering Fund is appropriately sized for CE groups, they said that £5-10k per project make sense as a lot of modest requests have been submitted in relation to what RCEF offer; bigger projects don't struggle for funding. **(CR438)**

- A consultant had been appointed by the RCEF early on so that the CE groups can contact them directly and get free, unbiased advice - one of the key successes in RCEF delivery. **(CR438)**

- In the follow-up meeting to discuss the Community Energy in the North East research study, participants said that North of Tyne Mayor is keen on seeing Community Energy projects and schemes delivered in the region; Yorkshire & Humber Climate Commission have CE on their priority list. **(CR448)**

- Scale is important when considering a community energy network – and NE, Yorkshire & Humber Energy Hub offers existing governance, links into BEIS, and the legacy Rural Community Energy Fund (RCEF) learning, so it could be a place for hosting this network initially - with the aim that the network becomes more self-sufficient eventually. **(CR448)**

- BEIS are planning to employ a part-time host to look at regional networks in England. The new person is expected to have capacity to analyse and link the learning in CE sector; moreover, the North is one of BEIS' priority areas, therefore the new person might be able to play a part in further developing or supporting a CE network in the North East. **(CR448)**

- It was hoped that RCEF will be followed with another fund next year for supporting community energy projects. **(CR448)**

- In Community Energy Stakeholder Panel in August, opportunities for matching a volunteer from Northern Powergrid with a local community organisation were discussed. **(CR434)**

- In Community Energy Stakeholder Panel in November, stakeholders wanted to see a way for the groups funded by the Northern Powergrid and NGN Community Partnering Fund to link up with other organisations in the area doing similar work. One stakeholder felt that Northern Powergrid could offer carbon literacy training for community organisations. **(CR434)**

- Asked about what outcomes should Northern Powergrid aim for, or measure the success in, with regard to its support for community energy groups, the Community Energy stakeholder panel felt strongly that we should not focus only on measurable outcomes or metrics. Instead they believed that the most powerful outcome was case studies to demonstrate positive impact, good stories and CE engagement evidenced by images. They thought that case studies showcased in Forums have been very useful and inspiring. At the same time, they believed it was important to report what gaps of what is not working. **(CR454)**

- Stakeholders believed that change of awareness is also very important, although difficult to measure. Further suggestions included measuring the number of vulnerable people supported and carbon reduction. **(CR454)**

- All panellists believed Northern Powergrid had a role in brokering relationships with Local Authorities, where these had not been established by the local groups already. One panellist suggested that Northern Powergrid could join more local working groups e.g. on affordable warmth - part of several which are looking to establish greater membership. **(CR454)**

- Asked to prioritise potential and additional support measures for community energy groups in 2022-23 **(CR454)**, the panellists chose:

  - Direct funding (4 votes) e.g. new, additional funding for community energy groups; most likely to support new groups to set up.

  - Funding for regional network (4 votes) – building a CE regional network across the North East and Yorkshire had been considered for a while; establishing a CE network was also a key recommendation from the North East CE Research Study, conducted by Centre for Sustainable Energy. This would allow to join up the efforts by Local Authorities, Northern Powergrid, Local Enterprise Partnerships, Community Energy England, and others.

  - CE training sessions (3 votes) - more CE training sessions, like the two organised in 2021.

  - A regional study (2 votes) – a refresh on the previous study, which explored the contribution of 20 groups in 2019; now being aware of c.50 CE groups.

  - Peer-to-peer support (1 vote) - Northern Powergrid to seek to offer peer to peer mentoring/support.

  - Community Energy Engagement Strategy update (no votes).

- A participant felt that bridge funding and/or first project funding might be better than 'new group' grants - it's relatively easy to set up a group but hard to progress projects. Regional network would be very useful to help us get taken more seriously by regional players. **(CR454)**

- Another participant felt that feasibility funding was essential as it may or may not be provided by BEIS. Support networks are also vital, as shown by the North East Community Energy Study report. **(CR454)**

- At the Community Energy Forum Community Renewables in a Climate Emergency **(CR430),** stakeholders were split into breakout groups to discuss the more relevant topics which were of interest, with an experienced CE practitioner sharing their experience and taking questions in each group.

- In *Buying back* existing *projects* breakout group:

  - Stakeholders had little experience or knowledge of community purchase of existing renewable energy projects, but were interested in learning more or developing their own community renewable generation schemes.

  - Community energy representatives were interested in how they could engage with commercial developers at an early stage and explore options for community part-ownership, while there was also discussion of the benefits for a commercial developer of having community involvement.

  - Many stakeholders were unsure of the long-term viability of business models for community solar and wind, so were keen for more information to help them explore options, including developers, local authorities and DNOs that they could partner with to support projects.

- In *Partnering* with *local authorities* breakout group:

  - Most stakeholders didn’t have a strong relationship with their local authority, but wanted to partner on solar and wind projects at a larger scale as their small-scale village projects tend not to be viable.

  - They are interested in working with local authorities on decarbonising housing and community buildings but need much more support from central government. Stakeholders want a replacement of the Green Homes Grant, and for Northern Powergrid to help them get the levy on electricity bills moved to gas in their feedback to BEIS.

  - Participants said that they would find templates useful for roof leases for PV and retrofit of community buildings.

  - Stakeholders reported challenges with planning for wind sites that have been designated but are not near any suitable grid connection sites. Communities want a much more joined up approach with local authorities and communities collaborating to find the most sensible and impactful low carbon generation sites. Communities want Northern Powergrid to work with councils more on removing planning barriers for wind from central government.

  - Communities reported grid connections for their projects as prohibitively expensive and running in some cases to six figure sums, making projects unviable, so they want Northern Powergrid to facilitate cheaper low carbon connections.

  - Participants want tailored local solutions with joined up thinking and more collaboration.

- In *Solar on* schools breakout group:

  - Participants reported successful solar on schools projects which have been delivered, with strong community support and expertise to find the right scale of project and overcome barriers, with engagement vital to get buy in from schools.

  - Stakeholders reported that solar is generally challenging since the Feed-in Tariff closure and very low export price, while changes to business rates have exacerbated this.

  - Communities realise that there is a mismatch between highest period of generation and school holidays, meaning many PV systems are sized to maximise school consumption rather than roof size or generation, with no practical route to sell overspill locally. Stakeholders were interested in how microgrids or smart local energy systems could resolve this and would be keen for Northern Powergrid to support these kinds of innovation projects.

- At the Community Energy Forum Local Energy – Paving the way to net zero, stakeholders reported significant success with community share offers for EV chargepoints, however there remain challenges to installing chargepoints, such as finding a suitable site due to highways ownership, while large fossil fuel corporations are trying to move into this area and taking locations where community-owned chargepoints could be installed. **(CR414)**

- Participants found that it was difficult to match generation, storage and EV charging because storage is still relatively expensive, and doesn't stack up commercially at present. However, community energy representatives like the idea of battery storage helping people to use more local generation, and want to explore this business model in the future when the market is ready. **(CR414)**

- Some community energy organisations have been reluctant to do an EV chargepoint project as servicing costs and legal issues are complex, while in some areas there are concerns over how many people will use these public chargepoints. **(CR414)**

- Community energy representatives wanted to know more about how community energy can use its collective voice to influence net zero policy, both at the national level, and approaching local councils. Stakeholders want Northern Powergrid and Community Energy England to continue engaging with Government and Ofgem, taking on communities' perspectives and advocating on their behalf. **(CR414)**

- Participants were concerned that, under current policy, the costs of net zero may be borne by those who are already struggling with energy bills and cannot afford extra. They want to see just transition principles at the heart of policy and regulation for net zero. **(CR414)**

- There was concern at the lack of guidance around planning regulations for retrofit, particularly in conservation areas. Stakeholders want more information on policy for retrofit and energy efficiency. **(CR414)**

- The majority of stakeholders wanted to see a community energy network across Northern Powergrid's region, however most aren't keen on actively helping run the network, preferring to participate and be kept informed. **(CR414)**

- Specifically on collaboration and training, the participants would like to see Northern Powergrid to facilitate partnerships between LAs and communities to develop low carbon projects, particularly around planning for wind, support local community energy organisations to develop networks and partnerships through sessions like this forum, invite participants onto the stakeholder panel, and hold a follow-up conversation to discuss the potential for a self-led network, run community energy organisation training on how to engage the non-usual suspects, consider a site-visit event for stakeholders on delivering a community-led whole house retrofit project and cover hydrogen at a future community energy forum in 2022. **(CR414)**

- The forum would like Northern Powergrid to inform BEIS/Ofgem about affordable grid connection challenges that communities have and explore community support options (e.g. tailored low carbon connection offerings) and to inform BEIS about the barriers communities face in developing onshore wind projects because of the planning regime. **(CR414)**

Openness and transparency

Stakeholder engagement summary

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
OT1	**Develop a comprehensive open data offering that includes access to non-personal network and utilisation data with a suite of online analysis tools**	**Wave 1 to 3:** At the start of our engagement, we looked at what data we already made publicly available to assess how our existing offering compared with those leading in this area and also the requirements set out in the business planning guidance. We started to explore what our data and digitalisation strategy would include, our level of ambition and the steps necessary to achieve our plans. Early engagement indicated that our stakeholders wanted us to share more open data and information to support their needs. Overall, stakeholders were supportive of us providing a more comprehensive open data offering and felt that this would help encourage competition and promote greater flexibility. In addition, certain stakeholders also showed an interest in collaboration by sharing their own data to best serve their needs. There were some concerns over the security of data and associated risks and how this would be managed. On the basis that it could be demonstrated that appropriate measures were in place and the hurdles overcome, data sharing was perceived to be positive and essential in order to further develop a decarbonised future energy system. ***Wave 1 to 3 key findings:*** *As outlined above, the majority of engagement concerning our open data offering was undertaken as part of the development of our data and digitalisation strategy. As a result, more detail concerning each wave of engagement can be found in the data and digitalisation stakeholder engagement summary.*	
OT2	**Develop our commercial function to stimulate flexibility markets, procure flexibility and govern our internal investment appraisal processes**	**Wave 1 to 3:** In support of our transition to a distribution system operator (DSO) and in the lead up to the commencement of our business planning activity, we had already taken steps to engage with stakeholders about the future of a flexible energy system and our part in it. The work we then undertook during our wave 1 engagement enabled us to further define how best we could evolve and structure our business to meet the needs of our stakeholders and promote flexibility, whilst strengthening the existing governance arrangements. ***Wave 1 to 3 key findings:*** *Given the overlap, the majority of engagement conducted in relation to this outcome was undertaken to shape and contribute towards the development of our DSO strategy. Accordingly, additional information can be found in the DSO strategy stakeholder engagement summary.*	
OT3	**Enhance our corporate governance and sustainability frameworks, making them more transparent than ever before**	**Wave 1:** Our wave one engagement explored how open and transparent stakeholders thought we were and how we could enhance our offering. Plans evolving in this area covered a broad spectrum but concentrated on our interaction with various groups including suppliers, the customer engagement group (CEG) and trade unions. We also wanted to test how stakeholders viewed our range of existing reports to determine if what we were already providing was sufficient or if more detail was needed and in what areas. ***Key wave 1 finding:*** *early indications suggested that sharing more data and reports about our investments would be beneficial, as would be using less technical jargon in reports.* **Wave 2:** We took the opportunity to explore the areas outlined above in more detail. From a supplier stance, we wanted to understand what aspects stakeholders felt were important and therefore asked questions about supplier size, geographical location, environmental commitments and how this tied into decarbonisation and a flexible future energy system.	*E001* *E134* *E114* *E158* *E198* *E208* *E209* *E001* *E006* *E050* *E152* *E153*

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
		In terms of the CEG we were keen to establish if stakeholders felt that retaining the group and strengthening our relationship was important. Similarly, we were interested to see how stakeholders felt about the trade unions and if they though it would be helpful for the board to interact more directly with the various representatives. Finally, we wanted to sense check our approach to reporting. Our starting position was that we knew we already published a lot of material, so we wanted to establish if our stakeholders found it useful, how understandable it was and if anything else would be helpful to them. ***Key wave 2 finding:*** *Stakeholders felt strongly that the way in which we interact with our suppliers should demonstrate a sustainable, ethical and responsible approach that contributed to the achievement of our (and regional) decarbonisation. The concept of introducing enhanced environmental metrics was supported but it was advised that improvements should be made without passing on costs to customers.* *There was overall support for retaining the CEG to promote the best interests of stakeholders on an ongoing basis. In respect of reporting, the consensus was that more information might be helpful in new or evolving areas (such as DSO) and to further itemise our expenditure. Importantly, technical jargon should be minimised. However, we should not invest in this area.* **Wave 3:** We opted to focus predominantly on the plans concerning our relationship with suppliers to establish the level of importance amongst wider initiatives and assess how ambitious stakeholders wanted us to be in terms of our priorities and expenditure. ***Key wave 3 finding:*** *It was confirmed that stakeholders felt it was important for us to demonstrate that we had policies and procedures in place to promote a strong ethical and sustainable supply chain which encouraged our suppliers to adopt robust environmental standards. It was acknowledged that there was a clear link between our plans and our approach to decarbonisation and other environmental initiatives.*	*E154* *E015* *E030* *E033* *E034* *E072* *E189* *E251* *E270* *E272* *E277* *E299* *E300*
OT4	**Enable competition**	**Wave 1**: Our early engagement explored the concept we had set out in our initial emerging thinking which focussed on greater collaboration with other network operators and utilities. ***Key wave 1 finding:*** *This idea generated inconclusive findings from stakeholders which resulted in us re-scoping our thinking and instead linking our plans into reinforcing and enhancing the level of competition in connections.* Given our change in approach, the engagement that underpinned our plans in this area was undertaken from the connections perspective. Consequently, additional information concerning our stakeholder engagement activity in support of this area and the associated key findings can be found in the connections stakeholder engagement summary.	*E001* *E134* *E114* *E158* *E198* *E208* *E209* *E325*
		Acceptance research and findings: *The acceptance score of openness and transparency is 74%. Acceptance scored highly with trust at 74% being equally important for customers. As acceptance for this area was high, and customers could navigate the area clearly, no further testing will be planned in wave 4.*	
		Overall Wave 4 Findings: A consistent theme during wave 4 was the importance of ongoing accountability and transparency in reporting. The Citizen's panel welcomed plans to report regularly and in plain English to ensure accessibility and plans to continue to educate customers on the energy transition. The proposal for the enduring role for the CEG was also supported *as it was acknowledged that they will play a key role in assuring the delivery of our plans and commitments.*	*CR459* *CR420* *CR426*

WAVE 1 – open and formative engagement

In the first wave of engagement, 103 events were undertaken, engaging 4,762 customers. Of these 103 events, openness and transparency featured as a specific sub-topic five times, reaching 60 stakeholders. The main themes covered by the engagement were:

- open data and data-sharing; and
- transparent reporting

The five events where openness and transparency was a specific sub-topic are listed below:

Engagement reference	Name	Subgroup	Method	Delivery partner	No engaged
E134	Meeting with Newcastle City Council	Local Authority	Online meeting	Northern Powergrid	1
E114	Introductory meeting with Transport for the North	Regional politics organisation	Online meeting	Northern Powergrid	4
E198	Customer experience	Consumers	Telephone interviews	Traverse	8
E208	DFES Workshop	Various: Regional politics, local authorities, corporate interest groups	Online workshop	Northern Powergrid	46
E209	Fuel Poverty Fairness Conference	Internal stakeholders and utilities	Conference	Northern Powergrid	1

Open data and data-sharing

Stakeholders are eager for increased data sharing with Northern Powergrid as an enabler of success in areas like decarbonisation planning and support for vulnerable communities.

- During an introductory meeting (May 2020), Transport for the North (TfN) noted that they are planning to model decarbonisation pathways for the whole transport system in the North as well as EV uptake in the region, creating Transport Future Scenarios (including EVs and public transport) which will include transport use changes over time. They want to explore sharing the outputs and updates as open data [with Northern Powergrid]. **(E114)**
- During a follow-up meeting (May 2020), Newcastle City Council (NCC) noted that they are keen to explore ways that Northern Powergrid and NCC could share data more actively and in real time. There is a significant amount of modelling and spatial analysis undertaken by NCC, and there are immediate areas for collaboration or data sharing [example is decarbonisation planning]. **(E134)**
- During the DFES workshop (March 2020) regional politicians and local authorities (e.g., Durham City Council, Barnsley City Council, and Transport for the North) as well as other organisations (e.g. Energy Assets Network, Amaresco, and Makertopia) identified data-sharing as an important element / prerequisite to advancing various objectives such as understanding future energy requirements, planning for decarbonisation or 'net zero', and in providing advice to customers and clients. **(E208)**
- The fuel poverty fairness event (March 2020) highlighted additional data sharing with customers as a future priority for Northern Powergrid. **(E209)**

- The fuel poverty fairness event (March 2020) also identified changes to use of the PSR and/or other data-sharing agreements as enablers of collaboration with partner organisations to address vulnerable customers needs' and alleviate fuel poverty. **(E209)**

Transparent reporting

- Stakeholders recommend Northern Powergrid increase use of data, provide regular reporting on spending and investment, and reduce technical jargon in communications. Support existed for more information and open-sourced data sharing with customers and stakeholders.

- In customer experience engagement (February 2020) consumers felt that Northern Powergrid should be more open about its costs and suggested that it should provide customers with itemised bills. **(E198)**

- During the GE Customer Service event, a consensus is that Northern Powergrid should be accurate with the information we give our customers, ensuring that it is consistent across all channels. Regardless of where the customer gets the information from, the message should be the same. This can be achieved by ensuring that the onsite staff report back with all changes or updates so that customers can be notified. When speaking to customers, staff should be clear with the information provided, manage the customers' expectations at the first point of contact, and fully explain all processes. **(E158)**

WAVE 2 – testing our emerging thinking with costed levels of ambition

The second wave of engagement was used to test the options generated through the first wave, in order to gauge the levels of customer ambition and further define our outcomes. Engagement was carried out with various stakeholder groups including domestic customers, partners, commercial customers, SMEs, and future energy consumers. The results were split into:

- Ambition (that Northern Powergrid should strive for): (most and least)

- Priority (of an initiative to Northern Powergrid): (highest and lowest)

During wave 2, we ran 135 events in total, engaging 15,475 stakeholders. Of those 135 events, Openness and Transparency was a specific sub-topic at five, covering >3,800 individuals.

The six events where openness and transparency was a specific sub-topic are listed below. Six non-focussed events touched on themes that would become part of this business plan area and included 147 individuals, are additionally overviewed below:

Engagement reference	Name	Subgroup	Method	Delivery Partner	No Engaged
E001	Consumer panel (Leeds and Newcastle)	Consumers	Online panel	Traverse	56
E006	Interviews with rural consumers across the Northern Powergrid area (ET1)	Consumers	Telephone Interviews	Traverse	36
EO50	Emerging Thinking consultation	Stakeholders consumers	Survey	Explain Research	3600
E152	Emerging Thinking Microsite	Stakeholder consumers	Digital engagement	Northern Powergrid	103
E154	Emerging Thinking - rural panel	Rural consumers	Telephone interviews	Northern Powergrid	20
Non-focussed specifically however, additional feedback from these events touched on openness and transparency sub-topics					

Engagement reference	Name	Subgroup	Method	Delivery Partner	No Engaged
E015	Teesside Net Zero Leaders Forum	Regional stakeholders	Online forum	Explain Research	2
E030	Consumer panel	Consumers	Online panel	Traverse	52
E033	Consumer Panel Leeds and Newcastle	Consumers	Online panel	Traverse	57
E034	Consumer panel	Consumers	Online panel	Traverse	34
E072	Institute of Customer Service Research	Future Energy	Research	Northern Powergrid	1
E189	Emerging Thinking - internal feedback	Colleagues	Online survey	Northern Powergrid	1

- Responses varied, covering topics including Northern Powergrid's plans for sustainable and transparent procurement, sharing open data, collaboration with other organisations, and stakeholders' views on accountability.

- Sustainable and transparent procurement: Consumers in Leeds and Newcastle (September 2020) stressed the importance of maintaining ethical standards throughout Northern Powergrid's supply chain and argued that all suppliers should adhere to the same social and environmental principles, even if they could not have the same impact as Northern Powergrid. **(E001)**

- Consumers in the panel stressed the importance of maintaining ethical standards throughout Northern Powergrid's supply chain and supported the development of strict social and environmental criteria for all suppliers. **(E001)**

- The highest priority was buying goods and services in a transparent, ethical, and sustainable way. **(E001)**

- Most consumers in the panel supported the development of a procurement framework that prioritised local suppliers so long as there is no increase in costs and high standards are maintained. **(E001)**

- Participants from rural areas (September 2020) largely supported favouring local suppliers and small businesses, providing they were willing and able to subscribe to the same social and environmental standards as Northern Powergrid. Some participants said they would support such an approach even if it meant higher costs to consumers, although most would only support a slight increase in costs. **(E006)**

- Consumers participating in the panel saw the use of small suppliers 'nice to have' but some raised concerns about the reduced capacity associated with small businesses. **(E001)**

Open data and data-sharing

- According to the panel in Leeds and Newcastle (September 2020), the least prioritised areas, given a consistent level of cost, (e.g., bolted on) were to: develop a comprehensive open data offering, including access to all non-personal electricity usage data and to hold regular trade union meetings with Northern Powergrid Boards. **(E001)**

- Some consumers expressed concern about the potential security and privacy risks associated with sharing data with third parties and would only support this on the condition that it is tightly regulated. **(E001)**

- Consumers in the panel felt they need to be convinced of data security and data ownership arrangements before being willing to engage in digitalisation of something so fundamental as electricity supply. **(E001)**

- On data security and transparency, many customers advised they would be willing to share information if they believed it would lead to more relevant experiences attuned to their needs. **(E001)**

Collaboration

- Consumers in the panel expressed support for Northern Powergrid building partnerships with local authorities and other companies to address inequalities and drive regional growth. **(E001)**
- The highest priority service level was expanding work with regional partners on community energy, decarbonisation, and green recovery projects to help communities and individuals use less energy. **(E001)**
- The lowest priority service level was working with other network operators and utilities to create a 'one stop shop' to access utilities from one account, reduce costs and stimulate the market / Maximise visibility of what Northern Powergrid invests in and why. **(E001)**
- According to the panel, most 'bolted on' service levels (additional services added to other proposition levels) were to create more partnerships with local authorities, heat and transport suppliers and others to drive regional growth and that a minimum of 95per cent of suppliers were to subscribe to strict environmental management standards. **(E001)**
- The most ambitious service level was expanding work with regional partners on community energy, decarbonisation, and green recovery projects to help communities and individuals use less energy. **(E001)**
- Some participants of the panel seemed to struggle with the language in the documents provided prior to the interview, particularly with the connections and openness and transparency sections and asked for simplification in future. **(E001)**

Accountability

- Consumers in the panel held in Leeds and Newcastle (September 2020) felt that Northern Powergrid should be more open about its costs and suggested that it should provide customers with itemised bills. **(E001)**
- Consumers supported the regular publication of detailed reports outlining Northern Powergrid's spending and investments, as well as the logic behind it. **(E001)**
- According to the panel, the least ambitious service level was to maximise visibility of what Northern Powergrid invests in and why. **(E001)**
- According to the panel, the lowest priority service level was turning its Customer Engagement Group into a standing body to ensure that Northern Powergrid is progressing and following its business plan properly. **(E001)**
- Many consumers in the panel argued that the language in reports should be less technical, and that reduced use of jargon would improve accessibility and, therefore, transparency. **(E001)**
- According to the panel, the most ambitious service level was turning its Customer Engagement Group into a standing body to ensure that Northern Powergrid is progressing and following its business plan properly. **(E001)**
- Most consumers expressed support for increased transparency, but some argued that Northern Powergrid was obliged to make improvements in this area without passing the costs on to its customers. **(E001)**
- Most consumers from the rural areas (September 2020) liked the idea of investing in a permanent Customer Engagement Group, as they felt it would help consistently prioritise consumers' interests. **(E006)**
- Participants of the consumer panel (September 2020) emphasised transparency around cost. **(E001)**

Other topics

- Consumers from the rural areas (September 2020) largely felt that Northern Powergrid's current service offer met, and in some cases exceeded, their expectations – although this was largely due to many of them not having any prior expectations regarding 'openness and transparency'. **(E006)**

- Consumers taking part in the consumer panel in Leeds and Newcastle (September 2020) supported Northern Powergrid taking a leading role in driving regional decarbonisation and setting strict environmental standards for both itself and for other companies. **(E001)**

- According to the consumer panel in Leeds and Newcastle (September 2020), the least preferred service level was option A (leaders in regulatory integrity). **(E001)**

- According to the consumer panel in Leeds and Newcastle (September 2020), the least preferred service level was option D (a regional leader on the path to decarbonisation). **(E001)**

- Many interviewees felt that the language used to describe this topic was more complicated and jargon-heavy than others and reported having to re-read the background information multiple times. **(E001)**

- According to the consumer panel in Leeds and Newcastle (September 2020), the most preferred service level was option C (actively facilitating regional decarbonisation). **(E001)**

- According to the consumer panel in Leeds and Newcastle (September 2020), the most preferred service level was option E (sustainable development at the heart of Northern Powergrid). **(E001)**

- The findings from the emerging thinking consultations (November 2020) established that the views of both audiences were broadly aligned; with 26 per cent of business respondents preferring option E overall (breaking new ground) and a similar proportion 24 per cent of domestic customers also chose this service level option. 21 per cent of both business and domestic customers preferred option D overall (regional leader driving sustainable development). **(E050)**

- Participants from rural areas (September 2020) were split on the appropriate level of ambition for openness and transparency, with some pushing for minor improvements and others arguing that the current offer was sufficient and that no further investment was required. **(E006)**

- Consumers in Leeds panel (September 2020) felt that they would benefit from more detailed information about specific topics, wider availability of information, improved transparency regarding ongoing projects and existing services, and a greater emphasis on group dynamics in online discussions. **(E001)**

- The consumer panel in Leeds and Newcastle also felt Northern Powergrid should inform its customers of its strategic approach to reaching net zero and ensure transparency around any costs that might be passed on to consumers. **(E001)**

WAVE 3 – refining and finalising our plan

Our third wave of engagement during 2021 was used to refine our proposals and gain endorsement for our final service level options. The engagement was carried with consumers and regional political representatives.

During wave 3, we ran a total of 91 events, engaging 32,500 stakeholders. Of these 91 events, openness and transparency was a specific sub-topic at five, covering 2,785 individuals.

The five events where openness and transparency was a specific sub-topic are listed below:

Engagement reference	Name	Subgroup	Method	Delivery partner	No engaged
E251	Willingness to Pay quantitative prioritisation survey – Choice Experiment	Consumers	Survey	Impact	1,908
E270	2023-2028 Regional Political Engagement	Regional politics	Bilateral meetings	The Public Affairs company	131
E277	Northern Powergrid Sustainability Survey	Customers stakeholders	Survey	Explain Research	300
E299	2023-2028 Plan Website Survey Responses	Stakeholders customers	Survey	Northern Powergrid	242
E300	Colleague engagement survey – plan acceptance	Internal stakeholders	Various	Survey	204

- During a willingness to pay choice experiment, openness and transparency ranked eighth of twelve for domestic customers **(E251)**
- Domestic customers advised that going forward, a deeper understanding of customer value was required; openness and transparency was partly tied in with the environment, which was a highly valued area. **(E251)**
- Respondents to Northern Powergrid's sustainability survey said that they want Northern Powergrid to highlight any impacts as a result of sustainability actions on customer bills in a clear and transparent way**. (E277).**
- According to the 2023-2028 Plan website survey responses, 45.4 per cent of the participant to the survey said they 'really like' openness and transparency. **(E299)**
- During the colleague engagement survey – plan acceptance, a majority (7 2per cent) of respondents stated that they would not be directly involved with delivering the commitments within the openness and transparency business plan area. Linked to this, a lower (in comparison to other plan areas) mean score was given from colleague respondents overall for their commitment to their role in assisting in delivering the propositions. This was a score of 8.8 out of 10 which is the joint lowest within the second colleague survey. **(E300)**
- Overall acceptability of this plan area was still relatively high at 4.4 out of 5. However, there were four respondents who selected the 'don't know' option for this question. **(E300)**
- Clearer information needed: The comments within this theme showed that a proportion of respondents believed that the information provided for this plan area could be made clearer and more understandable 'You're using a lot of acronyms and not a lot of explanation for the intentions of this area. I don't understand how burdening ourselves with greater reporting and publishing equates to cheaper connections from Northern Powergrid'. **(E300)**

- Time management concerns: Literal comments within this theme showed that a proportion of colleagues have concerns over how these propositions will affect staff workload 'From the industrial side of the business, increased flexibility will add additional pressures for both job planning and completion which is to be avoided'. **(E300)**

WAVE 4 – Finalising the plan

From July to December 2021, we finalised our plan, responding to queries, addressing gaps and testing overall acceptability. We engaged 10,081 customers and stakeholders overall and with detailed sessions on outstanding openness and transparency topics across 8 events.

The events where Openness and Transparency was a specific sub-topic are listed below:

Code	Name	Subgroup	Engagement Type	Date	No Engaged
(CR459)	Stakeholder panel interviews	Various stakeholders	Quant	May-Jul 2021	60
(CR420)	ED2 Stakeholder Webinar	Regional Politics, Consumers, Future Energy	Meeting	03/09/2021	101
(CR426)	Citizens Panel (Bill impact)	Consumers	Panel	20th & 23rd Sep	37
(CR465)	Business Plan Acceptability Testing	Consumers	Quantitative survey	Oct-Nov 2021	1,742
(CR466)	ED2 Acceptance Comms (winter awareness campaign mail-out)	Consumers	Quantitative survey	Nov 2021	8,141

Feedback in summary

- From the stakeholder panel quantitative survey, it was reported that satisfaction with Northern Powergrid (using a 1-10 scale, where 1 is very unsatisfied and 10 very satisfied) were 63% for "Satisfaction with the relationship with NPg" and 62% for "Satisfaction with the ease of doing business with NPg". In both cases the figure quoted is the proportion giving a rating of 8, 9 or 10. **(CR459)**

- Stakeholders were also asked to state their level of agreement with three attitudinal statements relating to their perception of NPg (1-10 scale, figures shown are the proportion scoring 8, 9 or 10): These were 61% for "NPg is continuously improving its services"; 52% for "I feel NPg make it clear how they have used feedback in their plans" and 55% for "NPg keeps me up-to-date on their investment plans". **(CR459)**

- The three most common topics of engagement that stakeholders reported having with Northern Powergrid across the three month period were: Investing in the future, cleaner, greener and more efficient services (51%), Local community involvement (37%) and Environment e.g. reducing carbon footprint (33%). **(CR459)**

- The three words used most often to describe Northern Powergrid were: Reliable (45%), trustworthy (30%) and Focused (29%). **(CR459)**

Connections

Stakeholder engagement summary

To shape our plan around the priorities of our connections stakeholders, we undertook a broad and inclusive programme of engagement in three waves. This engagement has enabled us to identify the priorities and challenges faced by our connections customers and broader stakeholders and allowed us to shape a plan that meets their needs.

Ref.	Outcomes	Engagement insight and triangulation	Eng ref:
C1	**Help all our small works customers, including those who are vulnerable, to get connected**	**Wave 1:** In wave 1, we identified and engaged with a broad and inclusive range of connections customers and stakeholders. We benchmarked our current performance and delivered a comprehensive programme of targeted engagement activities that enabled us to understand their views of our current service, as well as their evolving needs and future priorities. In terms of small works customers, throughout our engagement timescales and cost of connections were highlighted as key areas of improvement which triggered our exploration into the trade-off between the two in our further engagement. In discussions around service models, domestic and small works customers largely favoured a personal and closely supported service to guide them through the connections process, however many did also highlight the importance of self-serve tools for simpler connections and repeat customers. ***Key wave 1 findings:*** *A focus on the trade-off between timescales and costs was needed for future engagement, as well as finding the right balance between a personal and self-service model for our future propositions.*	*EO26* *E082* *E026* *E073*
		Wave 2: In wave 2, we explored our emerging thinking with our stakeholders and sought their feedback to refine our plans and customer outcomes. Stakeholders were presented with service levels A to E and asked to select their preferred balance between service level and cost. Generally, domestic and SME customers were supportive of service level E, with support for propositions that significantly reduced connections lead times, it was also highlighted that flexibility around dates would also be useful. Building on what we had learnt in wave 1, we had direct conversations with customers about their preferred service model and it was clear that customers favoured both an enhanced personal service for customers that needed 'hand holding' and a self-serve approach for those who were more experienced in order to speed up the process and keep costs down. ***Key wave 2 findings:*** *Domestic customers supported an ambitious approach that significantly reduced lead times and provides a personal service for those looking to connect. Providing hands on support when customers need it is important.*	*E050* *E001*
		Wave 3: In wave 3, we initiated targeted engagement sessions with small and major works customers to seek endorsement and further feedback on our customer outcomes, strategy and overall plan. Engagement prior to wave three had not fully addressed the impact that significantly reduced timescales would have on the cost of connections. This was directly explored with small works connections customers in wave 3 and we identified that, on the whole, customers were not willing to pay more for a quicker connection and were satisfied with the timescale of their works, as well as their overall experience. This helped balance our view and allowed us to carefully select a reduction in timescale that would not impact on the cost of connections. We therefore propose to reduce the lead time for small works customers by around 20 per cent at no extra cost. Our proposition to offer customers the opportunity to pick the date and time for their work was also endorsed.	*E254*

Ref.	Outcomes	Engagement insight and triangulation	Eng ref:
		Based on previous feedback, we also tested our proposition to provide digital platforms for customers who want to self-serve and enhanced upfront support for those who prefer to have a conversation before submitting an application and our stakeholders agreed this struck the right balance. In addition, our propositions to provide a free advice and application checking service as part of this upfront support were endorsed and valued. ***Key wave 3 findings:*** *Small works customers were not willing to pay for quicker connections which helped to balance our approach. Customers endorsed our propositions around digital offerings, enhanced personalised service, application checking service and flexibility around the dates and times for connections works.*	
C2	**Accelerate the drive towards net zero by facilitating the mass uptake of low carbon technologies, flexible connections and network flexibility**	**Wave 1:** Our engagement activities in wave one with our stakeholders highlighted that they see our role as driving decarbonisation. We were expected to set out a clear vision, roles and responsibilities and articulate how our connections services will support this. Enabling the connection of low carbon technologies (LCTs) was a key priority to ensure that we are an enabler to decarbonisation. In addition, stakeholders highlighted our role in the promotion of flexible connections, ensuring connections stakeholders are aware of and understand the options available to them. ***Key wave 1 finding:*** *We are seen as a driver of decarbonisation and our stakeholders want us to take a lead in enabling LCT uptake and flexible connections.*	*E079* *EO82*
		Wave 2: Stakeholders opted for service level E, looking for ambition from us to support the net zero transition. For example, consumer panellists recognised the need for us to expand connections services in order to facilitate the EV transition. Stakeholders also highlighted the need for efficient connections services in this area, streamlining processes given the volume of applications that would be required. In addition, speed of connection continued to be a theme as did support for customers to navigate through the process. ***Key wave 2 finding:*** *Dealing with the volume of applications required to accommodate the low carbon transition requires efficient and streamlined processes, we should be a driver of decarbonisation and not a blocker.*	*E001* *E020*
		Wave 3: In our wave 3, our willingness to pay survey highlighted that the value of connections was increased in the context of supporting the uptake of LCTs, this provided endorsement of our investment in this area to facilitate the connection of these technologies in the most efficient way. In an AutoDesign workshop, local authority stakeholders highlighted the need for data availability to support the connection of LCTs. In our major connections focus groups we shared our business plan propositions with a range of connections stakeholders through which they were endorsed. ***Key wave 3 finding:*** *Stakeholders endorsed our business plan propositions supporting our proposed tools and systems to facilitate the uptake of LCTs.*	
C3	**Empower our customers to make more informed decisions about how and where to connect by expanding the scope of network information**	**Wave 1:** Throughout our broad stakeholder engagement and benchmarking in wave 1, the availability of network data was highly prioritised for service improvement. Stakeholders shared positive experiences of using AutoDesign, but were looking for more. It was highlighted that visibility of network data is key to allow connections customers to make informed decisions about their connections before submitting an application. A self-serve option to determine point of connection was highly valued by ICPs and IDNOs. Major connections customers in general were also looking to shorten the connections process and the introduction of additional self-serve tools was identified as a possible way to facilitate this.	E076 E083 E082 E081

Ref.	Outcomes	Engagement insight and triangulation	Eng ref:
		Key wave 1 finding: *Availability of network information was highly prioritised across stakeholder groups to allow more informed decision making and reduced reliance on engineers.*	
		Wave 2*:* Making the appropriate data available to enable customers to make an informed decision about connections continued to be a strong theme in wave 2 engagement, including at our series of regional conferences. Stakeholders were keen to build on the positive impact of AutoDesign with expansion into the low voltage (LV) network, generation connections and retrofit capabilities. We were also challenged to provide forward looking data as well as real time, for example to share where capacity will become available on the network due to network investment. ***Key wave 2 finding:*** *Stakeholders are looking for network data across the LV, HV and EHV network, across demand and generation as well as a long term view of up and coming capacity.*	
		Wave 3: In wave 3 stakeholders endorsed our propositions. In our heat and transport workshop, stakeholders commented that it would useful to have greater visibility of the HV network through enhancements to AutoDesign supporting our proposition in this area. At an AutoDesign co-creation workshop, stakeholders strongly supported propositions to enhance AutoDesign to provide coverage across LV, HV and EHV networks including both demand and generation connections of a range of sizes. There was also support for the development of AutoDesign to enable optioneering around retrofitting properties with LCTs, as well as the ability to generate firm quotations. This feedback directly supported our propositions around future data provisions, linking with our openness and transparency proposition to develop a comprehensive open data offering. In major works connections focus groups, our propositions in this area were reviewed and endorsed by stakeholders, with clear support for the proposed open data platform. ***Key wave 3 finding:*** *Stakeholders are in support of our propositions around network information and our open data platform.*	*E269*
C4	**Continue to facilitate fair and open competition so that our customers have a choice in who delivers their connection**	**Wave 1:** Facilitating fair and open competition to enable choice continues to be a key obligation and one we take seriously. In conversations with ICPs specifically, it was highlighted that this could be better facilitated through greater availability of network information. ***Key wave 1 finding:*** *Availability of network information was a key priority for ICPs to help them actively compete, allowing equality between ICPs and Northern Powergrid.*	*E081*
		Wave 2: Our conversations with ICPs during wave 2 began to explore our proposition around providing ICPs and Independent Distribution Network Operators (IDNOs) with a bespoke AutoDesign platform. This development was supported by ICPs, reducing reliance on our engineers. ***Key wave 2 finding:*** *ICPs supported the development of a bespoke AutoDesign platform for non-contestable costs.*	*E089*
		Wave 3: In in-depth interviews with ICP customers we presented our propositions around extending the scope of contestable works, publishing guide prices and developing a bespoke AutoDesign platform. All propositions were endorsed by these stakeholders. ***Key wave 3 finding:*** *ICPs endorsed our business plan propositions.*	
C5		**Wave 1:** Across all stakeholder groups there were discussions around a preference to have easier access to engineers for technical advice and discussions. Stakeholders were looking for close working relationships with us and access to technical advice and support to enable optioneering and identifying the quickest and cheapest way to connect. Alongside this, stakeholders were looking for us to actively promote flexible connections to facilitate faster and cheaper connections.	*E076* *E082*

Ref.	Outcomes	Engagement insight and triangulation	Eng ref:
	Deliver an efficient connections service for all our customers with smarter, more flexible solutions	***Key wave 1 finding:*** *Stakeholders want to work with us to identify the most efficient ways to connect to the network.*	
		Wave 2: Stakeholders continued to discuss issues around cost, network capacity and speed of connections. This was particularly prevalent in our series of regional conferences, emphasising the need for a more efficient, flexible and smarter approach. Stakeholders suggested means of minimising reinforcement costs such as the use of battery storage. However it was clear that stakeholders did not fully understand the range of flexible options available to them, indicating that is an area where we will need to take the lead. ***Key wave 2 finding:*** *We need to be proactive in discussing flexible arrangements with customers, providing technical advice and support and these conversations are welcomed by stakeholders.*	*E199*
		Wave 3: Our conversations with stakeholders around flexible connection solutions continued into wave 3, for example at our Stakeholder Summit highlighted the need for us to support stakeholders with flexible solutions. In a heat and transport workshop it was also highlighted that better access to engineers would support with identifying connections sites and flexible solutions. This was in direct endorsement of our proposition to upskill our design engineers to facilitate conversations of this nature. In our major works connections customer focus groups, we shared our propositions in this area with stakeholders, all of which were endorsed. The enhanced 'ask the expert' technical advice service was met with enthusiasm as was the opportunity for discussions with engineers around flexible solutions. ***Wave 3 key finding:*** *Stakeholders endorsed our propositions in this area.*	*E267*
		Acceptance research and findings: *The acceptance score for connections is 72 per cent. Trust was important to customers at 75 per cent and in particular vulnerable customers who rated it 80 per cent. As acceptance is high from customers reflecting on the connections plan, this area will not be explored in further acceptability testing.*	*E325*
		Overall Wave 4 Findings: *In Wave 4, recognising that different customer groups have differing and individual needs - particularly with consideration of the acceleration of decarbonisation and the anticipated increase in volumes of LCT connections – engagement has focused on further understanding of these needs.* *This has helped us to better tailor our propositions and plans for connections including the introduction of tailored services, future end-to-end support models, more choice and data sharing approaches.*	*CR401* *CR402* *CR403* *CR415* *CR416* *CR418* *CR460* *CR461*

WAVE 1 – open and formative engagement

The first wave of engagement was used as a chance to shape and define our options. In total, we ran 103 events, engaging 4,762 in wave 1. Of these 103 events, connections was a specific sub-topic at >13, covering >1,400 stakeholders. Themes that were covered by the engagement:

- providing great customer service;
- cost of connections; and
- digital channels.

The events where connections was a specific sub-topic are listed below:

Engagement reference	Name	Segment	Method	Delivery partner	No engaged
E026	Consumer Panel	Consumers	Online panel	Traverse	57
E032	Consumer Panel	Consumers	Online panel	Traverse	62
E066	Consumer Rescue research	Consumers	Telephone interviews	Explain	165
E073	Broad Measure of Consumer Satisfaction Surveys	Consumers	Telephone interviews	Explain	873
E076	Interviews with pan UK DNO consumers	Consumers	Telephone interviews	NA	2
E078	Local Authority Forum – AutoDesign launch	Regional politics	Online forum	Northern Powergrid	29
E079	Supporting the electrification of transport event	Consumers	Online workshop	Northern Powergrid	32
E080	DG Owner Operator Forum	Generators	Online forum	Northern Powergrid	11
E081	AutoDesign workshop for ICPs	ICPs	Online workshop	Northern Powergrid	30
E082	Connections stakeholder priorities research	Small and major works connections customers	Telephone Interviews	Explain	65
E083	Connections and data services questionnaire	Consumers	Survey	Explain	34
E186	Colleagues survey	Northern Powergrid Colleagues	Survey	Northern Powergrid	34
	Survey of customers who received a quotation but did not proceed with the work	Small and major works connections customers	Survey	Explain	93
	Local Authority Forum – Focus on local area energy planning	Regional politics	Online workshop	Regen	23

Providing a great connections service

- Most consumers would prefer to apply for a connection via online self-service versus a phone call but want the option to speak to someone if necessary.

Awareness and communication

- Stakeholders from Leeds and Newcastle who participated in Northern Powergrid's Consumer Panel were largely unaware of Northern Powergrid's connections service prior to the online panel. In most cases, this was because for the most part they had not used the service, although those consumers who had used it spoke positively about their experiences. **(E026)**

- Most consumers of the online panel felt that the connection service offered by Northern Powergrid matched their expectations, although some expressed concern at the high costs and the lengthy waiting periods involved.

- When asked how Northern Powergrid could further improve our service. Consumers in Leeds and Newcastle prioritised 1) improved communication 2) simple processes and 3) quicker service. **(E026)**

Current dissatisfaction

- Pan UK DNO customers surveyed felt communication and providing a personal service is key to good customer service and wanted to be able to speak to the right person, in a timely manner. When considering what Northern Powergrid could do to improve customer service they prioritised availability of network data and cost. Northern Powergrid is considered one of the expensive DNOs. **(E076)**

- During the Supporting the Electrification of Transport workshop, some stakeholders said they would like to see Northern Powergrid do more in terms of the net zero transition. Stakeholders believe Northern Powergrid should be 'driving' not 'supporting' the transition. We need to clearly set our vision, role and responsibilities and explain how our connections service will support this transition. **(E079)**

- Overall in the Wave 1 stakeholder priorities interviews, domestic (small works) customers favoured a more personalised connections service model. Respondents referenced their own experience, highlighting that the process would have been easier if they had been supported from the start to the end of the process. They thought Northern Powergrid had a key role to play in enabling net zero by ensuring the infrastructure is in place to facilitate new LCT connections, they said the cost of these connections was too high however and that financial incentives would be helpful in encouraging them to make the switch. (**E082)**

- The cost of the quote was the number one reason identified by customers who received a quotation but did not proceed with the work, although changes to the nature of the project and wayleaves were also identified as contributing factors.

- Respondents were also asked whether they thought the quote they received represented good value for money and most agreed that it.

Improvement options

In the Connections Colleague Survey, internal stakeholders were asked to assess four different propositions **(E083)**:

- Proposition 1 (additional technical support pre-application): colleagues support this proposition but have mixed views on whether to apply a charge and the extent of the service.

- Proposition 2 (fast track – offering next day / same day connections service): colleagues lack confidence in our ability to deliver this proposition, due to resourcing capabilities and the potential for a lack of 'fairness.'

- Proposition 3 (diversions): colleagues were supportive of us improving timescales and service delivery arrangements, subject to it being provided at a reasonable cost.

- Proposition 4 (data services): strong support from colleagues for this proposition and for it not being charged for

Cost of connections

Self-service is assumed to bring more flexibility to the process at a lower cost.

- Consumers of the Northern Powergrid Consumer Panel identified the availability of information and the price of connection as the factors most important to them when applying for a new or upgraded connection to the grid. **(E026)**
- According to the panel, most consumers believe that costs of, for example, connecting an EV charger should be borne by those consumers who stand to benefit from them, and/or that any attempt to spread the cost should account for differences in income. **(E026)**
- During interviews with pan UK DNO customers (i.e. major works customers who deal with more than one DNO), when asked about how Northern Powergrid can improve their connections service, one customer stated availability of network data and the other costs. **(E076)**
- When considering time to connect, pan UK DNO interviewed highlighted they didn't want the quickest connection, but to have a good lead time to support their overall project. Both used ICPs to reduce cost and tailor timescales. **(E076)**
- Stakeholders who took part in the Local Authority Forum said collaboration and close working relationships with network operators will be crucial in helping them meet local area decarbonisation targets.

Digital channels

A slight majority of consumers supported provision of digital channels like apps and additional online services, if these were provided for a reasonable price or free of charge.

- The majority of consumers of Northern Powergrid Consumer Panel in Leeds and Newcastle said they would prefer to use an online self-service to a phone call to apply for connections, although they would like to have the option of speaking to someone over the phone if necessary **(E026)**
- Most consumers felt that an online self-service option would allow for more flexibility in the connection process, while also reducing costs due to less input from Northern Powergrid staff. **(E026)**
- At an AutoDesign workshop held for ICPs, those attending said network visibility and data is key and that they needed access to the same tools and information as our engineers.

Stakeholder priorities

- During the wave 1 stakeholder priorities research, domestic customer respondents said they favoured an enhanced, more personalised connections service. Respondents based this on previous experience, highlighting that the process would have been easier if they had been supported from the start to the end of the process. **(E082)**
- Generators said that being able to get an overview of the network and self-serve at the application stage was best for them. After the initial application stage generators expressed a preference towards a more hands on customer service, with a number highlighting that a single point of contact would be helpful. **(E082)**
- Where there was the opportunity for a flexible connection to be made, generators felt it was vital that Northern Powergrid were proactively flagging this with customers. **(E082)**
- ICPs said that it would be useful for network information to be more accessible and that current self-serve systems could be expanded to allow them to have a greater overview of the network at the planning stage of the connections process. After the initial stage, ICP respondents felt that an enhanced service was necessary in order to ensure they could discuss ideas and options for connections in more detail. **(E082)**

- Local authorities consistently highlighted that having a close working relationship with Northern Powergrid was key to achieving their goals going forward. They also stressed that it was vital for Northern Powergrid to invest in their network with many highlighting that the upsurge in new technologies like EVs was likely to cause a strain on their network. **(E082)**

- All local authorities favoured an advisory service, many highlighted that they would like a single point of contact for connections and a number also said it would be useful to have an account manager for their projects. Some did highlight that self-serve was useful at the initial planning stage in order to give them an overview of available capacity and cost. **(E082)**

- Local authority respondents generally had a lower understanding of flexibility until this was explained to them, these respondents highlighted that it was key for Northern Powergrid to share this information with them so they could understand the capacity for flexibility in their local area. Local authorities also felt Northern Powergrid should work with them and support in disseminating information about flexibility to domestic consumers in their area. **(E082)**

- The vast majority of domestic consumers favoured a more enhanced personalised service, essentially domestic consumers wanted to be supported throughout the process and assigning them a point of contact as early as possible in the process would help with this. **(E082)**

- In the same research, local authorities, generators and major connections respondents also favoured a more personalised service. In particular, local authorities were enthusiastic about developing strong working relationships and felt that having an overall account manager would be very useful **(E082)**

- Timescales for connections and speed of quotations were consistently mentioned by domestic consumers and across all stakeholder groups, highlighting that this is an area front of mind for the majority of connections customers. **(E082)**

- In interviews with major connections customers, delivering timely and cost efficient connections was seen as the key priority for the future. As with other stakeholder groups, investment in infrastructure was also highlighted and ensuring renewable energy was connected to the grid. **(E082)**

- Major connections customers clearly favoured an advisory service, with a number highlighting that it would be useful to have more direct access to Northern Powergrid staff throughout the connections process. Some respondents highlighted that they were happy to use a self-serve element on simpler connections however, still stressed that for more complicated connections they would like to have an enhanced, advisory service. **(E082)**

- Major connections customers felt that it was Northern Powergrid's responsibility to reinforce the infrastructure and incorporate as much new technology as possible onto the network in order to facilitate the transition to net zero. **(E082)**

- Major connections customers also felt that Northern Powergrid needed to understand their network fully in order to support greater flexibility. They felt it was key to utilise as many new technologies as possible so that flexibility and flexible connections could be pushed forward efficiently. **(E082)**

WAVE 2 – testing our emerging thinking with costed levels of ambition

Our second wave of engagement was used to testing options generated through the first wave – gauging levels of consumer ambition and defining our outcomes. Engagement was carried out on domestic consumers, SMEs and future energy consumers. The results were split into:

- Ambition (that Northern Powergrid should strive for): (most and least)

- Priority (of an initiative to Northern Powergrid): (highest and lowest)

- Cost of connections

In total, we ran 135 events, engaging 15,475 stakeholders in wave 2. Of these 135 events, Connections was a specific sub-topic at >16 of them, covering >5,100 interactions.

The events where Connections was a specific sub-topic are listed below:

Engagement reference	Name	Segment	Method	Delivery partner	No engaged
E001	Consumer Panel Leeds and Newcastle	Consumers	Online panel	Traverse	56
E006	Interviews with rural consumers across the Northern Powergrid area	Consumers	Phone interviews	Traverse	36
E009	SME Panel	Consumers	Online panel	Explain Research	21
E041	Distributed Generation Owner Operator forum	Generators	Online forum	Regen	19
E045	2023-2028 regional political engagement	Regional Politics	Online meetings	Public Affairs Company	7
E046	2023-2028 regional political engagement	Regional Politics	Online meetings	Public Affairs Company	74
E047	2023-2028 regional political engagement	Regional Politics	Online meetings	Public Affairs Company	35
E050	Emerging Thinking consultation	Consumers	Online survey	Explain Research	1,198
E086	DG Owner Operator forum	Generators	Online forum	Northern Powergrid	19
E087	LCT installer workshop	Future Energy	Online workshop	Traverse	17
E153	Emerging Thinking microsite users	All groups	Digital survey	Northern Powergrid	3,600
E088	Local Authority forum - Focus on local area planning	Regional Politics	Online forum	Public Affairs Company	20
E089	ICP Seminar	Utilities	Online forum	Northern Powergrid	20
E153	Emerging Thinking - microsite users	Consumers and Stakeholders	Microsite	NA	103
E154	Emerging Thinking - rural panel	Rural consumers	Microsite	NA	20
E199	EV connections engagement with BEIS/OLEV	Future Energy	Online meeting	NA	7
E050	Emerging Thinking deliberative workshop on connections	Connections customers and stakeholders	Online workshop	Explain	14

Ambition and prioritisation

- Consumers at the consumer panel in Leeds and Newcastle thought the following: **(E001)**
  - Highest priority: Offering an efficient connections service that offers value for money.
  - Lowest priority: Introducing more options for consumers who require flexible connections.
  - Most ambitious: Offering an efficient connections service that offers value for money.
  - Least ambitious: Extending the provision of network information and mapping data to help consumers make informed decisions about where to connect.
  - Most preferred: Option E (high levels of network flexibility and connectivity).
  - Least preferred: Option A (personalised and online support service offerings).
  - Most 'bolted on': 40 per cent reduction in connections waiting time (from 38 to 22 days on average).
  - Least 'bolted on': Enable the low carbon transition with a smart network that is managed locally and can facilitate mass uptake in flexible connections.
  - Most selected: Meet with someone to talk through your requirements prior to receiving a quote.
  - Least selected: Access a self-service system to complete your request, receive a quote and pay online.
- SME respondents were more likely to support the most ambitious service level option E, with 42 per cent preferring this compared to just over a quarter (27 per cent) of domestic consumers. **(E050)**
- During consultations on Northern Powergrid's emerging thinking, 21 per cent of business respondents preferred option D, which aligned with the views of 23per cent of domestic consumers. A sizeable minority of 19 per cent of domestic consumers also supported option B, compared to one in six (16 per cent) business respondents. **(E050)**
- At Northern Powergrid's ICP seminar, those taking part again highlighted the importance of network data availability. When asked level option they preferred, option D came out narrowly in front, there was significant support however for option A (same service, less cost). **(E089)**
- Those taking part in an EV connections engagement with BEIS/OLEV said that cost is an issue and it is 'inherently unfair' that the last person to 'tip the grid' (trigger reinforcement) 'over pays'. **(E199)**
- At the consumer panel in Leeds and Newcastle, consumers were largely supportive of an ambitious overhaul of Northern Powergrid's connections service, although several expressed a concern that this could lead to significantly higher costs for consumers. **(E001)**
- Most consumers recognised the need to expand Northern Powergrid's connections service to support the anticipated increase in EV connections, although some argued that supporting EV connections was the responsibility of local or national government. **(E001)**
- Many consumers supported the provision of an online self-service connections service on the basis that such a service would be quick, flexible and potentially cheaper for Northern Powergrid. However, most consumers felt that Northern Powergrid should also offer a personalised 'hand-held' service for those consumers who were less comfortable using an online service and/or who did not have the expertise necessary to apply for a connection themselves. **(E001)**
- Many consumers regarded the provision of a single point of contact throughout the connections process as a key feature of a 'hand-held' service. **(E001)**

- Consumers felt that an improved connections service should also include additional support for consumers wishing to connect renewable energy sources such as solar panels. **(E001)**

- Consumers supported the development of online self-service options, on the condition that additional support would be available to those consumers who need it. **(E001)**

- Most interviewees in the consumer panel said speeding-up the connections process should be the primary objective of any evolving connections service, and thought this could be achieved with relatively little investment. **(E001)**

- Interviews with many consumers living in rural communities across the Northern Powergrid area showed that many interviewees considered low carbon technologies such as electric vehicles as a key area for future investment, although some argued that national and local government should provide financial and practical support to Northern Powergrid to facilitate this. **(E006)**

- A small number of respondents on the SME Panel had experience of the connections process. One had experience of a service alteration, another had connected a new property, one had applied to connect a wind farm and another had experience trying to connect a PV for a client. **(E009)**

Low carbon technology uptake

- In the event that they needed an EV connection, most consumers said they would go to their energy supplier or the vehicle manufacturer, or local and/or national government for advice and support. Those who saw a role for Northern Powergrid in this process said that it could be providing independent advice or information, or support the development of on-street charging infrastructure for people with no access to off-street parking. **(E006)**

- The respondent participating in the panel who wanted to connect a wind farm to the network stated that the cost was prohibitive – they were too far away from the exchange to connect, so did not pursue this. **(E009)**

- There were very few respondents who had low carbon technologies (e.g. solar panels) and only a limited number were planning on adopting LCTs for their business in the near future. **(E009)**

- Some respondents might be interested if the technology advances enough (e.g. the farmer would purchase an electric tractor, the property developer would purchase an electric van). The main reason for low uptake was the high investment cost. **(E009)**

- Generally, SME panel respondents wanted to see more support, information and grants available from the government to support the low carbon transition. In terms of Northern Powergrid's role, they thought it should focus on raising awareness of the options available. **(E009)**

- Consumers at a sustainability engagement session questioned how Northern Powergrid is prioritising its connections to low carbon power generation and suggested that communities currently using oil or solid fuels should be prioritised in order to better facilitate decarbonisation. One consumer also commented that they had expected to see greater a focus on technology within the proposals, for example, the use of technology in promoting the transition to electric vehicles or facilitating local, low carbon power generation. **(E020)**

- During a 2023-2028 regional political engagement session, concerns were raised about the cost of connections for industry and new business and one consumer said that this is why people are looking at IDNOs and private networks. **(E045)**

- In the engagement with BEIS/OLEV on EV connections, consumers said that we should explore battery storage to avoid the need for consumers to pay for reinforcement. **(E199)**

- The transport industry for EVs is at the 'dipping the toe in the water' phase - but collectively the market needs the confidence they can put their foot to the pedal. Guidance for fleet managers that is written in language they understand is needed to help navigate through the process. **(E199)**

Cost of connections

- Northern Powergrid explored its emerging thinking with stakeholders at a deliberative connections workshop. One of the key areas for discussion was the impact of the various service levels on the cost of a connection (i.e. what customers pay us to carry out a service) as well as the socialised costs. **(E050)**
- Cost of connections was an area of concern flagged by these stakeholders and this is reflected in the range of preferred service levels they selected. **(E050)**
- When asked to pick their preferred service level, results were evenly split between option B (more for the same) through to option E. Overall, there was a slight majority came out in favour of the option D. **(E050)**

WAVE 3 – refining and finalising our plan

Our third wave of engagement was used to refine our proposals and gain endorsement for our final plans in 2021. The engagement was carried with domestic and rural consumers, SMEs, local authorities, as well as government, Ofgem and industry representatives. Themes covered by the engagement are:

- engagement on connections;
- willingness to pay; and
- self-serve options including AutoDesign

In total, we ran 91 events, engaging 32,500 stakeholders in wave 3. Of these 91 events, connections was a specific sub-topic at 12 of them, covering >2,250 individuals.

The 12 events where connections was a specific sub-topic are listed below:

Engagement reference	Name	Segment	Method	Delivery partner	No engaged
E236	Meeting with Energy Systems Catapult – discussing heat as a service and flexibility	Future Energy	Online meeting	NA	1
E251	Willingness to Pay (WTP) quantitative prioritisation – choice experiment research	Customers	Research survey	Impact	1,908
E254	Small works connection customers focus groups	Small works connections customers	Online focus groups	Explain Research	14
E259	Northumberland County Council meeting	Regional politics	Online meeting	NA	4
E266	Northern Powergrid AutoDesign co-creation Workshop	Various (local authorities, future energy)	Online workshop	Explain Research	13
E267	Stakeholder Summit	Various	Online conference	Traverse	140
E269	Northern Powergrid EV and Heat Workshop	Future energy & Local authorities	Online workshop	Explain Research	12
E270	Regional Political engagement meetings	Regional politics	Online meetings	Public Affairs Company	131

Engagement reference	Name	Segment	Method	Delivery partner	No engaged
E274	Green Recovery Scheme Surgeries	Regional politics	Online meetings	Public Affairs Company	80
E301	Interviews with consultants	Industry consultants	Interviews	Explain research	3
E302	IDNO forum	IDNOs	Online forum	Explain research	4
E303	Major works customer focus groups	Major works customers	Online focus groups and interviews	Explain research	20

Willingness to pay

- Connections was ranked 6 out of 12 for domestic consumers in the WTP quantification choice experiment. Connections has average value with customers and connections service may be seen as sufficient a service as it is although customers do value a quicker connection time and flexibility. **(E251)**

- The value of connections is increased in the context of supporting uptake of EVs and LCTs. Investment in connections in relation to EVs and net zero is therefore important. **(E251)**

Energy Systems Catapult (ESC) meeting – specific comments on connections

- In terms of what might Northern Powergrid think about ESC have identified five topics: **(E236)**
    - Organise and enable ease of access to Northern Powergrid network data in context of uncertainty.
    - Enable and support discovery of Northern Powergrid data applications by others.
    - Better understand consumer willingness to flex and impact of flex on Northern Powergrid network.
    - Understand potential risks and issues of service models on Northern Powergrid vulnerable consumers.
    - Understand impact of CCC high innovation and tailwinds scenarios on Northern Powergrid network.
- What would you expect Northern Powergrid's role to be on flexibility? **(E249)**
    - Help integrate V2G.
    - Support local balancing.
    - Long term forecasts for constraints and flex value.
    - Publish real time data.
    - Help enable local P2P trading.
    - Create a framework and easy to use interface.
- How can Northern Powergrid best support you to understand flex services? **(E249)**
    - Case studies and examples.
    - Accessible information and data on its impact.

- Roadmap showing individual and community benefits;
- Carbon saving potential.
- App based and service focussed.

Connections service for small works and domestic customers

- Small works customers who took part in focus groups were asked to consider the proposition: Northern Powergrid want to commit to supporting small works customers through the connections process from initial enquiry to completion. **(E254)**
  - On the whole customers felt well supported through their recent connections work, feeling Northern Powergrid had provided a good service.
  - A number of customers said that their experience would have improved if Northern Powergrid could have taken them through the connection from start to finish, including responsibility for the third party aspects such as moving the meter.
- Respondents were asked to consider the proposition: Northern Powergrid is planning to develop their digital offerings for customers who want to self-serve and complement this with an enhanced upfront support and advice for those who prefer to talk our experts before making an application. **(E254)**
  - Feedback from customers highlighted that Northern Powergrid are on the right track to both enhance self-serve and their upfront support and advice going forward.
  - Customers valued the customer service they had received and being able to speak to a Northern Powergrid representative throughout the process.
  - First time connections customers were most in need of support and preferred an enhanced support model.
  - Customers who were more knowledgeable and experienced in connections favoured a self-serve approach but recognised the wider need for enhanced upfront support and advice for customers.
- Customers were presented with the proposition: Another of Northern Powergrid's ideas is to provide a free advice service for domestic customers who are seeking new connections or making changes to existing ones, - this would include connections for low carbon technologies like EV and heat pumps. **(E254)**
  - Customers would most likely look for advice on applying for a new connection online, highlighting the importance of Northern Powergrid having a prominent presence online so customers in their area know where to go for connections support and information.
  - Customers would use the free advice service and expressed an interest in getting advice on the following areas: the connections process, Northern Powergrid role and options for connecting renewables.
- Customers were presented with the proposition: Northern Powergrid is also considering introducing a free application checking and validation service. This would be similar to the passport checking service provided by the Post Office whereby your application would checked and verified before you submit it. **(E254)**
  - Customers were aware that they could call the contact centre to ask about their application, but most had not used this.
  - Customer preference was to use the same method of application they had used previously – most commonly this was online, but some customers also used telephone and postal application.

    - Customers felt that they would use the application checking service and that this would offer them reassurance and allow them to avoid any delays.

- Customers were presented with the proposition: Currently Northern Powergrid offer customers the opportunity to pick a date for with around a six week lead time for the first available dates. Going forward they are looking to improve this service and give customers more options and choice. **(E254)**

    - Experience of picking a connection date was mixed, with some customers provided with a choice of date and others given one date to accept.

    - Customers were happy with the service regarding the date and time regardless of whether they chose this or not and the majority did not feel that picking a date was a priority.

    - However, a minority of customers felt it would be useful to have more control over picking a date and having a shorter window of time for the work to allow them to better align with related work such as meter installation with the supplier.

- Northumberland City Council were very keen to explore synergies between trenching required to install fibre and to install new electrical connection, where properties are off the electricity grid: **(E259)**

- Those who took part in the Stakeholder Summit intend to make the most of the benefits of customer flexibility where it is available as this, combined with smart solutions will be a cost-effective way of reaching net zero. There was a high level of interest in this area from stakeholders. **(E267)**

- Stakeholders were particularly keen to know what Northern Powergrid was doing in relation to: **(E267)**

    - the urgent improvements needed to allow stored battery energy to be shared back into the grid;

    - supporting stakeholders looking to invest in flexibility solutions;

    - whether Northern Powergrid has published the requirements for metering and minimum flexible capacity; and

    - how much do you think we should rely on this versus relying on more expensive but more certain network reinforcement options.

- Stakeholders who made comments in relation to this point felt that electricity flexibility can offer better value for money than replacing or reinforcing the network. **(E267)**

- At the EV and Heat workshop, several stakeholders stated that it would be useful to have greater visibility of the HV network - perhaps through enhancements to AutoDesign - to identify the best possible locations for projects such as EV community charging hubs that will keep costs down. This could enable local authorities to identify an opportunity and then engage a commercial organisation around the delivery of a charging hub or forecourt at that site. **(E269)**

- One stakeholder commented that heat maps could also share a greater level of detail around substations as capacity wasn't the only determining factor about whether a connection would be possible. **(E269)**

- There was suggestion that better access to system planners would be useful in order to help identify connections sites. Northern Powergrid clarified that they were happy to have these conversations. **(E269)**

- Installers have difficulty installing EV charging points in homes with a looped supply and this cannot be identified until the installation is being attempted. **(E269)**

- Future Energy consumers suggested that going forward; Northern Powergrid could make information available upfront and also respond more quickly to address a looped supply when it is identified. **(E269)**

- It was suggested that Northern Powergrid could take a more active role in helping customers join projects together to create efficiencies in power sharing, heat sharing, or sharing up-front costs. **(E269)**

- As part of Northern Powergrid's engagement on the national Green Recovery Scheme, regional stakeholders were informed that they could provide the evidence in support of locations that would benefit from accelerated network investment in E2015-2023, to bring forward green growth and jobs. The information will be used to create a short list of investment sites and also to inform Northern Powergrid's network planning for the next business plan period. **(E274)**

AutoDesign

- Stakeholders taking part in an AutoDesign co-creation workshop where they had opportunities to give feedback that would shape the development of future functionality and use cases for the tool. **(E266)**

- The majority said they were using AutoDesign as an optioneering tool to support project planning.

- A key area for improvement would be the ability to map multiple scenarios in one application, with suggestions for the future including enhanced features such as heat maps. There was also an appetite to integrate more data through the tool such as map overlaying and the ability to input different types of connections and larger capacities

- While the majority of stakeholders did not think they would use AutoDesign to generate firm quotations, preferring to have a quotation produced by Northern Powergrid engineers, consultants and ICPs who were more comfortable generating their own designs saw benefit in this and thought it could lead to a quicker, more efficient application process.

Major works focus groups

- Respondents were segmented by type and took part in targeted focus groups to seek their views and endorsement of our 2023-2028 service propositions.

- Overall, the propositions were positively received and endorsed across all the connections customer groups. On the whole, based on the propositions shared, connections customers agreed that Northern Powergrid was on the right track to meet their expectations and the regulators. Although the following gaps were highlighted:

    - Generally, they would like Northern Powergrid to look at how they can make connections cheaper e.g. through new technologies, systems, proactive reinforcement, etc.

    - They want the ability to understand future investment and when and where that would enable future capacity to become available.

    - Respondents also highlighted issues with their current experience including 1) the length of the process, 2) lack of available capacity, 3) the inability to have quality discussions with engineers and the wayleaves team.

WAVE 4 – Finalising the plan

From July to December 2021, we finalised our plan, responding to queries, addressing gaps and testing overall acceptability. We engaged 10,422 customers and stakeholders overall and with detailed sessions on outstanding connections topics across 31 events.

The events where Connections was a specific sub-topic are listed below:

Code	Name	Subgroup	Engagement Type	Date	No Engaged
(CR403)	DG Owner Operator forum	Various stakeholders	Forum	30/03/2021	21
(CR412)	Vulnerable internal workshops (Ensuring nobody is left behind)	Internal stakeholders	Meeting	30/09/2021	2
(CR415)	LCT Workshop insights	Future Energy	Meeting	14/10/2021	9
(CR416)	Industrial workshop	Customers	Meeting	19/10/2021	13
(CR418)	Cross Utility Workshop	Utilities	Meeting	20/10/2021	8
(CR420)	ED2 Stakeholder Webinar	Regional Politics, Consumers, Future Energy	Meeting	03/09/2021	101
(CR460)	Engagement on Access SCR and associated costs	Generation and demand connection customers	Other	Oct 2021	15
(CR461)	ICE Local Govt. connections	Regional politics	Elected Representatives	Oct-Nov 2021	23
(CR456)	Citizens Panel (Vulnerable topic)	Consumers	Panel	16/09/2021	37
(CR401)	Decarbonisation of Heat	Various stakeholders	Other	25/03/2021	49
(CR402)	Decarbonisation of Transport	Various stakeholders	Other	25/03/2021	67
(CON03)	Endorsement on 2021/22 ICE work plan actions	Major works customers	Quant	Apr-May 2021	125
(CON04)	Wave 3 major works customer engagement	Major works customers	Other	Apr-May 2021	20
(CR426)	Citizens Panel (Bill impact)	Consumers	Panel	20th & 23rd Sep	37
(CR437)	Webinar for Community Energy groups to discuss Ofgem's minded to decision on Significant Charging Review	Future energy stakeholders	Webinar	20/08/2021	12
(CR465)	Business Plan Acceptability Testing	Consumers	Quantitative survey	Oct-Nov 2021	1,742
(CR466)	ED2 Acceptance Comms (winter awareness campaign mail-out)	Consumers	Quantitative survey	Nov 2021	8,141

Feedback in summary

- A number of recommendations were suggested for NPg at the DG Owner Operator forum in March 2021. NPg should continue to inform DG operators about Operational Downward Flexibility Management and push National Grid ESO to simplify the ODFM process, it should work to ensure operators are aware of and reminded about the lower network security from single circuit connections, and it should look to engage with connections team on updating T&Cs in connection agreements to include flexibility opportunities. **(CR403)**

- Members of the forum voted 15 to 0 that the steps Northern Powergrid had taken regarding outage notification, would improve the provision of information on planned EHV outages. **(CR403)**

- The forum also discussed future topics which would be of most interest to cover. These included Operational Downward Flexibility Management (18%), Flexible power – local flexibility EOIs and tenders (24%), Notifications and communications for outages / constraints (24%), Other communications with Northern Powergrid and points of contact (18%) and Recent outage updates (15%). **(CR403)**

- A series of internal workshops were held within Northern Powergrid on the theme 'ensuring nobody is left behind' in the transition to net zero. Specifically on the Connections CN1 proposition, it was reported that the summary will be aligned to the following messaging: **(CR412)**

    - The connections team will be upskilled to identify and recognise customers in vulnerable circumstances, and provide tailored support through the end to end connections process. Northern Powergrid will also ensure that digital platforms are accessible.

    - The outcomes and therefore impact of training will be tracked, in order to measure, in terms of the number of vulnerable identified and supported through the enhanced processes

- With regards to the CN2 proposition, the summary will be aligned to the following messaging: **(CR412)**

    - In extension to the service NPg has developed in ED1, it will tailor bespoke services in the Connections space, for example the enhanced 'ask the expert' service.

    - It will use vulnerability data to inform investment decisions, to ensure it doesn't become a barrier to local energy scenarios, in conjunction with regulatory requirements/obligations. To measure this, NPg will identify the no. of projects this has been applied to. The impact will be measured based on the type of schemes, linked to SROI of investment schemes (meeting certain criteria).

- Links were drawn **(CR412**) to the business plan areas for:

    - Customer Service (Contact Centre training, including identification of those in vulnerable circumstances)

    - Data & Digitalisation (the development of digital tools and customer-facing processes),

    - Decarbonisation (provision of LCT and energy efficiency guidance, where appropriate as part of the connections application process, and ensuring the Connections process does not create barriers for LCT uptake in areas with levels of consumer vulnerability)

    - Communities where, as part of long term investment planning scenarios, the number of vulnerable customers supported will be considered, resulting in prioritisation of investment where it can support social housing development.

- The LCT connections Local Working Group members working on the low voltage (LV) network highlighted barriers to installing on looped supplies relating to the connections process. **(CR415)**

- Questions were raised about new application processes and whether combining applications for multiple technologies would be made possible. Challenges of working with the time consuming approvals process of G98 and G99 applications formed part of this discussion. **(CR415)**

- Relating to the topic of isolator switches, working group members were in consensus about regulation of quality and safety concerns in the industry, once government OZEV subsidies are scaled back in March. **(CR415)**

- Several of the group shared experiences of struggling to engage with local authorities, especially for on-street charging installation. **(CR415)**

- Availability and format of data was raised as an important service for Northern Powergrid to provide, particularly for large installers. **(CR415)**

- Stakeholders were disappointed there was no NPg director level member of the senior leadership team regularly in attendance, and contrasted this to other DNOs. The group raised concerns that it reflected low prioritisation for connections issues. **(CR415)**

- At the industrial stakeholder webinar NPg was told it should account for major new energy users in Humber and Teesside (part of BEIS' track 1 CCUS cluster selection) which are expected to come online in the mid-2020s. These companies will be enablers to regional decarbonisation and could be heavy energy users. **(CR416)**

- There was interest in whether the internal process to support self-generation projects can be improved (experience was 5 months to get G99 approval; a short term barrier to entry). **(CR416)**

- Port of Tyne is moving towards using an electric fleet. They are looking at bringing in on-site generation, to see if solar power is realistic to reduce their grid reliance. **(CR416)**

- Funding for infrastructure upgrades for shoreside power is the key issue and one for the Port of Tyne and the Government to work out. **(CR416)**

- The P66 Humber Refinery can connect directly to Transmission network and bypass NPg's distribution. It is involved in several projects that require a significant amount of additional power but are unsure whether these would impact the local transmission system or Northern Powergrid. These projects include (1) a green hydrogen project intended for use on a refinery, (2) a project looking to increase refinery efficiency. They process used cooking oil and rely on steam, imported from power station next door (very inefficient). There are electrification projects to try and replace this that would need another 30-40 MW, (3) a carbon capture project underway (part of Humber Zero) that needs c.10-12 MW and (4) a carbon capture at the power plant next door (VPI). There are two options; one involving a 20 MW increase in power, the other involving a 70 MW increase. **(CR416)**

- Most of Croda sites are landlocked, with limited space for new equipment. They want to install new analytical machinery at HQ near Goole, but there is no capacity. This is the same for EV chargers. Generally the local infrastructure is not ready and Croda cannot justify the economic outlay to address this. They feel they are really held back by the infrastructure. Northern Powergrid's ED2 plan did not appear to offer anything that would aid Croda's ten year plan. **(CR416)**

- Croda believes industrial customers would benefit from having someone at NPg they could touch base with; to discuss and resolve issues **(CR416)**

- KCOM wanted to understand the impact of mass adoption of EV charging and how those in terraced housing would be supported. Furthermore, they were interested in how the rollout would be funded (thinking in particular of communities who are dependent on cars to get around). **(CR416)**

- At the Cross Utility Working session, a discussion on charging arrangements for the fuel poor, revealed that Yorkshire Water is concerned that the infrastructure required to accommodate EVs will be huge with changes for higher voltage, especially where generation supply points are overloaded. They believe SCR changes will make connecting worse for the fuel poor (who will fund the cost of large connections?). Even a small bill increase may be difficult in the current economic climate due to the large increases in UK fuel bills. **(CR418)**

- Yorkshire Water also had questions around the socialisation of the cost of connections. These were:

    - Whether modelling had been done to see the impact on customer bills?

    - What controls would be put in place? (E.g. solar and wind might not be best for remote locations).

    - Is the part of the cost to be socialised that where a grid supply point needs upgrading and people are waiting for connections in that area?

- Northumbrian Water has a commitment to be net zero by 2027. It wants solar panels at its sites but currently there are communication blockers with NPg. They generate power at plants and then put this back into the grid. All energy comes from the North Sea and is renewable. They have EVs, and charge points at some sites, but it is not mass scale). They are trialling use of gas from a plant to power some vehicles. **(CR418)**

- Yorkshire Water feels it is doing well on EVs, and it is looking to raise funds for the infrastructure needed. They want to work with utility companies to optimise the number of charge points. **(CR418)**

- At the ED2 Stakeholder webinar, Hull Council reported it is looking at charging hubs as a solution, particularly for areas without off-street parking. They are disappointed Northern Powergrid is not committing to contributing to the cost of those, as they're a significant investment for a LA and will create data and design intelligence for Northern Powergrid in designing their own networks. **(CR420)**

- As a property developer, Wykeland Group is experiencing increased demand for serviced sites. Nearly all enquiries want extra power to provide EV charging points. Although assured by Northern Powergrid's engineers that this can be provided long term, there are "quick wins" to be had (e.g. Amazon want their last mile vans based at Melton to be electrically powered). **(CR420)**

- Wykeland Group welcome the hiring of more staff to assist in energy planning, but felt Northern Powergrid need additional wayleave officers and project engineers to speed delivery. **(CR420)**

- South Tyneside Council has noticed a shift in Northern Powergrid's attitude in recent years (lower prices and a more pragmatic approach). However, they would like to see a faster quotation process. Their projects can take years to plan and sometimes they need information quickly to put to committees. A faster quote process that would help enormously. **(CR420)**

- Ennoviga Solar is dissatisfied as every time they make contact with Northern Powergrid about a project, they are told that capacity is full. They are working with Northumbrian Water, which has a net zero date of 2027, but cannot move any projects forward as applications for more capacity are rejected. **(CR420)**

- Ennovigar Solar believe Northern Powergrid is rigid compared to other DNOs, who offer a meeting to discuss workarounds whenever there is a capacity issue. **(CR420)**

- It makes more sense for Ennoviga Solar to pay more and go off grid instead. **(CR420)**

- When Northern Powergrid quotes investment figures, Ennoviga Solar want to know how this impacts them. For example, it does not matter if £3.2 billion is being invested into the grid if they still need to wait nine months for applications to be rejected. Ennoviga Solar is more interested in more interested in what the investment will mean for speed of processes and available capacity. **(CR420)**

- South Tyneside Council felt that Ofgem's mind to position in terms of distribution of costs for reinforcement and the perception of this as balancing out so it is not just the renewable developer that pays for it, is a fair approach. **(CR420)**

- Hull Council questioned whether NPg was pushing back against Ofgem's minded to position on the socialisation of connections costs on electricity bills. They felt costs should also be socialised across the gas bill, as currently gas pays no costs towards decarbonisation of the network and since it this all done via the electricity bill, it means electrical solutions are ultimately more expensive. Furthermore, they believe this sends out the wrong message and that is was unrealistic for Ofgem to continue to increase the cost of electricity. **(CR420)**

- The Petrol Retailers Association, which represents most petrol retailers, was concerned about the electrification of transport and queried what NPg planned in terms of increasing capacity to accommodate rapid chargers. In most cases this would require a substation to be fitted on site, which is difficult due to the hazards associated with petrol retail. **(CR420)**

- The Petrol Retailers Association was also interested in Northern Powergrid's own plans for fleet decarbonisation. **(CR420)**

- Petrol Retailers Association are very happy to work with Northern Powergrid. **(CR420)**

- At the Citizens Panel session covering vulnerable customer strategy, cost was highlighted as likely being the main barrier to LCT uptake, especially for the fuel poor and the vulnerable. Other barriers included cultural norms, existing infrastructure, lack of motivation and lack of knowledge. **(CR456)**

- Community Energy Advisors were broadly supported in principle, though concerns were highlighted about the initial number of advisors proposed (two and then six). Others felt that whilst it was admirable for NPg to include community-based energy advisors in its plan, the onus should be on the Government to deliver this kind of initiative. **(CR456)**

- At the Citizens Panel session covering bill impact, and a conversation about socialised connection costs, most panelists agreed that something along these lines might be necessary to help build capacity and encourage a move towards decarbonisation. **(CR426)**

- However, there was discomfort with the idea of socialized costs, mainly in the context of rising energy prices, and the view that big companies should be able to afford the connection costs and did not need subsidies. **(CR426)**

- During engagement on Access SCR and its associated cost, the majority of demand and generation connections customers interviewed stated that the number of connections per year would stay the same or increase based on current connection charges. **(CR460)**

- For those who felt there would be an increase, this was primarily as a result of an increased demand for renewable generation or EV charging. **(CR460)**

- Overall, Ofgem's minded-to position was not expected to change connections behaviours in the next year, although some customers stated that it could lead to certain applications being delayed until this point. **(CR460)**

- More than half of demand and generation customers stated that Ofgem's minded-to position would encourage more connections applications after April 2023. **(CR460)**

- Customers expected the proposed changes to connections charging would lead to more projects and applications being viable to go ahead from a commercial standpoint. **(CR460)**

- The ICE Local Government connections engagement meetings were very well received. Attendees said that they appreciated the opportunity for engagement and Northern Powergrid being proactive in offering these calls. All said that they were useful and expressed strong interest in continued dialogue, indicating that they would sign up to future sessions. **(CR461)**

- The first round of meetings was oversubscribed and local authorities with less time sensitive requests were encouraged to book onto later sessions. **(CR461)**

- 100% of attendees who responded to in-meeting polling said that they were satisfied with the engagement. All but one (90%) said that they were 'very satisfied'. **(CR461)**

- There was a broad range of topics attendees wanted to discuss, ranging from the status of their connections applications to broader discussions on local authorities decarbonisation plans and how Northern Powergrid was supporting the low carbon transition. **(CR461)**

- This is a forum where Northern Powergrid can manage the diverse range of discussions more strategically, by bringing the most appropriate colleagues onto one call. By offering a platform for regular engagement, it is hoped that these sessions will act as a 'triage' for the numerous local authority requests for engagement Northern Powergrid is receiving and lead to more efficient operations by mitigating requests being sent to multiple colleagues. **(CR461)**

- A common theme from all the calls was a desire for early strategic engagement. Local authorities were keen to understand the best ways of working with Northern Powergrid to ensure it could input into their net zero plans. One of the recommendations Northern Powergrid made was for local authorities to provide a list of proposed connections projects with associated timescales to enable visibility at an early stage. This is something that Newcastle City Council have done and the larger local authorities were keen to emulate this best practice. **(CR461)**

- Another key point from the calls - and echoing what has been heard in previous engagement sessions - was that local authorities want a single contact point within Northern Powergrid to discuss wider issues. **(CR461)**

- Some stakeholders wanted to discuss their local area energy and net zero plans at a more strategic level and this was facilitated in separate meetings involving the Policy and Markets Director. Consideration is needed on how to manage these types of discussions going forward. **(CR461)**

- Northern Powergrid told LAs the information they provide could be used to inform future network and investment planning. To follow through on this commitment, the intelligence gained during this engagement will need to be funnelled through appropriate channel to inform Northern Powergrid DFES and future investment plans. **(CR461)**

- A number of the North Yorkshire councils mentioned the local government reorganisation which will impact the way that they operate. As of 1st April 2023, the seven local authorities (Craven, Hambleton, Harrogate, Richmondshire, Ryedale, Scarborough and Selby) will be reorganised to form one council across the whole of the county. The City of York will remain as a separate council. **(CR461)**

- During a number of the calls there was praise for system design colleagues and their work on the ground. They were already aware of, and had engaged on, many of the projects that the local authorities were looking to discuss. **(CR461)**

- The key findings from the endorsement of 2021/22 ICE work plan actions were that the vast majority of those interviewed (93%) would endorse Northern Powergrid's connection service improvement plan. **(CR462)**

- When asked about their experience in the past 12 months, 34% of respondents felt the service had either got better or much better, while 47% felt it had stayed the same. **(CR462)**

- Feedback from the Wave 3 major works customer engagement was that overall, the propositions were positively received and endorsed across all the connections customer groups. On the whole, based on the propositions shared, connections customers agreed that Northern Powergrid was on the right track to meet Ofgem's baseline standards. **(CR463)**

- Some gaps were also highlighted, however: **(CR463)**

    - Northern Powergrid should look at how to make connections cheaper. For example, through new technologies, systems, proactive reinforcement, etc.

    - Connections customers want the ability to understand future investment and where there may be future capacity based on that.

    - Connections customers also highlighted issues with their current experience, including the length of the process, lack of available capacity and inability to have quality discussions with engineers and wayleaves.

- In the community energy event to discuss the impacts of the Significant Charging Review, it became evident that over the past few years, the main barrier to the deployment of community-owned renewable generation projects has been the cost of connecting to the distribution network. These organisations want to localise energy generation and demand to help balance system use and retain economic value locally. Current regulation does not enable any direct financial value to be realised from balancing generation and demand at a local level. **(CR437)**

- Community organisations are disproportionately disadvantaged by current rules on network connection for generation. Due to their democratic governance structures, and often as non-expert volunteers, they tend to be slower to develop projects and apply for network connections than commercial developers. Community energy organisations are local by definition, so unable to move projects to less constrained parts of the network. **(CR437)**

- Community energy stakeholders have told us this is typified by the minded-to consultation using too much industry jargon, which prevents grassroots participation from communities who pay for the network through consumer bills, and will be heavily impacted by final SCR decisions. **(CR437)**

- Community energy organisations understand the conflict between 'least cost to consumer' and achieving net zero, but want BEIS and Ofgem to provide more leadership to enable a net zero transition which will be less costly than the impacts of climate change on communities and consumers in the longer term. On this note, many community energy stakeholders welcome the SCR's proposed move to a shallower connection boundary which could encourage networks to invest more strategically according to the net zero ambitions of local areas. This is particularly needed in rural villages with single phase connections, where communities are unable to afford the cost of upgrading the network to a three-phase connection, meaning these villages cannot decarbonise. **(CR437)**

- Communities and local authorities want to have more opportunity to engage in how, when and where strategic network reinforcement takes place, so that there is always scope for localities to increase their ambitions for low carbon technology schemes. **(CR437)**

- Community energy organisations want more detail on exactly how reinforcement costs of new demand connections will be socialised through DUoS charges on consumer bills. They want to see a fair system of achieving net zero so that costs are not disproportionately borne by consumers who can't benefit from new low carbon technologies such as EVs and may be facing fuel poverty. However, stakeholders strongly disagree with current arrangements that favour transmission connection costs, which are socialised, benefiting large scale fossil fuel and nuclear generators, and disadvantaging smaller distribution connections, particularly renewables. **(CR437)**

- Community energy organisations are concerned that time-profiled access could disadvantage renewable generation such as solar, which needs daytime access, while fossil fuel generation which is less time dependent could benefit. One solution this stakeholder group sees is for more dynamic curtailment arrangements, possibly linked to weather conditions, to allow renewable generation to export to the network at the best possible times. **(CR437).**

Workforce resilience

Stakeholder engagement summary

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
WR1	**Create more than 1,000 high quality job opportunities and attract talented people to the energy sector**	**Wave 1:** At the start of our engagement, we looked at our current working practices for recruitment, attraction and retention as well as benchmarking against others from within and outside of the industry. We explored areas of improvement for the 2023-28 period and consulted with colleagues, corporate interest groups and customers. Overall feedback showed that stakeholders recognised and valued the work we deliver in our communities in relation to science, technology, engineering and mathematics (STEM) activities in school, but expressed there is more to do to increase awareness about and the attractiveness of careers in our industry – and at our company. They also suggested that we should look to improve our recruitment processes. ***Key Wave 1 finding:*** *Stakeholders want apprenticeships to be a key priority focus. Stakeholders want us to continue to leverage the apprenticeship programme to reduce the average age of our workforce.*	*E029* *E053* *E056* *E140* *E141* *E144* *E145* *E179* *E180* *E182* *E187* *E191*
		Wave 2: These insights led to the development of a more comprehensive set of outcomes that incorporates trade union support for an ongoing jobs pledge and creating progression opportunities and clear career pathways for existing staff. It became clear from other sections of the plan (particularly community engagement and from interactions with Ofgem and government) that our role as a critical infrastructure provider in the region places us well to support the economic recovery following COVID-19 through green recovery – providing both investment in our regional economy and creating jobs. Stakeholders who were in favour of our apprenticeship and graduate programmes wanted to see it expanded across more roles within the organisation. ***Key wave 2 finding:*** *Stakeholders believed that we should prioritise a focus on the workforce renewal programme to create job opportunities, with particular focus on apprenticeship programmes. We have a role to play in the economic recovery from COVID-19 by stimulating investment and creating job opportunities.*	*E005* *E020* *E023* *E030* *E031* *E055* *E067* *E148* *E163* *E164* *E165* *E166* *E167* *E168* *E170* *E172* *E173* *E174* *E175* *E176* *E177* *E178* *E181* *E183* *E184*
		Wave 3: During the proposition finalisation stage, we quantified the job opportunities we aim to create. We explored what underlying and lower-level actions and initiatives would be required (and most valued) to improve our existing attraction, selection and hiring processes to open up opportunities to a more diverse set of applicants from a wider set of backgrounds.	*E213* *E214* *E215* *E216* *E241* *E242* *E243* *E244* *E245* *E246* *E261* *E272*

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
		Key wave 3 finding: *Strong support for job creation and for enhancing our recruitment approach to increase the awareness of Northern Powergrid careers, particularly within under-represented groups. We should strengthen existing and build new partnerships with educational institutions and specialist organisations that will help to promote STEM careers to under-represented groups.*	*E287 E288 E289 E290 E291 E292 E293 E294*
WR2	**Upskill and multi-skill our workforce to provide rewarding career paths and develop the new capabilities required for managing the future energy network**	**Wave 1:** With academics and corporate interest groups we explored the future of the energy sector and what impact that would have on the current workforce and what we would need to do to develop or obtain the relevant skills for the future workforce. ***Key wave 1 finding:*** *Stakeholders want us to upskill and train our workforce for the energy transition. Stakeholders want us to ensure high retention rates and ensure employees are supported through additional training in the skills needed for their current and future roles. The specifics of the future skills needs are not yet known but there is wide recognition that data management and digital technology skills will be increasingly important for both operational and non-operational employees.*	*E029 E053 E056 E140 E141 E144 E145 E179 E180 E182 E187 E191*
		Wave 2: These early insights ensured that during wave 2 we could appropriately frame our view of how what a workforce that is resilient to future demands looks like and therefore we could start mapping the skillset and training requirements. Trade unions and existing colleague groups want to see continued investment in skills and personal development, ensuring that we utilise the existing workforce and their potential when new job opportunities arise and to create career pathways. ***Key wave 2 finding:*** *Most stakeholders believed that our workforce resilience efforts are 'about right' in scope and ambition when rated on a survey. They recommended workforce training as an area for future focus.*	*E005 E020 E023 E030 E031 E055 E067 E148 E163 E164 E165 E166 E167 E168 E170 E172 E173 E174 E175 E176 E177 E178 E181 E183 E184*
		Wave 3: During the finalisation stage, through discussions with stakeholders -typically within the industry - we refined the customer outcome to take account of how we will address the workforce skill gaps, the new skills required to manage a more digitised energy network and new roles required to manage 'smart' networks.	*E213 E214 E215 E216 E241 E242 E243 E244 E245 E246 E261 E272 E287 E288 E289*

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
		Key wave 3 finding: *Invest in developing future skills and multi-skilling the workforce. Academics and training partners emphasised the importance of upskilling and multiskilling (cross-training) to grow the skillsets of Northern Powergrid's existing workforce. We need to ensure we have in the capacity, capability and infrastructure to deliver an ambitious programme of upskilling and multi-skilling.*	*E290 E291 E292 E293 E294*
WR3	**Increase the diversity of our workforce and develop a more inclusive workplace culture, supported by increasingly effective data insights**	**Wave 1:** Through research with corporate interest groups and from insights from best practice in the energy and other sectors we identified how we might start to increase the workforce demographics of under-represented groups. The customer engagement group (CEG) were very supportive of emerging inclusion, diversity and equality activities and wanted to see us set ambitious targets. It was recognised that we, and the broader energy sector, have lots of ground to cover to improve diversity within the workforce and that we should set out a compelling vision. ***Key wave 1 finding:*** *Stakeholders identified increasing diversity and inclusion of the workforce as being important. Stakeholders want us to attract a more diverse workforce, to do that prospective candidates need to see people like them working 'successfully' in the sector (women, BAME role models and mentors). Working and training practices should be adapted for all employees to increase inclusivity and diversity (including unconscious bias training).*	*E029 E053 E056 E140 E141 E144 E145 E179 E180 E182 E187 E191*
		Wave 2: These insights led to the development of a more comprehensive set of customer outcomes. Overall feedback showed that stakeholders recognised and valued the importance of inclusion, diversity and equality in the workplace but were largely, not in favour of setting workforce demographic diversity quotas. The general consensus from trade unions, existing colleagues and customers is that jobs should be awarded on merit. ***Key wave 2 finding:*** *Most stakeholders believed that our workforce resilience efforts are 'about right' in scope and ambition. They recommended diversity and inclusion as an area for future focus.*	*E005 E020 E023 E030 E031 E055 E067 E148 E163 E164 E165 E166 E167 E168 E170 E172*
		Wave 3: During the plan finalisation stage, customer outcomes in relation to diversity were refined to incorporate flexible working arrangements and working with partners to address diversity and inclusion challenges. In support of our stakeholders, we are increasing our leadership expectations, education and awareness as part of our strategy to improve workforce diversity and remove barriers to an inclusive workplace. We are retaining our 'best person for the job' position and are taking positive action to increase access to opportunities for all. ***Key wave 3 finding:*** *Take further steps to build a diverse workforce. Stakeholders recommended that we proactively address diversity and inclusion issues through targeted recruitment campaigns and increasing the visibility of under-represented groups (women and BAME) in its publicity.*	*E173 E174 E175 E176 E177 E178 E181 E183 E184 E213 E214 E215 E216 E241 E242 E243 E244 E245 E246 E261 E272 E287 E288 E289*

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
			E290 E291 E292 E293 E294
WR4	**Increase workforce engagement and strengthen partnerships with trade unions to become an even better, safer and rewarding place to work for our employees**	**Wave 1:** The latest employee engagement survey outcomes provided detailed insights into the areas of priority that have greatest impact on levels of engagement and satisfaction. This was used to develop priority areas to test with our stakeholders on what actions we should include in our plan. Key insights: – There is a strong sense of pride and satisfaction for the service we provide to customers, which provides a strong platform to build from. – Communication can be improved, to stay informed and be engaged/consulted on change that affects people. – Leaders/managers have a direct impact on engagement and satisfaction – there needs to be consistency across the business to implement the practices, using the tools and resources available. The issue of safety and wellbeing is important. Mental health has become an increasingly important area to provide colleagues with support – the tools/resources but also the environment where mental health can be openly discussed. ***Key wave 1 finding:*** *Many of the areas for action to improve satisfaction have been raised through previous colleague engagement surveys. We should use the insights generated from them to help inform target areas where strategic action can be taken.*	*E029 E053 E056 E140 E141 E144 E145 E179 E180 E182 E187 E191*
		Wave 2: We set out some proposals to test with stakeholders for improving engagement and satisfaction. ***Key wave 2 finding:*** *Most stakeholders believed that our workforce resilience efforts are 'about right' in scope and ambition. They recommended employee wellbeing as an area for future focus.*	*E005 E020 E023 E030 E031 E055 E067 E148 E163 E164 E165 E166 E167 E168 E170 E172 E173 E174 E175 E176 E177 E178 E181 E183 E184 E213*
		Wave 3: Wave 3 engagement involved consultation with trade union representatives and expert stakeholders to test the outcomes. We will introduce more flexible working and benefits options to increase access to job opportunities and career progression. We will engage regularly with trade unions and colleagues on key issues and report on actions we take to improve satisfaction. ***Key wave 3 finding:*** *Optimise and develop a high performing, supportive culture trade unions and other internal stakeholders thought we could improve workforce motivation through developing reward programmes, clearer career pathways, and actively engaging in major change programmes to strengthen the 'employee voice'.*	
		Acceptance research and findings: *The acceptance score for workforce resilience as an enabler is 79 per cent. 79per cent of customers agree that the business plan enablers such as Workforce Resilience are crucial for the successful delivery of the plan. As acceptance is high from customer for workforce as an enabler of the plan, this area will not be explored in further acceptability testing.*	*E325*

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
		Overall Wave 4 findings: *Stakeholders welcomed the workforce resilience propositions and re-emphasised the importance of ensuring NPg colleagues have the right skills to manage the future energy network.* *The focus on expanding the range of apprenticeships was also supported along with the commitment to have an increased presence at career fairs and schools across the region to raise aspirations.*	*CR418* *CR426*

WAVE 1 – open and formative engagement

In the first wave of engagement, we ran or attended a range of >12 events which focused on Workforce, including panels, conferences, roundtables, and workshops, engaging >450 stakeholders. Engagements were focused on how Northern Powergrid could improve our apprenticeships programme, create a more diverse workforce, and improve employee retention rates. The themes covered by the events:

- apprenticeships;
- diversity and inclusion; and
- upskilling and training.

The events where workforce was a specific sub-topic are listed below:

Engagement reference	Name	Segment	Method	Delivery partner	No engaged
E029	Northern Powergrid Stakeholder Engagement Roundtables	Corporate interest groups	Online panel	Traverse	55
E053	Skills deliberative roundtable	Education Groups	Online workshop	Traverse	9
E056	Future Customers Insights Research	Consumers	Analysis	Magpie	157
E140	Colleague Engagement	Internal Stakeholders	Group discussion	Northern Powergrid	96
E141	WISE webinar: Future proofing the UK workforce – exploring career paths into tech	Internal Stakeholders	Webinar	Northern Powergrid	5
E144	Roundtables with academics and training providers	Future energy	Online workshop	Traverse	8
E145	5 key things to Accelerate Inclusion and Diversity - Presented by Daniele Fiandaca	Internal Stakeholders	Webinar	Northern Powergrid	1
E179	CBI Diversity and Inclusion conference	Corporate interest groups	Webinar	Northern Powergrid	1
E180	Resilience deliberative roundtable	Corporate interest groups	Online workshop	Traverse	21
E182	WISE with Communities and Workforce Resilience	Corporate interest groups	Online meeting	Northern Powergrid	2
E187	University Student Workshop	Future consumers	Online workshop	Magpie	29
E191	Workforce Renewal colleague annual feedback	Internal Stakeholders	Group discussion	Northern Powergrid	90

- One academic from a corporate interest group asked if Northern Powergrid does as good a job letting people know that they operate one of the best systems of net zero practices. They suggested that this maybe an angle we could use without designing a marketing campaign. Sustainability, bringing those to the forefront in recruitment campaigns. **(E029)**
- University students said our website needs to be more contemporary in appearance with less text, more engaging content, images, animation maybe make more using of gamification. **(E187)**

- The students also said brand promises should be strengthened to emphasise commitment to high standards of customer service and responsiveness with improved digital presence, especially focussing more on social media. **(E187)**

Apprenticeships

- Corporate interest groups said there are lots of examples of best-practice around recruitment whether its gendered language, recruitment panel make-up, the Rooney rule when you can close a recruitment round e.g., interviewing someone who does not fit your criteria. **(E029)**

- Education Groups stated the importance of being flexible returning between working and studying, for students on apprenticeships who want to return to formal study and then move back. Ability to move between studying and working is very important. **(E053)**

- Young people from the education groups would like to see apprenticeships and job opportunities. They are very interested in the work that Northern Powergrid do and want to be involved. **(E053)**

- Apprenticeships in Cyber require a minimum standard, mentor support, holistic skills coverage, and digital master class. **(E093)**

Diversity and inclusion

To attract a more diverse workforce, prospective candidates need to see people like them working 'successfully' in the sector (female, BAME role models and mentors). Working and training practices should be adapted for all employees to increase inclusivity and diversity. Education (such as unconscious bias training) and awareness is important to help to address issues that create barriers to inclusivity in the workplace and more diversity in the workforce. Leadership is important in setting a positive tone from the top about, and commitment to, improving diversity and inclusion.

- In a focus group at Leeds University with BAME students, the need to be successful came up as incredibly important. They talked about role models, mentors... Do not see anyone like me working in the sector. I need to see people working here like myself. **(E029)**

- Education groups said that having a properly diverse, well balanced workforce which you will be able to achieve if you invest the time, then you will be able to be pioneering in a way that lots of engineering firms are missing out on. **(E053)**

- Internal stakeholders at a WISE webinar said that one in five mothers return to full time employment after maternity leave, and therefore asked how flexible Northern Powergrid were. The issue of flexible working practices is important to support mothers returning from maternity leave **(E141)**

- Future energy consumers said at a roundtable with academics and training providers that children want to see people like them in the roles. It is not just about the pictures seen on the website and social media it is those who interact with the children. The role of a role model. 'Can someone like me be successful?' **(E144)**

- Internal stakeholders at an Inclusive Companies webinar said there is ignorance in the world towards cultures and Northern Powergrid should therefore spend time to educate and train colleagues. **(E145)**

- From our attendance at the CBI Diversity and Inclusion conference, the CBI provided details of their campaign to change the race ratio and have set out four commitments to change, that they are asking businesses to act on: **(E179)**

    - Increase racial and ethnic diversity among Board members.

    - Increase racial and ethnic diversity in senior leadership.

    - Be transparent on targets and action.

    - Create an inclusive culture in which talent from all diversities can thrive

- At a resilience roundtable, corporate interest groups said that a diverse workforce equals diversity in thinking, with this culture being driven from the top. **(E180)**

- Internal stakeholders talked about how recruitment managers should undergo unconscious bias training prior to recruiting. The training will help people understand the impact of unconscious bias on their working lives and become more aware, less biased, and more inclusive. **(E141)**

Upskilling and training

To ensure high retention rates, employees should be supported through additional training to have the digital skills needed for their current and future roles. Internal training and development are valued in order to provide progression opportunities and broaden career paths.

- Education groups said that it is students from lab-based science who typically want to get STEM jobs. However, they often pursue careers in the finance or consulting sector as they have a clear structure of progression. Students want to see a pathway, a ladder, a structure. **(E053)**

- Internal stakeholders talked about learning 'on the job' skills and the value it could provide in terms of leading to new career opportunities beyond their existing skills set **(E141)**

- They also talked about how blended learning offers flexibility and inspiring backdrop while building relationships allow time for reflection - invest in learning products and utilise them. **(E141)**

- Academics and training providers referred to how many transferable skills there are, so having an organisation that can maintain those relationships to foster people when they are ready to switch roles etc. Third sector organisations could help foster those transitions. **(E144)**

- At the Quarterly Employee Engagement Update, internal stakeholders said existing training was organized and well structured, good hands-on experience, good overview of technical aspects in electrical distribution network. They also said they had undertaken very beneficial visits to some of the industry leading manufacturing & renowned distribution facilities. **(E191)**

Mental health and wellbeing

Positive mental health has become an increasingly important area to provide sufficient wellbeing support and resources to employees.

- From a resilience roundtable with corporate interest groups, mental health was a key priority and clear pressure of the future. We need to consider self-resilience for our colleagues and supported by safeguarding HR policies. **(E180)**

WAVE 2 – testing our emerging thinking with costed levels of ambition

Our second wave of engagement was used to test our workforce priorities and to develop a clearer picture of the drivers from our business plan that will have the most impact on our Workforce Resilience Strategy and what it would need to deliver from a workforce perspective. Engagement was carried out with existing colleagues, domestic customers, partners, commercial customers, stakeholders, SMEs, and future energy consumers. The results were split into:

In total, we ran 135 events, engaging 15,475 stakeholders in wave 2. Of these 135 events, workforce was a specific sub-topic at 25 of them, covering 380 individuals.

The 25 events where workforce was a specific sub-topic are listed below:

Engagement reference	Name	Segment	Method	Delivery partner	No engaged
E005	Consumer panel (Leeds and Newcastle)	Consumers	Online panel	Traverse	48
E020	Sustainability roundtable	Corporate interest groups	Online panel	Traverse	24
E023	Consumer Panel	Consumers	Online panel	Traverse	36
E030	Consumer panel	Consumers	Online panel	Traverse	43
E031	Consumer panel	Consumers	Online panel	Traverse	36
E055	Future customer insights research - University students	Consumers	Research report	Magpie	21
E067	Dimension Data - 2019 Global Benchmarking Report	Consumers	Report	Dimensions Data	1
E148	Emerging Thinking Performance & Planning Broadcast call	Internal Stakeholders	Telephone	Northern Powergrid	121
E163	Engineering a Winning Workforce: Engaging the Majority	Utilities	Online	Northern Powergrid	1
E164	The impact of the COVID-19 outbreak on disadvantaged young people entering the workplace	Future energy	Online	Northern Powergrid	1
E165	Overarching EDI Strategy	Utilities	Online	Northern Powergrid	1
E166	Optimising Recruitment processes	Utilities	Online	Northern Powergrid	1
E167	Attracting Diverse Talent	Utilities	Online	Northern Powergrid	1
E168	Retaining Diverse Talent	Utilities	Online	Northern Powergrid	1
E170	Digitalisation strategy and workforce resilience for trade unions	Internal Stakeholders	Telephone	Northern Powergrid	1
E172	Stakeholder Panel views on 2023-2028 Workforce Resilience Engagement Plan	Expert stakeholders	Online panel	Traverse	13
E173	Work-life (model) through a future lens	Consumers	Online	Northern Powergrid	1
E174	Rethinking the rules of high-performance teamwork	Consumers	Online	Northern Powergrid	1

Engagement reference	Name	Segment	Method	Delivery partner	No engaged
E175	10 trends impacting the future of work and employee engagement	Consumers	Online	Northern Powergrid	1
E176	Productive wellbeing and the 888 formula, creating a resilient workforce	Consumers	Online	Northern Powergrid	1
E177	Emerging Thinking and workforce resilience for trade unions - Industrial	Internal Stakeholders	Telephone	Northern Powergrid	7
E178	The Future of the Workplace - LGBT inclusion	Consumers	Online	Northern Powergrid	1
E181	Emerging Thinking and workforce resilience with Trade union Representatives	Internal Stakeholders	Conference call	Northern Powergrid	6
E183	WISE - Culture of Flexible Working	Corporate interest groups	Online	Northern Powergrid	1
E184	Emerging Thinking and workforce resilience for trade unions - Technical	Internal Stakeholders	Online discussion	Northern Powergrid	11

Responses varied, covering different methods for upskilling, training, and employee wellbeing. Stakeholders believed that Northern Powergrid should prioritise the workforce renewal programme, diversity, and inclusion initiatives, and continue to prioritise apprenticeship programmes.

- There were some conflicting messages from our consumer panel about the relative importance of diversity and inclusion, in comparison to the priority of jobs creation through workforce renewal. Whilst D&I is seen as a priority and we should be ambitious, it was voted the least important aspect of our propositions.
- There was minimal support adopting diversity targets, we should retain the approach of recruiting the best person for the job but action should be taken to attract more under-represented groups to the company.
- Whilst jobs creation / workforce renewal, there was support for and recognition of the need to invest in the ongoing upskilling and development of existing employees, not just new recruits

Ambition and prioritisation

- Participants in Leeds and Newcastle were asked 'Does our approach in this area feel…?': 'Too ambitious: 0; Moderately ambitious: 4 (13.8per cent); About right: 16 (55.52per cent); Not ambitious enough: 9 (31per cent); Not at all ambitious: 0 **(E005)**
- Most important (in both Leeds and Newcastle): Our workforce renewal programme, including apprenticeships. **(E005)**
- Least important (in both Leeds and Newcastle): Diversity and inclusion initiatives. **(E005)**
- Most participants in Leeds felt that Northern Powergrid should be very ambitious in addressing the lack of diversity in its workforce (despite not prioritising this versus other propositions). While there was some recognition that this reflected the demographics of the wider engineering sector, many participants expressed concern about Northern Powergrid being regarded as a ‘white male-only employer’. Participants were less concerned about Northern Powergrid’s ageing workforce but still agreed that steps should be taken to address this. **(E005)**

- Does our approach in this area feel? Too ambitious: 1 (5.3 per cent); Moderately ambitious: 3 (15.8 per cent); About right: 12 (63.2 per cent) Not ambitious enough: 3 (15.8 per cent); Not at all ambitious: 0 **(E005)**

Diversity and inclusion in the workforce

- Participants suggested a range of ways in which Northern Powergrid could seek to attract younger people into its workforce including increasing advertising in schools and colleges, centring young people in its publicity materials, and hosting open days for young people leaving full-time education. Many felt that Northern Powergrid should do more to publicise its apprenticeship programme in education contexts to encourage younger applicants. **(E005).**

- A few participants argued that Northern Powergrid's ageing workforce could be interpreted as a positive, as it suggested that employees enjoyed their work and had no desire to leave. As such, Northern Powergrid could market itself to young people as a highly secure 'job for life'. **(E005).**

- Participants felt that Northern Powergrid should proactively address the lack of diversity in its workforce by conducting targeted recruitment campaigns and increasing the visibility of women and BAME people in its publicity. Another suggestion was that Northern Powergrid could offer women- or BAME-only graduate schemes to attract a more diverse pool of recruits. **(E005)**

- Participants were largely unsupportive of diversity targets due to a perception that such an approach would amount to little more than a tick-box exercise and may incentivise recruiters to overlook 'the best person for the job'. **(E005)**

- Participants from Newcastle provided mixed responses regarding the appropriate level of ambition in addressing issues with Northern Powergrid's workforce. While most recognised the need to recruit younger employees, many argued that Northern Powergrid should not prioritise diverse recruitment. **(E005)**

- Participants suggested a range of ways in which Northern Powergrid could seek to attract younger people into its workforce including increasing advertising in schools and colleges, centring young people in its publicity materials, and hosting open days for young people leaving full-time education. Many felt that Northern Powergrid should do more to publicise its apprenticeship programme in education contexts to encourage younger applicants. **(E005)**

- A few participants argued that Northern Powergrid's ageing workforce could be interpreted as a positive; as it suggested that employees enjoyed their work and had no desire to leave. As such, Northern Powergrid could market itself to young people as a highly secure 'job for life'. **(E005)**

- Many participants did not see the need for Northern Powergrid to encourage more racial diversity in its workforce, as they felt this was reflective of the wider engineering sector, although some did express concern at the lack of BAME representation and queried whether this would be even more apparent at management level. **(E005).**

- The lack of female representation in Northern Powergrid's workforce was more of a concern, with several participants suggesting that Northern Powergrid should centre women in its publicity to overcome perceptions of engineering as 'a man's job.' **(E005)**

- Participants were largely unsupportive of diversity targets due to a perception that such an approach would amount to little more than a tick-box exercise and may incentivise recruiters to overlook 'the best person for the job'. **(E005)**

- In relation to the social sustainability proposals, participants from corporate interest groups tended to focus on workforce issues such as diversity and STEM subject engagement. **(E020)**

- At a Consumer Panel, workforce renewal was argued important to Northern Powergrid as a business, with apprenticeships and local workforce initiatives particularly welcomed. However, participants were confident

Northern Powergrid would succeed in renewing their workforce and felt it was less of a priority compared to other business areas. **(E031)**

- Students are looking for companies with an inclusive and positive culture that prioritises employee welfare. They want to work for a company that offers career progression and development. **(E055)**

- Students were surprised at Northern Powergrid's current diversity figures, and felt that the current diversity targets were good, but perhaps not good enough. In order to attract a more diverse workforce, students suggested ensuring leadership is diverse, offering education and training opportunities, and ensuring that the company has inclusive and flexible policies. **(E055)**

- Utilities participants said hiring managers should be taught about neuro-divergence. Being this way does not mean you cannot perform the job (diversity). **(E166)**

- Consumers at the work-life (model) through a future lens discussion talked about allowing more flexible working in terms of working from home (remote working) - a hybrid model offering both in-office working and remote working. **(E173)**

- Consumers in an online survey on rethinking the rules of high-performance teamwork said colleagues have higher expectations than before, of which well-being is more prominent. Get the team involved in agreeing the culture and the goal. **(E174)**

- At a WISE webinar with corporate interest groups, 60per cent wanted a hybrid model for flexible working (LinkedIn) - mixture of office and remote working. Flexible working is not just about flexible location it is also about hours. Flexible working supports inclusion, diversity, and equality (for all protected characteristics) **(E183)**

- At a subsequent emerging thinking session, internal stakeholders saw a strategic opportunity to build our plans, suggesting we invite a subset of the Technical Council to a separate working group session in January 2021 to further develop our plans. **(E184)**

Upskilling and training

- Internal stakeholders on the emerging thinking performance and planning broadcast call said there was not enough information about investing in our workforce, it was mainly about investing in our network. Decarbonisation and digitalisation mean a transition from traditional engineering and ways of doing things to new / innovative ways. If we are serious about achieving our business plan regarding these, then we need to be serious about providing training and incentives/ encouragement for people to take up such training. Training and change of mind set should start now to achieve our objectives in the future. **(E148)**

- Internal stakeholders on a telephone call for digitalisation strategy and workforce resilience for trade unions said we have an acute shortage of technical skills so we need to work with external stakeholders to improve our feedstock of suitable staff - the company recognises that propositions in line with amending our recruitment methods and entry routes will improve this. **(E170)**

- During the call focused on Stakeholder Panel views on 2023-2028 Workforce Resilience Engagement Plan, the importance of upskilling and multiskilling was stressed: train the workforce with new skills, do not just focus on recruiting or bringing in the skillset from outside. **(E172)**

- Internal stakeholders during an emerging thinking session said line managers play a significant role to the implementation of Workforce Resilience Strategy. **(E177)**

- Internal stakeholders believe Northern Powergrid could demonstrate clearer career pathways and increase awareness of horizontal and vertical moves, including case studies. **(E181)**

- We need to grow our own leaders and skills within. **(E184)**

Mental health and wellbeing

- Feedback from an online engagement called ten trends impacting the future of work and employee engagement was that Northern Powergrid should have a portal that has wellbeing and reward in one place. **(E175)**

- In line with this, consumers from a subsequent online survey said wellbeing is about protecting the asset - our people, our body, our mental health - movement, mind-set, and meditation. **(E176)**

WAVE 3 – refining and finalising our plan

Our third wave of engagement was used to refine our proposals and gain endorsement for our final plans in 2021. The engagement was carried with domestic and rural consumers, SMEs, local authorities, as well as government, Ofgem and industry representatives. Themes covered by the engagement are:

- building a resilient workforce;

- diversity and inclusion;

- technical roles; and

- workforce metrics and design principles.

In total, we ran 91 events, engaging 32,500 stakeholders in wave 3. Of these 91 events, workforce was a specific sub-topic at >9 of them, covering >400 individuals.

The events where workforce was a specific sub-topic are listed below:

Engagement reference	Name	Subgroup	Method	Delivery partner	No engaged
E213	EDI in the workplace	Internal Stakeholders & Utilities	Online	Northern Powergrid	9
E214	Emerging Thinking and workforce resilience for trade unions - Technical	Internal Stakeholders	Online discussion	Northern Powergrid	5
E215	Learn Best Practice from the UK's Most Inclusive Employer	Internal Stakeholders	Webinar	Northern Powergrid	1
E216	How to recruit, retain & engage a diverse talent pool	Internal Stakeholders	Webinar	Northern Powergrid	1
E241	Colleague engagement - Workforce Resilience Surveys	Internal Stakeholders	Online survey	Explain Research	165
E242	Celebrating Intersectionality on International Women's Day	Corporate interest groups	Webinar	Inclusive companies	1
E243	Harnessing workforce diversity to raise efficiency in the back office	Utilities	Webinar	Northern Powergrid	N/A
E244	Colleague engagement: interview and focus groups	Internal Stakeholders	Focus groups and Interviews	Explain Research	29
E245	Demystifying Diversity in STEM	Other (D&I consultants)	Webinar	Northern Powergrid	4
E246	RIIO 2023-2028 - Establishing key workforce resilience metrics: Session 1: DNO working group	Utilities	Online discussion	Northern Powergrid	6

Engagement reference	Name	Subgroup	Method	Delivery partner	No engaged
E261	Northern Powergrid Workforce Resilience – phase 1	Internal stakeholders	Survey	Explain Research	165
E272	Northern Powergrid focus group summary	Customers	Online	Northern Powergrid	N/A
E287	Inclusion, Equality & Diversity in Energy Virtual Conference: The impact of Coronavirus on diversity and inclusion in 2021	Various	Webinar	Northern Powergrid	6
E288	Inclusion, Equality & Diversity in Energy Virtual Conference - Keynote Speaker	Central Government	Webinar	Northern Powergrid	1
E289	RIIO 2023-2028 - Establishing key workforce resilience metrics: Session 2: DNO working group	Utilities	Online discussion	Northern Powergrid	11
E290	Inclusion, Equality & Diversity in Energy Virtual Conference: Senior leadership in the energy sector - where is the diversity and how do leaders drive positive change	Various	Webinar	Northern Powergrid	7
E291	Inclusion, Equality & Diversity in Energy Virtual Conference - Diversity as an essential enabler of the net zero transition	Various	Webinar	Northern Powergrid	7
E292	2023-2028 - Establishing key workforce resilience metrics: session 1: DNO working group	Utilities	Online discussion	Northern Powergrid	10
E293	Inclusion, Equality & Diversity in Energy Virtual Conference: Increasing the visibility and voice for underrepresented groups – learnings from BBC 50/50 equality project	Various	Webinar	Northern Powergrid	4
E294	Inclusion, Equality & Diversity in Energy Virtual Conference - Inclusion in Uncertain Times	Various	Webinar	Northern Powergrid	5
E297	Future consumer research	Consumers	Online Forum	Gusto Research	20
E299	2023- 2028 Plan Website Survey R esponses	Various	Survey	Northern Powergrid	242
E300	Colleague engagement survey – plan acceptance	Internal stakeholders	Various	Survey	118

Building a resilient workforce

- A utilities stakeholder event encouraged organisations to have a 'dignity at work' charter to set out the standards and behaviours expected that help to foster an inclusive culture. **(E213)**

- The Technical Council require clear messages on the future and skills requirements to build a resilient workforce to fulfil customer needs and requirements. The company needs to be clear in our vision and plan so we can create recruit, develop and retain employees and support their progression with clear pathways fit for the future. **(E214)**

- Internal stakeholders were keen that the current workforce mentors the future workforce and that we should consider recruiting retirees on consultancy basis. **(E214)**

- The future workforce needs to know roles exist in the company, so in order to not rely on word of mouth only presence in schools is needed plus information on websites and linkages to university job sites. Timing of graduate recruitment to align to others, so that Q4 is application and Q1 is interviews. **(E214)**

- At the Learn Best Practice from the UK's Most Inclusive Employer webinar, we undertook the following programmes: Respect champions (supporting colleagues subjected to bullying and harassment) - speak up ambassadors, 'Becoming Anti-Racist' programme (linked to rise in BLM movement), 'Positive Difference' programme, training programme for line managers (what an inclusive manager looks like, how managers can tackle blockers/nay-sayers), Leadership, i.e. 'towards inclusion' strategy owned by the board, embedding inclusion in every leadership decision. **(E215)**

- At the *How to recruit, retain & engage a diverse talent pool* webinar, internal stakeholders said there is no way to predict that the differences you are making will result in the step change you are aiming for – we need purposeful and deliverable actions. **(E216)**

- In the workforce resilience surveys, for workforce satisfaction 'technology and training' is ahead of 'collecting and addressing colleague feedback'. **(E241)**

- For upskilling and multiskilling colleagues support 'broadening apprentice and graduate programmes' ahead of 'developing accelerated development programmes.' **(E241)**

- At a workforce diversity webinar, utilities participants said one size does not fit all - individuals have different needs for how they work from home, different drivers to make the teams effective. Think of 'the whole person' - not everyone has the space or facilities to WFH, think about allowing them to take equipment home from the office to meet their needs and enable them to better serve customers. **(E243)**

- ROI on inclusion and diversity - be willing to accept that there may be no ROI, it does not mean that discrimination and exclusion becomes acceptable. **(E243)**

- At a Workforce diversity webinar, it was highlighted how flexible working has been key, especially with female workforce, COVID-19 has given more insight into the benefits and successes of flexible and remote working. Some recommendations for practical policy or working practices included; ensure people have a break away from their screen, they are set up correctly, offer unlimited paid leave, allow flexible working. Multi-skilling colleagues to deal with different types of demand due to COVID-19 will change how you upskill and schedule in the future. **(E243)**

- Internal stakeholders who took part in colleague engagement interviews and focus groups said mental wellbeing was the area that received higher levels of feedback in terms of what Northern Powergrid can do differently in the future. **(E244)**

- Independent mental health support could be offered to staff. Awareness of this could be raised through word of mouth – such as discussions with line managers – to ensure that those who need these services are accessing support. **(E244)**

- Appreciate greater consistency regarding the applications of competency assessments. **(E244)**
- Living wage was paid to all P&A colleagues. **(E244)**
- Increase the flexibility of benefits packages, such as allowing staff to buy back holidays or work more flexible hours from home. **(E244)**
- Leaders must be 'culture makers' and prioritise culture change. As a leader, ask yourself how are you listening to the silence and what is not being said? Do you have forums for people to share their experiences or talk about their concerns? As a leader, engage with the voices. **(E287)**
- At the Inclusion, Equality & Diversity in Energy Virtual Conference the participant pointed out to Code switching – consider how your organisation can encourage people to embrace their individuality rather than have them 'code switch' and play a part they believe the organisation wants them to play or that is perceived to be more acceptable/in line with the norm. **(E288)**
- To create a fair and just transition to net zero, we need to: **(E288)**
    - Open doors to more diverse perspectives
    - Create opportunities for people to thrive at what they do
    - Create an environment in energy that is truly inclusive and encourages community participation from the ground up.

Diversity and inclusion

- At the Demystifying Diversity in STEM webinar, participants said we need buy in and commitment from top level, need to ensure colleagues understand the value of DEI: **(E245)**
    - Having a dedicated DEI team to lead initiatives.
    - Accelerated inclusion training.
    - Educating colleagues to benefit the future workforce.
    - Working with schools - pipeline talent.
    - Be more creative with recruitment practices.
- Now is the best time to start looking at DEI as we potentially have up to 5 generations in our workforce - who are our teams, who are our customers, breadth of experience and perspectives. The challenge is matching varying expectations of different generations to what you can offer them as an employer. **(E245)**
- There are visible and invisible diversity traits (John Hopkins Diversity Wheel) - intersectionality, be conscious of judgements we might make. **(E245)**
- Positive action in relation to the equality act is acceptable, i.e. 'we would really welcome female applicants from applying' on a job advert from an engineering firm. **(E245)**
- Get your diversity groups to go into schools so students can see themselves in your workforce. **(E245)**
- At the Learn Best Practice webinar we discussed the introduction of diversity champions (different champions for different diverse groups, which operate differently as appropriate to the group and have evolved naturally), diversity champions have external network links, networks have a lead who is responsible for supporting and developing the diversity champions, diversity networks bring emerging themes to the attention of the company, find the people with the passion to make the change and create a social movement of change. **(E215)**

- At the 'Learn Best Practice' webinar we discussed our response to COVID-19 introduced disability leave policy (if any individual has any leave associated with their disability, it won't be used punitively in an absence management process, individuals will be supported by their line manager, getting on the front foot with reasonable adjustments, so people don't feel stigmatised by having a long term condition), introducing a health passport (recording any adjustments they need in case they work in a different area or move to a different team, focusing on what someone can do and how the company can support them to do so, rather than what they can't do), responding to different diversity needs in a different way, wellbeing calls to those who are shielding/absent, leaders reaching out to diversity networks, recognition that some diverse groups i.e. BAME have been hit harder by COVID. **(E215)**

- At the 'How to recruit, retain and engage a diverse talent pool' webinar, internal stakeholders said we needed to understand the current landscape before we can change direction – 'if we do not change direction, we will end up where we are going.' **(E216)**

- It was suggested that instead of measuring how many people we have from a particular diversity background, we should set a metric around how inclusive we are. Deliotte Inclusion model: when each person in and around your organisation can say that they have been treated fairly, respected, feel valued, feel part of that organisation, is there a safe/open environment, am I being invested in - these are all signs of inclusion. Only then will you have an inclusive culture. Inclusion is the starting point; only then can you start to focus on diversity. **(E216)**

- Unconscious bias training is only effective if you reinforce the learning. **(E216)**

- Open leadership programmes up to everyone, do not restrict them to a certain group, i.e., do not offer a BAME leadership programme, but offer a leadership programme to everyone but consider ringfencing spaces to certain groups - otherwise you will experience backlash. **(E216).**

- Our colleague engagement survey results showed that colleagues rated Inclusion, diversity, and equality and upskilling and multiskilling lower than workforce satisfaction. **(E241)**

- For inclusion, diversity, and equality colleagues rank 'build education partnerships to promote subjects that lead to careers in our industry', 'provide more accessible entry routes to employment and work experience opportunities' and 'improve visibility of Northern Powergrid out in the communities 'ahead of 'leadership programmes for underrepresented groups.' **(E241)**

- A number of suggestions on how to improve gender diversity and inclusion were obtained from Celebrating Intersectionality on International Women's Day webinar:

- 'The Story of Gender' - talent pipeline starts in schools, but if when they come into the organisation and feel that they are not represented, they will feel un-included. Think about who you put on your corporate comms - is it always the same people? **(E242)**

- How can organisations embrace this and why is it good for business - companies need to understand and respect different facets of personalities, COVID has accelerated our ability to bring our authentic self into the work and removed a lot of barriers, leading to a more united workforce, starting to see different conversations happening, approach to intersectionality - how facets of a personality overlap, we are all different on multiple levels. **(E242)**

- Keep turning intersectionality into a positive, do not get too caught up in box ticking. **(E242)**

- Barriers - assumptions and stereotypes still have not gone away, i.e., everyone experiences discrimination in the same way, we rush to generalise people's experiences. **(E242)**

- Making it more than a tick-box exercise - having more conversations, do not worry about getting it wrong or saying the wrong thing, i.e. say 'how do I best support you', understanding what you have in common, keeping dialogue open. **(E242)**

- Employee groups can bring together people under the same characteristics, with the assumption that they have all the answers, then organisations try to build policies on their experiences, that fails, and they stop because it has not worked. **(E242)**

- Significant progress has been made on gender equality - 80per cent of companies host a women's network (FTSE 100). Must not become complacent - need to ensure a clear understanding of what intersectionality is (belonging to 2 or more underrepresented categories). Companies should ask their senior male leaders to sponsor women in middle management roles - start with mentoring, you will learn from that individual but also have the opportunity to impress. **(E242)**

- Social class is not a protected characteristic, but poorer people are more likely to be treated less favourably. **(E242)**

    - Aim to create a more equitable workplace - more comfortable someone feels at work they are more likely to perform better. **(E242)**

    - Fostering inclusion should be at the heart of your culture. **(E242)**

    - Allow colleagues the time to understand what it is like to be treated a different way, i.e., share lived experiences rather than just online training. BUT do not assume that everyone feels comfortable about sharing their own experiences. **(E242)**

- Neurodiversity - some neurological conditions remain under-represented in a number of industries, working in an office would be impossible for some people, whereas WFH they can be much more efficient - create individual plans for individual employees. **(E243)**

- At the Inclusion, Equality & Diversity in Energy Virtual Conference, the impact of Coronavirus on diversity and inclusion in 2021 participants highlighted that COVID-19 has exacerbated many socio-economic inequalities that already existed and has had the greatest detrimental impact on those with lower incomes**. (E287)**

- The impact of being furloughed has been greater on ethnic minorities with 22per cent of ethnic minorities losing their jobs after being furloughed compared with 9per cent of all other adults. **(E287)**

- People with disabilities are amongst those most impacted with 1 in 4 facing redundancy. **(E287)**

- Gender equality is estimated to have been set back by 36 years given women are overly represented in industries predicted to be in decline such as hospitality and retail (where there has been less opportunity to work from home) as well as the burden of unpaid care which is disproportionately carried by women. Also, the number of people working part time has reduced significantly during COVID. **(E287)**

- Energy workforce: ‘stale, male and pale’ **(E288)**

    - 2018: 5 per cent UK employees in the energy sector came from a BAME background

    - 38 per cent of energy companies have no female representation on the board

    - A lack of diverse representation at leadership level can not only detriment businesses, but it can create a risk of perpetuating existing inequalities.

- Companies need to ensure the complex and varying priorities of all individuals are considered when we make decisions on the future of energy systems. **(E288)**

- At the ‘Inclusion, Equality & Diversity in Energy Virtual Conference’ the participant pointed out that as leaders, we are responsible for opening the door to enable others to take charge and we need visible leadership and role models at all levels of decision making and delivery. **(E288)**

- Diversity and inclusion are inseparable from the net zero transition. **(E288)**

- Various participants agreed during the 'Inclusion, Equality & Diversity in Energy Virtual Conference: Senior leadership in the energy sector - where is the diversity and how do leaders drive positive change' that diversity challenges experienced by Northern Powergrid are that of the industry as a whole. **(E290)**

- During the Inclusion, Equality & Diversity in Energy Virtual Conference - Diversity as an essential enabler of the net zero transition participants said that there is a clear link between diversity and net zero ambitions and the best way to boost diversity is not about focusing solely on diversity. The end goal is not just diversity but about performance and workplace culture is key to improving diversity and increasing performance. **(E291)**

- One of the participants stressed that net zero will increase diversity in three ways: **(E291)**

    - Decentralisation: will enable more diverse communities to get involved in energy services

    - Dealing with complexity: will need all the different minds around the country to help us get there – diverse ways of thinking will be crucial, particularly from younger people

    - Behaviour change: to deliver net zero we need massive behaviour change in homes, businesses and day to day lives – need to ensure this is effective and it sticks.

- One of the participants suggested that good initiatives to increase diversity targets to improve diversity by 2030 – commitment from CEO and SLT, make targets part of incentive scheme for line managers and to truly make all colleagues feel they belong: unconscious bias, re-launched all diversity networks, D&I is becoming an everyday conversation, colleagues coming forward to share their own experiences, seeing it filter down to different levels and into different functions. **(E291)**

- Participants agree that equality is key to business and that organisations focus on gender equality first but shouldn't forget about the other area of equality such as race, disability and sexual orientation. Role models to be seen from all diverse backgrounds at all positions of the business. **(E293)**

- Encouraged to sign up to the Renewable UK Switch List directory. A directory of women speakers in energy. Established to help the industry have panels with wide diver representation. **(E293)**

- Line managers and internal communications are absolutely fundamental during times of uncertainty. **(E293)**

- Some participants raised the questions of 'How do we communicate with a 'desk-less' (field based) workforce: invest in line managers so they know how to communicate effectively; appreciate that the relevance of communication to field based workers is very local to where they are (i.e. they may only concerned with their depot not head office); avoid using 'third space' (i.e. mess room/canteen) to try to engage with these workers'. **(E294)**

- The participants suggested that lunch and learn sessions (not compulsory, recorded so can be watched later), sharing stories/hints and tips/recipes for social rather than work related interactions, zoom survival pack (to cope with lengthy zoom sessions), walk and talk etc. (**E294)**

- Reactions to Northern Powergrid's plan: minority would like to see more ambitious gender targets (leadership/engineering) and Greater racial diversity**. (E297)**

- Reactions to Northern Powergrid's plan: positive that targets are in place and that targets mostly seem balanced and timescales realistic/achievable. **(E297)**

Colleague engagement survey and focus group insights

- For motivation and productivity, although slightly contradictory, 'utilise IT solution to increase productivity' is ahead of 'using analytics.' **(E241)**

- For upskilling and multiskilling colleagues support 'broadening apprentice and graduate programmes' ahead of 'developing accelerated development programmes.' **(E241)**

- For health, safety and environment 'PPE' is ahead of an 'app on fatigue management' with 'mental health' being in the middle. **(E241)**
- For pay and rewards, colleagues ranked 'competitive pay ad reward' higher than 'aligning incentive mechanisms'. **(E241)**
- To raise awareness of what opportunities are available, colleagues suggested that more resources were put into school visits, and that colleagues who spoke to pupils represented a variety of ethnic backgrounds and genders. **(E244)**
- Northern Powergrid's workforce does not reflect the diversity of the communities that it serves, and aligns with Northern Powergrid's own view that inclusion, diversity, and equality is an important theme to address in the 2023-2028 strategy. **(E244)**
- Northern Powergrid is not necessarily appealing to a broad enough audience to get through the door in the first place, which may limit the diversity within Northern Powergrid's workforce. To appeal to a broader audience, colleagues suggested that Northern Powergrid volunteers go into schools and colleges to show students what career opportunities are available to them. **(E244)**
- In addition, colleagues suggested promoting Northern Powergrid more at universities, as well as advertising roles on more popular job websites. Attract applicants without a background in STEM, as communication skills would provide a valuable asset to Northern Powergrid's workforce. **(E244)**
- To therefore create fair access to opportunities, some colleagues suggested promoting work experience opportunities in technical, professional and administration roles to the wider community. **(E244)**
- Establish a prayer room, to create a more welcoming environment for Muslim colleagues. **(E244)**
- There was support from colleagues for working from home or working with more flexible hours. **(E244)**
- Industrial colleagues suggested improving communication by facilitating conversations between decision makers and the staff on the ground, so that their knowledge and experience can be considered in decision-making. **(E244)**
- Some colleagues in industrial or technical roles felt that they would be more productive if roles were re-filled more rapidly following leavers. **(E244)**
- This feedback suggests that improving the management of workload across technical and industrial teams could support with staff retention and improve motivation at work. **(E244)**
- The 2023-2028 business plan could focus on increasing recruitment numbers, expanding recruitment windows to be more continuous, speeding up the recruitment process and ensuring that the knowledge of experienced staff is passed on before retirement. Further, the 2023-2028 business plan could focus more on exit interviews. **(E244)**
- A common view was that more could be done to ensure that career progression opportunities were consistent across colleagues, due to the subjective nature of competency assessments. **(E244)**
- Multiskilling was not encouraged as much as they would like, hence staff may become 'pigeon-holed' within their own departments. **(E244)**
- Educational requirements can be a barrier to progression. Certain management courses could be made more accessible. **(E244)**
- Technical colleagues said that managers are perceived to have a very high workload, and therefore they sometimes do not have the time to support staff with concerns about their workload. **(E244)**

- Further, it was a common view that technical colleagues would like to have training encouraged by Northern Powergrid to keep up with evolving technologies and improve their competence at work. Suggestions included relevant master's degrees for example. However, some technical colleagues explained that this is not encouraged by Northern Powergrid. **(E244)**

- Some colleagues in technical and professional and administration roles did not know who their mental health first aiders were, or what they do specifically. **(E244)**

- Opportunity to have meaningful conversations with managers when their own workload is too high, to discuss how they can get the right support. Regular one to one conversation with staff was established as a requirement for management positions. **(E244)**

- During the 2023-2028 Plan Website Survey Responses, 42.7per cent of the participant to the survey said they 'really like' workforce. **(E299)**

- During the colleague engagement survey – plan acceptance, there was a low mean score given be colleague respondents for their 'confidence in delivery' within the workforce plan area, of 3.5 out of 5, which was the lowest mean score given for confidence in delivery for all plan areas. **(E300)**

Workforce metrics and design principles

- At the RIIO 2023-2028 - Establishing key workforce resilience metrics: Session 1: DNO working group, DNOs agreed that common workforce metrics that reflect key 2023-2028 priorities (areas of significant change) covering, as a minimum, workforce satisfaction, diversity/inclusion, mental health in the workplace, were important. **(E246)**

- Results from Northern Powergrid Workforce Resilience – phase 1: **(E261)**

    - Ensure colleagues have the best technology and training to support them in their work. 4.8 - Mean average on a scale of 1 to 5 with 1 being 'strongly disagree' and 5 being 'strongly agree.

    - Improve colleague access to career pathways and promotional opportunities to provide a clear view on progression. 4.6 - Mean average on a scale of 1 to 5 with 1 being 'strongly disagree' and 5 being 'strongly agree'.

    - Step change our attraction and retention methods through open and honest discussions on roles and expectations via entry and exit interviews. 4.4 - Mean average on a scale of 1 to 5 with 1 being 'strongly disagree' and 5 being 'strongly agree.

    - Establish working policies and practices to underpin a more flexible and inclusive workplace. 4.4 - Mean average on a scale of 1 to 5 with 1 being 'strongly disagree' and 5 being 'strongly agree'.

    - Introduce frequent colleague feedback forums to continuously improve and address areas of dissatisfaction. 4.3 - Mean average on a scale of 1 to 5 with 1 being 'strongly disagree' and 5 being 'strongly agree'.

    - Further utilise or implement IT solutions to increase productivity of our workforce. 4.6 - Mean average on a scale of 1 to 5 with 1 being 'strongly disagree' and 5 being 'strongly agree'.

    - Ensure our colleagues are not working under fatigue and are therefore able to perform at their best. 4.4 - Mean average on a scale of 1 to 5 with 1 being 'strongly disagree' and 5 being 'strongly agree.

    - Improve working relationships with our third-party contractors to improve how the different workforces can perform better together. 4.1 - Mean average on a scale of 1 to 5 with 1 being 'strongly disagree' and 5 being 'strongly agree'.

- Widen leadership engagement visits to more business sections to allow for more openness and candid conversations that lead to improvements identified by our colleagues. 3.9 - Mean average on a scale of 1 to 5 with 1 being 'strongly disagree' and 5 being 'strongly agree'.

- Utilise data analytics of productivity tools to show how well our colleagues perform and identify areas of improvement. 3.5 - Mean average on a scale of 1 to 5 with 1 being 'strongly disagree' and 5 being 'strongly agree.

- Broaden our apprentice and graduate programme to additional roles (operational and non-operational) giving more individuals with differing skillsets an opportunity to apply. 4.5 - Mean average on a scale of 1 to 5 with 1 being 'strongly disagree' and 5 being 'strongly agree'.

- Widen our people leadership training offering to enhance the leadership skills of our colleagues. 4.3 - Mean average on a scale of 1 to 5 with 1 being 'strongly disagree' and 5 being 'strongly agree'.

- Promote the opportunity to be a part of a key worker organisation and shape a sustainable future to increase awareness of the work performed by our colleagues. 4.1 - Mean average on a scale of 1 to 5 with 1 being 'strongly disagree' and 5 being 'strongly agree.

- Implement learning tools/IT solutions such as a learning management system and fixed reality training to allow blended and flexible approach to training. 4.0 - Mean average on a scale of 1 to 5 with 1 being 'strongly disagree' and 5 being 'strongly agree'.

- Establish relationships with universities to attract the best graduates and offer an accelerated development programme to develop our colleagues in a shorter period of time. 4.0 - Mean average on a scale of 1 to 5 with 1 being 'strongly disagree' and 5 being 'strongly agree.

- Procure the best work wear to keep our colleagues protected at work. 4.8 - Mean average on a scale of 1 to 5 with 1 being 'strongly disagree' and 5 being 'strongly agree'.

- Broaden the awareness of mental health to develop a culture that supports the health and wellbeing of our colleagues. 4.4 - Mean average on a scale of 1 to 5 with 1 being 'strongly disagree' and 5 being 'strongly agree.

- Implement further risk management training to keep colleagues safe at work. 4.3 - Mean average on a scale of 1 to 5 with 1 being 'strongly disagree' and 5 being 'strongly agree.

- Introduce the role of Mental Health Champions to effectively promote the wellbeing of colleagues. 4.0 - Mean average on a scale of 1 to 5 with 1 being 'strongly disagree' and 5 being 'strongly agree'.

- Develop a mobile phone application (an app) to monitor colleague fatigue risk. 3.5 - Mean average on a scale of 1 to 5 with 1 being 'strongly disagree' and 5 being 'strongly agree'.

- Ensure that we offer competitive pay and reward packages. 4.7 - Mean average on a scale of 1 to 5 with 1 being 'strongly disagree' and 5 being 'strongly agree.

- Broaden our reward package to have flexible options to meet colleague is changing and evolving personal needs by trading a percentage of their salary in flexible benefits, such as holiday trading, medical cover, childcare vouchers etc. 4.2 - Mean average on a scale of 1 to 5 with 1 being 'strongly disagree' and 5 being 'strongly agree'.

- Implement a mechanism for colleagues to see their total reward package in one place, such as salary, pension, and retail discounts. 4.2 - Mean average on a scale of 1 to 5 with 1 being 'strongly disagree' and 5 being 'strongly agree'.

- Enhance our benefits offering to include benefits that colleagues can access from home (via online portal), such as retail discounts. 4.1 - Mean average on a scale of 1 to 5 with 1 being 'strongly disagree' and 5 being 'strongly agree.
- Align collectively bargained incentive mechanisms so all colleagues are rewarded in line with common agreed goals. 3.9 - Mean average on a scale of 1 to 5 with 1 being 'strongly disagree' and 5 being 'strongly agree.
- Workforce satisfaction. 4.7 - importance on a scale of 1 to 5 with 1 being 'very low importance' to 5 being 'very high importance'.
- Pay and reward mechanisms. 4.5 - importance on a scale of 1 to 5 with 1 being 'very low importance' to 5 being 'very high importance.
- Health, safety, and mental wellbeing. 4.5 - importance on a scale of 1 to 5 with 1 being 'very low importance' to 5 being 'very high importance'.
- Motivation and productivity. 4.5 - importance on a scale of 1 to 5 with 1 being 'very low importance' to 5 being 'very high importance.
- Upskilling and multiskilling. 4.3 - importance on a scale of 1 to 5 with 1 being 'very low importance' to 5 being 'very high importance'.
- Inclusion, diversity, and equality. 3.8 - importance on a scale of 1 to 5 with 1 being 'very low importance' to 5 being 'very high importance'.
- Focus on reducing operational and office waste and limit our impact on the environment. 4.5 - Mean average on a scale of 1 to 5 with 1 being 'strongly disagree' and 5 being 'strongly agree.
- Provide options for low carbon business travel and make improvements to our working premises and substations to be more energy efficient. 4.4 - Mean average on a scale of 1 to 5 with 1 being 'strongly disagree' and 5 being 'strongly agree'.
- Integrate sustainability into our investment decisions. 4.4 - Mean average on a scale of 1 to 5 with 1 being 'strongly disagree' and 5 being 'strongly agree'.
- Work with our suppliers and contractors to reduce their emissions and amplify positive outcomes. 4.2 - Mean average on a scale of 1 to 5 with 1 being 'strongly disagree' and 5 being 'strongly agree'.
- Deliver tailored programmes of work to support the communities we serve – including our most vulnerable, promote volunteering. 4.1 - Mean average on a scale of 1 to 5 with 1 being 'strongly disagree' and 5 being 'strongly agree'.
- Create opportunities for colleagues to learn about and to champion sustainability and low carbon transition. 4.0 - Mean average on a scale of 1 to 5 with 1 being 'strongly disagree' and 5 being 'strongly agree'.

– When asked: 'What additional ideas do you have that Northern Powergrid should consider increasing inclusion, diversity and equality amongst the workforce?' Northern Powergrid colleagues shared the following ideas: Engage with local schools and communities, reach a wider audience in recruitment and advertising opportunities, increase honesty in recruitment, focus on ability regardless of gender or ethnicity, modernise diversity policy for lesser represented groups, evaluate current teams for diversity, and to support flexible working needs. **(E261)**

– When asked: 'What additional ideas do you have that Northern Powergrid should consider improving workforce satisfaction?' Northern Powergrid colleagues shared the following ideas: Improve IT systems and equipment, improve accessibility and clarity of training, improve cross-departmental communication, offer more flexibility

in working hours and location, listen more carefully to employee needs, improve office facilities, and increase effort to take on feedback. **(E261)**

- When asked: 'What additional ideas do you have that Northern Powergrid should consider driving motivation and productivity?' Northern Powergrid colleagues shared the following ideas: Enhance IT systems and devices, reward and bonus schemes, capacity, fatigue and productivity assessment tools, further internal training, and development opportunities, increase culture of positivity, and to increase manager involvement. **(E261)**

- When asked: 'What additional ideas do you have that Northern Powergrid should consider ensuring we have the skills for the future?' Northern Powergrid colleagues shared the following ideas: Improve internal development training support, review graduate/apprenticeship schemes, review recruitment processes for diversity and outreach, assess current skill gap, enhance IT training systems, and review the availability of skills amongst field staff. **(E261)**

- When asked: 'What additional ideas do you have that Northern Powergrid should consider ensuring the health, safety, and mental wellbeing of our workforce?' respondents shared the following ideas: Help manage workload stress and fatigue, enhancement of wellbeing training and personnel, improve access to wellbeing resources, increase useful employee dialogue and feedback, ensure adequate staff resources, and improve the team morale and environment. **(E261)**

- When asked: 'What additional ideas do you have that Northern Powergrid should consider for the pay and reward of our workforce?' respondents shared the following ideas: Reassess annual bonus schemes and targets, tailor rewards to staff type and needs, increase incentives, discounts, and perks, create additional and updated pay scales, offer more competitive pay, and have high performance recognition. **(E261)**

- When asked: *'*On reflection of the respective areas of our Workforce Resilience strategy, what, if anything, is missing and do you have any final ideas to share with us as we shape up the plan?*'* respondents shared the following ideas: Further upskilling and training, transparency in process and communications, resolve workload and staffing issues, clearer development opportunities, increase morale and collective culture, and meaningful action on feedback. **(E261)**

- When asked: 'What additional ideas do you have that Northern Powergrid should consider to be a more sustainable business and to enable and support you to be more sustainable in your work, commute to work, and other activities?' respondents shared the following ideas: Increased and sustained remote working opportunity, introduce electric vehicles and charging facilities, reduce carbon footprint of office + equipment, reduce unnecessary travel, offer cycle to work scheme, and upgrade IT systems. **(E261)**

- Positive action – there is a fine line between positive action and positive discrimination. Don't rely on employment law as the basis for setting targets and quotas as this will cause as many problems as it seeks to resolve. Start from the premise that supports bringing people who are furthest from the labour market into your organisation. Be authentic. **(E287)**

- Recruit for potential and development – consider character and attitude, flexibility and adaptability over traditional qualifications and skills to support bringing new, diverse talent into your organisation. **(E287)**

- During RIIO 2023-2028 - Establishing key workforce resilience metrics: Session 2: DNO working group, the participants all agreed that for the Metric development: **(E289)**

    - Agree on 2023-2028 priorities in each category

    - Define a set of metrics under each priority (or groups of priorities) that will report on progress against those priorities.

- During the RIIO 2023-2028 - Establishing key workforce resilience metrics: Session 1: DNO working group all the participants agreed that for Final Plan submission in December 2021 there is a need for more detailed, lower-level metrics and data sharing as part of a formal, cross-DNO collaborative effort aimed at facilitating best-practice in the sector (and wider industry). It was agreed on data to be shared and the forum to do this.

- As a group consensus all DNOs agreed that:
  - As design principles, there is a need to minimise additional overheads for reporting metrics and use existing vehicles/processes where possible (e.g. gender pay report
  - In agreeing metrics – priority is on the three areas (above) stipulated in Ofgem Guidance to CEGs:
  - We recognise there will be differences in data sets, comparability, availability and other challenges that need to be considered so that outputs are meaningful -, e.g. employee demographic data is not widely held. For this publicly shared metrics – they should be high-level enough to overcome these challenges, e.g. demonstrating increase in proposition of in female engineers
  - We will target a bi-lateral meeting with Ofgem in late May to share our proposals **(E292)**

WAVE 4 – Finalising the plan

From July to December 2021, we finalised our plan, responding to queries, addressing gaps and testing overall acceptability. We engaged 45 customers and stakeholders overall and with detailed sessions on outstanding workforce resilience topics across three events.

The events where Workforce Resilience was a specific sub-topic are listed below:

Code	Name	Subgroup	Engagement Type	Date	No Engaged
(CR418)	Cross Utility Workshop	Utilities	Meeting	20/10/2021	8
(CR426)	Citizens Panel (Bill impact)	Consumers	Panel	20th & 23rd Sep	37

No new insights were gathered – the focus of discussions was around support for the plan.

Innovation

Stakeholder engagement summary

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
IN1	**Identify opportunities to accelerate the benefits of flexibility**	**Wave 1:** Flexibility first was identified as a key theme during our open and deliberative engagement. Stakeholders fully supported an approach which enables customers to participate in the merging and future energy market. Large industrial customers supported this view, however, domestic customers were less able to understand flexibility and their role in our early engagement. ***Key wave 1 finding:*** *There is support from customers and stakeholders for flexibility but more information is needed to explain what it is and the benefits of it for different customer groups.*	*E029* *E147*
		Wave 2: We developed new 'What is?' education tools and re-shaped our communications to further explain flexibility in our wave 2 engagement. We then tested this in-depth with our customer panels. Customers found energy future, innovation, and environment both interesting and relevant. These areas were viewed as closely related, forward looking and contributing to battling climate change. ***Key Wave 2 finding:*** *Once their understanding of flexibility improved, customers supported the inclusion in the plan and linked it to innovation as a priority.*	*E005* *E023* *E031*
		Wave 3: At our Stakeholder Summit, future energy workshops and the 2023-2028 business plan survey we were able to further develop and test our innovation propositions. Flexibility was identified as being increasingly important for a successful energy transition, with strong support for investing ahead of need to support flexible connections. Most domestic and business customers and 67per cent of rural customers voted for the upper levels of ambitions (options D or E) to create high levels of flexibility and connectivity ***Wave 3 finding:*** *In addition to identifying flexibility as a priority for innovation the acceleration of these programmes was highlighted as an area for up-front investment and activity.*	*E271* *E275* *E235* *E236* *E263* *E265* *E295* *E299* *E300* *E262*
IN2	**Develop sophisticated data management and analytics to inform energy system forecasting, planning and real-time decision-making**	**Waves 1 and 2:** Whilst innovation in relation to data was not a focus within wave 1 engagement, it was covered in its own data and digitalisation engagement. ***Key wave 1 and 2 findings:*** *Whilst not explicit in wave 1 and 2, innovation engagement, the themes emerging around data and digitalisation indicated the need for links to innovation to meet stakeholders' priorities and needs.*	*N/A*
		Wave 3: At our stakeholder summit, future energy workshops and the 2023-2028 business plan survey we were able to further develop and test our innovation propositions. Data sharing was supported by all stakeholders and customers with an emphasis on how this could facilitate transition to DSO. Stakeholders were supportive of open data sharing and most domestic and future customers were comfortable with us sharing data on household-level energy use. We heard from our supply chain and experts that more data should be shared in order to increase the relevance of academic research and allow innovators to develop more appropriate solutions ***Key wave 3 finding:*** *The smart use of data and appropriate data sharing will enable more appropriate innovative solutions.*	*E271* *E275* *E235* *E236* *E263* *E265* *E295* *E299* *E300* *E262*

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
IN3	**Enhance the connections process to facilitate higher volumes and different types of connection**	**Waves 1 and 2:** Whilst innovation in relation to connections was not a focus within wave 1, engagement around connecting low carbon technologies was covered in our connections and decarbonisation engagement. ***Key wave 1 and 2 findings**: Whilst not explicit in wave 1 and 2 engagement, the themes emerging around low carbon technology connections indicated the need for links to innovation to not only meet customers' practical connections needs but to model, demonstrate and help us to communicate about the different technologies available and the benefits they can deliver for customers.*	*N/A*
		Wave 3: Through our wave 3 engagement we were able to further develop and test our innovation propositions. There was general support for investing in innovation, for example, the development of batteries for home storage of electricity and the roll out of more EVs. Domestic customers mainly mentioned the importance of innovative new methods of generating electricity. They were generally keen on the idea of generating their own energy and being self-sufficient and wanted more information on this. Stakeholders called out the need for quicker and more innovative connections from us for projects like charging forecourts to help facilitate the LCT roll out. ***Key wave 3 finding:** There is an appetite for domestic customers and from wider stakeholder groups to generate their own electricity and connect new technologies like EVs and battery storage. Simple processes and more information will support take up.*	*E271* *E275* *E235* *E236* *E263* *E265* *E295* *E299* *E300* *E262*
IN4	**Maintain the dependability of the energy system as seen by the customer during the energy system transition and decarbonisation**	**Wave 1:** Whilst innovation in relation to reliability was not a focus within wave 1 engagement in prioritising the key areas of business plan reliability and affordability consistently came out as the top priorities across all stakeholder and customer groups. ***Key wave 1 finding**: Network reliability is the top priority for customers and stakeholders.*	*N/A*
		Wave 2: When asked, most of our consumer panel placed reliability as their number one priority. Our panel in Leeds went further suggesting that we should be very ambitious in using innovation to guarantee the reliability of the electricity network, as this is central to our role as a DNO. The majority of our panel also felt that we should look to potential outcomes for customers as the primary factor in allocating its innovation budget, in order to avoid investment in areas that would not reflect our customers' priorities. ***Key wave 2 finding**: We should be ambitious in our innovation to guarantee the reliability of the electricity network.*	*E005* *E023* *E031*
		Wave 3: In our wave 3 engagement discussions were focussed around the future energy system transition and decarbonisation. It is clear that innovation is key to delivering and maximising customer and stakeholder benefits in these areas, however, not at the detriment of delivering a safe and reliable service. ***Key wave 3 finding:** Future energy system transition and decarbonisation are important but shouldn't be over emphasised above the dependability of the network. Innovation projects need to factor this in.*	*E271* *E275* *E235* *E236* *E263* *E265* *E295* *E299* *E300* *E262*

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
IN5	**Remove barriers preventing access to the energy, including access to energy data; particularly for those not currently engaged or informed, vulnerable or less-advantaged**	**Wave 1:** Our technical panel, partners and expert stakeholders, highlighted the importance of data, all making specific reference to vulnerable customers. They encouraged us to continue to increase our understanding through data, understanding of the industry, as well as looking at how different utility companies can work collaboratively and intelligently support vulnerable customers. ***Key wave 1 finding****: Data is key to understanding customers (particularly those experiencing vulnerabilities) and communities. Improving our understanding will better enable us to meet their specific needs and address barriers through innovation.*	*E029* *E147*
		Wave 2: As a result of our wave 1 engagement we developed our 'nobody left behind' approach that was assured by our future fairness panel. This panel was established to ensure that our vulnerability strategy encompasses all current vulnerabilities in our region and to help us to identify new and emerging issues. They suggested that we look at ways to apply this to innovation and the development of new services. ***Key wave 2 finding****: Our 'nobody left behind' approach should be applied to innovation.*	*E248*
		Wave 3: At our Stakeholder Summit, our stakeholders encouraged us to support customers with engaging in the flexible energy market and in particular, support vulnerable and fuel poor households to understand more about LCTs. We were also encouraged to deliver more innovation projects focussed on vulnerable households. Throughout our wave 3 engagement, barriers and accessibility issues relating to participation in innovation were identified, highlighting that academia and SMEs are the stakeholders who struggle the most. Barriers included innovation timescales, funding models, access to network data, time to engage and lack of understanding of the energy landscape. Suggestions were made to support innovators to engage with each other. ***Key wave 3 finding:*** *More innovation projects should be focused on vulnerable households and we need to consider barriers to innovation for SMEs, academia and other stakeholders as well as domestic customers.*	*E271* *E275* *E235* *E236* *E263* *E265* *E295* *E299* *E300* *E262*
IN6	**Create capabilities to deliver a next generation local energy network that links up whole system energy sources and vectors, balancing in real time**	**Wave 1:** As with IN4, whilst innovation in relation to reliability was not a focus within wave 1 engagement, reliability and affordability consistently came out as the top priorities across all stakeholder and customer groups. ***Key wave 1 finding****: Network reliability is the top priority for customers and stakeholders.*	*N/A*
		Wave 2: When asked, most of our consumer panel placed reliability as their number one priority. Our panel in Leeds went further suggesting that we should be very ambitious in using innovation to guarantee the reliability of the electricity network, as this is central to our role as a DNO. ***Key wave 2 finding****: We should be ambitious in our innovation to guarantee the reliability of the electricity network.*	*E005* *E020* *E023E005* *E020* *E025* *E030* *E031*
		Wave 3: In our wave 3 engagement, discussions were focussed around the future energy system transition and decarbonisation. It is clear that innovation is key to delivering and maximising customer and stakeholder benefits in these areas. Expert stakeholders, particularly in relation to local area energy plan discussions, were interested in opportunities for localised energy including micro-grids, micro-hydro, rapid charging and energy storage. Local authorities (LAs) and other stakeholders emphasised collaboration in local areas on smart local energy system projects. ***Key wave 3 finding:*** *Innovation has a key role to play in balancing energy supply and this should be achieved through close collaboration.*	*E271* *E275* *E235* *E236* *E263* *E265* *E295* *E299* *E300* *E262*

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
		Acceptance research and findings: *The acceptance score for innovation as an enabler is 79per cent. 79per cent of customers agree that the business plan enablers like innovation are crucial for the successful delivery of the plan. As acceptance is high from customers considering the role of the enablers such as innovation, this area will not be explored in further acceptability testing*	*E325*
		Overall Wave 4 findings: *Stakeholders welcomed the innovation plans, highlighting the importance of innovation as a key enabler for decarbonisation of the network.* *The Citizen's panel, Future Fairness panel and stakeholders continued to raise the theme of nobody left behind and wave 4 engagement included further consideration of how the vulnerability lens would be applied to the selection and evaluation of innovation projects.* *The Citizen's panel supported plans for voltage optimisation and the introduction of microgrids, particularly in worst served rural areas but were cogniscent of environmental and financial implications.*	*CR412* *CR418* *CR420* *CR425* *CR426*

WAVE 1 – open and formative engagement

Our first wave of engagement was used as a chance to shape and define our options. In total, we ran 103 events, engaging 4,762 in wave 1. Of these 103 events, innovation was a specific sub-topic at two events, covering 61 stakeholders.

Engagements were focussed on:

- open data and data sharing;
- collaboration and partnership working with Northern Powergrid.

Engagement reference	Name	Segment	Method	Delivery Partner	No Engaged
E029	Technical panel - Introduction and 2023-2028 Challenges	Future Energy	Online panel	Northern Powergrid	55
E147	Technical panel – Introduction and 2023-2028 Challenges	Future Energy	Online panel	Northern Powergrid	6

Open data and data sharing

Stakeholders wanted Northern Powergrid to share more information and open-source data with stakeholders and customers to increase the quality of messaging and to increase innovation.

- At a technical panel focusing on 2023-2028 challenges, stakeholders from corporate interest groups agreed that innovation is great but it needs to be accessible to the market that we are targeting as people will make their own choices. Some stakeholders' questionedwhether accessibility needs to be more explicitly highlighted in our priorities. **(E029)**
- These stakeholders also made it clear that we need to understand how people interpret understanding human computer and, human application. Our investment decisions tend to be very long and expensive. **(E029)**
- Future Energy customers at the technical panel wanted. We need to see the demonstration of innovation in all elements of the plan especially when that delivered from innovation projects in other network operators. **(E147)**

Collaboration

Stakeholders urged Northern Powergrid to expand engagement to explore how innovation can develop solutions to provide support for vulnerable customers and leverage emerging technologies.

- Corporate interest groups believe data on vulnerable customers, goes beyond PSM. It goes back to understanding data and understanding the industry, how different utility companies can work collaboratively and intelligently support vulnerable customers. **(E029)**

- The same stakeholders said that if innovation challenges match certain communities, resources will be aligned, people's egos will join together. There may be subtle differences where language needs to be changed, but they can help facilitate that.' **(E029)**

Our progress to wave 2

During wave 1, we learned from our stakeholders what their priorities and expectations are of Northern Powergrid. This helped us to understand overall priorities and shape engagement to test the role of innovation in delivering them as we moved to wave 2.

WAVE 2 – testing our emerging thinking with levels of ambition

Our second wave of engagement was used to test options generated through the first wave – gauging levels of customer ambition and defining our outcomes. Engagement was carried out with on domestic customers, partners, commercial customers, stakeholders, SMEs, and future energy customers. The results were split into:

- Ambition (that Northern Powergrid should strive for): (most and least)

- Priority (of an initiative to Northern Powergrid): (highest and lowest)

In total, we ran 135 events, engaging 15,475 stakeholders in wave 2. Of these 135 events, innovation was a specific sub-topic at >5 of them, covering >180 interactions.

The events where Innovation was a specific sub-topic are listed below:

Engagement reference	Name	Segment	Method	Delivery partner	No engaged
E248	Future Fairness Panel	Vulnerability Experts	Online panel	Northern Powergrid	17
E005	Consumer panel (Leeds and Newcastle)	Customers	Online panel	Traverse	48
E020	Sustainability workshop	Customers	Online workshop	Northern Powergrid	24
E023	Consumer Panel	Customers	Online panel	Traverse	36
E030	Consumer Panel	Customers	Online panel	Traverse	43
E031	Consumer Panel	Customers	Online panel	Traverse	36

Responses varied, covering points on investment to fuel innovation, off-grid connections, climate change, generation and desired results like improved reliability and decarbonisation gains. Customers also expressed concerns around ensuring service outcomes and return-on-storage.

Innovation investment

- As a consumer, how comfortable do you feel knowing Northern Powergrid invests some of your network charges on projects like these, not all of which have successful outcomes??: Very comfortable: 14 (48.3per cent); Comfortable: 13 (44.8per cent); No opinion: 1 (3.4per cent); Uncomfortable: 1 (3.4per cent); Very uncomfortable: 0 **(E005).**

- Do you support Northern Powergrid continuing to invest money in this sort of way? Yes definitely: 20 (69per cent); Yes probably: 8 (27.6); No opinion: 0; No probably not: 1 (3.4per cent); No definitely not: 0 **(E005).**

- Participants largely felt that facilitating the decarbonisation of the rail network fell outside Northern Powergrid's core remit, and should instead be financed by the private train companies that use the network **(E005).**

- The majority of participants felt that Northern Powergrid should look to potential outcomes for customers as the primary factor in allocating its innovation budget, in order to avoid investment in areas that would not reflect its customers' priorities. **(E005)**

- The anticipated financial return for Northern Powergrid and the impact on regional emissions were also seen as important factors to consider when allocating funds for innovation, but these were seen as secondary to outcomes for customers. **(E005)**

- Some participants suggested that Northern Powergrid should also consider the anticipated financial return for customers, as well as for Northern Powergrid, when making such decisions. **(E005)**

Innovation priorities

- Based on your current understanding of Northern Powergrid's business plan areas, where would you like innovation to be a priority for Northern Powergrid? Most selected: 'Reliability'. Least selected: 'Openness and Transparency.' **(E005)**

- Most participants in Leeds said that Northern Powergrid should be very ambitious in using innovation to guarantee the reliability of the electricity network, as this is central to its role as a DNO. **(E005)**

- The majority of participants in Leeds and Newcastle saw connecting off-grid customers to the network and electrifying the agricultural industry as 'nice to have' and did not feel that significant resources should be diverted to addressing these issues. **(E005)**

- Participants largely felt that facilitating the decarbonisation of the rail network fell outside Northern Powergrid's core remit and should instead be financed by the private train companies that use the network. **(E005)**

- Most participants felt that Northern Powergrid should look to potential outcomes for customers as the primary factor in allocating its innovation budget, to avoid investment in areas that would not reflect its customers' priorities. **(E005)**

- Some participants expressed concern that the language and terminology used to discuss innovation was unnecessarily complicated and jargon-heavy, which prevented them from engaging meaningfully with the topic.

Generation and storage

- At a consumer panel, there was general support for investing in innovation, for example, the development of batteries for home storage of electricity and the roll out of more EVs. **(E030)**

- Participants at this panel mainly mentioned the importance of innovative new methods of generating electricity. **(E030)**

- Participants of the Northern Powergrid Consumer Panel found future energy, innovation, and environment both interesting and relevant. These areas were viewed as closely related, forward looking, and contributing to battling climate change. This Participants were generally keen on the idea of generating their own energy and being self-sufficient and wanted more information on this. **(E031)**

Financial returns

- Participants in Leeds and Newcastle said anticipated financial return for Northern Powergrid and the impact on regional emissions were also seen as important factors to consider when allocating funds for innovation, but

these were seen as secondary to outcomes for customers. Most of these participants felt that Northern Powergrid should look to potential outcomes for customers as the primary factor in allocating its innovation budget, to avoid investment in areas that would not reflect its customers' priorities. **(E005)**

- Our Future Fairness Panel was established to ensure that our strategy encompasses all current vulnerabilities in our region and to help us to identify new and emerging issues. They assured our 'nobody left behind' approach suggesting we look at practical ways to apply this to innovation and the development of new services. **(E248)**

Climate change/sustainability

- Participants expressed support for green bonds, whilst also questioning whether these would cover commercial power purchase agreements. In relation to the question about collaborating with partners to deliver a green economy, it was suggested that moving from an innovation funding model to an 'embedded R&D approach', combined with cross-sector working, may help to 'unlock value'. One participant questioned whether the proposals are realistic, given the short-term cost increases required. **(E020)**

- Participants found energy future, innovation, and environment both interesting and relevant. These areas were viewed as closely related, forward looking and contributing to battling climate change. This made them equally relevant to Northern Powergrid and participants. **(E023)**

- Participants found energy future, innovation, and environment both interesting and relevant. These areas were viewed as closely related, forward looking and contributing to battling climate change. This made them equally relevant to Northern Powergrid and participants. **(E031)**

Our progress to wave 3:

- During wave 2 our propositions engagement focused more on the key areas where innovation could support the delivery of the wider plan and how. This carried forward into wave 3 with a renewed focus on the priorities, the detail around the propositions and specifics around deliverability.

WAVE 3 – refining and finalising our plan

The third wave of engagement was used to refine our proposals and gain endorsement for our final plans. The engagement was carried out with domestic and rural customers, SMEs, local authorities, vulnerable customers, future customers as well as utilities and government, Ofgem and industry representatives. Themes covered by the engagement are:

- collaboration;
- flexibility;
- open data and innovation;
- funding;
- vulnerable customers;
- future energy;
- just transition, engagement and accessibility; and
- investment, longevity and scale

In total, we ran 91 events took place, engaging 32,500 stakeholders in wave 3. Of these 91 events, innovation was a specific sub-topic at >9 of them, covering >400 interactions.

The events where Innovation was a specific sub-topic are listed below:

Engagement reference	Name	Segment	Method	Delivery partner	No engaged
E271	Analysis of RIIO2 Stakeholder Survey Comments	Government, Ofgem and industry	Survey	Explain Research -	425
E275	Future Fairness Panel: Vulnerable Customer strategy workshop	Customers	Online workshop	Explain Research	10
E235	Meeting with flexibility provider - insight on growing customer flexibility	Future energy stakeholders	Online meeting	Northern Powergrid	1
E236	Meeting with Energy Systems Catapult - Heat-as-a-service and flexibility	Future energy stakeholders	Online meeting	Northern Powergrid	1
E263	Northern Powergrid IDNO Workshop	Utilities	Online workshop	Explain Research	4
E265	Stakeholder Summit - Net Zero Energy Future for the North	Academic, customers, vulnerable customers	Online conference	Traverse	120
E295	Northern Powergrid Citizens' Panel, Final session: Innovation proposals	Customers	Online panel	Traverse, Explain Research	45
E299	2023-2028 Plan Website Survey Responses	Various	Survey	Northern Powergrid	229
E300	Colleague engagement survey – plan acceptance	Internal Stakeholders	Survey	Explain	118
E262	Local Authority Forum (Collaborating for local green recovery)	Local Authority stakeholders	On-line forum	Regen	20

Innovation priorities

- At the online analysis of 2023-2028 stakeholder survey comments, there was agreement with the proposed innovation themes. However, stakeholders would like network companies to be more open to high -risk, potentially high-benefit innovations. Stakeholders also commented about the need for a mechanism to fund costlier, larger scale innovations. **(E271)**

- According to Northern Powergrid's citizen's panel, final session for innovation proposals, the majority of customers could see some value in this proposal and felt that it could offer reduced energy consumption, benefits to the environment and cost saving. Some customers had concerns about the logistics surrounding this proposal and questioned whether there were other more cost-effective alternatives available. **(E295)**

- Most customers could see the value of this proposal, even if they do not live in an area that would necessarily benefit. Where there were concerns, these were focused around the environmental impact of batteries, the 'short-term' nature of this solution and potential pressures on domestic customers to install. **(E295)**

- The majority of customers saw the value in this proposal and felt that it plugs an existing gap in free, independent advice around decarbonisation. However, there were a few concerns about the visibility of Northern Powergrid and whether enough people would know about the platform to use it. **(E295)**

- During the 2023-2028 plan website survey responses, 42 per cent of the participant to the survey said they 'really like' innovation. **(E299)**

- According to the Colleague engagement survey – plan acceptance, overall acceptability from respondents was rated at 4.5 out of 5 for the Innovation business plan area, with four respondents selecting the 'don't know' option for this question. Confidence in delivery had a lower mean score when compared to other areas, at 4.1 out of 5**. (E300)**

- Consumer panel members were keen to have the information to become participants were asked about what Northern Powergrid might think about and the ESC identified four topics: **(E236)**

    - Organise and enable ease of access to Northern Powergrid network data in context of uncertainty.

    - Enable and support discovery of Northern Powergrid data applications by others.

    - Better understanding in energy self-sufficiency and generation.

    - We were also encouraged to understand consumer willingness to flex and impact of flex on Northern Powergrid network.

Flexibility

- Flexibility is increasingly important for a successful the energy transition. **(E271)**

- Most domestic and business customers and 67per cent of rural customers voted for the upper levels of ambitions (options D or E) to create high levels of flexibility and connectivity. **(E271)**

- Invest 'ahead of need' to support flexible connections. **(E271)**

- Stakeholders want Northern Powergrid, the government and the regulator to work together to ensure that policies and regulations are in place to allow peer-to-peer trading. This will mean that more communities can benefit from using local energy. **(E265)**

Open data and data sharing

- Future energy services and data sharing is supported. **(E271)**

- Many stakeholders are eager to explore methods to better share data more actively to facilitate transition to DSO. **(E265)**

- Open data with greater availability of network data is supported. **(E271)**

- Most stakeholders support increased collection and sharing of data on energy consumption. Most domestic and future customers are comfortable with Northern Powergrid sharing data on household-level energy use. **(E271 and E265)**

- Many stakeholders are eager to explore methods to better share data more actively to facilitate transition to DSO. **(E265)**

- More data should be shared in order to increase the relevance of academic research and allow innovators to develop more appropriate solutions. **(E265)**

Future energy

- Local and national authorities, interest groups, and councillors emphasise their support for the increased use of solutions like heat pumps, hydrogen, smart meters, solar farms, geothermal generation, or even direct current, with several constituencies actively planning for investments. **(E265)**

- Preparations to develop a network for the future must underpin net zero. **(E265)**

- Stakeholders perceived that Northern Powergrid had a key role to play in the transition to net zero by ensuring that the required infrastructure is in place to facilitate new connections for low carbon technologies. **(E265)**

- Developing an integrated future energy network is a priority. **(E265)**

- Customers liked that this proposal would make use of existing technology (smart meters) and increase capacity on the network. Some customers said they would be happy to trial this if it were in their area and a few actively queried whether a trial would be taking place near them. **(E295)**

- Some customers were unsure about the value of this proposal, expressing reservations about how it would be achieved logistically when not every household has, or uses, a smart meter. **(E295)**

- From a business perspective, SME customers saw value in this proposal, particularly the cost-saving opportunities and the fact that businesses would have to replace equipment less frequently. **(E295)**

- Some customers felt like this proposal is a short-term fix and that, rather than investing in this proposal, more could be done to find permanent solutions for the communities most at risk of power cuts. Others were concerned at domestic customers feeling pressured to install them and that the batteries used as part of this proposal are bad for the environment. **(E295)**

- For the most part, customers felt that the open data platform is a good idea and could see the value. They felt that it would plug the existing gap in free, independent advice around decarbonisation and could provide a unique experience for the customer. One consumer suggested that the platform could be signposted on EPC reports to increase awareness and usage of the platform. **(E295)**

- Some customers had concerns around visibility of the platform, noting that their knowledge of Northern Powergrid was limited before they joined the panel. Others felt that the platform should not be abused and should not advertise or recommend specific suppliers but remain independent. **(E295)**

- Customers were asked which aspects of the plan they would like to be updated on in the future. 16 customers said wanted to be updated on all plan areas. The remaining customers mentioned a range of plan areas that they would like to be updated on, the most frequently mentioned being decarbonisation, innovation, cyber resilience, communities, vulnerable people and the Environmental Action Plan. **(E295)**

Collaboration and Innovation

- Stakeholders commented that quicker and more innovative connections from Northern Powergrid for projects like charging forecourts would be welcomed to help facilitate the LCT roll out. **(E262)**

- At the stakeholder summit Local Area Energy Plans (LAEPs) were a key area of interest with stakeholders keen to understand and support; plans to allow micro-grids in local communities, proportion of social and private rented housing in need of retrofitting, whether local point-of-flow micro hydro projects could be used to deal with anticipated excess of water/flooding, whether rapid chargers are the best solution in a rural setting. **(E265)**

- LAs want to collaborate with Northern Powergrid to manage/reduce demand and engage low-income households, and for Northern Powergrid to collaborate with local areas on smart local energy system projects. **(E262)**

Just transition, engagement and accessibility

- At the stakeholder summit Just Transition was a low interest theme on the day. However, the NEA presentation and discussion showed a desire for Northern Powergrid to support customers engage in the flexible energy market and, in particular, support vulnerable and fuel poor households to understand LCT and to deliver more innovation projects focussed on vulnerable households **(E265)**

- Understand potential the risks and issues of service models on Northern Powergrid for vulnerable customers and to develop new solutions for vulnerable customers **(E104B)**

- Network companies must further facilitate SME participation in Innovation, increase engagement, collaborate more with academia, and consider a portal to enable innovators to connect with each other **(E271,E265)**
- Some innovators, including start-ups and academics, are struggling to navigate the Energy Landscape, work with current incumbents or make their work visible **(E271, E265)**
- Events in short, virtual, and free events are better **(E271)**
- Stakeholders commented that in the context of net zero, decision making and adoption of innovations into business as usual are too slow. The lack of pace is also negatively impacting small innovators **(E271/E265)**
- There is a largely positive view of the EIC and the role it plays. A number of areas for improvement have been identified such as the need for more specific feedback. **(E265)**
- Innovators' time is precious and smaller companies cannot afford to attend numerous events. Innovation is occurring acceptably but there is a shortage in pulling together the pieces or outcomes from trials. These need to be consolidated better so that we can link the pieces together and work out what needs to be done. **(E235)**
- In terms of data, stakeholders commented that more data should be shared to increase the relevance of academic research and allow innovators to develop more appropriate solutions. **(E271)**
- Short, virtual and free events are better. **(E265)**
- What needs to happen to balance the need for decarbonisation with support for vulnerable citizens? Five key areas require action: **(E265)**
    - Ensure that tech focused on decarbonisation of heat works in homes (as important to learn what does not work as what does)
    - Support vulnerable and fuel households beyond what is set out in business plans.
    - Do more to support households and communities to engage in a flexible energy market – particularly support in navigating the rules and regulations.
    - Northern Powergrid can also use various government schemes, like ECO, home upgrade grants to leverage in energy efficiency opportunities.
    - Speaking directly to vulnerable/fuel poor households to understand the route-map to heat pumps and EVs.
    - Focus innovation projects on vulnerable households. This requires a shift in focus from dealing with Asset Managers and huge construction firms, to organisations that work with vulnerable and fuel poor – like NEA.
- Customers who live in rural areas were the most positive about this proposal but other customers who do not live rurally acknowledged its value despite this proposal being unlikely to impact them. Some customers felt that 30 micro-grids are not enough, whilst others felt this level of ambition was appropriate. **(E295)**

Investment, longevity and scale

- There is demand for a mechanism to fund costlier, larger scale innovation. **(E265)**
- The importance of financial benefits and the need for return on investment is recognized. **(E265)**
- Other benefits (e.g. environment) should also be considered and money should be spent wisely and all options should be considered as an Innovation project is not always the most effective route to solving a problem (i.e. better training might solve the issue). **(E265)**

- Provide more clarity on requirements (e.g. calls for innovation), longer term roadmaps and the ability to resubmit ideas following initial feedback. Lower TRL projects may result in higher benefits delivered at lower cost in the longer term. **(E265)**

- There is a need for increased investment, longer term thinking and funding for innovations that fall outside the scope of the RIIO regulatory framework. **(E265)**

- Stakeholders commented about the limitations of the RIIO framework and the need to look beyond the regulatory periods. **(E265)**

- The transfer of innovation into business as usual remains a significant barrier. One innovator commented that going out to tender at the end of an innovation project may impact the willingness of innovators to support the development of innovations in the first place. **(E271/E265)**

- One stakeholder at the Northern Powergrid IDNO workshop highlighted that most DNO innovation is done under Network Innovation allowance and that there was a well-established network in this to share ideas between DNOs and that they are introducing innovation that was developed by other DNOs and that other DNOs are rolling out things Northern Powergrid have developed. He then highlighted that across DNOs they work on the Open Networks Project and that this tries to map a common path on these issues and that this has some IDNO representation, and that UK Power Distribution could get involved in this. **(E263)**

Funding

- Stakeholders commented about the need for increased investment in innovation, longer term thinking and funding for innovations that fall outside the scope of the RIIO regulatory framework. **(E271)**

- Residential customers were extremely comfortable with showcard B4 and £5 increase. They felt £5 was 2 drinks, equated to 50p a week and would not be noticed by the majority. They acknowledged that there were many more vulnerable customers who might struggle with an increase, but they hoped the vulnerabilities strategy would pick them up. Many commented that prices were regularly going up post-pandemic for no reason at all, and it was refreshing to see a company put prices up to pay for innovation and improvements. They supported the £5 increase, and some felt it could even be higher. **(E275)**

- One stakeholder Northern Powergrid IDNO workshop highlighted that he attended a session with Ofgem which made him aware that the SIF (innovation fund) standards were going to be lower than they had been in the past and that IDNOs may be able to access this in the future due to a drop in financial values to have access to this. He said this may allow a more level playing field to be achieved between IDNOs. **(E263)**

- A stakeholder at the Northern Powergrid IDNO workshop highlighted that the only issue is that Ofgem do want to encourage innovation and to push boundaries, particularly on LV networks and that capacity could be pushed past traditional DNO pinch points so long as electrical integrity was maintained. He highlighted that DNOs and IDNOs should be looking at what facilities there are at substations to help capacities be managed on a more granular basis to be better for customers. **(E263)**

- Another stakeholder answered saying there were 300 ICPs and 15 IDNOs, going on to point out that IDNOs are licensed identically to DNOs from condition 1 – 31 and that the conditions after that, generally financial conditions, differed between DNOs and IDNOs. Again, he highlighted those common standards and collaborative innovation between DNOs and IDNOs is key to ensuring the integrity of the UK PLC network going forward. **(E263)**

WAVE 4 – Finalising the plan

From July to December 2021, we finalised our plan, responding to queries, addressing gaps and testing overall acceptability. We engaged 192 customers and stakeholders overall and with detailed sessions on outstanding innovation topics across 7 events.

The events where Innovation was a specific sub-topic are listed below:

Code	Name	Subgroup	Engagement Type	Date	No Engaged
(CR412)	Vulnerable internal workshops (Ensuring nobody is left behind)	Internal stakeholders	Meeting	30/09/2021	1
(CR418)	Cross Utility Workshop	Utilities	Meeting	20/10/2021	8
(CR420)	ED2 Stakeholder Webinar	Regional Politics, Consumers, Future Energy	Meeting	03/09/2021	101
(CR425)	Citizens Panel (Innovation)	Consumers	Panel	07/05/2021	45
(CR426)	Citizens Panel (Bill impact)	Consumers	Panel	20 & 23 Sep	37

Feedback summary

- A series of internal workshops were held within Northern Powergrid on the theme 'ensuring nobody is left behind' in the transition to net zero. A vulnerability lens was also applied to the selection and evaluation of innovation projects. In particular, a framework will be developed that takes into account the following when reviewing potential innovation projects (could the project introduce any disbenefits or barriers for vulnerable customers and, if so, how these can be mitigated; could the project produce any benefits for vulnerable customers and if so, can this be forecasted and a value assigned?). **(CR412)**

- Similarly, the following will be taken into account when evaluating an innovation project (did the project introduce any disbenefits barriers for vulnerable customers and if so how can these be mitigated; did the project produce any potential benefits for vulnerable customers and if so, can these be forecasted and a value assigned; and can vulnerable customers be prioritised in the roll out? (E.g. the use of vulnerability scores to decide which areas or substations innovation projects are rolled out first). **(CR412)**

- At the Cross Utility Working session, Yorkshire Water revealed that they believed the link between hydrogen and sharing of EV infrastructure is practical and would like to see more debate about having the right solution in place. **(CR418)**

- Northumbrian Water suggested that the Innovation Festival could present an opportunity for collaboration (with external organisations and stakeholders in attendance. **(CR418)**

- NGN believes that if hydrogen blending into the gas networks in 2023 were to progress, it would have a significant impact on the electricity network. They would like to discuss this with NPg, especially on where might be the best places to implement it. **(CR418)**

- Yorkshire Water uses diesel generation to prop up the grid and they will rely increasingly on this as we head towards net zero. They believe it is difficult to make the financial case for ongoing diesel generation, compared to alternative sources like hydrogen or tidal, that are able to deliver an immediate switch on, so that customers can still be supplied. Currently there is no alternative to emergency diesel on standby, though they are looking to see whether there is scope for a regional innovation project to resolve this. **(CR418)**

- Northumbrian Water could use hydrogenation to support with replacement of diesel generators (with hydrogenation on most reservoirs putting power into the grid, turbines could be synched to the grid, removing the need for diesel standby generator. **(CR418)**

- NGN wanted to know whether NPg had been engaged on the hydrogen village trial. The stakeholder or customer experience will be significant as they have option of hydrogen or heat pumps as part of these trials. **(CR418)**

- At the ED2 Stakeholder webinar GTEC noted that whilst some technologies are available now (e.g. time of use tariffs for managing EV charging and / or heat pump use, and domestic appliances which 'communicate' with smart meters), they are not yet "consumer friendly". **(CR420)**

- Citizens Advice Newcastle believed people need more information on the types of heating systems available for housing, so that they can start to think about these things. More information on smart meters would also be helpful (what they are for and the benefits, especially for those in fuel poverty). **(CR420)**

- A representative from Leeds Teaching Hospital reported a concern about the plan not including enough considerations for advancements in heat technology. **(CR420)**

- Ideal Heating also noted the need to consider seasonal changes in electricity use, and people using more electricity at certain times of day such as in the morning. **(CR420)**

- Hull Council are looking at charging hubs as a solution, particularly for areas without off-street parking. They are disappointed Northern Powergrid is not committing to contributing to the cost of those, as they're a significant investment for a LA and will create data and design intelligence for Northern Powergrid in designing their own networks. **(CR420)**

- 1600 Systems knew about plans nearby for a trial of hydrogen in the home. There was interest in this new technology but they were concerned issues may arise with developers who were perceived to be risk averse with new technology. They were also interested to know how Northern Powergrid could encourage early adoption. **(CR420)**

- The Petrol Retailers Association, which represents most petrol retailers, was concerned about the electrification of transport and queried what NPg planned in terms of increasing capacity to accommodate rapid chargers. In most cases this would require a substation to be fitted on site, which is difficult due to the hazards associated with petrol retail. **(CR420)**

- The Petrol Retailers Association was also interested in Northern Powergrid's own plans for fleet decarbonisation. **(CR420)**

- The Citizens Panel discussed innovation in May and the majority off the panel could see some value in voltage optimisation and felt it could offer reduced energy consumption, benefits to the environment and cost saving. Others had concerns about the logistics surrounding this proposal and questioned whether there were other, more cost effective alternatives available. **(CR425)**

- Most of the panel saw the value of microgrids, even if they did not live in an area that would necessarily benefit. Concerns were focused around the environmental impact of batteries, the 'short-term' nature of the solution and potential pressures on domestic consumers to install. **(CR425)**

- The majority saw the value in an open data platform and felt that this would plug an existing gap in free, independent advice around decarbonisation. There were a few concerns about the visibility of Northern Powergrid and whether enough people would know about the platform to use it. **(CR425)**

Data and digitalisation

Stakeholder engagement summary

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
DD1	**Understand, improve and expand our energy system data and promote data transparency through open data**	**Wave 1:** Our initial engagement established the importance of data and digitalisation for stakeholders. Our engagement included other utilities, future consumers, local authorities and community energy groups and we engaged with them through bilateral meetings, focus groups, surveys and deliberative engagement. We discussed their views on the importance of data sharing, particularly in the context of enabling decarbonisation. Key to data sharing was the need to provide support and capacity building to enable the effective use of data by stakeholders as well as ensuring it is easily accessible, up to date and consistent with approaches undertaken by other DNOs. These insights allowed us to establish a direction from stakeholders on where we should focus our range of ambition and propositions in our emerging thinking. ***Key wave 1 finding:*** *Stakeholders welcome greater access to open data and network data, supported by increased automation and a consistent approach across all DNOs.*	*E054* *E147* *E149* *E186* *E194* *E206*
		Wave 2: Our engagement during Wave 2 allowed us to further develop our propositions to prioritise the level of ambition that stakeholders valued. Stakeholders commented that there was a need for data to be: standardised, transparent, of a consistent quality, interoperable, real time and containing high levels of granularity. Additionally, when considering the level of ambition, stakeholders were ambitious selecting 'a new world' when asked about our plans for the use of data and digitalisation. This feedback has helped us shape our data vision particularly in setting out the high level principles that 1) data is an asset, 2) data is F.A.I.R (Findable, Accessible, Interoperable and Reusable) and 3) data is shared and trusted. ***Key wave 2 finding:*** *Stakeholders support the need to invest in enhancing and expanding our energy system data and promoting data transparency.*	*E028* *E036* *E044*
		Wave 3: During the proposition finalisation stage, we worked with stakeholders on the detailed propositions and costs to refine our plan. Local authorities at the net zero action planning forum (NZAP) were unclear on how they'd use our data – the overriding impression was that they need more clarity on what data is available and how to access it. Stakeholders suggested that working through example use cases would be helpful. This feedback has helped shape our approach on user personas and how we would like to engage data stakeholders as we develop our future products and services. We will be trialling a platform to help us seek more real-time feedback from data stakeholders for example as a way of trying to make this a reality through co-creation. We will provide relevant and good quality data in a timely manner that will help consumers, policy makers, researchers and others to accelerate the journey to decarbonisation. Our open data offering will allow the wider ecosystem to develop new markets and innovate continuously. ***Key wave 3 finding:*** *Stakeholders require further information about what data is available and how they could use it. This would be enhanced through use case examples developed through co-creation with stakeholders.*	*E217* *E223* *E232* *E235* *E240* *E246* *E248* *E249* *E261* *E263* *E264* *E267*

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
DD2	**Upgrade and implement new IS systems to enhance network management and decision making in real-time to enable us to efficiently operate our distribution network in a decarbonisation era.**	**Waves 1 to 3:** During engagement carried out through waves 1 to3, the importance of enabling decarbonisation was a key engagement insight from our stakeholders. This was particularly important for our commercial customers and local authority stakeholders who have ambitious decarbonisation targets. Supporting and enabling decarbonisation will be driven by the increased capabilities digitalisation brings, and this resonated with stakeholders as early as during our wave 2 engagement, where participants felt that decarbonisation and environmental protection could only benefit from increased digitalisation. As the foundation capability for our DSO strategy, enhanced and accelerated data and digitalisation will help to optimise the management of future distributed energy resources, customer flexibility, the low voltage (LV) network, the need for new connections and our interaction with the ESO and the wider market. Community energy stakeholders supported this capability to enable more low carbon technology to be supported by the network. This objective has been supported throughout our development of the data and digitalisation strategy. The synergistic collaboration between the DSO and data and digitisation strategies has meant that we have constantly reacted to their stakeholder feedback and adjusted our plans as the drafts developed, as the new capability will be designed to seamlessly integrate data between business systems and expose the data through our open data proposition in the right way for our stakeholders and future business needs.	*E054* *E147* *E149* *E186* *E194* *E206* *E028* *E036* *E044* *E217* *E223* *E232* *E235* *E240* *E246* *E248* *E249* *E261* *E263* *E264* *E267*
DD3	**Introduce data and applications at the point of need in order to improve colleague efficiency and effectiveness.**	**Waves 1 to 3:** The importance of investing in, and developing intuitive, future-proofed processes and business systems was a key theme emerging from colleagues throughout our internal engagement during waves 1-3. These capabilities, it was felt, would enable them to deliver excellent service - meeting the future needs of customers (internal and external). This was aligned with feedback highlighting the need to invest in and develop internal capabilities, particularly related to AI, robotics, automation and data analysis to support the development of new business processes and capabilities aligned to the DSO strategy. In wave 2, our colleagues told us that they too had had to react to the increased digitalisation ways of working brought about through the coronavirus pandemic and that they felt digitalisation would improve efficiency in many of their business areas – increasing efficiency and the need for virtual collaboration. This feedback led to a full review of our position in light of our response initially made to COVID-19 and helped us identify gaps to address in the way we make data and effective tooling for collaboration available to our colleagues.	*E054* *E147* *E149* *E186* *E194* *E206* *E028* *E036* *E044* *E217* *E223* *E232* *E235* *E240* *E246* *E248* *E249* *E261* *E263* *E264* *E267*
DD4	**Continue to invest in advanced cyber controls and tools to maintain a robust cyber security posture, aligned to the threats emerging from increased digitalisation**	**Waves 1 to 3:** An area of interest and growing priority for customers including industry stakeholders, consumers, future consumers and colleagues was the increasing threat of cyber resilience, data privacy management and mitigating the impact of future cyber-attacks on the network. It was clear from wave 1 that the effective management of customer data and data privacy was a key issue for our stakeholders and domestic customers. Therefore we have continued to focus our cyber resilience on consumer data as well as on protecting the power network. In wave 2, our consumer panel and stakeholders fed back concerns that increases in digitalisation of security could potentially lead to an increased risk of cyber-attacks and accompanying data breaches. In response, we have ensured our plans are reviewed by Cyber Assessment Framework (CAF) accredited consultants to ensure they will not introduce more risk and this will be monitored throughout the next business plan period.	*E054* *E147* *E149* *E186* *E194* *E206* *E028* *E036* *E044* *E217* *E223* *E232* *E235* *E240* *E246* *E248*

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
		During engagement in wave 3, customers supported our plans and asked to have future updates to demonstrate that we have robust cyber security policies, processes and controls in place to maintain our strong security posture and continually reduce risk, protecting our customers' personal data and operating a resilient distribution network through; ▪ security tools and advanced threat monitoring that protect our network from unauthorised access or attack; ▪ skilled and competent cyber professionals; ▪ taking appropriate and proportionate measures to secure the network and information systems in Compliance with the NIS Directive (NISD); ▪ protecting our customers and employee's personal information through compliance with the General Data Protection Regulations (GDPR); and ▪ maintaining ISO 27001 accreditation and achieving ISO 27019 accreditation.	*E249* *E261* *E263* *E264* *E267*
DD5	**Modernise the back-office environment to reduce risk, secure information and improve colleague experience**	**Waves 1 to 3:** During the three waves of engagement, we have heard from many of our colleagues and their trade union representatives about the importance of providing the most appropriate tools to enable them to carry out their role as effectively as possible. This is particularly important as we move forward into the early stages of the energy transition, developing new skills, processes and services aligned to the development of the DSO model. In response, a key priority is development of colleague journeys for high priority business processes to ensure that aspects of business change are included in our plans. This approach will ensure that colleagues can both shape / co-create and be fully trained on new business solutions. Additionally, in response to feedback, we will adopt cloud-based, 'ever green' systems and benefit from lower operational costs by running those environments, with the latest functionality available to us that will allow us to continuously increase the efficiency of our back office processes and help our colleagues do their jobs more effectively.	*E028* *E036* *E044* *E217* *E223* *E232* *E235* *E240* *E246* *E248* *E249* *E261* *E263* *E264* *E267*
DD7	**Deploy robotics and automation to reduce cost of low value, high volume tasks and improve customer and colleague experience**	**Waves 1 to 3:** Greater efficiency and improved customer processes were welcomed by stakeholders and customers during waves 1, 2 and 3. Whilst there was an overall positivity amongst stakeholders in general, there were concerns raised about the impact on the work force of embracing emerging technologies such as automation. Additionally, some stakeholders and colleagues expressed concern that the introduction of automation and the potential anticipated accompanying reduction in resource requirements to carry out high volume tasks might lead to job losses for some of our staff. Whilst we have not directly addressed this in the data and digital section, this feedback has fed into the workforce resilience plan highlighting the ongoing need for an increasingly skilled future workforce who can maximise the benefits of having more access to data to drive different patterns of work and future energy transition roles.	*E054* *E147* *E149* *E186* *E194* *E206* *E028* *E036* *E044* *E217* *E223* *E232* *E235* *E240* *E246* *E248*

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
DD8	**Implement self-serve, personalised services to meet customer demand and experience, implementing a customer insight and interaction portal and reducing the cost to serve**	**Wave 1:** As part of wave 1 engagement we focussed on what we currently deliver to support our customers, reviewed priorities and sought to explore areas where we could expand or improve upon to offer an even higher customer experience. This included educating our customers across a range of panels to demonstrate what we currently offer, providing the opportunity to understand further to enable them to provide feedback on our future service offering. We engaged externally and internally, whilst also undertaking industry research and working with the Institute of Customer Service to understand what 'best in class' service looks like and anticipated changes in customer expectations in the future. Customers were overall happy with the existing service however fed back on areas they thought could improve the service further, including more choice in how they contact us by expanding our range of contact channels and enabling more self-service, flexibility in how and when they do business with us, pro-active communications and personalising our service by providing the option to speak to one of our team. They recognised that different customer groups have different needs and we should offer a range of options to support our diverse range of customers. Building trust with customers was an important topic to come out of industry research. Overall feedback shows that customers valued high quality customer service and thought what we offered currently was really good but did highlight that not everyone may be aware of us. ***Key wave 1 finding:*** *Customers could see the benefits of greater use of digital contact channels, a wider offering of appointment times when planning works and a personalised service, with the ability to speak to someone when required. We can build trust through transparency across our communication channels.*	*E054* *E147* *E149* *E186* *E194* *E206*
		Wave 2: The insights from our wave 1 engagement led to the development of our propositions to deliver on the requirements of our customers to be proactive, personalised and provide greater choice. We developed our five levels of ambition which were presented to our stakeholders during wave 2 as part of emerging thinking. Rural consumers appreciated the idea of diversifying customer service platforms as long as the chosen mediums were effective and were not intended to replace human interaction. This helped shaped our vision of an omni-channel approach that could be unified across every channel and meant that, no matter what your point of entry was in communicating with us, we could provide a consistent service outcome, utilising human interaction if required. ***Key wave 2 finding:*** *Customers supported continued enhancements to services while recognising the importance of choice to cater for the differing customer needs and preferences across our customer base. Continued support for greater digital channels but also recognising that human contact is important to our customers where greater support is required. There was also support for the development of an app from rural communities which helped shape our approach to deploy modern web platforms capable of surfacing solutions as apps without significant redesign or configuration.*	*E022* *E039* *E056* *E065* *E067* *E070* *E073* *E074* *E075* *E150* *E158* *E160*

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
		Wave 3: As part of the proposition finalisation stage, we discussed the more granular detail of our propositions with a range of stakeholders, testing our thinking to ensure our offering was aligned to the feedback we had received. We further tested the contact channels and the capabilities data and digitalisation will offer, allowing us to offer four new communication channels and the foundations for offering enhanced self-service digital offerings. As well as this, it will enable both proactive communications to customers for planned and unplanned power cuts and the provision of information and support on the transition to net zero. ***Key wave 3 finding:*** *Customers were overall supportive of our propositions and the potential new ways of support through developing a modernised website including enhanced portals for open data, modern contact centre technology and improved connections processes.*	*E217* *E223* *E232* *E235* *E240* *E246* *E248* *E249* *E261* *E263* *E264* *E267*
DD9	**Enable advanced analytics to improve the planning, design and operation of our distribution network.**	**Waves 1 to 3:** Throughout our engagement programme, stakeholders have supported our flexibility first approach. Most customers we have engaged with on this topic would be willing to be flexible in using their energy as a response to time-of-use tariffs. Stakeholders also recognised this might be limited where customers' schedules are fixed and that the region requires additional investment in network capacity to enable widespread use of LCTs. In support of our plans to enable the energy transition and the implementation of our DSO strategy, we are developing our capabilities, including advanced analytics, to support, enable and manage future customer flexibility markets through a step change in our analytical infrastructure. In response to feedback and support from stakeholders, future investments will include enabling capabilities such as analytics to support LV monitoring and support for a more dynamic, smart network. Through these actions we are actively preparing and managing the decarbonisation of the energy network by supporting the development our flexibility capabilities and approach.	*E029* *E147* *E054* *E147* *E149* *E186* *E194* *E206*
DD10	**Provide future-proofed, agile solutions in order to be flexible enough to adapt to the change in the energy sector**	**Waves 1 to 3:** Our stakeholders were clear that we needed to prepare for net zero with a planning approach that is responsive to deal with an uncertain future. We have completed comprehensive scenario modelling with sensitivity analysis that was scrutinised in depth by the experts on our technical panel, and sub-group of our customer engagement group and shared with stakeholders as an important part of our engagement programme. The majority of customers recognised the climate emergency and were comfortable to spend more to accelerate decarbonisation. Given the uncertainty of national and local energy developments, as well as diversity in local net zero targets, stakeholders were in favour of a planning scenario that would enable any decarbonisation pathway that emerges. Our approach in choosing our planning scenario has been to prepare for net zero and the differing levels of decarbonisation ambition across our region through collaboration and proactive network planning to enable the emerging pace of low carbon technology (LCT) uptake. This approach combined with our overall approach to monitor, manage and reinforce the network seemed to resonate well with stakeholders as a cost effective way to deliver decarbonisation. To enable this we are preparing a data and digital architecture that is agile and enabling; supported by dynamic cloud based platforms which will ensure we are able to swiftly adapt to the needs of the emerging needs of our organisation and our customers as the route to decarbonisation becomes clearer.	*E005* *E023* *E031*

Ref.	Outcomes	Engagement insight and triangulation	Eng Ref:
		Acceptance research and findings: *The acceptance score for data and digitisation as an enabler is 79per cent. 79per cent of customers agree that the business plan enablers including data and digitalisation are crucial for the successful plan delivery. As acceptance is high from customers, this area will not be explored in further acceptability testing.*	*E325*
		Overall Wave 4 findings: *The provision of data and new data services to underpin and enable decarbonisation was welcomed, particularly by regional stakeholders.* *Responding to earlier feedback about the need to be clearer about the customer benefits of data and digitisation, we have worked with stakeholders to design personas to guide the development of new services and articulate the benefits more clearly.* *Our business plan has therefore been updated to more clearly show these benefits and we will continue to develop this approach with stakeholders as data tools move forward.*	*CR446* *CR425* *CR426* *CR428*

WAVE 1 – open and formative engagement

In the first wave of engagement we ran 103 events, engaging 4,762 individuals. Of these 103 events, eight engagements included a focus on how stakeholders wanted Northern Powergrid to prepare employees and technology for a digital future. Themes covered by the events:

- digital capability building;
- data sharing; and
- new digital tools.

The eight events where data and digitalisation was a specific sub-topic are listed below, reaching 529 stakeholders:

Engagement reference	Name	Subgroup	Method	Delivery Partner	No Engaged
E039	Student Consumer Group Insight research	Consumers	Face-to-face	Magpie	10
E054	Future customer insights research - College students	Consumers	Online workshops	Magpie	349
E074	Internal Customer Service Engagement	Internal stakeholders	Online survey	NA	76
E147	Technical panel - 2023-2028 Challenges	Future Energy	Online panel	NA	6
E149	Road Map to Digitalisation	Central government	Conference call	NA	15
E186	Insights from 2023-2028 Survey	Internal Stakeholders	Survey	Explain	34
E194	DG Forum	Utilities	Online forum	Northern Powergrid	19
E206	Community Energy Research	Local interest groups	Research and online	Regen	20

Digital capabilities

Stakeholders identified the benefits for additional digital capabilities across DNO interfaces

- Stakeholders at the Direct Generator Forum:
    - Believed the lack of automation is major barrier for them. It would be more convenient to have more automation and a digitized process. They want a consistent approach across all DNOs whereby they could submit an electricity application. They would like to see automation that appraises the network in the background and gives a reduced timeframe on responses, bringing it all back to them in a consistent format via a single portal / dashboard where they can see enquires that are 'in flight'. There are inconsistencies across all the DNOs, and it is difficult to manage the responses. Some kind of online tool – perhaps led by the ENA – to a standardised approach would be welcomed. **(E194)**
    - Made the point that we are a national company, and this is certainly one of the challenges – there are a great deal of inconsistencies in how these are processed and a great deal of variation in what they consider chargeable upgrades and what they consider socialised cost upgrades. **(E194)**
    - Said that when we submit an application, the customer chases for the result, so we have to go back to the DNO and then the customer and we find ourselves the middleman. We do not want to see it all put on the customer because of the nature of the information involved, but I think there needs to be some sort of middle ground, where the customer knows how long it would take and will also be contacted directly by the DNO – that would help. **(E194)**
    - Believed that we cannot expect the customer to be doing all the leg work. It is just having that visibility across the board, so the customer knows where we are, we know where we are and you at Northern Powergrid to as well. The portal would be a way of helping with that. **(E194)**

Data sharing

Support existed for more information and open-source data sharing with stakeholders and customers.

- Stakeholders at the DG forum said that once the data is collectively captured, having it made available to the Electralink Flexr platform would be highly useful. We need to capture static and dynamic data going forwards. **(E194)**
- Overall, most participants of the consumer panel held in Leeds and Newcastle were happy to share their energy data for different purposes they could see would come to benefit themselves or others. Moreover, findings revealed a general willingness and interest to learn more about personal energy consumption. **(E028)**
- Most interviewees from the rural areas were willing to share their energy consumption data with Northern Powergrid in exchange for increased reliability, improved support for vulnerable customers, and/or personalised customer service, although they expected Northern Powergrid to guarantee their security and privacy. **(E036)**
- In the same engagement with rural customers, all participants were willing to share their data if it would increase the efficiency and reliability of the network, as they felt that reliability was of particular importance to them as rural consumers. **(E036)**
- According to emerging thinking, colleagues felt they need to be convinced of data security and data ownership arrangements before being willing to engage in digitalisation of something so fundamental as electricity supply. **(E189)**

New digital tools

- At the future customer insights, made up of college students, 72per cent of young people said they are comfortable or very comfortable with the sharing of street-level data. **(E054)**

- Participants in the student consumer group insight event (April 2020) felt that Northern Powergrid could hugely improve their digital presence and generally communicate more effectively by employing much more relevant and wide-ranging channels – especially focusing on use of social media. **(E039)**

- 22 per cent of internal stakeholders surveyed in May 2020 believed that Northern Powergrid should expand further into web-chat and social media, with 19per cent recommending Northern Powergrid offer live video calls to personalise the service further. Additional recommendations included developing an App for appointment booking, engineer tracking, planned notifications and restoration time changes; providing on-site colleagues with the tools to book appointments / work for customers and building trust through being honest and advertising externally more of the great customer service stories via social media. **(E074)**

WAVE 2 – testing our emerging thinking with costed levels of ambition

The second wave of engagement was used to test options generated through the first wave – gauging levels of customer ambition and defining our outcomes. Engagement was carried out with domestic customers, partners, commercial customers, stakeholders, SMEs, and future energy consumers. The results were split into:

- Ambition (that Northern Powergrid should strive for): (most and least)

- Priority (of an initiative to Northern Powergrid): (highest and lowest)

In total, 135 events took place, engaging 15,475 stakeholders and of these 135 events, data and digitalisation was a specific sub-topic at three of them, covering 257 individuals.

The three events were data and digitalisation was a specific sub-topic are listed below:

Engagement reference	Name	Subgroup	Method	Delivery Partner	No Engaged
E028	Consumer panel (Leeds and Newcastle)	Consumers	Online panel	Traverse	53
E036	Findings from interviews with rural consumers across the Northern Powergrid area	Rural Consumers	Telephone interviews	Traverse	39
E044	Climate Change Adaptation roundtable	Corporate Interest Groups	Online workshop	Regen	165

- Responses were varied, covering topics like digitalisation trends, customer willingness to share energy data in exchange for improved services as well as concerns around potential costs and the need for data security.

Engagement on digitalisation

- Across Leeds and Newcastle, participants felt comfortable with using various digital appliances in their day-to-day life. Those less comfortable with digital appliances highlighted concerns for the 'unknown' and frustration with set-up and installation. Most participants, however, felt that they used digital tools more frequently today than pre-lockdown. Many highlighted how lockdown had 'forced' them to interact more with, for example, online services and how this had been a positive experience. **(E028)**

- Most participants deemed digitisation as essential for most business areas. However, 'network reliability' and 'customer service' were the two business areas where participants across both locations could more clearly envision positive impacts of digitisation going forward. Participants anticipated less need for digitisation to protect the environment and keep up social impact. **(E028)**

- Rural consumers were largely supportive of digitalisation and felt that it would lead to improvements in energy distribution, network reliability, decarbonisation, and environmental protection. **(E036)**

- Overall, rural consumers felt digitalisation would improve efficiency in many of the business areas by facilitating remote monitoring, prediction, and resolution of issues. Participants felt that decarbonisation and environmental protection could only benefit from increased digitalisation. Conversely, several interviewees felt that digitalisation could lead to an increased risk of cyber-attacks and accompanying data breaches. The potential digitalisation of customer service received a mixed response for participants, the majority of whom foresaw both positive and negative outcomes. **(E036)**

- Several participants expressed concern that digitalisation of Northern Powergrid services could lead to high implementation costs and job losses for Northern Powergrid staff. **(E036)**

- While there was an overall positivity among interviewees towards Northern Powergrid's embracing of emerging technologies and its attempts to improve network efficiency, some participants expressed concern that the anticipated accompanying reduction in staff hours might lead to job losses for some Northern Powergrid staff. Other general concerns included high implementation costs and the risks of increased reliance on technology to identify and address issues. **(E036)**

- Rural participants were split on the usefulness of AI technology. Those who felt it would be beneficial either used similar technology in their homes or anticipated more widespread usage in the future. Most of those who did not find it beneficial neither had, nor wanted, to use the technology. Overall, rural consumers appreciated the idea of diversifying customer service platforms [if] the chosen mediums were effective and were not intended to replace human interaction. **(E036)**

- Corporate Interest Groups said there is a need for data to be: Standardised, transparent, of a consistent quality, interoperable, real time and containing high levels of granularity. **(E044)**

Data sharing

- Overall, the majority of participants from Leeds and Newcastle were happy to share their energy data for different purposes they could see would come to benefit themselves or others. Moreover, findings revealed a general willingness and interest to learn more about personal energy consumption. **(E028)**

- The majority of rural participants were willing to share their energy consumption data with Northern Powergrid in exchange for increased reliability, improved support for vulnerable customers, and/or personalised customer service, although they expected Northern Powergrid to guarantee their security and privacy. **(E036)**

- The majority of participants were willing to share their data to enable Northern Powergrid to provide targeted support to vulnerable customers, as they felt a responsibility to support vulnerable people in their communities, although there was some confusion as to how such a system might work. Those who were reluctant to share their data for this purpose felt it was the responsibility of the government or of social services, rather than Northern Powergrid. **(E036)**

- One internal stakeholder during an emerging thinking session said that they must be convinced of data security and data ownership arrangements before being willing to engage in digitalisation of something so fundamental as electricity supply. **(E189)**

A Northern Powergrid app

- Almost all rural participants supported the development of a dedicated Northern Powergrid app, on the basis that it would facilitate more efficient communication between Northern Powergrid and its customers as it could be used in any location and would allow consumers to get on with other things while waiting for a reply through the app. **(E036)**

- A small number of rural participants said that they would be unlikely to use an app due to their unfamiliarity with the technology, although they liked the idea that it would be there if needed. **(E036)**

- Corporate interest groups said that user interfaces need to be digitally inclusive, accessible, interactive, and appropriate to the user needs. **(E044)**

WAVE 3 – refining and finalising our plan

Our third wave of engagement was used to refine our proposals and gain endorsement for our final plans in 2021. The engagement was carried with domestic and rural consumers, SMEs, local authorities, as well as government, Ofgem and industry representatives. Themes covered by the engagement are:

- collaboration;
- local flexibility; and
- future service design.

In total, we ran 91 events, engaging 32,500 stakeholders in wave 3. Of these 91 events, data and digitalisation was a specific sub-topic at 14 of them, covering >800 interactions.

The events where data and digitalisation was a specific sub-topic are listed below:

Engagement reference	Name	Subgroup	Method	Delivery partner	No engaged
E217	Follow-up meeting with the Durham Energy Institute	Future energy	Online meeting	NA	4
E223	Transport for the North / northern DNO catch-up meeting	Utilities	Online meeting	NA	6
E232	Flex provider insight growing customer flexibility – ESO	Utilities	Online meeting	NA	1
E235	DSO strategy (2.9 Enable the transition to a low carbon future)	Future energy	Online meeting	NA	1
E240	Pod Point and Northern Powergrid bilateral	Future energy	Online meeting	NA	1
E246	2023-2028 - Establishing key workforce resilience metrics: Session 1: DNO working group	Utilities	Online meeting	NA	7
E248	Future Fairness Panel	Community stakeholders	Online panel	Explain Research	20
E249	Future Service Design Workshop	Future energy	Online panel	Regen	15
E261	Northern Powergrid Workforce Resilience – phase 1	Internal stakeholders	Survey	Explain Research	165
E263	Northern Powergrid IDNO Workshop	Utilities	Online workshop	Explain Research	4
E264	Local Authority Forum: Net zero action planning	Regional politics	Online Forum	Regen	42
E267	Stakeholder Summit	Stakeholders	Online conference	Traverse	140
E299	2023-2028 Plan Website Survey Responses	Customers stakeholders	Survey	NA	242
E300	Colleague engagement survey – plan acceptance	Internal stakeholders	Survey	Explain	204

- Local authorities at the net zero action planning forum had little to say on how they currently use Northern Powergrid's data – the overriding impression was that they need more clarity on what data is available and how to access it. Working through example use cases would be helpful. **(E264)**

- There was interest in further training to understand Northern Powergrid's heat map and how to use it to inform project development and site allocations. One stakeholder highlighted some ongoing investment into the heat map and that it may be worth highlighting further to LAs. **(E264)**

- At the Stakeholder summit focused on 2023-2028 questions, there was a low level of interest in this area. One stakeholder was keen to know if the AutoDesign tool would have an equivalent for generation, since it is currently only consumption based. **(E267)**

- According to the 2023-2028 plan website survey responses, 35.6per cent of the participant to the survey said they really like Data and Digitalisation. **(E299)**

Collaboration

- The local authority forum said there may be opportunities for Northern Powergrid to collaborate with local data experts such as the Urban Observatory in Newcastle on data visualisation. **(E264)**

- At Northern Powergrid's Stakeholder Summit 2023-2028 questions Stakeholders also believed that digitalisation of the energy system has the potential to deliver significant benefits for our customers. **(E267)**

- DEI is always keen to work with partners on data analysis if there are any areas of research that Northern Powergrid would like to explore with their collected data. **(E217)**

- Data and digitalisation are the key area where we need to co-ordinate our intentions. Distribution and transmission companies need common approaches to enable us to share data to help each other deliver efficient services. **(E232)**

Flexibility

- Future Energy participants at the DSO strategy session said it is hard to predict when local flexibility will be sufficiently available and manageable to be used to defer reinforcement at the local level. Barriers to above. Need better information on available network data and provide two-way data exchange capability so that we may both understand the need and the resource availability for performing LV flexibility. **(E235)**

- There is substantial flexibility potential; evening peak is slightly later than DNO system peak + another peak after midnight for those using off-peak tariffs: There are peaks observed at 20-21 and at 9:00, and also at 00:30 (for all chargers); For around 17k home chargers, peaks occur at 20:00 and around 01:00; Data on charge state - i.e., vehicles plugged in and not charging - indicate a substantial potential for flexibility, especially in the very early morning hours. **(E240)**

Future service design

- Participants at the RIIO-ED2 working groups understood there will be differences in data sets, comparability, availability, and other challenges that need to be considered so that outputs are meaningful -, e.g., employee demographic data is not widely held. For this publicly shared metrics – they should be high-level enough to overcome these challenges, e.g., demonstrating increase in proposition of in female engineers. **(E246)**

- At the future fairness panel, community stakeholders said they wanted Northern Powergrid to publish more up-to-date, granular data on energy use and carbon intensity of electricity; Refine tools to assess future energy scenario data and network reinforcement plans. **(E248)**

- Future energy participants were asked: What data do you receive now? Why? **(E249)**

  - Estimates of new connection costs.
  - LV substation peak load data.
  - Feeder line monitoring data.
  - Connection heat maps for potential community rooftop PV projects.
  - ODI future scenarios tool.
  - National energy usage data to educate young people.

- Future service design - What support do you expect?: **(E249)**
  - Real time interactive data.
  - Simple user interface.
  - Good quality, free, open data.
  - Substation monitoring.
  - Help understanding and interpreting data.
  - Data on carbon intensity of electricity.
  - More data on rural communities' consumption.
  - Network data available at detailed level.
  - Collaborate w/ other utilities.

- Future service design - What are the characteristics of a service that would help you access the data you need? **(E249)**
  - Should support local energy planning, but Northern Powergrid needs to develop trust and collaborate more to achieve this.
  - Trusted data which is accessible and easy to use.

- Internal stakeholders who responded to the Northern Powergrid workforce resilience survey wanted us to utilise data analytics of productivity tools to show how well our colleagues perform and identify areas of improvement. 3.5 - Mean average on a scale of 1 to 5 with 1 being 'strongly disagree' and 5 being 'strongly agree. **(E261)**

- At an Northern Powergrid IDNO Workshop, utilities participants wanted Northern Powergrid to consider how the functionality can be put in place to provide a data sharing mechanism to allow exchange of network data between DNOs and IDNOs on parts of the network that have a measurement device available for example on a 33kV substation. **(E263)**

- Local authorities had little to say on how they currently use Northern Powergrid's data – the overriding impression was that they need more clarity on what data is available and how to access it. **(E264)**

- Working through example use cases would be helpful.
- There was interest in further training to understand Northern Powergrid's heat map and how to use it to inform project development and site allocations. Phil Jagger highlighted some ongoing investment into the heat map that it may be worth highlighting further to LAs.
- Local authorities are interested to collaborate with Northern Powergrid not just on Local Area Energy Plans, but also on the development of the LAs' Local Plans.

– There may be opportunities for Northern Powergrid to collaborate with local data experts such as the Urban Observatory in Newcastle on data visualization. Local authorities had little to say on how they currently use Northern Powergrid's data – the overriding impression was that they need more clarity on what data is available and how to access it. **(E264)**

– Additionally, the comments within the theme 'current system should be updated' showed that a proportion of colleagues believe that the current system of how data is used within Northern Powergrid should be altered with one stakeholder stating: 'I think the proposals are good, but the business is still heavily reliant on inefficient old systems and manual databases/spreadsheets which don't interact with one another. I think it will take a great deal of work to get into a position where that's no longer the case'. **(E300)**

WAVE 4 – Finalising the plan

From July to December 2021, we finalised our plan, responding to queries, addressing gaps and testing overall acceptability. We engaged 153 customers and stakeholders overall and with detailed sessions on outstanding data and digitalisation topics across seven events.

The events where Data and Digitalisation was a specific sub-topic are listed below:

Code	Name	Subgroup	Engagement Type	Date	No Engaged
(CR446)	Digital Catapult roundtable	Consumers	Meeting	05/10/2021	40
(CR425)	Citizens Panel (Innovation)	Consumers	Panel	25/05/2021	45
(CR428)	Digitalisation Strategy and Action Plan	Experts	Meeting		23
(CR418)	Cross Utility Workshop	Utilities	Meeting	20/10/2021	8
(CR426)	Citizens Panel (Bill impact)	Consumers	Panel	20th & 23rd Sep	37

Feedback summary

– At the Digital Catapult roundtable, in response to the question 'Do energy networks need greater intelligence' participant felt that the lines between first, second and third party information were becoming blurred. A lot of stakeholders are looking at what digital information they could provide to, or get from, the customers in the context of service provision. However, looking at third party type information can also give valuable insights for whole system benefit, e.g. traffic flow data provided by spatial applications can inform EV charging demand. **(CR446)**

– At the Citizens Panel discussion about Innovation, the majority saw the value in an open data platform and felt that this would plug an existing gap in free, independent advice around decarbonisation. There were a few concerns about the visibility of Northern Powergrid and whether enough people would know about the platform to use it. **(CR425)**

Consumer Value Propositions (CVPs)

Engagement for the CVPs is included in the comprehensive engagement feedback and numbers reported. Here we set out the relevant feedback and insight to make it clear how engagement has informed these specific propositions.

Vulnerable customers

Details of engagement undertaken	Insights
Online survey with 6,010 respondents. - 45% of respondents were 65 and over - 54% of respondents were living in vulnerable circumstances with 37% living with a long-term physical health condition	**Use of digital technologies:** Of respondents 85% owned a smartphone; 83% used mobile apps and 80% used apps on a daily basis **Support for proposal:** 80% of respondents supported the CVP proposal and wanted to see this included in our business plan with 71% of respondents 'somewhat' or 'very' likely to use the app **Key benefits:** Responses included 'easy access and all in one place' (1,811 responses), 'it will be useful for helping vulnerable customers' (510 responses) and 'live updates' (494 responses) **Additional functionality customers would like to see:** 'live chat function' (104 responses) and 'links to other organisations' (35 responses)
In-depth interviews with five representatives of vulnerable customers with communication issues 14 customers 4 expert groups - Blind/partially sighted - Deaf/hard of hearing - Non-English speaking	**Support for proposal:** All respondents were supportive of the idea provided it was supplementary to other lines of communication **Suitability:** Those with communication difficulties, mental health issues and those who are medically dependent would benefit. Representatives wanted to see the app tested across a range of vulnerabilities with most respondents willing to support Northern Powergrid in the development and testing of the application **Key benefits**: Features were significantly skewed towards making the app as accessible as possible to support communication needs
Two focus groups with ten PSM customers	**Use of digital technologies:** Nearly all users regularly used mobile applications **Support for the proposal:** The application received a mean score of 7.5 on a scale of 1 – 10. It was reinforced as key to keep other lines of communication in place. All respondents would use the app in the future **Partnerships:** Respondents didn't want to feel like they were being sold something in relation to partnerships **Additional requirements:** Promotion of the application would be important
Communications research with 17 stakeholders (7 PSM registered) - 7 blind/visually impaired - 5 hearing loss and/or speech impaired - 5 non-English speakers	**Use of digital technologies:** Within the sample there was a spread of technology adoption. More tech savvy consumers appreciated how technology is improving their lives – this was especially the case amongst those with sight loss. Those who were less savvy found a number of barriers to up-take including learning new skills and security **Support for proposal:** Research found that live chat with video and translation/interpreter services were appealing features across segments. Those who were non-English speaking and with hearing loss valued features including subtitled videos, translated services and text services. For those who were partially sighted, voice recognition provided benefits. None of the segments saw benefit with an online Q&A tool.
Wider industry engagement - Monzo (desktop review) - Virgin Money (1 representative)	**Concept development:** Both Monzo and Virgin Money have had experience in developing an application where customers can access their services. Engagement with these parties has led to us gaining an understanding of how we can ensure that the services we offer to customers are designed to be both useful and accessible to customers. We will continue to engage with both Monzo and Virgin Money as well as any other suitable providers as we develop the application to leverage their experience.

Expert Stakeholder Engagement – Social Issues Expert Group (SEIG) – 10 members; and Future Fairness Panel – 12 members	**Industry experience:** We have monthly meetings with our SEIG, with the future fairness panel in attendance of some meetings) who review our plans for vulnerable customers in order to stress test and challenge these as well as input into their development which has been the case with our application development. The chair of our SEIG is Derek Lickorish who is a non-Exec chairman at Utilita Energy and has had experience with launching an application to support their customers. 90% of Utilita's customer base falls within Ofgem's vulnerability risk factor categories and application up-take on a regular basis was 50%. Furthermore, during 2020, 71% of customers utilised the emergency credit function. These findings have been used to support up-take assumptions for our application.

DSO – Open Inisghts

Details of engagement	Insights
Incentive on Connections Engagement, 2019-20 - 76 stakeholders across Local Authorities, consultants, installers and other interested parties	**Summary of engagement:** We engaged with stakeholders - in particular Local Authorities and their consultants - to develop AutoDesign. We tested how users were using AutoDesign and we ran a co-creation workshop to understand details of the types of connections the tool was being used for, so stakeholders could input into the development of the tool. This included a dedicated session for ICPs and IDNOs where they provided feedback on how they would like us to develop the tool to suit their future use. We heard: - Network visibility and data are key – ICPs need access to the same tools and information as our engineers; and - AutoDesign should be developed to enable ICPs to determine points of connection
Incentive on Connections Engagement, 2020-21 - c. 6,600 stakeholders	**Insights:** During a further co-creation workshop with regular AutoDesign users and key stakeholders from a range of different disciplines including EV installers, the Highways Agency, Local Authority representatives, consultants and ICPs we found that most were using AutoDesign as an optioneering tool and saw benefits in being able to self-serve and perform their own upfront assessments. Users told us they wanted to see the tool developed to include the following functionality: - Capability to optioneer and map multiple scenarios - Ability to use AutoDesign for new generation connections and to make modifications to existing connections - Local Authorities specifically wanted the tool to be able to drive forward their decarbonisation plans and specifically, whether it could be used assess the feasibility of retrofitting heat pumps in existing domestic and social housing properties. The insights we received informed our thinking on future use cases for AutoDesign and shaped development of the tool Open Insights tool.
Online bilateral meetings – 5 aggregators - March 2021 - present	**Summary of engagement:** Our flexibility services related stakeholder engagement with aggregators and energy technology providers has identified a number of common themes that would be of use to them regarding the provision of data to markets and other stakeholders: - Visibility of network data: Processes that enable quick and easy understanding of the situation on different areas our network provide increased opportunities for interested parties to understand the likely profile of network need and adjust their plans accordingly - Early visibility: In order to take advantage of market opportunities and utilise customer assets where they have been given control, early visibility of opportunities is important to allow for appropriate planning and preparation

Details of engagement	Insights
	- Flexible data formats: As aggregators tend to have larger portfolios and technical capability, they have indicated a preference for flexible, accessible data formats to allow them to manipulate the data to suit their requirements **Consideration for development:** Insights from these engagements have informed development of the tool, considering the products and services that would be of use to support market development
Citizens Panel, 45 respondents (Domestic, 36 and SME, 9) - Including 21 hard to reach and 5 seldom heard	**Support for the proposal:** For the most part, consumers felt that the open data platform is a good idea and could see the value. They felt that it would fill the existing gap in free, independent advice around decarbonisation and could provide a unique experience for the customer. One consumer suggested that the platform could be signposted on EPC reports to increase awareness and usage of the platform. **Consideration for development:** Northern Powergrid would need to promote the platform as many customers have limited knowledge of the company prior to joining the panel. The platform should also remain independent and should not be used as an advertising opportunity or to recommend specific suppliers.
Online focus Groups, 20 (Major connections customers) - Consultants, contractors, Local authorities, generators and ICPs	**Support:** Stakeholders were encouraging of future improvements to the AutoDesign tool. Automated processes for LCTs were valued, however the option for human interaction should also be available. **Future development:** Stakeholders gave active suggestions of how the heat map tool should be developed, with stakeholders looking for the tool to support flexible decision making and support for the transition to EVs and electrification of heat.

Whole Systems – voltage optimisation

Details of engagement	Insights
Boston Spa Community – Keith Jackson (1) on behalf of Northern Powergrid	Keith Jackson, a Boston Spa resident who initiated voltage optimisation has been a key stakeholder in the trial since Northern Powergrid became involved. Throughout the trial we have been engaging the community involved and Keith Jackson is a customer representative on the Northern Powergrid Stakeholder Panel. Keith launched a petition in early 2021 to bring in legislation to ensure that Ofgem measure voltage optimisation across all UK power networks to ensure the industry takes action.
2020 Innovation festival, ~40 technical stakeholders including other DNOs 2020 ENIC conference, ~30 technical stakeholders 2021 ENIC conference, ~20 technical stakeholders	**Support:** Stakeholders were very interested in the idea. During the 2021 ENIC conference when asked “would you want your local DNO to rollout voltage optimisation”; over 80% voted yes, with the remaining votes being ‘not sure’ or ‘no’. **Challenge:** Benefits stated are based on existing load types. Future load growth will be attributable to EVs and heat pumps which may not benefit from voltage optimisation as the charging equipment contains power electronics which converts the mains AC voltage into a DC voltage as the battery requires. **NPg response:** We have therefore based the benefits and value to customers on the current electricity usage levels, i.e. we have not included future load growth as we recognise that these technologies will not benefit. As part of the project we will undertake a statistical analysis to monitor the benefit of voltage optimisation into the future.

Details of engagement	Insights
Citizens Panel, 45 respondents (Domestic, 36 and SME, 9) - Including 21 hard to reach and 5 seldom heard	**Support:** Overall this was considered to be a good idea as it can contribute to reduced energy consumption, benefit the environment and reduce costs. Consumers liked that fact that this made use of existing technology (smart meters). SMEs particularly liked the cost saving opportunities and the fact that equipment would be replaced less frequently. Customers were generally happy to participate in a trial with some customers actively querying if a trial would be taking place near them. **Concerns:** The logistical roll-out of the programme was raised as a concern when not every household has a smart meter. There was also concern that energy suppliers would not pass the saving onto customers **NPg response:** We do not require 100% of customers to have a smart meter for the programme to be successful, as we can still gain a good understanding of the voltage requirements with the majority of customers owning a smart meter. We have accounted for this in the make-up of the algorithm as part of our work with Sheffield University.

Whole Systems – Microgrids

Details of engagement	Insights
Citizens Panel, 45 respondents (Domestic, 36 and SME, 9), May 2021 - Including 21 hard to reach and 5 seldom heard	**Support:** Rural customers were the most supportive of this proposal however other consumers who do not live rurally acknowledged its value (despite this proposal being unlikely to impact them in the short-term) **Challenges:** Some stakeholders felt that 30 microgrids was not enough**.** Some stakeholders also considered this a short-term fix and more should be done to invest in more permanent solutions **NPg response:** This does not represent a short-term fix but a long-term solution to improve the resilience of the network. It encourages low carbon technologies as the future of energy supply to not only improve the resilience of the network (which will become increasingly more important as we decarbonise), but also opens up new markets by encouraging localised energy trading
Meeting with North East Local Enterprise Partnership, May 2021 - 3 stakeholders	The LEP were supportive of the CVP - microgrids are a key area of interest for industrial companies in the North East, e.g. local ports and industrial clusters
Community Energy stakeholder Panel, May 2021 - 7 stakeholders	Panellists gave overwhelming support for the proposition and expressed a strong interest in the roll-out

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