Northern Ireland Electricity Networks

A FUTURE NETWORK FOR ALL

NIE NETWORKS BUSINESS PLAN

1 April 2025 to 31 March 2031

March 2023

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FOREWORD

Thank you for taking the time to read our proposal for the work that we believe is needed for the electricity networks in Northern Ireland over the coming years. We have been working with stakeholders in Northern Ireland to determine how we should invest in the network so that we meet our shared objectives. You have clearly told us to make sure that the network has sufficient capacity to allow for greater electrification, is reliable enough to maintain confidence that homes and businesses will have electricity when they need it, and to make sure that all new and existing customers can get the connections they need to the network quickly, transparently and cost effectively.

NIE Networks recognises the privilege and responsibility that it bears to make sure that the electricity networks in Northern Ireland are developed in a way that allows all of the families and businesses in Northern Ireland to participate in the transition from a fossil fuel-based way of life, to a way of life that is powered by electricity that is generated from renewable means. We recognise the responsibility that we have to build, maintain and operate new and existing electricity assets in a way that reduces the financial burden of this investment on the homes and businesses in Northern Ireland.

Our plan sets out to invest almost £2.6bn over the RP7 period, or well in excess of £3bn over the next 10 years (2023 to 2032). This is the required level of investment that we believe is needed to allow the homes and businesses of Northern Ireland to invest in electric vehicles and electric heating to the scale needed to meet Northern Ireland's climate change commitments.

Not only will our investment provide the electricity network for Net Zero, it will also create greater prosperity in Northern Ireland and will provide training and long-term careers for many young people that may not have had opportunities to remain in Northern Ireland. We believe that we will need to create 1,000 new jobs in NIE Networks, and up to 500 new jobs in support partners between now and 2030. We believe that this level of investment in the electricity network will attract additional inward investment into Northern Ireland and will encourage new businesses to come here, and existing businesses to grow.

We recognise that the NIE Networks that has delivered on RP5 and RP6 is not the one that will double the work and investment in RP7. The increased scale of people, funding, outputs, technology, and stakeholder interaction all require an evolution of our business model so that we maintain our existing focus on safety and efficiency, while investing in our people and technology to maintain the confidence of the people of Northern Ireland that we can meet the commitments that we set out in this plan. We recognise that the way that we have connected homes and businesses to the electricity network up to now will not work in the future. We are committing in this plan to work more closely with everyone who uses the electricity network and with those who seek to connect to it to make the electricity network work for them. We recognise that we need to put much more control into the hands of the people of Northern Ireland, and our investment in Digital and IT Systems aims to achieve this.

The exact path that the world will take over the coming years is uncertain; however, we need to invest now to create the long-term electricity capacity and reliability that is needed to satisfy the increasing demand for electricity over the next 50 years. This plan is one of a series of investment steps that NIE Networks will need to take over the next 20 years so that we have a network that is ready for 2050 and Northern Ireland's net zero commitments.

Derek Hynes
Managing Director, NIE Networks

1. INTRODUCTION AND STRUCTURE OF DOCUMENT

a. Introduction to NIE Networks and RP7

1.1 This document provides an overview of Northern Ireland Electricity Networks Limited's (NIE Networks) business plan for the six-year period from 1 April 2025 to 31 March 2031. This will be the seventh regulatory price control period (Regulatory Period 7 or RP7) since NIE Networks was privatised in 1993. The current price control period (RP6) spans a seven-and-a-half-year period from 1 October 2017 to 31 March 2025 (noting that this timeframe includes a one-year extension to the original six-and-a-half-year period for RP6). Our RP7 plan details what we intend to deliver during RP7, how much it will cost and the benefits provided to customers and stakeholders.

1.2 NIE Networks is the owner of the electricity transmission and distribution networks in Northern Ireland and is the electricity distribution network operator, serving over 910,000 customers connected to the network including homes, businesses and farms.

1.3 We share responsibilities with SONI in respect of the transmission network. SONI is the System Operator for Northern Ireland and is responsible for the operation and planning of the transmission network. NIE Networks owns, develops and maintains the transmission network. The sharing of functions meets the requirements of the European Union's Third Energy Package.

1.4 Our role is –

- to operate the network of overhead lines, underground cables and substations effectively to 'keep the lights on' for our customers;
- to maintain the network so that it is in a condition to remain safe and reliable;
- to fix the network if it gets damaged or if it is faulty;
- to upgrade or extend the existing network to provide additional electricity supplies or capacity to our customers including the development of innovative solutions to manage the increasing level of renewables connections and the uptake of low carbon technologies – and to do this is an efficient, coordinated and economical manner;
- to provide electricity meters and provide metering data to suppliers and market operators. This is a key role in enabling wholesale and retail market competition; and
- to connect customers to the network, both for new electricity supplies and for new electricity generators.

1.5 NIE Networks is a regulated company and our business activities are overseen by the Northern Ireland Authority for Utility Regulation (UR or Utility Regulator). The UR will use this document together with more detailed supporting submissions which we will make to the UR to determine our allowed revenues for RP7.

1.6 The UR set out its overall approach to developing its RP7 determination in the Overall Approach document which it published in July 2022. The price control has been planned to develop over a number of stages as follows –

- NIE Networks' RP7 plan including actual data for previous years, is submitted to the UR in March 2023;

- the UR will assess the plan and publish a draft determination for public consultation in November 2023; and

- the UR will publish a final determination and proposals on licence modifications, in October 2024.

1.7 Our Business Plan has been developed and structured in a manner consistent with the guidance set out in the UR's overall approach. In addition to this RP7 plan overview document, we will submit detailed workbooks and commentaries to the UR as a set of completed Business Plan Templates.

1.8 NIE Networks' vision is 'Delivering a sustainable energy system for all'. In practical terms, for us this means providing an electricity network that is capable of facilitating Northern Ireland's overall plan to address climate change, which aims to achieve net zero carbon and affordable energy by ending society's reliance on fossil fuels and its associated price volatility.

b. Structure of this document

1.9 We appreciate that the readers of this document will range from regulatory experts and well-informed stakeholders through to new customers who may have little previous knowledge of NIE Networks. We have therefore set out to provide a simple overview of our plans and wherever possible have sought to avoid using acronyms or industry jargon. This applies particularly to Part 1 of the document. Parts 2 to 4 may be of more interest to technically-minded readers.

1.10 The document is subdivided into the following chapters:

- **Chapter 2: Executive Summary**. This chapter provides an overview of the Business Plan. It describes the key strategic themes and drivers that have resulted in a RP7 plan that is much more transformational in nature than anything we have done before.

PART 1: CONTEXT AND SCENE SETTING

- **Chapter 3: Who We Are and What We Do**. This chapter provides a simple description of our business.
- **Chapter 4: Our Track Record**. This chapter describes what we have achieved to date with a particular focus on the most recent price control, RP6.
- **Chapter 5: Developing the Plan for RP7**. This chapter describes the governance arrangements for development of the plan, and the process of engagement with stakeholders that we went through to develop and formulate our plans for RP7.
- **Chapter 6: Our Commitments for RP7**. This chapter sets out the commitments that we are making during RP7.

PART 2: OUR BUSINESS PLAN IN DETAIL INCLUDING EXPENDITURE

- **Chapter 7: Our Business Plan in Detail**. This chapter sets out how we have assessed the required investment needed in the network and our business, to deliver on our RP7 commitments.
- **Chapter 8: Expenditure**. This chapter sets out the amount we propose to spend on (1) the distribution network including business support activities and market operations, and (2) the transmission network.
- **Chapter 9: Transmission Expenditure: Capability / Capacity**. This chapter describes projects which may be proposed by SONI during RP7 to enhance the capacity and capabilities of the transmission network.

PART 3: UNCERTAINTY & INCENTIVES, AND CONNECTIONS

- **Chapter 10: Uncertainty and Incentive Mechanisms**. This chapter provides details of where there is uncertainty that could affect the overall programme planned for RP7 and mechanisms to deal with the uncertainty. The chapter also covers incentives which formed the basis of the RP6 regulatory framework and other potential incentives which could be introduced in RP7.
- **Chapter 11: Connections**. This chapter sets out the key business objectives and long-term strategy that drive our connections business.

PART 4: MAKING IT HAPPEN

- **Chapter 12: Delivering the Plan**. This chapter sets out how we will ensure we have sufficient resources to deliver the RP7 plan.
- **Chapter 13: Financing the Business Plan**. This chapter describes how we will finance the network investment through debt and equity.
- **Chapter 14: Impact on Customers' Bills**. This chapter illustrates how the electricity cost for customers will change as a consequence of the expenditure in the plan.
- **Chapter 15: Glossary**. This chapter provides an explanation of specific terms and acronyms.

1.11 All costs referred to in this document are in 2021/22 prices unless otherwise stated.

2. EXECUTIVE SUMMARY

a. Context for RP7: a changing energy landscape

2.1 The Northern Ireland energy system is at a transformational juncture. In December 2021, the Department for the Economy (DfE) published its strategy report 'The Path to Net Zero Energy', setting a long-term vision of 'net zero carbon and affordable energy' by 2050. This Energy Strategy also committed to interim 2030 deliverables, including 70% of electricity consumption from renewable sources, 56% reduction (versus 1990 levels) in total emissions from energy (power, heat and transport), and doubling the size of the low carbon and renewable energy economy to a turnover of more than £2 billion per year.

2.2 Subsequently, a Climate Change Bill was passed by the NI Assembly in March 2022 and enacted into law in June 2022. This is Northern Ireland's first Climate Change Act, bringing Northern Ireland in line with the rest of the UK and with the Republic of Ireland (ROI). The Climate Change Act makes a legal commitment to net zero greenhouse gas emissions by 2050. It also commits to 80% of electricity consumption coming from renewable sources by 2030, superseding the original target of 70% within the Energy Strategy.

2.3 The energy system will need to undergo a rapid transformation as we transition towards net zero, and networks are at the heart of this change. In order for Northern Ireland to meet the targets laid out in the Energy Strategy and achieve net zero by 2050, we need to decarbonise the whole energy system. This includes reshaping the power system as a means to decarbonise other crucial sectors in transport, heat and industry. These customer-led changes are significantly beyond what the network and our internal systems are currently designed for.

2.4 Accordingly, our plans for RP7 and beyond – which our stakeholders have helped shape – are to deliver a smarter, more flexible and integrated energy system for all our customers so that they can decarbonise their lives at least cost. To achieve this, we must expand our capabilities, evolving our existing roles and taking on new functions as a Distribution System Operator (DSO). We will actively manage and optimise the increasingly complex power flows on the networks driven by decarbonisation, reducing the need for conventional network reinforcement so that the transition to net zero is as affordable as possible.

2.5 The role of customers is also changing as they actively manage their consumption and choose to produce electricity at home or business premises. This is happening against the backdrop of increasing digitalisation where technological innovations like smart appliances and commercial developments like aggregation are allowing customers to reduce or shift their demand for electricity in response to price signals and other incentives. This creates challenges but also brings opportunities to deliver significant benefits for our customers and for Northern Ireland as a whole.

Net zero: a vision for the future

2.6 We recognise that we are part of an energy ecosystem and that whole system thinking is needed. That is why we aspire through our company vision to 'Delivering a sustainable energy system for all'. Our intention is through RP7 and beyond, to provide an electricity network that is capable of facilitating Northern Ireland's overall plan to address climate change, which aims to achieve net zero carbon and affordable energy by ending our

society's reliance on fossil fuels and its associated price volatility. Taking the necessary steps to meeting climate change targets set out in statute presents a huge opportunity for Northern Ireland to move away from fossil fuels, and in-so-doing we can provide significant protection against future energy crises triggered by turbulence in global energy markets.

2.7 Our vision for this future is for customers to heat their homes using electrically powered heat pumps and to power their car using electricity which they produce at home by solar panels or buy from a supplier of renewably generated power at a smart tariff based on their usage – which can be adapted based on energy availability and price.

2.8 That will require increased network capacity at the customer's home, increased connection capacity for the renewable generator and a smarter network which can support power flowing in different directions while being resilient and reliable. And all of this must be underpinned by data to enable suppliers and customers to act at the right time based on their consumption.

2.9 It is in this context that we have developed our plan for RP7 spanning the years 2025 to 2031. These years will be a critical period on the pathway to achieving net zero carbon by 2050.

2.10 Our plan aims to –

- **Facilitate the decarbonisation of society**. This means developing the network to support the electrification of heat and transport, whilst also enabling the 80% renewables target to be achieved. This will require not only additional capacity to be added to the network, but also a more flexible and digitally enabled operating approach.

- **Maintain a safe, reliable and resilient network**. As heat and transport electrifies, society's reliance on electricity will increase even more than currently. Accordingly, we will need to ensure the network remains safe, reliable and resilient so that customer outages are kept to a minimum.

- **Ensure our customers continue receiving an excellent level of service**. This will include developing new and more digitalised methods for customers to interact with the network. Digitalisation of the network will allow customers to be more empowered about their energy choices.

- **Ensure our business is prepared for the future**. Our ambitions for the future are underpinned by a number of key organisational changes that are essential to delivering the transformational change in RP7 and beyond. These include addressing the challenges of environmentally sustainable operations, greater digitalisation and workforce resilience. We also need to re-shape our organisation to ensure we have sufficient capability to deliver the investments needed during RP7 and beyond.

2.11 And of course, we want to achieve these aims at the least possible cost, in keeping with our long history of delivering a safe, reliable and resilient network for customers, and doing so at a level of cost which benchmarks among the very best in the UK and Ireland.

Investing to achieve this vision

2.12 To achieve these aims, significant investment is needed in the network during RP7, and beyond.

2.13 Specifically, a significant step-change is needed in the level of investment required to facilitate the scale of decarbonisation that has now been mandated by government. These are investments that will provide increased network capacity to enable our customers to connect low carbon technologies (LCTs) such as electric vehicles (EVs), solar panels and heat pumps. We will also need to invest to enable network capacity to meet government targets for a greater proportion of electricity to consistently and reliably come from renewable sources (80% by 2030).

2.14 We expect many benefits to flow from these investments including creating the potential for lower overall energy bills as we consume more from indigenous renewable sources. It is important to recognise that the cost of investment in the network is recovered over a long period of time (typically 40 years), so costs and benefits are shared between current and future customers.

2.15 Another factor driving increased investment is maintaining the resilience and safety of the existing ageing network. The initial development of the electricity network in Northern Ireland occurred primarily in the 1950s and 1960s, and much of the original network that was built all those decades ago remains in place today. These assets are now upwards of 60 years old or more and need, or will soon need, replacement in order to maintain reliability of supply. So, during RP7 and beyond we will need to undertake a comparatively larger programme of network renewal than ever before.

2.16 Investment is also needed so that we can meet changing customer needs, identified through extensive engagement directly with customers during RP6. Our plan is designed to deliver the solutions that our customers require, particularly the most vulnerable in society.

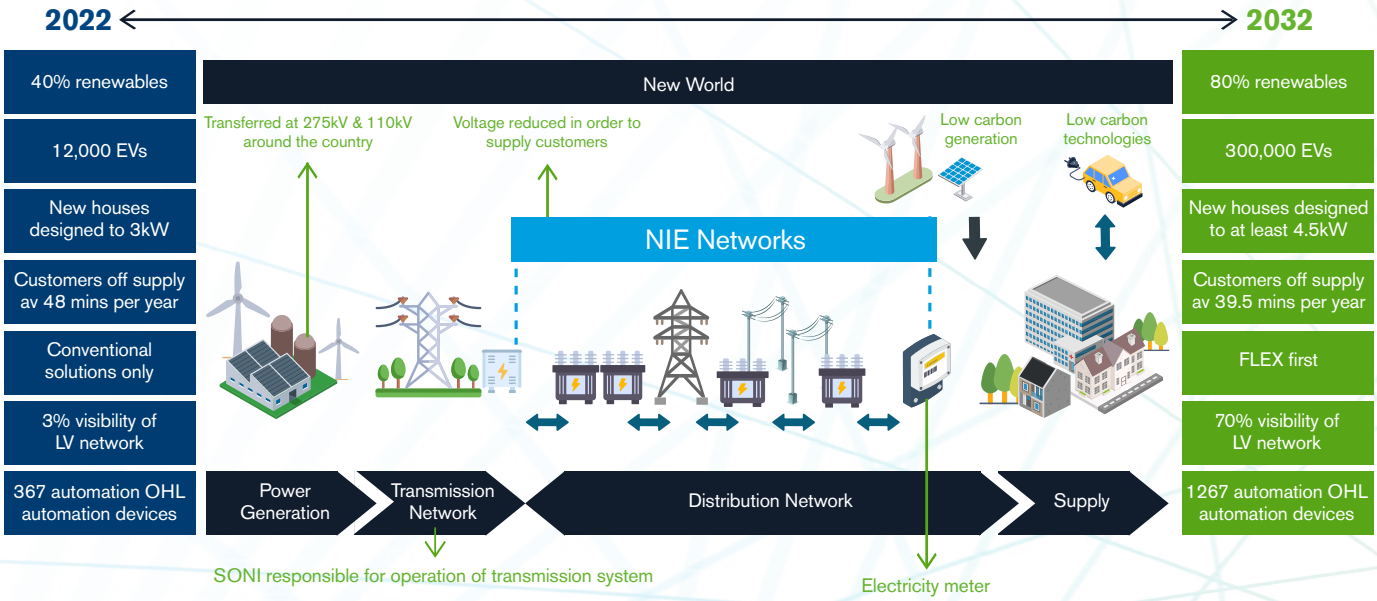
b. Facilitating net zero through a flexible and integrated energy system

2.17 The RP7 years of 2025 to 2031 will be a critical initial period for enabling the transformation of the electricity network necessary to facilitate a net zero carbon future. By delivering an innovative, dynamic and integrated distribution system that can flex in response to supply and demand, our customers will benefit from faster and cheaper access to network capacity. This will also enable uptake of LCTs at least cost, whilst retaining flexibility in the network for future changes in customer demands.

Investment and innovation

2.18 The scale of the effort needed to decarbonise our society is significant and will be complex to achieve, requiring a significant increase in investment on the electricity network over several price control periods. By way of example, our plan aims to ensure the network can facilitate 300,000 electric vehicles, 120,000 heat pumps and 3,900MW of renewable generation in Northern Ireland by 2030. This will result in demand consumption increasing significantly between now and the end of RP7, 80% of which will be supplied through indigenous renewable generation.

Figure 1 – our vision for the network at 2030



2.19 We are committed to ensure that we facilitate the transition to net zero at least cost. To achieve this goal, the following are considered vital requisites.

- We are increasingly taking a whole system approach. This means that we look at all the energy requirements for customers – oil, gas and electricity – as well as water and communications to ensure what we do in the electricity arena works best for Northern Ireland's overall net zero requirements, not just the electricity network in isolation. By collaborating with other utilities, sharing data, and coordinating planning and operations, we can collectively develop more optimal and efficient solutions which minimise costs, timelines and disruptions for customers.

- In particular we will need to roll out our flex project and take a "flexibility first" approach to creating additional capacity on the network in lieu of investing in new or enhanced assets. This means, for instance, that we will be buying more demand-side response services from customers in RP7. This will help empower customers to optimise their energy needs with the needs of the network.

- We must also take every opportunity to innovate to ensure we have a broader range of solutions available. In Northern Ireland we have a long history of innovation which we will build on and continue to search for new solutions as we journey to net zero. We will continue to develop an innovative culture at NIE Networks and support innovation across our business.

- If uptake of demand or generation levels differ from our forecasts then we will need a price control with agile uncertainty mechanisms so that our allowances can be adjusted quickly and efficiently. You can read more about our proposed uncertainty mechanisms in Chapter 10.

2.20 In Chapter 7, we explain in more detail how we have developed the plan to facilitate net zero. And in Chapter 8 we set out the investment expenditure that is required to achieve this.

c. Maintaining a safe, reliable and resilient network

2.21 The network consists of a range of specialised equipment including overhead line conductor, wooden poles, steel towers (sometimes referred to as pylons), underground cables, circuit breakers and power transformers. A significant proportion of the network was built between the 1950s and 1960s; and many network assets, having been maintained to maximise their working life, will soon need replacement.

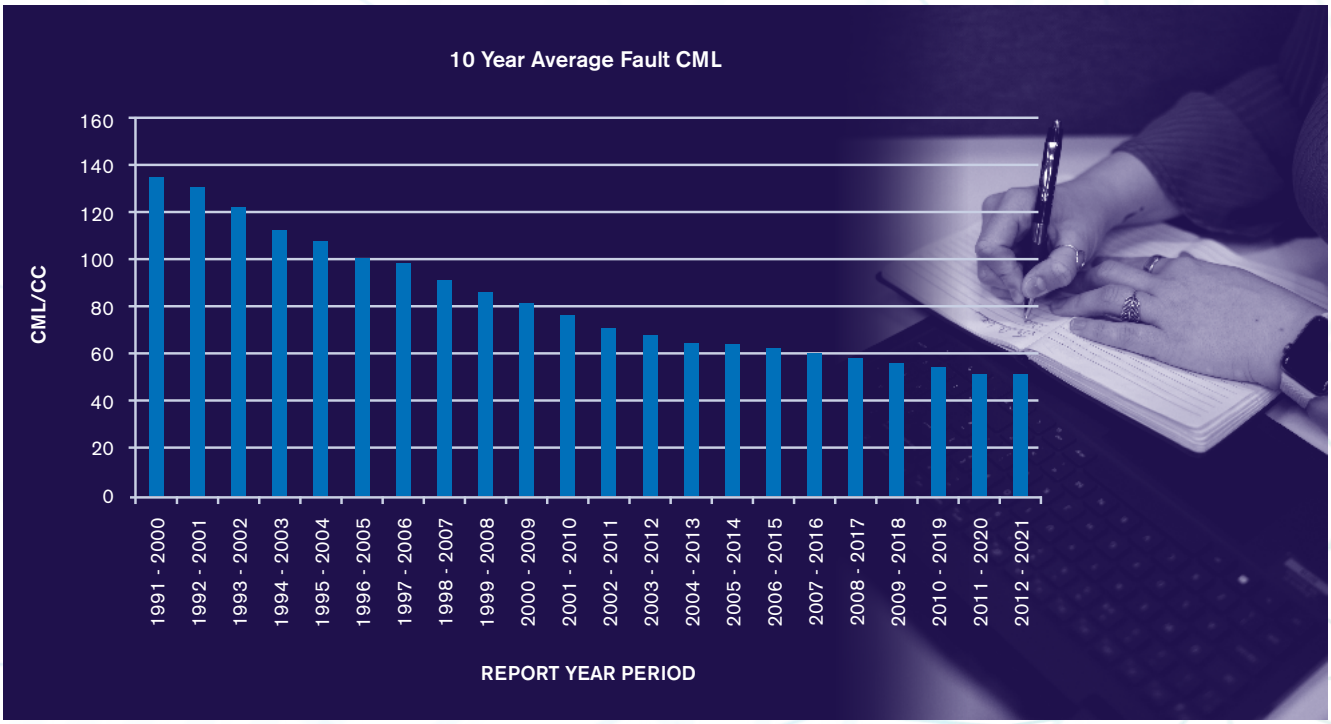
2.22 Whilst asset age is not a reason in itself to qualify an asset for replacement, assets tend to deteriorate in condition significantly when approaching or exceeding the limit of their intended design lifespan. The condition of many of these older assets is such that investment in their refurbishment and replacement will be required in RP7 and beyond to maintain high levels of network reliability and resilience.

2.23 The changes in remote working patterns resulting from the Covid pandemic and the move towards decarbonisation means that, as a society, we are becoming increasingly more reliant on electricity than ever before. This, in turn, places greater importance on the reliability and resilience of the network in providing a secure electricity supply that meets the needs of our customers.

2.24 This increasing societal reliance on electricity will also present a step-change in the volume of work on or in connection to the network, with an increasing number of interactions by our customers, third-party LCT installers, as well as our own staff and contractors. It is imperative that we continue to aim to provide a 'Zero Harm' environment for all those interacting with the network throughout the RP7 period and beyond.

2.25 We are confident we can continue to deliver the level of network safety, reliability and resilience customers expect. For example, since being privatised in 1993 we have successfully managed to reduce the amount of time customers are without electricity supplies due to network faults, to one third of the level at privatisation. Our proposals for RP7 seek to deliver a further reduction (8.2%) to our current level of performance.

Figure 2 – 10-year average fault CML[1]



[1] Our primary measure of network performance is the time customers are off supply due to faults on the network. We measure this in terms of Customer Minutes Lost per Connected Customers (fault CML), which is the average number of unplanned minutes customers are off supply per annum due to network faults.

2.26 We are also mindful of wider global trends and risks to the network. Electricity networks are not immune to the increasing impact of climate change, illustrated in recent times by the impact of Storms Arwen and Barra on customers in Scotland and the north of England, and the wildfires caused by the record-breaking heatwave in July 2022. It is important that we invest in the resilience of the network and mitigate against the impact of a changing climate on the network during the RP7 period.

2.27 Finally, we are acutely aware of the cost of living crisis currently facing our customers. Throughout RP7 we will continue giving high priority to delivering the network reliability and resilience expected by our stakeholders at minimum cost by exploring all viable alternatives to conventional asset replacement.

2.28 Accordingly, during RP7 our planned asset management programme will aim to –

- maintain network reliability by continuing with programmes to replace and refurbish assets in poor condition whilst improving longer-term network resilience;

- adhere to relevant safety, legislative and environmental requirements;
- optimise asset lives; and
- maximise opportunities to deliver efficiencies within our business.

2.29 In Chapter 7, we explain in more detail how we have developed the plan to deliver a safe, reliable and resilient network. And in Chapter 8 we set out the investment expenditure that is required to achieve this.

d. Meeting the needs of our customers

2.30 RP7 presents an opportunity to do more for and with the wide range of customers we have in Northern Ireland, who may have different needs and priorities. Traditionally electricity customers have been passive in terms of their relationship with the network. We see the Energy Transition changing the energy system to one that is more active and dynamic, where customers are more empowered in what they can do. It is clear to us that we have a significant role to play in protecting and enabling customers as we move through this transition. We see the need to enable new low carbon technologies to work in tandem with the network at least cost, whilst ensuring that those that can afford these technologies the least are not left behind in any way.

2.31 We have set out our commitments to our customers for RP7 in Chapter 6, all of which are clearly linked to three key themes at the heart of our customer service approach –

- **Key theme #1:** Protecting vulnerable customers. We will aim to ensure a fair energy transition for all, with no customers left behind. There has never been a more important time than now to protect the most vulnerable so we are already looking at how we can support customers better and we will continue to build on this in RP7. Our plan commits to developing more tailored support for vulnerable customers affected by power outages, this will develop as we work to register customers who fall into a wider definition of vulnerability. We will also be looking at how to improve network resilience so that those who depend on their electricity supply are protected.

- **Key theme #2:** Digitalisation – making it easy for customers to do business with us. We will ensure that our customers can engage with us in the most relevant and convenient way for them. We will develop a self-serve customer portal where customers can interact digitally with us. We will provide data where we can for customers to help them make informed decisions. We also want to adopt more digital channels of communication such as WhatsApp for business and using live-chat functionality within our contact centre.

- **Key theme #3:** Enabling our customers to become more active in their energy usage. We will ensure customers have the opportunity to make best use of new connected technologies, to effectively manage their energy consumption. We are continually improving our processes and services based on customer feedback. We will continue to do that in RP7 and will look at innovative ways of connecting customers more flexibly.

2.32 We recognise that the above themes and the commitments they drive, are interlinked. For example, we need to be cognisant of the digitally excluded and ensure they are included in the work we do to protect vulnerable customers. Similarly, if we are to achieve our ambition that no customer is left behind, it is essential that all customers are enabled to become more active in their energy use.

2.33 Therefore, to ensure that we establish appropriate targets and measures to encourage and track delivery against our commitments during RP7, we will continue engaging with the UR and the Consumer Council of Northern Ireland via the Consumer Engagement Advisory Panel (CEAP), to ensure appropriate targets and measures are set and achieved. We also envisage the introduction during RP7 of an Evaluative Performance Framework (EPF) incentive mechanism which will have a specific focus on customer service quality.

2.34 We continue to rollout out the commitments made in our Vulnerable Customer Strategy[1] which we launched in 2021. We have already seen a significant increase in the number of customers on our medical care register and we continue to engage with those on the register to make sure they get the support they need.

2.35 We are committed to delivering meaningful and tangible outcomes and improvements for customers, meeting the requirements of the UR's Consumer Protection Programme and Best Practice Framework and reflecting our customers' priorities, as identified through ongoing engagement with customers and stakeholders.

2.36 This engagement has taken many forms. Through our participation in the CEAP we have become more aware of the level of digital exclusion in Northern Ireland. Through discussions with Major Energy Users we have a better understanding of how important the resilience of the network is. We have engaged with the Northern Ireland Youth Forum who helped us consider what the customer of the future will need and how they can adapt accordingly. We intend to continue to engage with these stakeholders and others throughout RP7.

Our vision for customer experience in RP7

2.37 This price control takes us out to 2031 and we know the world will be a different place in that time period. Therefore, it is important to look out at what the future needs of customers could be. This led us to developing a vision for what customer service should look like in RP7. This has been developed with input from our staff, feedback from our stakeholders as well as looking out at what we believe is best practice in other jurisdictions.

Figure 3 – our vision for customer experience during RP7

[1] https://www.nienetworks.co.uk/documents/customer-leaflets/vulnerable-customer-strategy.aspx

2.38 Our RP7 business plan sets out to develop the network in a way to enable customers. We will be working on greater digitalisation of our network so customers can work in harmony with the network and their specific energy ambitions can be met. For example, we will take a 'flexibility first' approach and work with customers and the market to see what options exist to enable connections or upgrades without the need for traditional reinforcement.

2.39 We are in alignment with the DfE's Energy Strategy on the particular point of fair access and charging. We are working already on how the right balance could be achieved for connecting customers. It is not within our gift to change this ourselves; however, we are committed to working with the UR and the DfE to help highlight potential areas of policy change that could be needed as part of a just transition.

2.40 We recognise we have a role to play in being an organisation that customers can trust and working with our customers to help educate and inform them on what is possible. Our ambition is to take on a lead role in being trusted experts, making sure that the aims of the energy strategy are met. We are committed to working with customers to ensure the information that we provide and our processes are clear and easy to understand.

2.41 We want to take the digital experience for our customers to another level and create platforms where customers can engage with us and where we can share information easily. When we consider how much digital technologies have come on in the past ten years, it is important to us that we keep pace with that level of change and provide the same experiences for engagement that customers have grown to expect.

2.42 We see an increasing appetite for self- service options and in RP7 we will develop this capability further. For example, we will develop a platform where customers can get high-level quotations for their connection costs to help inform their decisions.

2.43 Whilst we want to have more channels of communication, we recognise the need to support customers with traditional forms of communication and we will look to see how we can enhance the support needed for our customers who need it most. We envisage continuing to have dedicated, highly-trained people within NIE Networks with the skills to help support the most vulnerable in society.

2.44 In general, we are continually looking at how we can improve the ease of doing business and this is a theme that will continue into RP7.

2.45 In Chapter 6, we describe the key services, outputs and/or outcomes ("the commitments") that we plan to deliver for customers during RP7 through our investment programmes, network management decisions and customer service initiatives.

Connections and customer requirements

2.46 Connections charging is a key area of concern for our customers that falls outside of RP7 as outlined in the UR's decision on its approach to RP7. Distribution connection charging in Northern Ireland involves the recovery of the total reinforcement costs at the connection voltage and one voltage up that will be incurred as a result of connecting new load or generation to the system, through an up-front connection charge required to be paid by the connecting customer.

2.47 Our customers have told us that high distribution connection fees are dissuading some from connecting to the network. This is slowing the uptake of low carbon technologies

including electric vehicles and heat pumps, and reducing the competitiveness of Northern Ireland as a region to connect for large energy users in the commercial and industrial sectors. It follows that the current distribution connections charging arrangements in Northern Ireland may be a significant barrier to meeting decarbonisation and 2030 Energy Strategy targets.

2.48 Reinforcement costs associated with new or increased connections at the connecting voltage and the next voltage up are not included in the RP7 Business Plan; these costs are fully chargeable to the connecting customer based on the current connection charging methodology. Reinforcement costs two voltages up from the connecting voltage are included within the RP7 Business Plan as this reinforcement is not chargeable to connecting customers based on the current connection charging methodology.

2.49 The current distribution connection charging arrangements in Northern Ireland differ significantly from Great Britain (GB) and Republic of Ireland (ROI). While the overall connection cost is similar, it is who contributes to the cost that is different. In Northern Ireland the connecting customer pays a much higher proportion of the cost which has resulted in Northern Ireland becoming a less competitive jurisdiction for investment in distribution connections than its counterparts in GB and ROI.

2.50 It is apparent there is a trend in the rest of the UK to address the issue of deep distribution connection charging, and we feel it is important that Northern Ireland is not left behind in this space. We welcome the UR's inclusion in its Draft Forward Work Plan 2023/24 to commence a review of connections charging, and we are advocating to more closely align connections charging methodology in Northern Ireland to that of neighbouring jurisdictions.

e. Preparing our business for the future

2.51 NIE Networks has a long history of delivering the requirements of Northern Ireland customers reliably and efficiently. We have evolved our company over the years to meet the challenges of the day and have delivered at a level of costs which benchmarks among the very best in the UK and Ireland. However, our ambitions for the future are underpinned by a number of key organisational changes that we consider essential to driving transformational change in RP7 and beyond. Chief among these is addressing the challenges of environmentally sustainable operations, greater digitalisation and workforce resilience. We also need to re-shape our organisation to ensure we have sufficient capability to deliver the investments needed during RP7 and beyond.

Environmentally sustainable operations

2.52 We recognise our direct responsibility to protect the environment and reduce the business carbon footprint of our own operations. This involves setting a science-based target to reduce emissions by 50% including network losses by 2030 compared with our 2019 baseline, and reach net zero by 2050 or sooner.

2.53 Building on our achievements in the current period, we have developed an Environmental Action Plan which sets out what we believe are ambitious yet achievable targets for the RP7 period.

2.54 In Chapter 6, we set out what we will deliver during RP7 to make our operations more environmentally sustainable.

Greater digitalisation

2.55 Digitalisation and data services are widely seen as key enablers of Net Zero ambitions. In its decision on the approach to RP7 the UR states, '*Delivery of the Climate Change Act and Energy Strategy will require consumers to make informed choices on how and when to use energy. NIE Networks should set out its plans to make data and system service opportunities/platforms available to consumers (or its intermediaries) in conjunction with other stakeholders to inform these choices.*'

2.56 Accordingly, our aim is to provide the necessary IT infrastructure to promote digitalisation of our data and wider operations. Associated with this ambition is the need to consider the adequacies of our telecommunications infrastructure and cyber security capabilities. Taken together, these will require a step-change in our investment in our IT infrastructure in the RP7 period.

2.57 In Chapter 7, we explain in more detail how we have developed the plan to deliver greater digitalisation. And in Chapter 8 we set out the investment expenditure that is required to achieve this.

Workforce resilience

2.58 NIE Networks has invested heavily in its people over the years. The investment is reflected in our status as a 'Gold' Investors in People business and we have recently been awarded the Silver Diversity Charter Mark. We believe it is essential that we have a highly trained, motivated and committed workforce that has both the capacity and skills to deliver the ambitious plans we have for RP7 and beyond. We call this enabler 'workforce resilience'.

2.59 We also recognise the increased competition and demand for skills across all sectors and as such our goal for the future will be to stand out as an employer of choice in the changing world of work.

2.60 Accordingly, we have developed a workforce resilience strategy which we are submitting to the UR as part of our Business Plan submissions.

Reinventing our business for RP7

2.61 We are making a series of commitments that outline our approach to how we will reinvent our business for RP7.

2.62 In Q3 2023 NIE Networks will create an Organisational Renewal Programme to deliver an organisational change process lasting c.18 months to identify and implement the required people, process and structural investments required to be ready by the start of RP7 to meet the commitments outlined in our plan. The project will focus on the following themes:

- increased delivery and network capabilities
- improved organisational capability
- DSO readiness

Increased delivery and network capabilities

2.63 We will grow our existing delivery capability by bringing in new apprentices and graduates. We will grow our contractor fleet across all of our existing framework capabilities. We will seek opportunities to expand the deliverability role of these

contractors by asking them to take on more end to end programme responsibility to increase output, reduce interfaces and keep downward pressure on unit costs. We will add in additional programme management, procurement and supply chain capability so that we are properly resourced and structured to live up to our commitment to "Touch the Network Once"[2].

2.64 We will establish a team that will have responsibility for delivering large-scale contracting projects. They will develop the alternative contracting models (Design and Build, Turnkey, EPC etc) to allow NIE Networks to deliver larger bespoke projects, including transmission asset replacement projects, cluster substations, offshore connections etc.

Improved organisational capability

2.65 We recognise the need to grow our workforce to approximately 2,000 people by the end of RP7 to have the long-run resource and organisational support capability to meet future work programmes and to operate safely, efficiently and with the appropriate governance structures.

2.66 We will reorganise our strategy and innovation activities so that they are embedded in each part of NIE Networks, but also have executive-level responsibility. We recognise the need to –

- deliver on the traditional well-trusted work programmes;
- remain vigilant so that we can foresee customer, environmental and policy changes in Northern Ireland; and
- support NIE Networks and our partners to create new ways of doing things to become more efficient, and faster to respond as opportunities arise.

2.67 We will increase our commitment to listening to our stakeholders, and will build a capability to turn the things that we hear into business change. We believe that investment in digital engagement and increased organisational change expertise will make this much more responsive and will result in better delivery outcomes and increased efficiency for our customers.

2.68 NIE Networks will review how we are organised to ensure that we efficiently deliver the parts of our plans related to –

- Cyber resilience
- Enterprise system upgrades
- Operations technologies
- Data strategy
- Digital innovations for our customers and our business

2.69 By the start of RP7 we will have reorganised our connections activities in anticipation of a future change in connections charging policy. We will renew our processes to respond to customer feedback about speed and transparency of the connections journey. We will have a better way of providing connection offers to renewable generators – small-scale, larger onshore and offshore generators – as well as the many demand customers who will want enhanced connections. We will work with industry to develop specific solutions for EV charging and housing so that these customers have a better experience.

[2] When planning investments for the network, we aim to ensure that disruption from any works is minimised and the whole-life cost efficiency of the investments made are maximised. In practical terms this might mean things like coordinating with other utilities so that roads are only dug up once; or increasing the capacity of the investment being made or installing additional circuits, so that we do not have to come back again in the short- to medium-term future if or when demand increases. We discuss our 'touch the network once' approach in more detail in Chapter 7.

DSO transition

2.70 We will establish an organisation structure that gives distinctive effect to the role of Distribution System Operator (DSO) in Northern Ireland so that the right activities are carried out in the right area. The structure will allow the independence of thought, process and structure to ensure that the best decisions are made for the future development of the network and that energy market opportunities are created and exploited to reduce end user cost.

f. A transformational opportunity: costs and benefits

2.71 Alongside recognising the need to take an ambitious and innovative approach to developing the electricity network to meet the demands of the Energy Strategy during RP7, we remain acutely aware that we are putting forward this Business Plan in the midst of a cost of living crisis and that high energy costs are a huge source of concern to customers.

2.72 So, our aim is to strike a balanced position during RP7 which facilitates provision of a safe, secure and high-performing network; enables Northern Ireland to achieve its climate change ambitions; supports the growth of the Northern Ireland economy; facilitates access to new services and markets for our customers; encourages customers to make the right energy decisions through access to energy information; and ensures a just transition which recognises the more vulnerable in our society. We will also work hard to apply downward pressures on costs where we can, by focussing continually on operating as efficiently as possible – reflecting that we have a strong track record in this regard.

We will continue to operate efficiently

2.73 NIE Networks has a long history of delivering what is needed by NI customers – a safe, reliable and resilient network. Our company has continually adapted to changing circumstances to ensure that we deliver this network at a level of cost which benchmarks among the very best in the UK and Ireland.

2.74 Since being privatised in 1993 we have implemented a series of initiatives and programmes designed to improve the efficiency of our cost base. These efficiencies are reflected in a reduction of over 33% in network charges since privatisation.

2.75 Looking to the future, and to support the development of our RP7 Business Plan, we commissioned NERA Economic Consulting (NERA) to assess the relative efficiency of our current and forecast levels of expenditure by benchmarking ourselves against our counterpart distribution network operators (DNOs) in GB.

2.76 NERA found that NIE Networks consistently ranks as one of the most efficient companies in our sector in the UK. In some areas the relative efficiency of our business is considerable. For example, NERA's findings suggest our historic operating costs are in the region of one fifth lower than our GB counterparts.

2.77 These findings also provide context for the increase in expenditure expected in RP7. Cost allowances for RP7 will need to be higher because current costs will not be sustainable going forward. The reason for this is two-fold. Firstly, NIE Networks will be undertaking a lot more required activities in future. Secondly, input prices are increasing significantly with global cost pressures.

2.78 During RP7, we estimate we will need to almost double our levels of investment in the electricity network compared to that in RP6 – from £1.4 billion in RP6 to £2.6 billion in RP7. Our investment proposals are summarised in Table 1 below. In this table we compare expenditure between RP6 and RP7, categorised against the strategic themes which are driving the need for investment, as described above.

Table 1 – investment during RP6 and RP7

£ in 2021/22 prices		RP6[i], £m	RP7, £m	Increase, £m	Increase %
Facilitating Net Zero through a flexible and integrated energy system	*Distribution investment*	227	653	426	188
	Transmission investment[ii]	91	493	402	440
Total investment to facilitate Net Zero		**319**	**1,147**	**828**	**260**
Facilitating Net Zero through a flexible and integrated energy system		319	1,147	828	260
Maintaining a safe, reliable and resilient network		679	945	266	39
Preparing our business for the future		17	78	61	355
Meeting the needs of our customers[iii]		12	21	8	69
Other costs[iv]		373	359	-15	-4
Total		**1,400**	**2,550**	**1,149**	**82**

[i] Latest best estimate of actual allowances to the end of RP6 (normalised to a 6-year equivalent, to ensure like-for-like comparability to RP7).

[ii] Investment requirements on the transmission network are determined by SONI. NIE Networks has limited influence over investment requirements on the transmission network, as these are mostly determined by SONI.

[iii] Expenditure for 'Meeting the needs of our customers' relates to specific initiatives to enhance and/or improve customer service. However, and in reality, all of our investments are intended to meet the needs of customers.

[iv] 'Other costs' include: metering / market operations / Enduring Solution costs; pensions; business rates; UR licence fees.

2.79 The scale of our ambition is in our opinion, necessary if Northern Ireland is to have a chance of achieving the challenging targets set out in the Climate Change Act and Energy Strategy. Achieving the renewables target set for 2030 requires a step-change in the level of investment needed in the electricity network – and our proposals for RP7 reflect this[3].

2.80 Significant investment is needed to enable decarbonisation and the transition to net zero. We also need to spend significant sums to keep the network in good condition, and to maintain its resilience given that dependency on electricity is already high and will increase further with the electrification of heating and transport. This is driving investment requirements higher. It is important to note that the bulk of our investment is in long-life assets so, while the overall cost is significant, the charges levied on customers to pay for those assets is spread over a long time period, much like a mortgage. So, the impact of costs in annual terms is much smaller.

2.81 To counter the upward pressure these investments might place on network charges, we will continue to operate as efficiently as possible. For example, by way of our 'Flexibility First' approach we will test the market first before committing to major conventional

[3] A significant element of the estimated costs needed to facilitate net zero during RP7 (c£493 million) is driven by decisions made by SONI, and not NIE Networks (although SONI will engage with us before finalising its decisions). Specifically, it is SONI that is responsible for the planning and high-level design of transmission load-related projects needed to ensure the transmission network remains fit for purpose. Following completion by SONI of the planning and high-level design work, NIE Networks is then responsible for the detailed design and specification, procurement, construction and commissioning of the projects identified by SONI.

reinforcement schemes. If investment is required, we will be smart and efficient in how we plan our investment programmes, seeking out all opportunities to add extra capacity required for the future as we replace, refurbish or maintain parts of the network in need of attention We will also seek to finance our business as efficiently as possible; and to spread the cost of these investments in the most fair and appropriate manner between customers today and customers of the future.

2.82 Another factor to be considered is that we expect transformational changes in society such as the electrification of transport and heating, to lead to greater electricity consumption in future compared to today, which will help spread the costs more widely. We are estimating that the volume of electricity transported across the network will on average be around 27% higher by the last year in RP7 compared to the last year in RP6 as electricity displaces fossil fuel usage. The anticipated growth in electricity sales will put downward pressure on network charges. As a result, network charges in the last year of RP7 are projected to be £10 higher than in the last year of RP6 for an average household, excluding inflation. We discuss the impact on tariffs in more detail in Chapter 14.

2.83 The displacement of fossil fuel usage is important as, while customers may pay more for their electricity as they consume more, they will not have to pay for home heating oil if their homes are heated with a heat pump; or for petrol / diesel for their cars if driving an EV. We have been working with economic advisers Ernst & Young (EY) to quantify the impact of these off-setting cost savings. Using its findings of the potential macro-level benefits that could be realised from the electrification of heating and transport, EY also estimates a household that is able to fully embrace electrification and purchases low carbon technologies that are widely available now[4], could expect to make net savings of around £2-3k per year[5].

2.84 In addition, the future wholesale cost of electricity should be less driven by movements in the price of fossil fuels, if and when there is more renewable generation on the system increasing Northern Ireland's self-sufficiency with less reliance on imported fossil fuels to generate electricity. Consultants at KPMG estimate that electrification of heat and transport would displace £1.4 billion of annual expenditure on imported fossil fuels by 2040[6].

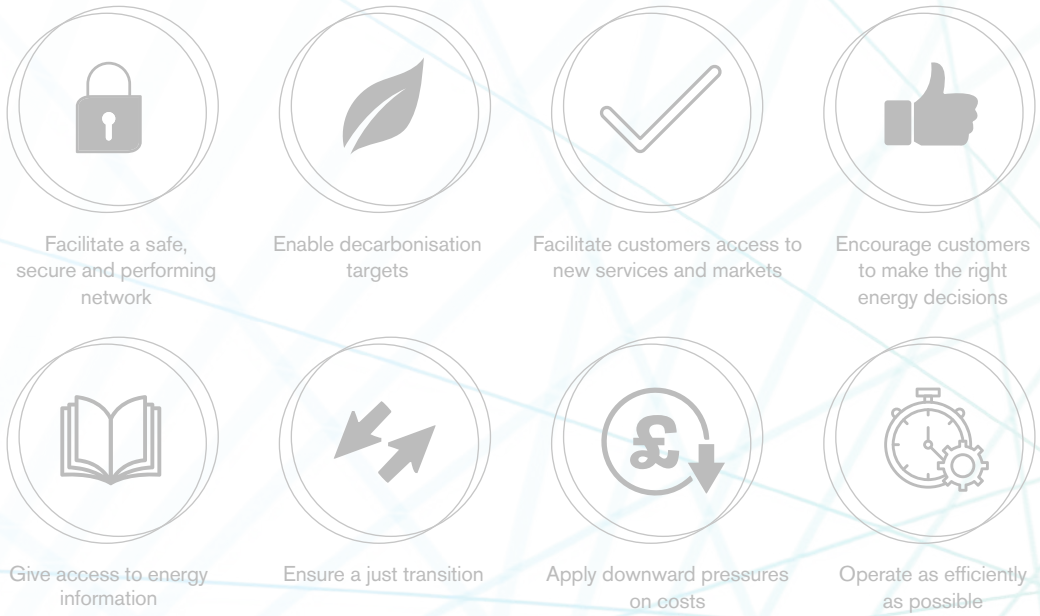
2.85 In addition, KPMG concluded that the capital investment needed to electrify society would have other indirect benefits, leading to an estimated total Gross Value Added of £18.8 billion for Northern Ireland. The employment created from the capital investment programme is significant, forecast to reach up to 5,000 full-time jobs over the investment period.

[4] Meaning a household that installs a heat-pump and solar panels, and purchases an electric vehicle instead of a petrol/diesel powered vehicle.
[5] See EY's report, 'A Cost-Benefit Analysis of NIE's RP7 Investment'.
[6] See KPMG's report, 'Electrification: Economic Opportunity for Northern Ireland'.

g. Conclusion

2.86 We know there will be pivotal shifts ahead for energy in Northern Ireland. In the next decade renewable energy sources will power us even more than today. Batteries charged using renewable energy (from wind and solar) and energy generated from customers' own homes will help drive down carbon emissions and save customers money on their energy bills. Home energy management systems will help us consume less energy; new technologies could change the way we heat our homes. Transport will be largely electrified to make it cleaner and greener, and the development of whole system solutions to deliver benefits to customers will emerge. NIE Networks has a key role facilitating these societal shifts, ensuring that we can deliver a sustainable energy system for all.

Figure 4 – RP7 objectives – a balanced position



2.87 We believe NIE Networks' RP7 Business Plan as detailed herein, is required to achieve the ambitious goals of the Climate Change Act and Energy Strategy for the people of Northern Ireland. We look forward to engaging with the UR, and other interested stakeholders, as we work towards a regulatory settlement for RP7.

2.88 Then the real work begins. And NIE Networks stands ready to embrace the challenge.

PART 1: CONTEXT AND SCENE SETTING

3. WHO WE ARE AND WHAT WE DO

a. Transmission and distribution networks

3.1 NIE Networks is the owner of the electricity transmission and distribution networks in Northern Ireland and the distribution network operator.

3.2 Electricity transmission involves the bulk transfer of electricity across the high voltage network of overhead lines, underground cables and associated equipment mainly operating at 275kV and 110kV.

3.3 Electricity distribution involves the transfer of electricity from the high voltage transmission network and its delivery to consumers across a network of overhead lines and underground cables operating at 33kV, 11kV and lower voltages. These networks enable the delivery of electricity from generators to customers. A pictorial representation of the electricity industry is set out on the page overleaf.

Figure 5 – an overview of the electricity industry

Generation

Large Thermal

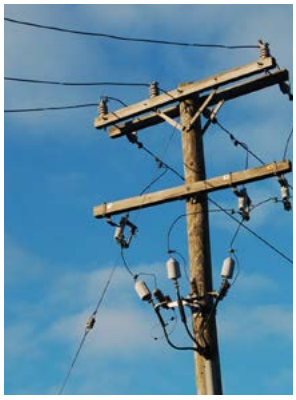
Renewables

Interconnectors

Transmission

Northern Ireland Electricity Networks

Distribution



Northern Ireland Electricity Networks

Owned by NIE Networks
Transmission system operated by SONI

Generators sell energy into the SEM wholesale market

NIE Networks transports energy from generators to end customers

Supply

power ni your kind of energy

budgetenergy Northern Ireland's Electricity Company

sse Airtricity

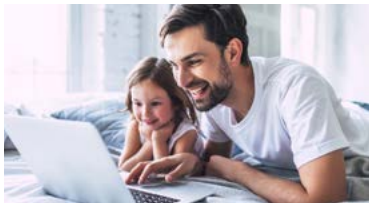
energia Switched on

firmus energy

electric Ireland

Others

Customers



Suppliers buy energy from the wholesale market and sell to customers

3.4 We share responsibilities with SONI in respect of the transmission network. SONI is the System Operator for Northern Ireland and is responsible for the operation, design and planning of the transmission network.

3.5 NIE Networks' vision is 'Delivering a sustainable energy system for all'. In practical terms, for us this means providing an electricity network that is capable of facilitating Northern Ireland's overall plan to address climate change, which aims to achieve net zero carbon and affordable energy by ending society's reliance on fossil fuels and its associated price volatility.

3.6 Our key tasks historically have been –

- to operate the network of overhead lines, underground cables and substations effectively to 'keep the lights on' for our customers;
- to maintain the network so that it is in a condition to remain safe and reliable;
- to fix the network if it gets damaged or if it is faulty;
- to upgrade or extend the existing network to provide additional electricity supplies or capacity to our customers including the development of innovative solutions to manage the increasing level of renewable connections and the uptake of low carbon technologies;
- to provide electricity meters and provide metering data to suppliers and market operators. This is a key role in enabling wholesale and retail market competition; and
- to provide connections to customers seeking to connect demand, generation and low carbon technologies to the network.

3.7 All of these tasks are carried out having the highest regard to (1) levels of safety, whether that is to members of the public, contractors or our own staff, (2) cost impact, and (3) environmental impact.

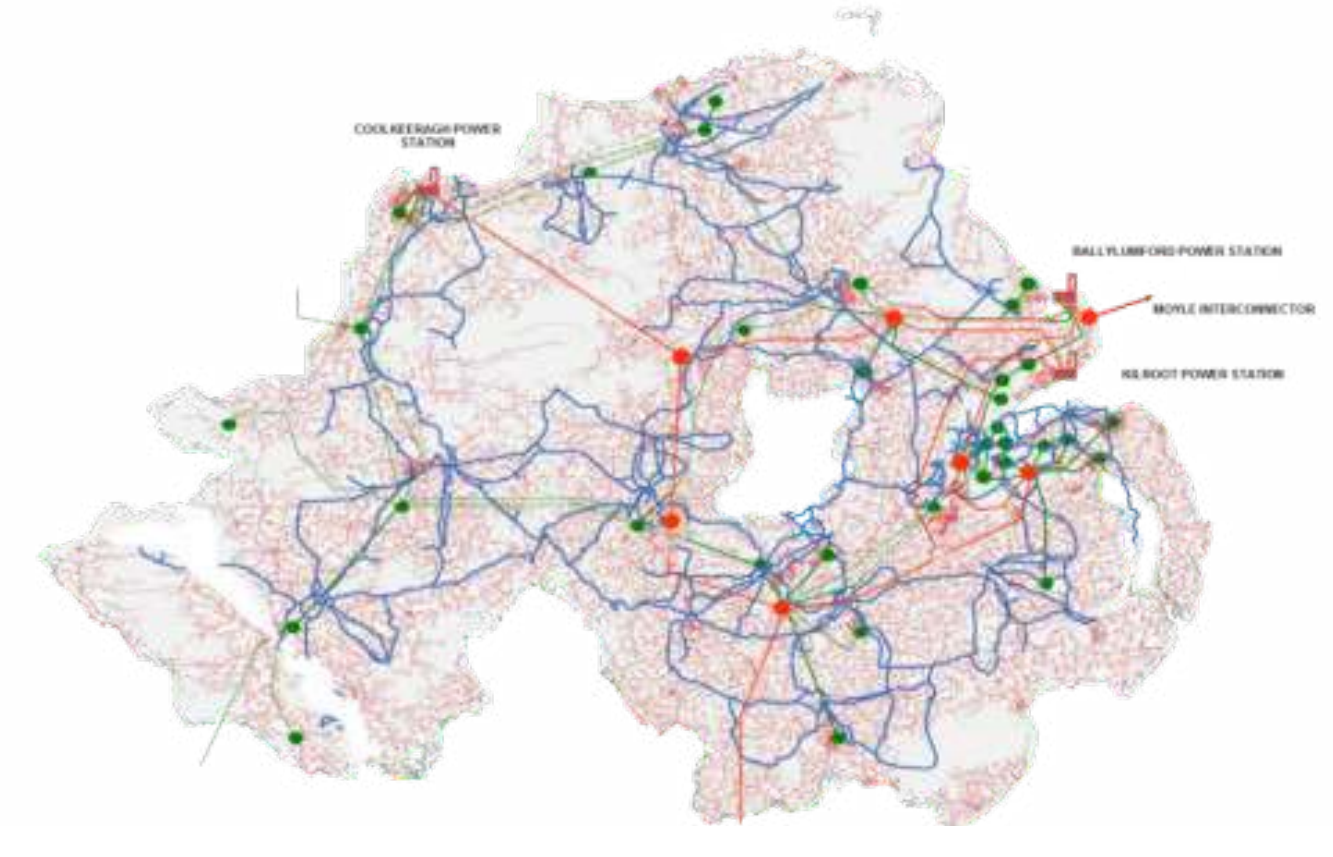
3.8 Furthermore, as we continue in the transition from Distribution Network Operator (DNO) to a Distribution System Operator (DSO), the range of activities we carry out will increase such as –

- purchasing "flexibility" services to relieve network congestion;
- establishing more automated network switching positions, enabling networks to be dynamically controlled and reconfigured to meeting customer demand;
- working collaboratively with energy suppliers, including through timely sharing of data and information about our networks, to ensure effective time-of-use signals and other smart charging incentives are passed through to final customers; and
- continuing to innovate and find faster, and more cost-effective ways to connect customers to increasingly constrained networks.

3.9 The transmission and distribution networks comprise a number of interconnected networks of overhead lines and underground cables which are used for the transfer of electricity to over 910,000 homes, businesses and farms via a number of substations. There are 2,200 km of transmission network, 47,000 km of distribution network and 300 major substations, including 40 serving large wind farm sites. The transmission network is connected to that of the Republic of Ireland (ROI) through a 275kV interconnector and to that in Scotland via the Moyle Interconnector. There are also two standby 110kV connections to ROI.

3.10 The network covers every kind of geography and demography from densely populated residential areas to widely dispersed rural communities.

Figure 6 – network map of Northern Ireland



3.11 At the end of 2022 there were over 910,000 connections to NIE Networks' distribution network, comprising of c837,000 domestic customers with the remainder being commercial and industrial customers. The volume of electricity delivered to these customers through the network was approximately 7,272GWh in 2022.

3.12 In addition to our network activities, we have a market services team which provides meter reading, meter installation and certification services and metering data to support the retail and wholesale electricity markets. The arrangements in respect of metering and market operations in Northern Ireland are different to those in GB. In Northern Ireland, NIE Networks is the common service provider for all metering operational activities including meter reading, whereas in GB there are a variety of independent providers of metering services contracted directly to suppliers. Other activities carried out by our market services team which are not carried out by the GB distribution network operators (DNOs) include the provision of metering data to support the retail and wholesale markets, maintenance of the market website, data communications infrastructure and retail market design and governance.

b. Connecting customers to the network

3.13 NIE Networks' provides safe, secure and reliable electricity connections to the distribution system within Northern Ireland.

3.14 Connecting customers is at the core of our business and will be central to ensuring the aims of the Energy Strategy can be met. Each year we connect approximately 9,000 customers to the electricity network powering homes, businesses, farms and connecting renewable and low carbon technologies. Our services also include providing increased supplies, network alterations and disconnections. We have a critical role to play in connecting the forecast rapid growth of LCTs to the network. It is anticipated that of the 300,000 EVs and 120,000 heat pumps that could connect to the network by 2030, circa 20% of these are expected to need some degree of network intervention or reinforcement which will need to be assessed by our connections team (as opposed to the customer simply 'fitting and informing' NIE Networks).

3.15 Currently the cost of new and increased connections reflecting work required at the connecting voltage and next highest voltage is fully chargeable to the connecting customer in accordance with the NIE Networks Statement of Connection Charges (SoCC). Any costs chargeable directly to connecting customers through the SoCC are therefore excluded from the price control. Accordingly, and in general, our Connections business is self-funded. The exceptions to this are the costs associated with connecting housing sites with 12 or more dwellings and cluster substations for connecting renewable generation (principally wind farms). In these instances, costs to construct – as reduced by contributions received from customers – are added to our Regulated Asset Base (RAB).

3.16 Connections charging is a key area of concern for our customers, particularly the level of costs which are funded by connecting customers. This is an area that falls outside of our RP7 business plan in accordance with the approach outlined in the UR's RP7 Final Approach paper[7]. However, any change to current connections charging in Northern Ireland requires a UR/DfE decision to amend the policy. We welcome the UR's commitment in its Draft Forward Work Plan 2023/24 to commence a review of connections charging.

3.17 NIE Networks has a licence obligation to publish a SoCC on an annual basis setting out the methodology to be applied when assessing the cost of any new connection, along with indicative costs. Accordingly, we revise the SoCC every year with any changes being agreed with the UR.

3.18 We have connected 1.8GW of generation to the Northern Ireland grid to date. We are currently planning and working on a number of generation projects which will bring the total amount of generation connected to the grid in the next few years to around 2.2GW. Around 77% of these projects are for onshore wind, 14% for solar, 8% for biomass and 1% from other renewables. It is anticipated that a total of 3.9GW of renewables will be required to be connected to the network to meet the target of 80% renewables by 2030.

3.19 For the 12-month period January 2022 to December 2022, 51.0% of total electricity consumption in Northern Ireland was generated from renewable sources located in Northern Ireland[8]. This represents an increase of 9.7 percentage points on the previous

[7] https://www.uregni.gov.uk/files/uregni/documents/2022-07/2022-07-06%20RP7%20final%20Approach%20Document%20final.pdf
[8] Issue 26 - Electricity Consumption and Renewable Generation in Northern Ireland January 2022 to December 2022 | Department for the Economy (economy-ni.gov.uk)

12-month period (January 2021 to December 2021) and is the second highest proportion on record with 51.6% achieved in the 12-month period December 2021 to November 2022. In terms of the volume of electricity consumption between January 2022 and December 2022, some 7,494 Gigawatt hours (GWh) of total electricity was consumed in Northern Ireland. Over the same period, some 3,825 GWh was generated from renewable sources located in Northern Ireland. This is the second highest rolling 12-month renewable generation volume on record with 3,868 GWh generated from renewables between December 2021 and November 2022.

3.20 We provide our connecting customers with choice. The market for new electricity connections was fully opened to competition in March 2018. Independent Connection Providers (ICPs), accredited through the National Electricity Registration Scheme, can undertake contestable parts of the connection works and once constructed NIE Networks then adopt the assets.

3.21 For 'contestable' elements of connections, customers can choose whether to accept a quotation from NIE Networks or to engage an accredited ICP to design and construct the connection.

3.22 Following a consultation process to explore the possibility of further establishing contestability in electricity connections, the UR published a paper entitled 'Expanding the Scope of Contestability in Northern Ireland – Next Steps' in July 2021. The aim is to establish contestability for low voltage final connections to the distribution network. NIE Networks is at the final stages of implementing this important change, and we continue to engage with the UR and the relevant stakeholders to establish contestability for low voltage final connections during 2023.

3.23 Since market opening NIE Networks have delivered 97.5% of Demand and Small-Scale Generation (<5MW) connections and 70% of Large-Scale Generation (>5MW) connections.

3.24 Throughout RP6 we have seen an increased number of connections customers engaging with us digitally. Currently around c86% of customers are applying online and making electronic payments.

3.25 In 2021, NIE Networks introduced an online Customer Job Tracker enabling new applicants to utilise the system to send and receive information relating to their connection job and for that information to be retained in one convenient-to-access location. Customers with multiple applications are able to access each job individually and monitor its progress. This provides customers with the ability to track the progress of their job online, to receive notifications as their job progresses through key stages and if the customer has multiple jobs, a dashboard showing all active jobs.

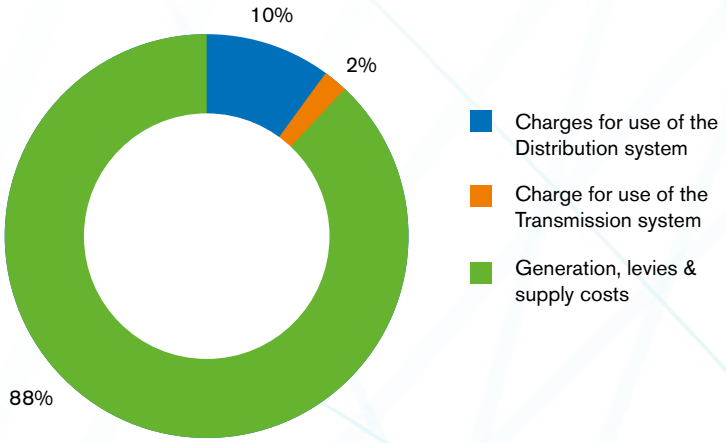
c. Cost of using the network

3.26 The UR reviews our business plan through a process known as a price control review. This determines how much we are allowed to charge in total per year for network investment, operating costs and allowed returns and ensures that the costs we incur provide good value for customers.

3.27 We derive our revenue principally through charges for use of the distribution system levied on electricity suppliers and charges for use of the transmission system levied on

SONI. Our network costs currently represent approximately 12%[9] of Power NI's final bill to domestic customers before the Energy Price Guarantee discount[10] is applied.

Figure 7 – NIE Networks costs as a % of Power NI's Domestic Standard Home Energy tariff



3.28 These percentages will vary each year depending on electricity wholesale prices and other costs which make up the final bill.

d. Corporate social responsibility

3.29 NIE Networks provides a vital service to every home, business, farm, school and hospital in Northern Ireland as part of its day-to-day work in delivering electricity supplies. Through our mainstream business activities and various specific initiatives, we seek to make a positive impact on the communities in which we operate. For example, we support our employees through volunteering opportunities giving of their time and skills to community organisations and projects and the NIE Networks Charity Fund makes quarterly funding donations to local charity initiatives and good causes. In addition, we have been supporting a local charity through our Charity of the Year.

3.30 We aim to provide a safe, reliable and responsive electricity service, which meets the standards customers expect.

3.31 We aim to continually heighten the awareness of the general public to the dangers of electricity and the risks of coming into contact with the electricity network. We are targeting information and awareness campaigns to 300,000 people over the RP7 period, including 50,000 school children.

3.32 We engage proactively with students to consider engineering as a career, through a wide range of educational outreach initiatives. We have strong links with the education system in Northern Ireland, ranging from schools to local further education colleges and local universities. Through these links, we seek to promote opportunities from taking Science, Technology, Engineering and Maths (STEM) subjects. We currently have 16

[9] This assessment is based on Power NI's tariff rates effective from 1st January 2023 for their Standard Home Energy tariff excluding the EPG, compared to NIE Networks' prices for the 2022/23 tariff year.
[10] The EPG discount as set out in the UR's review of Power NI's Maximum Average Price https://www.uregni.gov.uk/files/uregni/documents/2022-12/Utility%20Regulator%20Electricity%20Tariff%20Briefing%20Paper%20.pdf

scholarship students at Queen's University Belfast, one at the University of Bath and one at the Ulster University.

3.33 We believe in our employees, in developing and creating effective teams and high performing leaders to deliver our goals. Our Investors in People (IIP) Gold standard accreditation reflects the quality and commitment of our employees and effective employee engagement processes. We were the first company in Northern Ireland to attain accreditation from the Institute of Engineering and Technology for our training and mentoring programme.

3.34 Our environmental policy commits to protecting the environment and mitigating the impact of our activities upon the environment. For further details of our activities and plans in this important area, see from paragraph 4.23 onwards.

e. Risk management

3.35 Our risk management framework provides for the continuous identification, evaluation and management of our significant risks and includes appropriate structures to support risk management and the formal assignment of risk responsibilities to facilitate managing and reporting on individual risks.

3.36 The NIE Networks Board has overall responsibility for risk management, ensuring that the company's risk exposure remains proportionate to the pursuit of its strategic objectives and longer-term stakeholder value. The Board delegates responsibility for oversight of risk to the Audit & Risk Committee which retains overall responsibility for ensuring that enterprise risks are properly identified, assessed, reported and controlled on behalf of the Board in its consideration of overall risk appetite, risk tolerance and risk strategy. The process of considering the company's exposure to risk and the changes to key risks assists the Board in its review of strategy and the operational challenges faced by the company.

3.37 The company's Risk Management Policy outlines the risk management roles and responsibilities and the main organisational and procedural arrangements that apply to support the effective management of risk. At Executive level, the Risk Management Committee (RMC), chaired by the Finance & Regulation Director and comprising a wide range of senior managers from across the company, oversees and directs risk management in accordance with the approved policy. The RMC considers the status of principal risks and mitigation strategies (as well as emerging risks and High Impact Low Probability risks) biannually and reports on its activities to the Executive Committee, Audit & Risk Committee and the Board throughout the year.

4. OUR TRACK RECORD

4.1 This chapter provides an overview of NIE Networks' track record in relation to –

- health and safety;
- customer service;
- helping vulnerable customers
- asset management processes;
- network reliability;
- restoration of supplies following a fault;
- sustainability and environmental impact;
- innovation;
- our people;
- market operations;
- connection of renewable generation;
- network charges; and
- RP6 performance.

a. Health and safety

4.2 Ensuring the Health and safety of employees, contractors and the general public continues to be the number one value at the core of all NIE Networks' business operations. The aim is to provide a zero-harm working environment where risks to health and safety are assessed and controlled.

4.3 The quality of our safety processes is reflected in the downward trend in the number of lost time incidents (LTIs) experienced by our employees since privatisation, and the low number of LTIs in recent years. A lost time incident is a work-related injury or illness which prevents the injured or ill employee from carrying out their work. While we have made good progress on safety practices, we fully recognise that we have not achieved a zero-harm working environment at all times. Indeed, as we carry on our journey towards zero harm we had a tragic fatality of one of our colleagues while working on the network. This incident – as with all other safety incidents was fully investigated – and led to us establishing the 'Safer Together' programme.

4.4 The company's 'Safer Together – Our Pathway to Zero Harm' programme was developed as an enabling action plan to improve adherence to our safety value, reduce the risk of harm and improve the wellbeing of our staff within the organisation. The Safer Together programme continues to refocus our commitment to our safety value, through promoting an open and proactive safety culture with the full involvement of all. This has been reinforced through strong and visible leadership and the implementation of a series of safety improvements throughout the latter part of RP6. We recognise that this is a continual improvement journey and are committed to ensuring the we are doing the best for our people in ensuring they have a safe work environment.

4.5 Furthermore, developing our culture has been a focus in the latter parts of RP6, with the creation of safety leadership coaching and additional forums where people's views can be expressed, where we can work together to bring solutions, while ensuring everyone is treated fairly, with respect and that people feel safe to raise safety concerns that we can all learn from.

b. Customer service

4.6 The UR sets overall and guaranteed standards of performance for NIE Networks. We have had an excellent record of meeting these standards, as demonstrated in the table below. However, during 2022 we experienced an increase in the number of Guaranteed Standards defaults as a result of workload challenges, particularly for new connections where there was a significant increase in the number of applications for low carbon technologies (LCTs) and electric chargers and we did not provide quotations within the required timeframe. We continue to manage and review the overall workload given the high volume of applications and the associated technical complexity. Providing quotations for these connections requires considerably more work in how we assess the network and the work required to complete the connection and we have updated our processes and resourcing in this area to address the challenges.

Table 2 – performance against standards

	2016	2017	2018	2019	2020	2021	2022
Defaults against overall standards	0	0	0	0	0	1	1
Defaults against guaranteed standards	0	1	0	0	0	0	52

4.7 As a result of the Covid pandemic we have defaulted on our Overall Standard to achieve 99.5% of meters read at least once a year. Getting access into customers' properties during this time was very difficult and NIE Networks was sensitive to how we could go about this in a non-intrusive manner. We consider that this standard should be reconsidered going forward and whether it is still appropriate given the change in customer behaviours.

We endeavour to meet the standards our customers expect.

4.8 We expect these challenges to continue into RP7 and as such have set a target of 99% compliance with the guaranteed and overall standards during this period.

c. Helping vulnerable customers

4.9 At NIE Networks we want to continually improve our customer service. We work closely with the UR to deliver the goals of its Consumer Protection Programme. NIE Networks is committed to providing a high level of service to all its customers and is particularly committed to providing support to those vulnerable customers who depend on electricity for life saving equipment or are identified as needing extra support due to their personal characteristics or circumstances. Since the start of RP6, the number of customers on our Medical Customer Care Register has increased by 140% to over 16,000, and it continues to increase incrementally each month. As a JAM Card Friendly organisation, we continue to roll out training to our staff including more tailored training within our Contact Centre to help us communicate better with vulnerable customers.

4.10 Each year we invest around £500k on support services specifically for more vulnerable customers. We have over 20 tailored ways that we offer help and support to vulnerable customers, as set out in our Vulnerable Customer Strategy[11], which we launched in June 2021 and runs until 2024. Some of the ways we offer help include providing extra support for customers with healthcare needs during an interruption to supply and communicating

[11] https://www.nienetworks.co.uk/documents/customer-leaflets/vulnerable-customer-strategy.aspx

with deaf customers through the use of SignLive in our Contact Centre. We have facilities on our website to increase text size, read text aloud or translate information into over 90 different languages. To help provide assurance and safety for customers, we operate the PSNI's Quick Check 101 number when a meter reader or engineer calls at a customer's property as well as a password scheme and appointment system for meter reading visits. The introduction of live chat has helped some vulnerable customers such as those with hearing difficulties

4.11 This strategy aims to take the UR's Consumer Protection Programmes' broad themes and tailor them into an ambitious strategy appropriate for our customers. It details the many services which we offer customers. Many of these services rely on the skills and competence of our employees and the ideas for improvement have come from them and other stakeholders.

4.12 We understand that vulnerability is not always visible, may be temporary, and may be due to external circumstances. We also understand that some customers may need extra time and support, or further explanations of when, why or how we are carrying out our work. The services set out in our Vulnerable Customer Strategy are for household customers who are critically dependent on electrically powered equipment (including life protecting devices, technologies to support independent living and medical equipment), or are identified as needing extra support due to their personal characteristics or circumstances. We have identified these customers based on the UR's definition of vulnerable customers. This is set out in the UR Consumer Protection Programme, which states that a customer is considered to be vulnerable when 'their personal characteristics or circumstances reduce their ability to engage effectively and achieve fair outcomes'.

d. Asset management processes

4.13 Our asset management processes are accredited under International Organization for Standardization (ISO) 55001. ISO 55001 defines the requirements for a best practice asset management system. It covers the fundamentals of asset management through the topics of organisational context, leadership, planning, support, operation, performance evaluation, continuous improvement and is underpinned by the commitment of senior management.

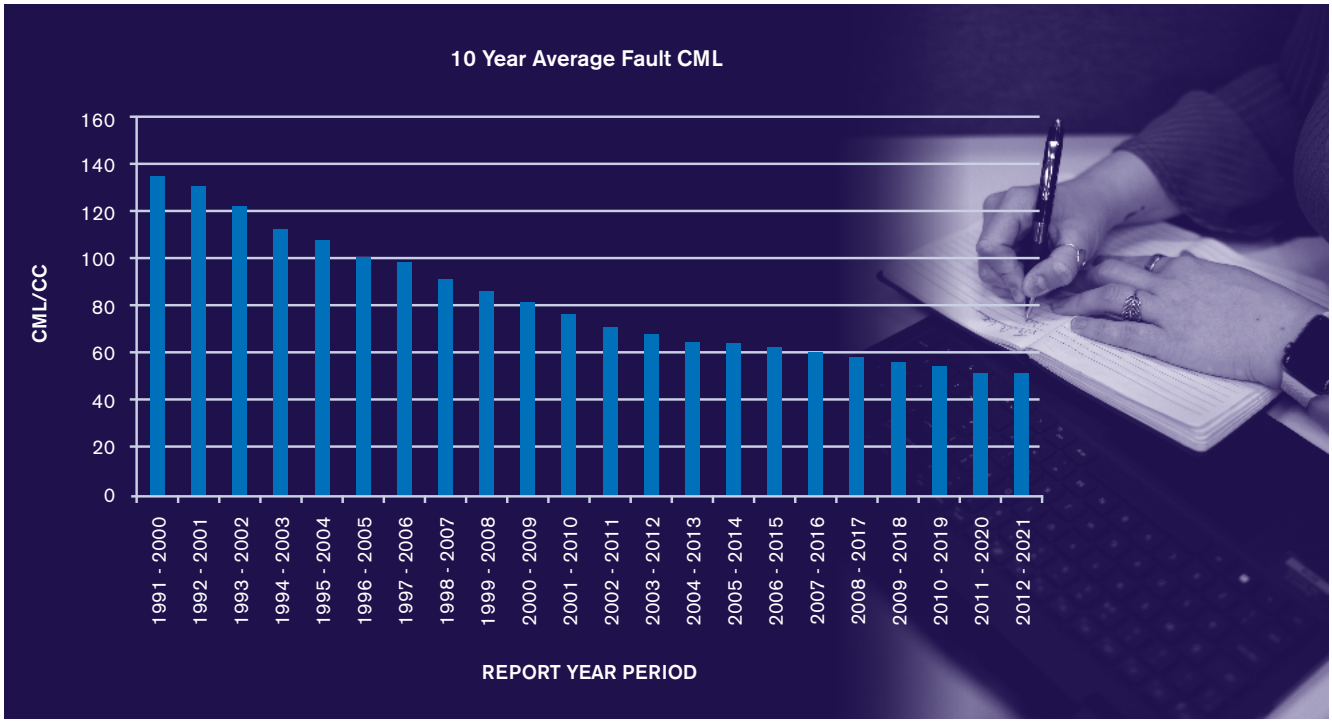
4.14 Through effective asset management processes, we have been able to achieve strong performance in network reliability, as detailed below.

e. Network reliability

4.15 We aim to provide a safe, reliable and responsive electricity service, which meets the standards customers expect.

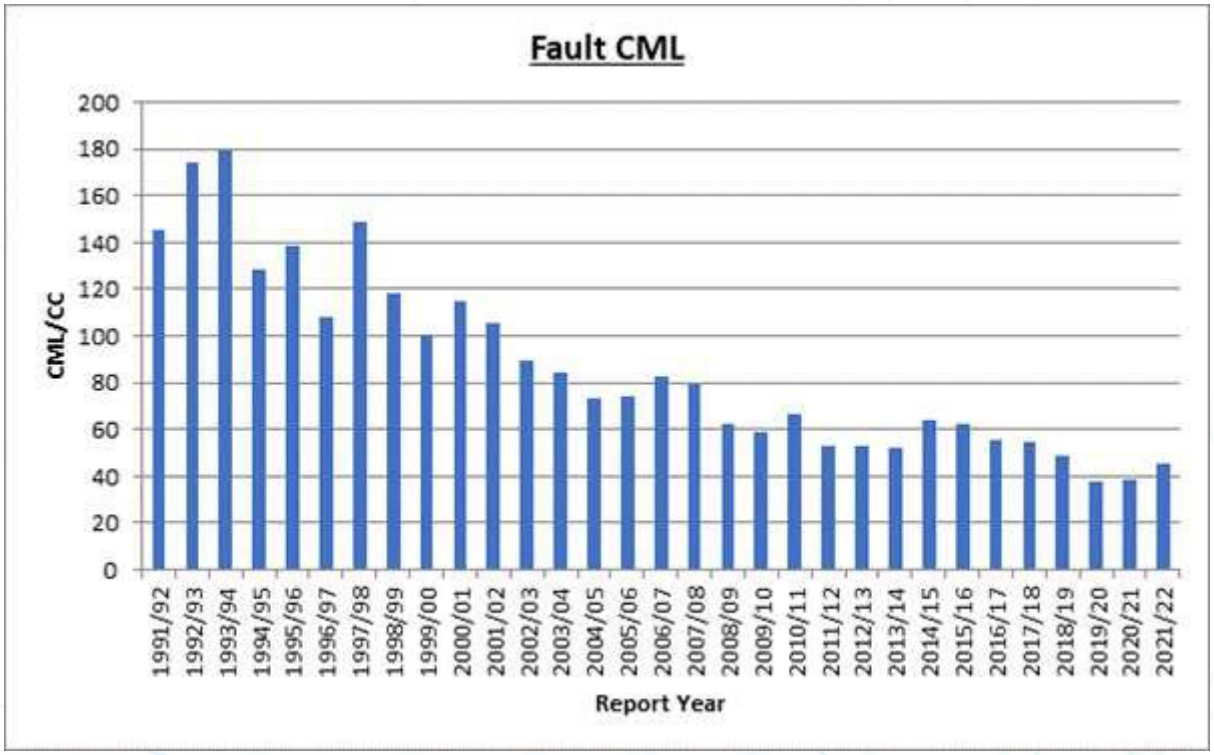
4.16 Our primary measure of network performance is the time customers are off supply due to faults on the network. We measure this in terms of Customer Minutes Lost per Connected Customers (fault CML), which is the average number of unplanned minutes customers are off supply per annum due to network faults. The diagram below shows that, averaged on a 10-year rolling basis, we have delivered a substantial reduction in fault CML.

Figure 8 – 10-year average fault CML



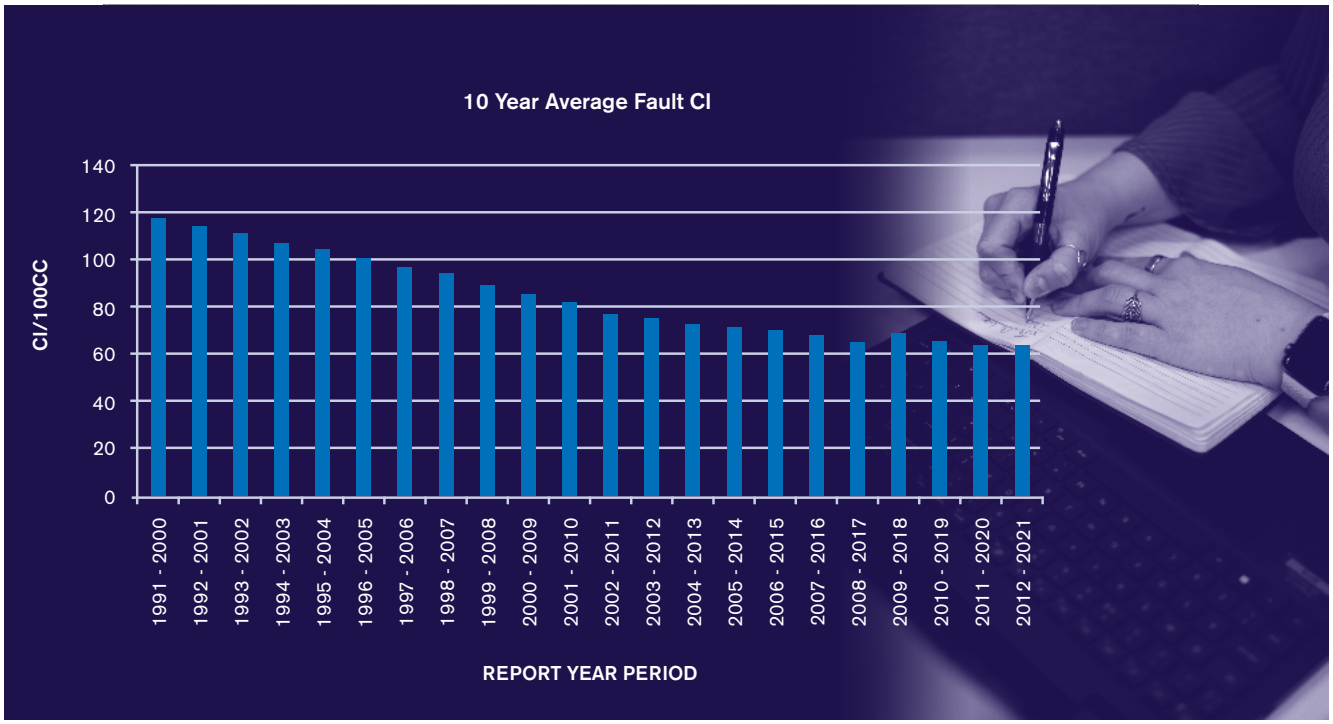
4.17 RP6 saw the introduction of a CML incentive mechanism; business and process changes implemented as a result of that mechanism being introduced have resulted in average fault CMLs decreasing from a broadly flat average of around 60 CMLs in the years prior to RP6 to around 45 CMLs on average during RP6 to date. This is a 25% reduction in fault CMLs experienced by our customers. Year-to-year variation is mainly driven by weather patterns. On average customers are off supply for 45 minutes per year due to faults which equates to 99.999% network availability.

Figure 9 – fault CML



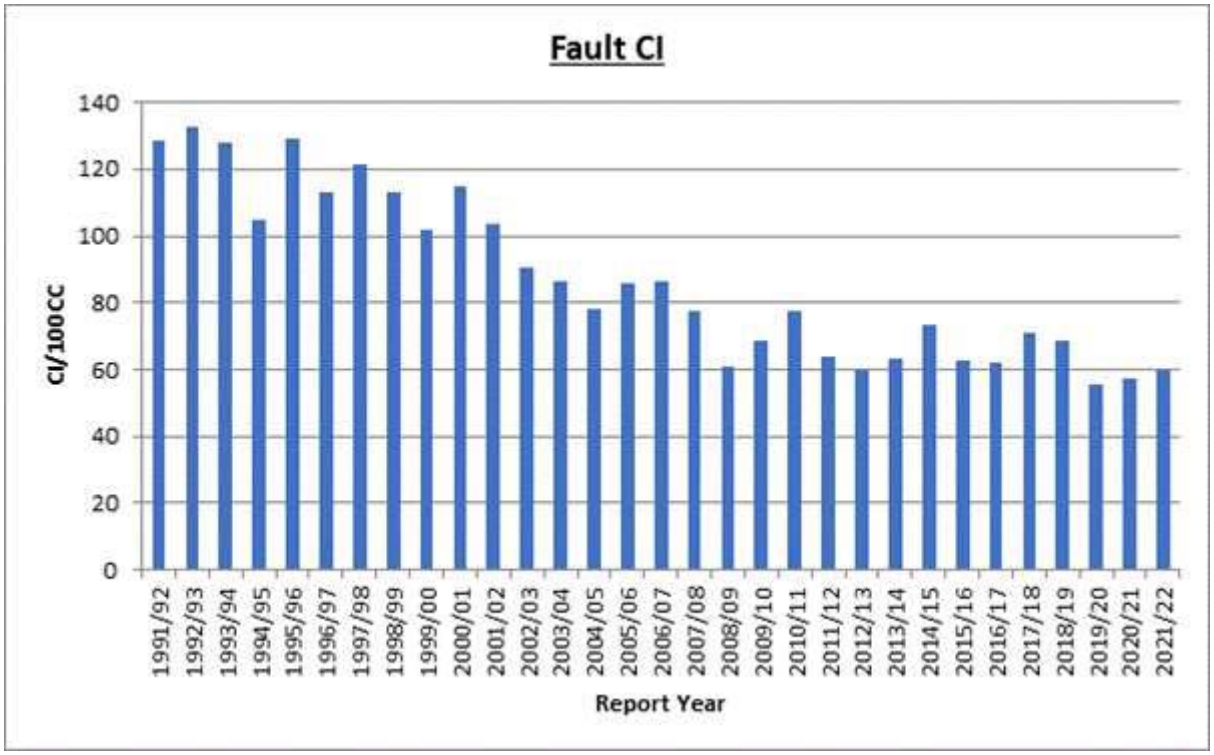
4.18 Another measure of network performance is the number of times customers are off supply. We measure this as fault Customer Interruptions per Connected Customer (fault CIs), by reference to the number of times customers experience supply interruptions of more than one-minute duration per 100 connected customers. The diagram below shows that, averaged on a 10-year rolling basis, we have delivered a reduction in fault CIs albeit not as pronounced as the fault CML reduction.

Figure 10 – 10-year average fault CI



4.19 Similar to fault CML, whilst over the period since 1991 the longer-term average fault CI has decreased, the trend for the last number of years has been broadly flat, with an average of approximately 60 fault CIs. Year to year variation, as shown in the diagram below, is mainly driven by weather patterns.

Figure 11 – fault CI



f. Restoration of supplies following a fault

4.20 The distribution network is predominantly an overhead line network and is therefore vulnerable to adverse weather conditions such as lightning, gales and ice storms. When bad weather occurs, we aim to restore power to affected customers as quickly as possible.

4.21 We have a well-rehearsed emergency plan and have arrangements in place with councils, emergency planners, health trusts, and other organisations to respond to wider community needs in the event of customers being without electricity for an extended period of time. We also provide an information service to customers on our Medical Customer Care Register which assists customers who rely on electricity for their healthcare needs with a specific team dedicated to communicating with these customers during power outages.

4.22 Excluding severe weather events, we have been working towards restoring 100% of customers who lose power supply within 18 hours, a target we set for ourselves to achieve by the end of RP6; and which we have achieved. Furthermore, we aim to restore 90% of customers within 3 hours, another target we have strived for and achieved during RP6.

g. Sustainability and environmental impact

4.23 NIE Networks' Sustainability Policy commits to ensuring our business has a minimal or positive impact on the local and global environment, community, society and economy. Our commitment to the European Distribution System Operators Sustainable Grid Charter underscores our intentions in this regard and also our commitment to addressing climate change and the wider societal impacts of our business operations.

4.24 Our Sustainability Action Plan, launched in November 2020 and endorsed by the NIE Networks Board, will be essential in securing a low carbon future. This plan provides the key sustainability objectives we aim to achieve and covers the below main high-level areas –

1. Carbon and Energy Reduction (Climate Change Mitigation)
2. Supply Chain & Contract Management
3. Health and Wellbeing
4. Diversity and Inclusion

4.25 Some examples of practices implemented through the plan include –

- decarbonising business activities;
- taking lifecycle of materials into account;
- preventing harm to eco-systems;
- investing in sustainable infrastructure; and
- procuring environmental and social value from suppliers.

4.26 At the heart of the delivery of this action plan is creating personal accountability of employees through a behavioural change programme with monthly two-way company-wide communications on the topic.

4.27 We have an Environmental Management System (EMS) certified to ISO14001, which covers all of our business activities and locations. Our EMS ensures that we (1)

continually improve our environmental performance beyond just compliance, (2) demonstrate leadership and ensure buy-in / compliance throughout the organisation, and (3) fully demonstrate implementation of our environmental responsibilities to our interested parties and stakeholders. Our EMS tracks the implementation of our environmentally responsible policies and procedures. We do this through regular reviews of risks and opportunities associated with the delivery of our business activities.

4.28 As part of the accreditation process, the British Standards Institution (BSI) completes a six-monthly assessment, to ensure that we continue to meet the internationally recognised standard and that we are also compliant with legislation. BSI has a three-year programme where all relevant activities are reviewed at least once, or more regularly as required. The visits include reviewing central office records and interviewing staff about their specialist topic and visiting sites to see how strategic goals are delivered and processes are managed.

4.29 We strive to set challenging targets year-on-year to continually improve our approach to environmental management whilst aiming to improve the impact we have on the environment through our day-to-day activities.

4.30 As part of our ISO14001 certification we prepare an annual environmental action plan. This plan provides the key environmental objectives we aim to achieve and covers the below main high-level areas –

- minimise the risk of land, air and water contamination;
- improve our impact on the local community;
- minimise our impact on Protected Sites and species;
- enhance waste management; and
- ensure appropriate environmental management and compliance.

4.31 Each area has several objectives contained within it that are carefully selected after scoring our environmental impacts that may arise throughout the business. Some examples of practices implemented through the plan include –

- taking part in material resource exchange with local bodies, diverting resources such as wooden pallets and cable drums from waste streams;
- testing our site interceptors to determine their level of contamination allowing us to decide if they require emptying and/or cleaning rather than this happening automatically;
- maintaining bunded containers for oil barrels storage and returned defective transformers, safely capturing any leakage that may occur;
- installing at all pole storage site locations protective absorbent matting to prevent creosote leaching into the ground and keeping abreast of new requirements in the Creosote Active Substance Renewal;
- introducing more energy efficient equipment on to the network to reduce network losses and reviewing equipment sizing;
- completing energy audits across the company, so that we can identify areas where savings can be made; and
- carrying out companywide training on incident preparedness and energy awareness.

4.32 We need to cut trees in close proximity to our overhead line network to maintain and improve network reliability, and maintain network resilience to storms. However, as part of a new initiative beginning in October 2023, for every tree we fell as part of our tree-cutting programme, we will plant two new trees.

4.33 To help us monitor our progress against the sustainability and environmental action plans, key activities are measured and collated centrally and reported at the highest level of the organisation allowing us to track trends and to review performance across locations and also against historical data. This includes monitoring our energy and fuel usage, and waste recycling performance.

4.34 Each year we participate in the Business in the Community (Northern Ireland) Environmental Benchmarking Survey. This survey recognises those organisations that go above and beyond their legal requirements to improve their environmental impacts and better manage their resources. In 2022 NIE Networks received the Platinum award for the sixth consecutive year.

h. Innovation

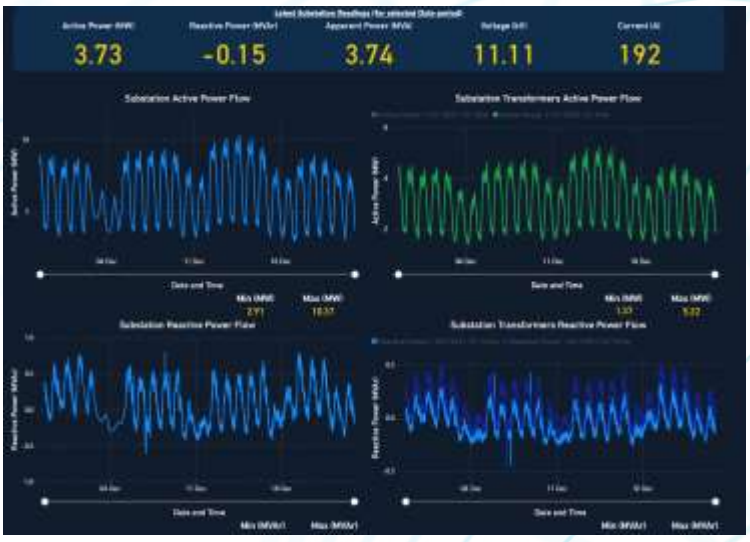
4.35 Technical innovation enhances working methods, speeds up processes and improves network performance for our customers. We have a history of developing and implementing a number of technical and operational innovations. Below are a few examples of the innovation projects we have undertaken during RP6.

Open data portal

Development stage: trial

4.36 Utilities hold significant volumes of data which can be of value to others outside of the organisation like innovators and entrepreneurs, investors, and academia. We have developed a proof of concept Open Data Portal[12], an online portal and a governance process, which allows us to publicly share both continuous network data like voltages and power flows and discrete asset data like model and age through our DSO and substation dashboards and useful geospatial mapping. This data is free to access and can be downloaded or streamed using an application program interfaces (API).

The picture below shows a screen shot of the portal.



[12] www.nienetworks.co.uk/open-data-portal

FLEX

Development stage: transitioning to business as usual

4.37 FLEX is a project demonstrating the use of customer flexibility to manage distribution network demand, contracting with customers to increase or decrease their consumption at a time and in a direction that supports the network allowing reinforcement to be delayed or avoided. The FLEX project developed an initial technical and commercial framework to procure flexibility, successfully demonstrating the procurement and operation of three different flexibility products across 11 separate trial zones. The project has been a catalyst for the development of a new TSO/DSO operational model for sharing information and co-optimising the use of distribution connected resources.

Online connections tracker

Development stage: business as usual

4.38 We have transformed our customer service approach with a new online job tracker. The online portal enables customers to track their jobs through each stage and engage directly with the relevant team or person dealing with their job. The online portal also enables customers to view and submit documents through a document exchange facility e.g. quotation documents, maps, drawings or acceptance of terms, view outstanding balances and variations. Through this portal, customers can receive automated notifications (SMS and emails) at relevant job stages and view the date their job has been scheduled for and the tasks they need to carry out in preparation for their connection, access FAQs and submit queries online.

Partial discharge monitoring

Development stage: business as usual

4.39 This is an initiative trialling a state-of-the-art acoustic camera to detect partial discharge on network assets. Partial discharge is a localised breakdown of the insulating medium and can lead to total breakdown of insulation and asset failure. Using an acoustic camera, characteristic acoustic patterns can be used to find hard to locate sources of partial discharge so that it can be monitored and preventative maintenance scheduled when necessary to avoid asset failure.

Customer video chat

Development stage: trial

4.40 This project will introduce a communications solution which enables our Dispatch Analysts to see what customers see when they call us. When a customer contacts us to report broken or faulty network equipment, our analysts will be able to send the customer a link which enables them to view the feed from the customer's mobile device camera. In doing so, our analysts can immediately assess the situation, confirming that it is our equipment that has been damaged, and ensure we send the correct resources to rectify the situation or sometimes help customers restore supply within their own premises.

Smart meter pilot

Development stage: trial

4.41 We have undertaken a pilot deploying 1,000 smart meters in domestic customer premises to learn more about installing and operating smart meters, supporting any future roll out in Northern Ireland. The pilot is focused on the lesser understood network benefits offered by smart meters in addition to customer benefits. We are looking at how consumption data from smart meters can be used to better understand customer behaviour, network power flows and detect outages driving more efficient network investment and operational decisions.

D-STATCOM

Development stage: trial

4.42 This project is trialling the design and implementation of a static synchronous compensator or STATCOM on distribution networks to support voltage regulation in challenging network situations. STATCOMs (normally associated with transmission and renewables) dynamically absorb and produce reactive power to manage both high and low network voltages. During periods of high generation, a STATCOM can limit voltage rise by absorbing reactive power while supporting voltages during periods of peak demand by producing reactive power replacing traditional voltage regulators. It is particularly useful where alternative options are limited, very expensive or intrusive.

Fleet electrification

Development stage: trial

4.43 During RP6 we have trialled a number of electric vehicles (EVs) to better understand how we can integrate alternative powered vehicles onto our fleet. We have considered EV battery ranges and charging infrastructure requirements to ensure we find a best fit approach that complements our activities. Based on the positive outcome of these trials, we have commenced a programme to transition 48 small diesel vans to electric equivalent, accounting for 14% of our current fleet, by the end of RP6. To facilitate this transition, we will be installing 26 fast charge points at our office locations and over 40 charge points at the homes of our fleet drivers. We will continue to trial new, larger EVs to ensure that our fleet transition continues throughout the period of RP7.

QR codes for assets

Development stage: design

4.44 This initiative is investigating applying QR codes to network assets and substation entrances which enable staff to access applicable safety critical and other information on site. When a specific QR code is scanned by a registered mobile device, any information related to that asset (or site) such as asset operational restrictions (AORs), bulletins, exclusion zones or additional hazards will be presented, ensuring staff have the information they need to keep safe. This is particularly useful for new staff and contractors who may be less familiar with our networks and assets.

i. Our people

4.45 We seek to attract, develop and retain highly skilled people mainly through our apprenticeship, higher level apprenticeship, graduate, apprentice-to-graduate, scholarship and sponsorship programmes.

4.46 It remains a challenge however to ensure we have access to a large enough pool of potential candidates to join our workforce. For many of our professional skilled roles including finance, HR, IT and experienced administrative roles the local external market continues to be challenging. The challenge is also evident for engineering resources. There also continues to be a decline in the number of students choosing science and technology, which in turn limits the number of future engineering trainees. By contrast, on the labour demand side, there is an increasing requirement for engineers to deliver much needed investment in network renewal across the UK and beyond to achieve the Net Zero targets and deliver the green growth strategy in NI.

4.47 This potential supply-demand mismatch means the electricity industry faces a significant skills shortage now and in to the future. We therefore engage proactively with students to consider engineering as a career, through a wide range of educational outreach initiatives. Some recent examples include –

- linking with over 60 schools, most of the local further educational colleges and the two local universities to promote opportunities from taking Science, Technology, Engineering and Maths (STEM) subjects;
    - supporting the First Lego League Challenge and Explore programmes, a global robotics programme for primary and secondary schools;
    - providing mentoring services to school children participating 'Sentinus Team R&D';
- providing Engineering scholarships at Queen's University Belfast (QUB) and Ulster University (UU) sponsoring Electrical and Electronic Engineering, Computer Engineering, Energy & Renewable Energy students through their studies primarily as part of a dedicated NIE Networks Scholarship programme or also through the Institute of Engineering and Technology's Power Academy;
- providing work experience for A-Level students including involvement in research and development work;
- providing other internship opportunities;
- industrial placement opportunities for undergraduates;
- sponsorship of the QUB Science laboratory and QUB Young Female in STEM Network;
- participation in the 4Cur Future initiative and Schools Summit careers event.

4.48 We have the ability to train our staff for all key operational roles mainly through the apprentice and graduate schemes within our training school. The ability to train our own staff is all the more important to us given the much more limited pool of skilled labour from which to draw from in Northern Ireland – in contrast to the GB distribution network operators who all draw from the same pool and from each other.

4.49 With currently nine internal technical training instructors delivering training across a number of disciplines who use on-site classrooms, workshops and formal on-site training to train our staff, we are self-sufficient for the training of new starters, for the training of refresher courses for existing staff and for the 'up-skilling' of existing staff. Many of our operational staff are multi-skilled, resulting in more effective and flexible service delivery to meet customers' needs.

4.50 We are committed to a working environment which enables employees to realise their maximum potential and to be appropriately challenged and fully engaged in the business, with opportunities for skills enhancement and personal development. Human Resources policies are aligned with key business drivers including: performance and productivity improvement; maximising the effectiveness of the working week; clearly defined values and behaviours; a robust performance management process; and a strong commitment to employee development, all of which are underpinned by competitive market-based terms and conditions that are efficient and effective. In addition, we have a strong focus on ensuring we have a diverse and inclusive work place with equal opportunity.

4.51 The focus on development means that each year a high percentage of employees are involved in skills development, pursuit of formal qualifications, role enhancement, role changes, team development initiatives, coaching or mentoring.

j. Market operations

4.52 We carry out approximately 3.5 million visits per annum to customer properties to take meter readings. Under our overall standards of performance, we are required to obtain a meter reading from 99.5% of customers once per year. We have achieved this consistently over the years, however since the start of the pandemic, we have observed a shift in customer behaviours which has resulted in defaults on this standard. We are looking at new ways of engaging with our customers to attain meter reads.

4.53 We are responsible for managing all retail market processes and the provision and maintenance of accurate data to support the operation of the competitive retail and wholesale electricity markets. Our Market Registrations and Change of Supplier processes facilitate customers switching suppliers in a timely manner in accordance with retail market rules.

4.54 We also provide aggregated data to the Single Electricity Market Operator (SEMO) on a daily basis for settlement of the wholesale market in accordance with our responsibilities as a meter data provider under the Trading and Settlement Code. We have consistently achieved 100% compliance with these requirements since the Single Electricity Market (SEM) was introduced in 2007.

Keypad meters: bluetooth top-ups

During RP6 we worked with Power NI to develop “Keypad+”, a metering innovation that uses bluetooth technology to send top-ups to Keypad meter from a smartphone app.

Energy support schemes

4.55 In the second half of 2022, our Market Services team played a critical role in facilitating the introduction and successful rollout of the Energy Support Schemes in Northern Ireland, which saw customers receive £600 and a discount on the unit rate for electricity.

k. Connection of renewable generation

4.56 In 2010 the Strategic Energy Framework (SEF) for Northern Ireland set an ambitious target for 40% of demand to be met by Renewable Energy Sources for Electricity (RES-E). Northern Ireland was successful in achieving this target objective one year in advance of the 2020 target.

4.57 NIE Networks continues to play a critical role in providing connections for renewable energy sources including connection of a windfarm cluster substation at Garvagh in late 2021, which provided capacity for 90MW of renewable generation to be connected to the distribution network. To date, NIE Networks has successfully connected around 21,000 generators providing renewable generation capacity to the network, significantly adding to the available market capacity and resulting in approximately 1.8 GW of renewable capacity now connected to the network with another 0.4 GW in progress.

l. Network charges

4.58 Since being privatised in 1993 we have implemented a series of initiatives and programmes designed to improve the efficiency of our cost base. These efficiencies are reflected in a reduction of over 33% in network charges since privatisation. Some examples of how we have improved efficiency include –

- improving business processes supported by investment in new IT systems;
- improving operational working practices;
- introducing more effective procurement strategies;
- continued use of in-house resources to undertake core activities;
- reducing our headcount when appropriate (our employee numbers have reduced from approximately 3,000 employees at privatisation to approximately 1,370 today);
- design of the right engineering solutions to network problems i.e. no 'gold plating';
- maximising the useful lives of assets through appropriate asset management processes; and
- learning from other distribution network operators (DNOs), utilities and large asset-based organisations.

4.59 Some of the examples noted above cannot endure indefinitely, however. For example, we are now in a phase of workforce expansion as we seek to gear up our organisational capability to deliver the RP7 plan. The 'sweating' of some assets is also reaching a natural end as the assets reach a conditional state where replacement is the only solution.

m.RP6 performance

4.60 The RP6 price control was originally determined to be a six-and-a-half-year period from 1 October 2017 to 31 March 2024. However, the UR has recently decided to extend RP6 by one additional year so RP6 will now end on 31 March 2025.

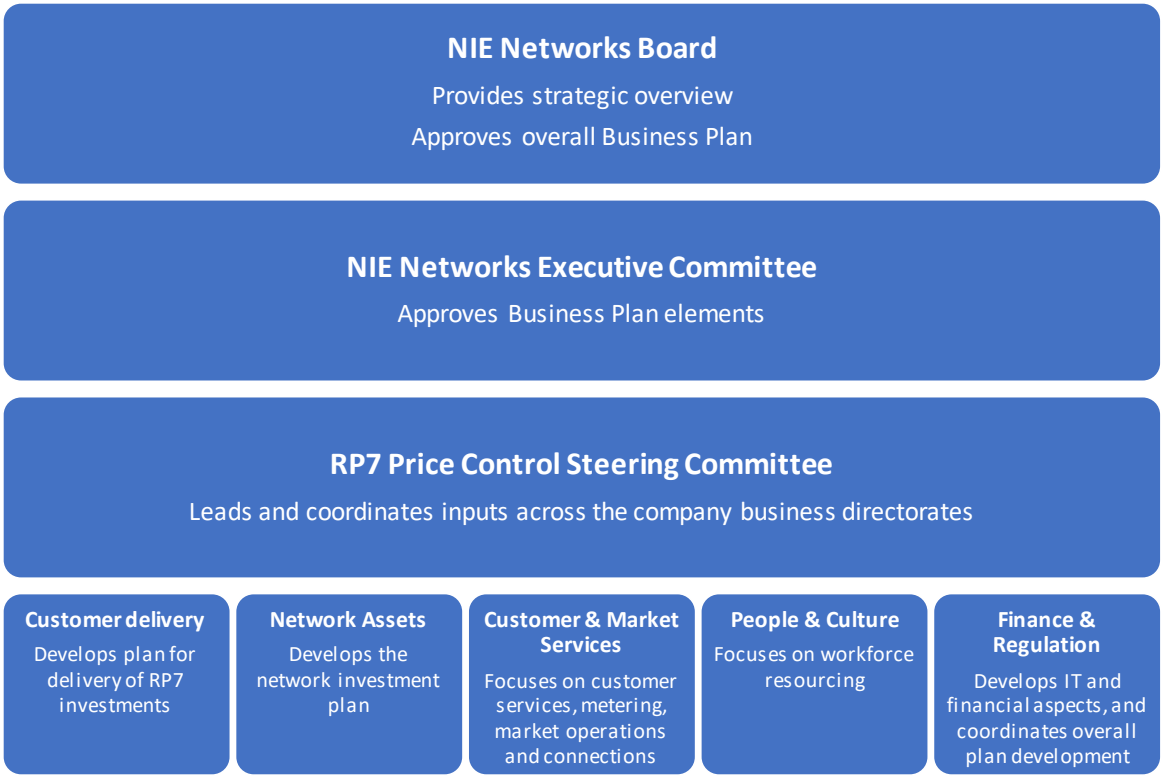
4.61 The price control prescribes specific projects which NIE Networks is required to deliver during RP6. We are on target to deliver these projects by the end of the price control; and furthermore, we expect our total expenditure during RP6 to be broadly in line with the price control allowances. (See accompanying paper 'RP6 Allow v Act - Variance Analysis @ Mar 2022'.)

5. DEVELOPING THE PLAN FOR RP7

a. Developing the plan – project governance

5.1 The RP7 project governance structure was set up to ensure clarity of roles and responsibilities along with a formal and accountable reporting structure. An overview of the project structure is illustrated below.

Figure 12 – RP7 project governance structure



5.2 The role played by each of the above is briefly described below.

- **The NIE Networks Board**. Over the course of the last 12-24 months, the development of the RP7 business plan has featured on the agenda of the Board's regular meetings. In addition, the Board has met outside of its normal schedule of meetings, to discuss the RP7 plan exclusively.

  The Board has taken overall responsibility for the development and assurance of the RP7 business plan[13].

- **The NIE Networks Executive Committee**. The Board delegates day-to-day management responsibility to the NIE Networks Executive Committee. In this capacity, the Executive Committee has had overall operational responsibility to ensure the development of the RP7 business plan.

- **The RP7 Price Control Steering Committee**. A steering committee for the RP7 project was established in 2019, comprising several members of the Executive

[13] See accompanying extract from the minutes of a meeting of the NIE Networks Board on 21 March 2023.

Committee and also a number of relevant senior managers from across the company. The Steering Committee, which has met monthly since its inception, has acted as a cross-business forum to facilitate the development of all aspects of the RP7 business plan.

- **The company directorates**. The RP7 business plan requires input from, and will impact on, all areas of the NIE Networks business; and therefore, all of the company directorates have been involved in its development.

5.3 We have made a number of improvements to our planning processes to support our RP7 expenditure plan including –

- consideration of sustainability, innovation and longer-term asset replacement requirements;
- more cost-benefit analysis to support investment decisions;
- more robust justification in relation to managing network risk to quantify the asset replacement requirements in respect of plant and equipment;
- more scrutiny and challenge to engineering decisions, through independent reviews by informed / expert third parties; and
- the quantification of safety and environmental impacts in addition to the customer impact when calculating consequences of asset failure.

5.4 We have been very conscious of the importance of engaging with our stakeholders, as gaining an understanding of their wants and needs is a pivotal part of the process to ensure we strike the right balance when developing our future plans.

b. Stakeholder engagement journey through RP6

5.5 Stakeholder engagement activity at NIE Networks is overseen by the Consumer Engagement Advisory Panel (CEAP). CEAP was established during the development phase of the RP6 business plan. Comprising representatives from NIE Networks, the UR, DfE and Consumer Council for Northern Ireland (CCNI), it oversees consultation with customer groups on the delivery of the RP6 programme and priorities leading into the next price control period, RP7.

5.6 Throughout RP6, NIE Networks maintained a clear commitment to working closely with our stakeholders to give them opportunities to provide feedback on our services and shape our plans for the future. We used stakeholder views to directly influence our overall business strategy, challenge our performance and develop plans to address stakeholder concerns and priorities.

5.7 As we moved towards the end of RP6, stakeholders have influenced and helped to shape all aspects of our RP7 Business Plan. We used a phased approach to build the plan. We began by informing stakeholders about who we are, what we do, the challenges we face and how we plan to address these. We listened to stakeholders to better understand what matters to them. We also engaged with industry peers and experts, including those in other jurisdictions, to inform our views.

5.8 This approach helped us to identify broad stakeholder priority areas which we then developed into commitments to our customers. We presented these at stakeholder

workshops to hear their views before finally consulting on initial proposals for the Business Plan. A detailed report setting out our approach to stakeholder engagement, the feedback we have received from our different stakeholder groups and, most importantly, the actions we have taken as a result can be found in accompanying paper 'RP7 Stakeholder Response'[14].

5.9 We are grateful to all our stakeholders who were involved in our consultation activities. We commit in RP7 to build on this engagement activity, aligning our approach to best practice engagement and continually striving to deliver positive customer outcomes.

[14] The RP7 Stakeholder Response report is available on our website, accompanying this RP7 Business Plan.

6. OUR COMMITMENTS FOR RP7

6.1 This chapter describes the key services, outputs and/or outcomes ("the commitments") that we plan to deliver on during RP7 through our investment programmes, network management decisions and customer service initiatives. We have developed these commitments having considered carefully (1) what it will take to deliver against the key strategic investment themes for RP7, and (2) the feedback received from stakeholders as described in Chapter 5.

6.2 These commitments are intended to –

- meet the increasing needs of our customers and enhance the services we provide;
- develop and shape the electricity network to facilitate a Net Zero future while maintaining focus on our core responsibility of maintaining a safe and resilient network; and
- develop our systems, processes and organisational capability to deliver key future requirements e.g. DSO transition, digitalisation, whole system collaboration.

6.3 Accordingly, we have grouped our RP7 commitments under the following broad themes –

- facilitating net zero through a flexible and integrated energy system;
- maintaining a safe, reliable and resilient network;
- meeting the needs of our customers; and
- preparing our business for the future.

a. Facilitating net zero through a flexible and integrated energy system

6.4 Our commitments in this area are focused on the following.

- **Promoting innovation in everything we do**. We will continue to develop an innovative culture and support innovation across our business.
- **Progressing the DSO transition**. We will ensure the business is organised, equipped and resourced to effectively deliver our DSO functions.
- **Taking a whole system approach**. We will collaborate with other organisations and sectors to deliver better energy solutions – not just in electricity.

Innovation in everything we do

Continue to develop an innovative culture and support innovation across our business, maturing in how we deliver new initiatives

We will implement new technologies, techniques and learning from RP6 innovation projects as 'business as usual' activities during RP7, enabling the network to facilitate LCTs and renewables while safely managing assets at least cost for customers

We plan to undertake a broad range of focused innovation projects in RP7 and seek greater flexibility in funding to respond quickly to emerging challenges and opportunities

- Explore innovation projects with a wider range of technology readiness levels, becoming a 'faster follower' and a leader where it is appropriate
- Through a Network Innovation Fund (NIF), ensure we have the necessary agility to respond to emerging customer and network needs or challenges as well as new technologies and processes. We will issue 'call for ideas' to understand what our stakeholders and industry think should be brought forward under the NIF
- Leverage opportunities as we deliver our innovation programme to support vulnerable customers
- Take a greater whole system approach towards innovation. This means working more closely with SONI, key stakeholders on cross-vector projects, and wider industry, academia, DfE and UR on collaborative initiatives

Progressing the DSO transition

RP7 is a critical stepping stone on our DSO pathway towards 2050. Our vision is to deliver a smarter, more flexible and resilient energy system for all our customers so that they can decarbonise their lives at least cost. In RP7 we will ensure the business is organised, equipped and resourced to effectively deliver our DSO functions

Our DSO strategy will deliver objectives in five areas, focusing on how we collect and use data, and how we support and utilise flexibility

Data

- Network Visibility – we will install additional monitoring across all voltage levels, significantly expanding our network and market data capture
- Systems and Data – we will develop our IT and telecommunications infrastructure, transforming our analytical capabilities
- Customer & Commercial – we will ensure customers have access to 'open data' across different time horizons to enable informed customer choices. We will enable an open energy system data and joint planning with stakeholders

Flexibility

- Network Controllability – we will enhance the control capabilities on our network, enabling a step change in ability to operate and optimise a system with increasing customer and network flexibility
- Market Operability – as DSO, we will work to ensure we meet customers' needs by providing access to a range of emerging markets including DSO markets

Underpinned by: **Digitalisation**, **Innovation**, and **People & Skills**

Taking a Whole System Approach

We will introduce a step-change in whole system engagement and collaboration across the following sectors –

- **Wider electricity networks**. This is our closest whole system partnership and relates to our close engagement and collaboration with the System Operator Northern Ireland (SONI) as we collectively plan, build and operate the electricity networks in Northern Ireland. We have tried and tested processes and collaboration with SONI, but there's more we can do, building on existing relations, as we jointly develop the network towards a net zero future. This also relates to our collaboration with other Distribution Network Operators (DNOs) and Transmission System Operators (TSOs) via the ENA and with ESB Networks in ROI

- **Wider electricity community**. This encompasses generators, both onshore and offshore, battery storage, interconnectors, electricity suppliers, microgrids, aggregators who directly interact with the electricity network and markets

- **Wider energy community**. This includes the decarbonisation of the heat and transport sectors and the emerging role of hydrogen. Importantly this includes other utilities such as the gas and water industries, where information, access to assets and collaboration between sectors has the potential to deliver significant whole system benefits

- **Wider society and community**. This relates to local councils, authorities and community energy schemes as they seek to decarbonise their respective areas. It relates to academia as we seek out new and better ways of doing things. Finally, it relates to policy makers such as government departments and political representatives as they set direction, strategy and reform out to 2030 and beyond

We will introduce a step-change in the following whole system activities in RP7 –

- **Engagement / collaboration**. This is the foundation of all whole system activity. Enhanced engagement and collaboration are necessary to understand each other's needs and seek out where whole system opportunities exist. We will also use our expertise to support stakeholders to develop and realise their own net zero aspirations

- **Data provision**. This is essential to unlock whole system benefits for our customers and stakeholders. Increasing the data that we make available to stakeholders enables more informed and timely decision making regarding their energy needs and encourages increased participation in flexibility markets. It also enables entrepreneurs to come up with business propositions and create value from the data

- **Coordinated planning and/or operation**. This involves coordinating with local councils and energy sectors to avoid siloed solutions and enable whole energy system solutions to minimise cost, timelines and disruption. This will include developing our role within Local Area Energy Planning (LAEP) activities to ensure optimum solutions are deployed for customers

- **Opportunities to share infrastructure**. This involves work with other entities to avoid duplication of costs for customers and exploit synergies in objectives

b. Maintaining a safe, reliable and resilient network

6.5 Our commitments in this area are focused on the following.

- **Safety**. We will identify and minimise risks from the electricity network to our employees, contractors, customers and the general public.

- **Network performance and resilience**. We will maintain or improve current levels of network performance and resilience.

Safety
We aim to provide a 'Zero Harm' working environment where risks are assessed and controlled • We will enable development of our safety culture consistent with our 'Safer Together' programme and employee wellbeing • We will work collaboratively with Trade Unions to ensure an inclusive approach to workplace safety while having regard for business and regulatory requirements • We will maintain ISO 45001 accreditation for our Health & Safety Management System • We will reduce the number of safety incidents • We will comply with all Health & Safety legislation **We will continue to prioritise work programmes to address ESQCR statutory clearances to overhead lines** **We will reduce the risk of harm to members of the public including school children by conducting an effective Public Safety Campaign** • We will set an annual target to reach 50,000 people (including 10,000 school children) • We will deliver a targeted campaign focussed on emerging risk each year • We will continue to develop the use of social media platforms and utilise local media as an effective way to communicate our safety messages to the public

Network Performance and Resilience
We will aim to maintain the health of the network through our maintenance and investment strategies **We will deliver value for money by minimising whole lifecycle costs and optimising synergies between investments** **We will continue to focus on replacing our poorest performing assets whilst complying with new legislative requirements** **We will continue to focus on improving the resilience of the network to climate change by –** • Installing appropriate flood mitigation to 5 major substations sites deemed to be most at risk • Enhancing our current vegetation management programme to reduce the impact of storms on the network • Targeted replacement of 25mm^2 overhead line conductor to facilitate LCT uptake as well as improving network resilience **We will aim to improve security of supply by enhancing network design and availability of strategic spares** • Improve N-2 re-supply for 'bulk supply' substations with the lowest capability through a variety of network investments

Network Performance and Resilience
• Ensure sufficient coverage of strategic spares to combat increasing equipment delivery lead times **We will aim to reduce unplanned supply outage times** • Increase the deployment of active network management schemes on the high voltage network **We will aim to reduce the number of customers defined as 'Worst Served' in terms of supply availability**

c. Meeting the needs of our customers

6.6 The commitments set out below all stem from three key themes at the heart of our customer service approach –

- **Key theme #1:** Protecting vulnerable customers. We will aim to ensure a fair energy transition for all, with no customers left behind.
- **Key theme #2:** Digitalisation – making it easy for customers to do business with us. We will ensure that our customers can engage with us in the most relevant and convenient way for them.
- **Key theme #3:** Enabling our customers to become more active in their energy usage. We will ensure customers have the opportunity to make best use of new connected technologies, to effectively manage their energy consumption.

6.7 Accordingly, our commitments in this area are focused on the following.

- **Supporting vulnerable customers**. We will expand the offerings we make to vulnerable customers so that they can be supported through the energy transition.
- **Enhancing customer service**. We will make it easier for customers to do business with us.
- **Supporting customers with the energy transition**. We will better enable our customers to become more active in their energy usage. We will ensure customers have the opportunity to make best use of new connected technologies, to effectively manage their energy consumption.
- **Enhancing our Connections services**. We will enhance and improve our Connections services in the areas most important to customers, being: cost, speed of connection and communication with customers.
- **Supporting competition in connections**. We will continue to promote fair and open competition in connections.

Supporting Vulnerable Customers

We will implement recommendations as set out in the UR's Best Practice Framework

- Adopt UR's wide ranging definition of vulnerability
- Work collectively with suppliers/other utilities to enhance our Medical Customer Care Register
- Establish a centralised specialist vulnerability team, with representation at Board level
- Achieve full compliance with BSI 18477 for Inclusive Service provision
- Set up effective referral points with external partners
- Develop and deliver company-wide training on vulnerability and how to identify those in need
- Create a dedicated phone line for those registered as vulnerable

We will ensure a socially inclusive and fair transition as we develop our DSO functions and capabilities

We will advocate for transformation change in electricity network tariff / charging arrangements in the context of government energy strategy including –

- Tariff reform
- Reform of charging policy relating to new distribution connections
- Smart metering – anticipated programme

We will develop a more tailored approach to our support during a power cut to minimise impact on the customer

Enhancing Customer Service

We will improve communication channels

- Introduce new multi-channel communications for our Contact Centre
- Provide a digital self-serve platform, ensuring that if customers need to speak to someone they can
- Develop our website to provide more information on how customers can become prosumers
- Expand social media availability including live-chat
- Provide public briefings and advice to support customers and communities regarding the energy transition
- Become a trusted advisor for customers in supporting decarbonisation

We will improve our response to customer contacts

- Enhance speed of response and resolution for customer contacts –
    - Introduce a target for 80% of complaints to be resolved Day +1
    - Introduce a target for 95% of complaints resolved Day +31
    - Increase from 80% to 90% of enquiries responded to within 2 days and maintaining a target of 100% of enquiries to be responded to within 5 days
    - Maintain target for 93% of calls to be answered within 20 seconds
    - Maintain target that 99% of all Contact Centre calls answered
- Provide accessible services via digital solutions to enhance customer experience

We will use customer feedback to development commitments that mean the most to customers

Supporting Customers with the Energy Transition

We will ensure the network is developed to facilitate 300k electric vehicles and 120k heat pumps by 2030

We will advocate for a Connections Charging Review in Northern Ireland

- To more closely align connections charging methodology in Northern Ireland to that of neighbouring jurisdictions
- To ensure there is a level playing field in connections charging in order to encourage investment in the wider economy

We will ensure our processes and policies are smart and flexible to enable targets outlined in the NI Energy Strategy to be met

We will develop innovative Connections solutions to facilitate meeting 2030 targets, including -

- Non-Firm Connections
- Flexible/Timed Connections
- Hybrid Schemes
- Community Energy Schemes

We will upskill our design engineers on these solutions and will provide expert technical advice to customers to allow them to make informed grid connection decisions

We will be a trusted expert in helping customers to transition to a low carbon future

- Ensure our website has simple and easy to understand information to make it easy for customers to connect LCTs, including EV chargers, heat pumps and renewables
- Hold connections surgeries to educate customers on the grid connection process for renewables, energy storage and LCTs
- Provide advice on making applications for small works, community energy schemes, generation and LCT applications
- Sign-post customers to an independent body for impartial advice on non-connections aspects of the energy transition

Enhancing our Connections Services
We will deliver the significantly higher volumes of connections expected in RP7 associated with LCTs and renewables whilst maintaining our performance against Time To Quote and Time To Connect metrics **We will develop digital platforms to offer self-serve options to customers** • To assist customers with high level budget costs before they make their application **We will provide network capacity information at a more granular level** • Our network capacity map will be available on our website to allow customers to make more informed investment decisions based on the available capacity on the network **We will develop automated design functionality to provide online quotations** • To facilitate notification/applications for mass uptake of LCTs as we transition to Net Zero **We will offer enhanced advice and support services for those customers who wish to speak with us before making their application** **We will build on the success of our Online Connections Job Tracker to make it easier for customers to step through the connections process from application to energisation** **We will listen to customer feedback on the job tracker and implement improvements annually**

Supporting Competition in Connections
We will continue to promote fair and open competition in Northern Ireland to provide our customers with choice • We will enhance our service to Independent Connections Providers by providing them with a Key Account contact • We will engage with the UR and Independent Connections Providers to evolve competition in connections in Northern Ireland; and will aim to agree a mechanism with the UR to fund any further expansion in RP7 as appropriate

d. Preparing our business for the future

6.8 Our commitments in this area are focused on the following.

- **Providing IT infrastructure to promote digitalisation**. We will provide a modern, scalable information technology (IT) platform that can help our teams and customers organise, access and analyse data in an easier way.
- **Telecoms, cyber-security and metering**. We will continue to build secure and resilient systems to transport significant quantities of data which will be used for network monitoring and service provision.
- **Our sustainability and environmental aims**. We will deliver on our business commitments in a way that reduces or eliminates our impact on nature and the planet.
- **Workforce resilience**. We will ensure that we have the skills and capability to deliver our commitments efficiently with a workforce that is happy and healthy.

Providing IT Infrastructure to Promote Digitalisation

Network Assets Strategy

- We will provide the scalable IT Infrastructure to enable the storage/processing of increasing volumes of data from across the HV and LV networks
- We will provide customer and stakeholder access required to open data sets in line with our RP7 strategies
- We will provide IT solutions to support enhanced network asset management / risk management functionality to enable effective network planning
- We will integrate IT and operational technologies (OT) to support the increased utilisation of digital monitors on the electricity network

IT Strategy and Technology Roadmap

- We will deliver highly resilient and available IT systems and infrastructure as the foundation for future stakeholder delivery
- We will provide an infrastructure model incorporating a Cloud Strategy to manage data volumes and underpin effective data analytics
- We will provide the technology required to enable a fully digital and mobile workforce

Customer Service and Digital Strategy

- We will digitalise our business processes to enhance customer service and business effectiveness in line with stakeholder expectations
- We will provide an integrated IT infrastructure to actively support digital processes
- We will provide the technology platform to enable self-serve facilities for Connection customers, including automated design functionality

Telecoms, Cyber Security and Metering

Telecoms

- We will continue to maintain and develop a telecommunications infrastructure to enable dynamic control and monitoring of the electricity network to ensure we deliver a secure and high quality of supply to customers
- We plan to extend our telecommunications infrastructure to deliver our DSO functions, including expanding it to our LV network to allow us to monitor load growth and provide cost-effective solutions that facilitate the transition to net zero
- We will deliver best value by ensuring proposed telecommunication solutions are flexible and scalable to match the growth and evolution of future devices

Cyber Security

- We will continue to integrate cyber resilience across the IT and telecommunications networks and maintain focus on delivering against our NIS objectives
- We will enhance our disaster recovery capability to ensure continuity of business operations

Metering

- We will advocate for the introduction of smart metering to best meet the needs of electricity customers in Northern Ireland; and will work with DfE, UR, electricity suppliers and other relevant stakeholders to achieve this outcome during RP7

Sustainability and Environmental Aims

Our strategy aligns with the UN Sustainable Development Goals[15] and our commitments as signatories to the E.DSO Sustainable Grid Charter, specifically –

- SDG 7 "Affordable and Clean Energy", SDG 9 "Industry, Innovation & Infrastructure", SDG 12 "Responsible Consumption & Production", SDG 13 "Climate Action" and SDG 17 "Partnerships for the Goals"

Reducing our Business Carbon Footprint (BCF)

- We will set a science-based target; in the interim targeting a 50% reduction in BCF
- We will aim to have 70% of our transport fleet electrified
- We will take the lifecycle of materials into account and employ circular economy principles where appropriate

Improving Awareness and Visibility of Sustainability Performance

- We will educate our staff and align our plans to the latest science on climate change
- We will monitor our internal processes to track performance against our plans and publicly report at least annually

Promoting Environmental and Social Transparency in the Supply Chain

- We will aim for 80% of our major 250 suppliers to have carbon reduction targets
- We will upskill our Tender Assessment Panel members and Procurement Professionals in assessing environmental and social value in tenders

Reducing the Impact of the Network on the Environment

- We will invest in sustainable infrastructure
- We will prioritise SF_6 alternatives and commit to reduce our reliance on SF_6 as an insulant gas - targeting <1% losses of SF_6 and recycle 90% of recovered SF_6 for reuse on the network
- We will aim to ensure that all newly installed circuit breakers are non-SF_6 alternatives by 2025 for distribution and 2026 for transmission (subject to market availability)
- We will reduce oil leakages from fluid filled cables by 10% over RP7 (excluding third party damages)
- We will replace 5km of fluid-filled cables with non-oil alternatives & tag all remaining fluid-filled cables outside of substations for highly sensitive leak detection
- We will trial alternatives to creosote-treated poles to reduce our environmental impact whilst ensuring readiness for future legislative changes
- We will invest in biodiversity improvement schemes at 91 substation sites and non-operational lands optimising our corporate partnerships
- We will reduce and limit pollution, while also improving our waste management to achieve recycling of greater than 96% of waste

[15] The Sustainable Development Goals are described by the United Nations as the 'blueprint to achieve a better and more sustainable future for all'. The goals seek to address global challenges including poverty, inequality, climate change, environmental degradation, peace and justice. More details can be found here – https://www.un.org/sustainabledevelopment/sustainable-development-goals/

Workforce Resilience

Our employees will have the necessary skills, expertise & knowledge required for the future and we will achieve this by:

- Continuing with and further developing our investment in our apprenticeship, trainee and graduate programmes alongside growing our own talent
- Seeking opportunities to collaborate on skills initiatives within our own sector, across sectors and with our contractors
- Maximising opportunities for reskilling / upskilling
- Investing in organisational development and skills programmes
- Promote retention of our highly skilled employees in an increasingly competitive labour market by offering appropriate reward and recognition packages in line with the employment market

We will continue to promote proactive occupational health and wellbeing initiatives to help our people maintain good physical and mental health

- We will continue to host wellbeing events attended by healthcare professionals and agencies and encourage staff participation
- We will support employees with health issues or problems due to or caused by stress whether work related or otherwise
- We will develop our support and processes to manage the health and wellbeing of our staff consistent with ISO 45003

Our engagement processes with our people will continue to be a key priority for us

We will aim to achieve significant improvements in levels of diversity within the organisation, evidenced by achieving Silver or Gold Diversity Mark accreditation

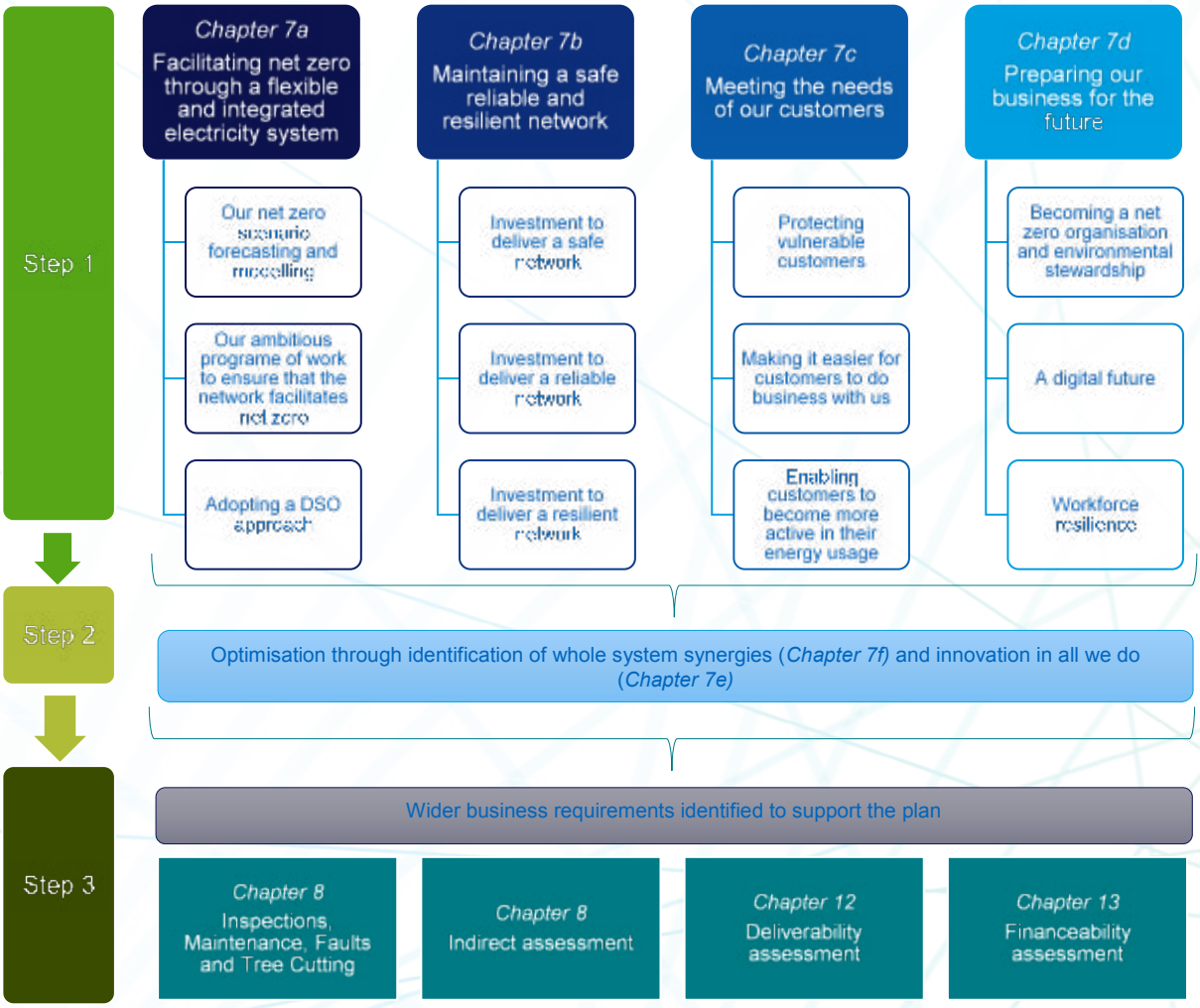
- To achieve this, we will invest in outreach programmes and other initiatives to achieve greater diversity

PART 2: BUSINESS PLAN IN DETAIL INCLUDING EXPENDITURE

7. OUR BUSINESS PLAN IN DETAIL

7.1 In this chapter we describe the methodological approaches we have employed to develop the RP7 business plan, outlined in the diagram below.

Figure 13 – developing the RP7 plan



7.2 The chapter is structured as follows.

a. **Facilitating net zero through a flexible and integrated energy system**. Here we describe how we have assessed the investments needed to facilitate net zero and how developing DSO capability and taking a whole system approach is necessary.

b. **Delivering a safe, reliable and resilient network**. Here we describe how we have assessed the investments needed to ensure a safe, reliable and resilient network.

c. **Meeting the needs of our customers**. Here we describe how we have developed our plans for RP7 to align with what customers actually want.

d. **Preparing our business for the future**. Here we describe how we have assessed the investments needed to prepare for a more digital future, and to ensure our business is environmentally sustainable.

e. **Innovation in everything we do**. Here we describe the savings that we have included within our RP7 plan through the innovation that we carried out in RP6 and set out our future plans for innovation within the RP7 period.

f. **Whole system optimisation.** Here we outline the whole system optimisation we have included within our RP7 plan.

g. **Assessing cost efficiency**. Here we describe how we have assessed, and continue to ensure, the cost efficiency of our business.

a. Facilitating net zero through a flexible and integrated energy system

Changing energy landscape

7.3 The energy system is undergoing a rapid transformation as we transition towards net zero, and our networks are at the heart of this change. In order for Northern Ireland to meet the targets laid out in the NI Energy Strategy and achieve net zero by 2050, we need to decarbonise the whole energy system. This includes reshaping the power system as a means to decarbonise other crucial vectors in transport, heat and industry. These customer-led changes are significantly beyond what the network and our internal systems are currently designed for.

7.4 Our DSO vision, shaped by our stakeholders, as well as learning from pilots and other jurisdictions, is to deliver a smarter, more flexible and integrated energy system for all our customers so that they can decarbonise their lives at least cost. To achieve this, we must expand our capabilities, evolving our existing roles and taking on new functions of Distribution System Operation (DSO). We will actively manage and optimise the increasingly complex power flows on our networks driven by decarbonisation, reducing the need for conventional network reinforcement so that the transition to net zero is more affordable for all customers.

7.5 The role of customers is changing as they actively manage their consumption and choose to produce electricity at home or at businesses. This is happening against the backdrop of increasing digitalisation where technological innovations like smart appliances and commercial developments like aggregation are allowing customers to reduce or shift their demand for electricity in response to price signals and other incentives. The most cost and carbon effective solutions will need to consider other energy assets and vectors. This whole system approach creates challenges but also brings opportunities to deliver significant benefits for our customers and society at large.

Figure 14 – comparing "traditional" and "future" energy systems

Traditional energy system

A centralised system where the network is designed around unidirectional power, flowing from large (fossil fuel) generators to homes and businesses. Here, generation has to meet peak demand.

The future energy system

A decentralised system where small-scale generators deliver energy to local customers. Customers utilise renewable energy when the wind is blowing and the sun is shining. EVs and community energy storage are charged during these periods and at times when prices are favourable based on real-time supply and demand data. Users flex accordingly and networks facilitate this.

7.6 The networks designed for the traditional energy system have met the needs of our customers for decades. However, for Northern Ireland to meet its commitment to net zero by 2050 and fulfil 2030 policy objectives, we need to continue to develop functionality to deliver a future energy system which enables whole system decarbonisation. Our networks remain pivotal to meeting customer needs and are central in facilitating Northern Ireland's decarbonisation requirements, regardless of the exact pathway we follow.

Developing our investment plan to facilitate net zero

What our plan needs to deliver

7.7 Ensuring that we develop a robust plan has never been as crucial to our customers and to meeting legislative targets. It is vital that we considered all credible future energy pathways as we created a best-view of what the future requirements on the electricity system are likely to be, whilst ensuring that appropriate and agile mechanisms are in place that will allow the network to respond and deal with future uncertainties. This then requires the assessment of the most economically viable intervention solutions to meet the needs of our customers in this regulatory period as well as regulatory periods to come. In light of this, it is clear that traditional methods for developing previous business plans are no longer suitable.

7.8 For RP7, we needed to develop a plan which could tell us when, where, why and how to intervene.

When

The decarbonisation of energy vectors such as heat and transport alongside the continued penetration of renewable generation will drive increased power flows on the network. A view of the scale of the expected uptake, including the rate of this uptake is required for our planning.

Where

As well as having a country wide view of the forecasted uptake of LCTs, to allow the impact on the network to be assessed a methodology is required to locate the forecasted connection of LCTs geographically. This allows us to target where greater capacity is needed on the distribution network.

Why

The electrical impact of increasing demands and generation cause safety and power quality issues through thermal, voltage or fuse reach constraints. The bi-directional powerflows which are to be exacerbated in the coming years mean that solutions need to be designed that cater for multiple investment drivers, leveraging areas of overlap where possible.

How

Whenever we know the when, where and why we are equipped to select the correct method of intervention to meet our customers' needs. This selection needs to be on an equal and impartial basis considering whole life costs, longer term network needs, environmental impact, and compliance with standards.

Net zero investment strategy

7.9 Our strategy, developed in conjunction with both our DSO and Whole System visions, to answer these fundamental questions and deliver a more flexible and integrated energy system for our customers is based on a 4-step approach, shown below, with each step described in detail subsequently.

Figure 15 – RP7 strategy to facilitate Net Zero through a flexible and integrated energy system

- **Step 1**. Scenario forecasting and modelling to project future uptake of load and generation at regional and local level, and identify 'demand hotspots' and likely future network constraints.
- **Step 2**. Deployment of monitoring across all voltage levels to closely observe actual demand increase to determine the optimum intervention at the optimum time.
- **Step 3**. Before we invest in traditional increases in capacity we will first test the market for flexibility solutions.
- **Step 4**. When traditional network investment is the correct option we will aim to touch the network once, ensuring this specific investment is adequate to meet 2050 targets.

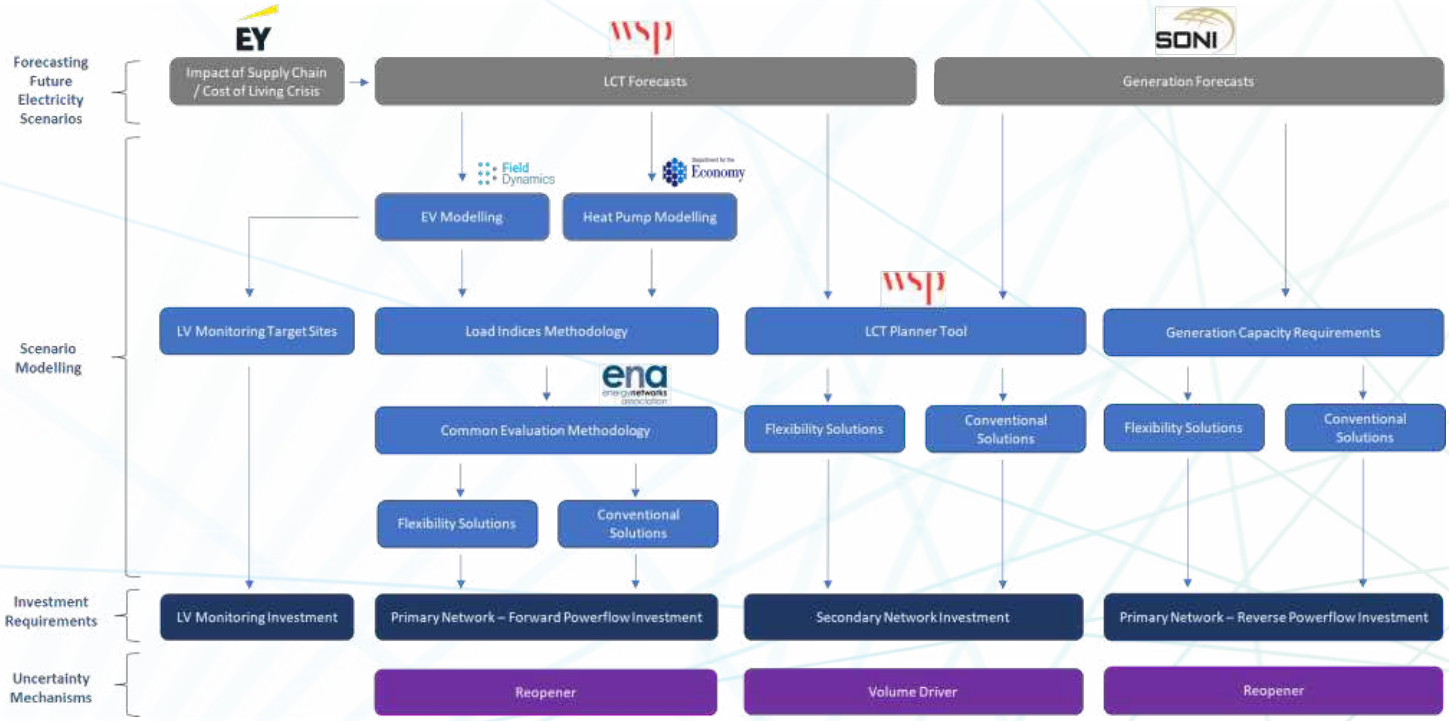
Facilitating net zero through a flexible and integrated energy system

Step 1 – ongoing scenario forecasting and modelling

7.10 Historically, network modelling has been largely based on historic trends and a reactive approach, however the net zero future will mean that the electricity system is required to meet new demands from our customers, with the electrification of energy vectors such as transport and heat alongside continued emergence of embedded renewable generation resulting in dynamic network power flows to an extent which has not been experienced before. In order to develop a distribution system capable of meeting these needs a systematic and stakeholder endorsed approach has been adopted to forecasting future electricity scenarios. These scenarios were then inputted into prudent network modelling which was performed at all levels of the distribution system to specify our network investment needs. This methodology has leveraged our enhanced DSO functionality to complement traditional network modelling and is shown below in Figure 16.

Facilitating net zero through a flexible and integrated energy system

Figure 16 – scenario modelling



Facilitating net zero through a flexible and integrated energy system

Forecasting future electricity scenarios

7.11 Different forecast scenarios will have different network impacts and subsequently will drive different levels of network investment. Before developing a plan to meet the future needs of our customers we firstly had to assess how these needs are likely to evolve. We have utilised the expertise of consultants to produce a range of scenarios forecasting the potential impact that changing customer behaviour will have on our network. This primarily focuses on the uptake of electric vehicles, heat pumps, and renewable generation.

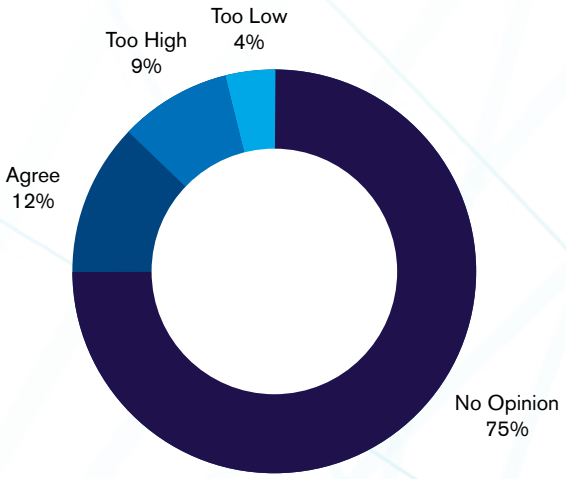
7.12 The approach taken by the consultants was to align our forecasts with the NI Energy Strategy, in conjunction with considerations of the changing energy landscape as a result of international events which are triggering dramatic rises in international fossil fuel costs. A wide range of material specifically focussed on NI was gathered, consolidated and analysed to tune the forecasts to specific NI Policy, existing energy trends and probable uptake profiles. Where information regarding NI technologies or market details has not been available, GB Future Energy Scenario forecasts have been translated, using NI metrics, to compliment the NI available information. This is a similar approach as is adopted by GB DNOs when they produced their regional Future Energy Scenarios (FES) forecasts. Read more about the initial forecasts produced by our consultants within the accompanying paper 'Forecast of low carbon technology deployment in Northern Ireland'.

7.13 Given the uncertainties around future energy scenarios and the dependencies on a wide-range of factors such as government policy, customer ambition, economic capability and technological improvements our consultants developed three scenarios of how we can expect our customers' needs to change by 2050. Each scenario considers the impact of how variability in these factors will affect the overall proliferation and rate of uptake of LCTs in Northern Ireland. From this range of pathways, following the recommendation of our consultancy support we selected our 'best-view' forecast, which is the one deemed most representative of the likely change in customer behaviour during the RP7 period. Within our RP7 draft business plan consultation we outlined these considerations to our stakeholders and asked the following question:

"*We are interested in your views on our scenarios of future consumer behaviour. Do you think they are realistic? Do you think our 'best view' scenario reflects the likely changes in the RP7 period?*"

Facilitating net zero through a flexible and integrated energy system

Figure 17 – question responses



7.14 Following this feedback from our stakeholders and in light of the changing economic challenges being faced by our customers from the cost of living crisis, we appointed economic consultancy support to review our three forecasted scenarios with respect to:

- Stakeholder insights and feedback
- Current pace of uptake
- Policy environment and market factors
- Customer response to cost pressures
- Supply chain delays

7.15 This review provided insights and analysis on the three LCT scenario pathways developed and provided evidence in determining the reasonable level of adjustments which should be made. It did not offer alternative forecasts, but rather informed us about how our current forecasts could be refined in light of research conducted and the evidence presented. Read more about the review conducted by our consultants within the accompanying paper 'EY commentary on NIE LCT forecasts'. This process used for developing our LCT forecasts is summarised below in Figure 18.

7.16 We collaborated extensively with SONI throughout the development of future scenarios, the result of which was the adoption of consistent NI forecasts for the uptake of EVs, heat pumps, generation and overall demand consumption by both NIE Networks and SONI. This alignment leverages the value of sharing expertise and adopting a whole system approach.

Why do we forecast to 2050?

Whilst RP7 is scheduled to conclude in 2031, we are taking a long-term view of our investments to ensure that they are able to meet the needs of our customers in both the short-term and the long-term. Some of the interventions will last for decades and therefore it is prudent to adjust our investment decision making to take account of these longer time horizons. This is the basis of our 'touch the network once' strategy, preventing short-sighted investment decisions from costing our customers more in the longer term.

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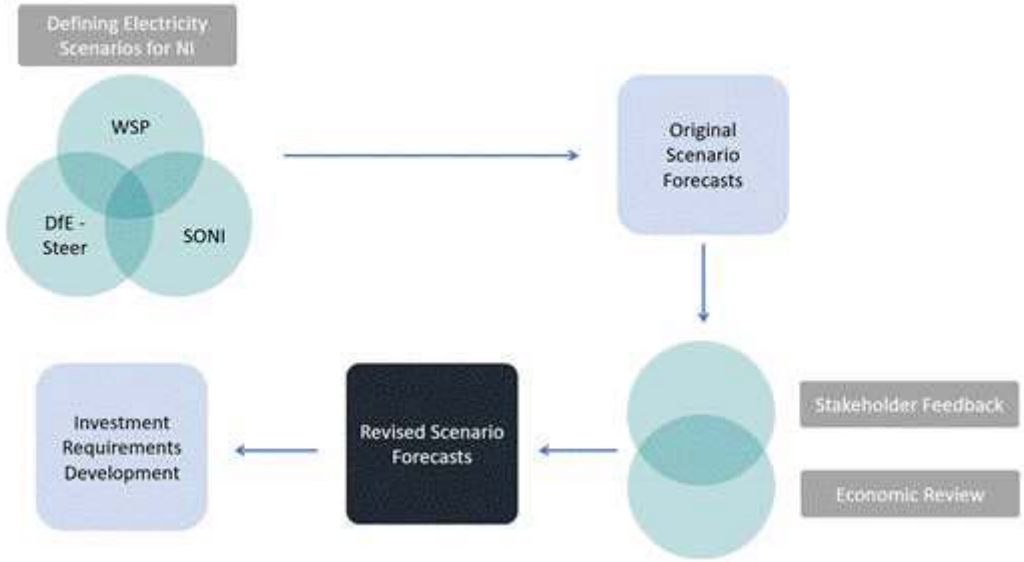
Figure 18 – process for refining scenarios



Forecasting future electricity scenarios – electrification of heat and transport

7.17 The outcome of this assessment was support for our best view scenarios and the tightening of the higher and lower forecasts and is shown in the table below.

Table 3 – EV and HP Scenarios

LCT	Scenario	Original (By 2030)	Assessment	Revised (By 2030)
Electric Vehicles	Low	200k EVs	Too Low	250k EVs
	Best view	300k EVs	Reasonable	300k EVs
	High	400k EVs	Too High	320k EVs
Heat Pumps	Low	60k HPs	Too Low	80k HPs
	Best view	120k HPs	Reasonable	120k HPs
	High	180k HPs	Too High	140k HPs

7.18 We have developed a robust process in developing our forecasted uptake scenarios, however as with any forecast there is inherent uncertainty regarding how the uptake will actually materialise. In March 2023 the Climate Change Committee (CCC) published an Advice Report for Northern Ireland[16], presenting the 'Stretch Ambition Pathway' which reflects the Climate Change Act (Northern Ireland) 2022, legislation that sets a very ambitious target to reach net zero greenhouse gas emissions by 2050. This pathway implies that 350k EVs and electric vans and 160k heat pumps are required by 2030. In

[16] https://www.theccc.org.uk/publication/advice-report-the-path-to-a-net-zero-northern-ireland/

comparison to this publication our best view scenario could be considered conservative, which reinforces the need for appropriate uncertainty mechanisms so that we can flex to keep pace with a pathway which is faster than our regulatory allowances are based on.

7.19 Figure 19 and Figure 20 outline our low, best view, high scenarios alongside the CCC stretch ambition pathway for electric vehicles and heat pumps respectively.

Figure 19 – EV volume scenarios

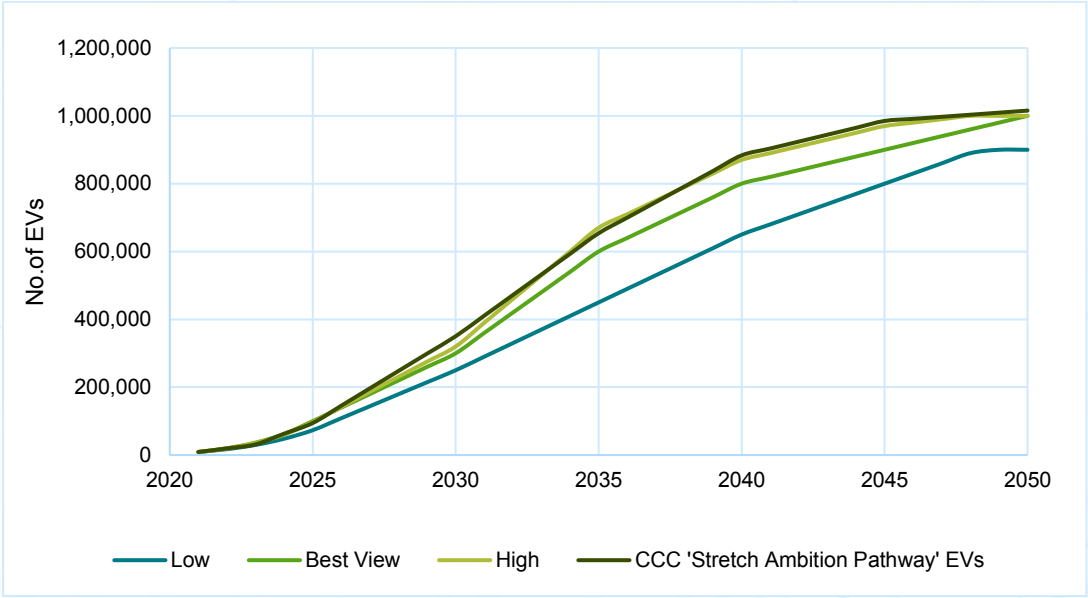
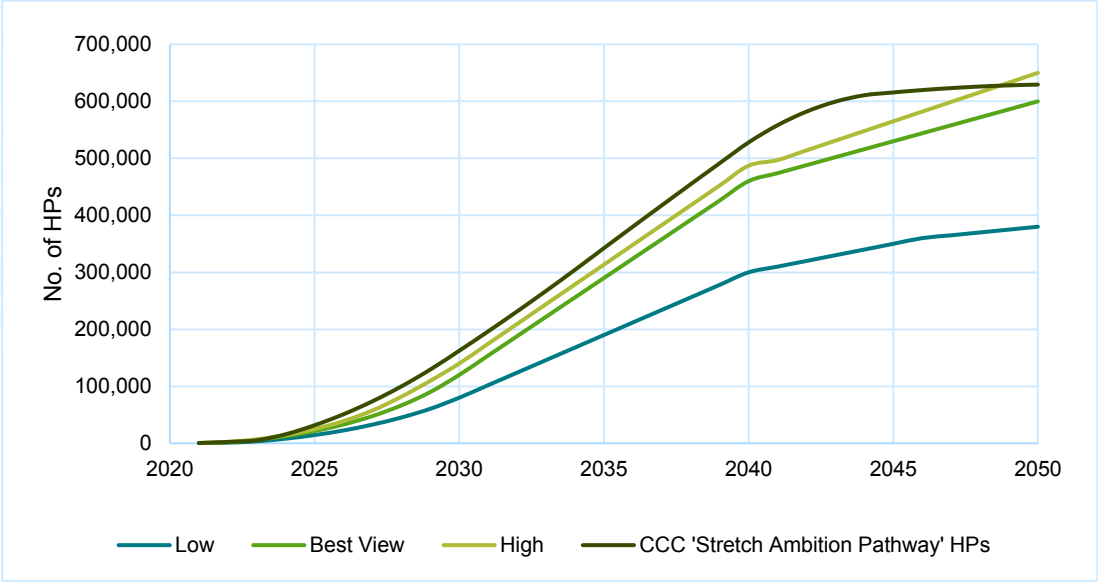


Figure 20 – HP volume scenarios



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Forecasting future electricity scenarios – renewable generation connections

7.20 The Northern Ireland Energy Strategy "Path to Net Zero Energy" was published in December 2021 setting a new renewable energy target of 70%, which has subsequently been reviewed and increased to 80% by the year 2030 as part of the Climate Change Act. NIE Networks is collaborating with SONI to update the Shaping our Energy Future (SOEF) renewable generation forecast to reflect the 80% target. This updated SOEF forecast outlines an additional 2.23 GW of renewable generation to connect by 2030, of which 77MW is micro-generation, 300MW is small scale generation and 1,850MW is large scale generation.

> For a complete set of our forecasts, including underpinning assumptions and the economic review, refer to our main forecasting documents 'Forecasting of Low Carbon Technology Deployment in Northern Ireland' and 'EY Commentary on NIE LCT Forecasts'

Scenario modelling

7.21 Our forecasts show a shift in how our customers will use the distribution network in the coming years. In order to ensure that the network does not become a blocker to our customers' needs and decarbonisation legislation, we must identify the parts of the network where capacity will be inadequate in order to plan for the most appropriate intervention to be undertaken.

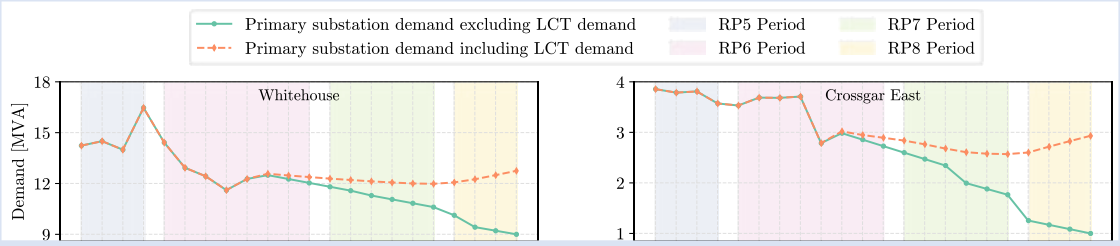
7.22 We have enhanced our network modelling capabilities, allowing us to assess the ability of our network to accommodate this demand and generation increase. Effectively, these modelling techniques enabled us to layer our forecasts onto our network and consider the impact.

7.23 The network requirements of the future are very different to the network requirements of the past. As well as the magnitude of extra demand which will emerge and aggregate at each voltage level, the location of the demand will be at the extremities of our low-voltage network which will be on the front-line of the energy transition. These networks have not historically been designed to cater for these demands and require intervention to allow our customers to adopt LCTs whilst ensuring we maintain a safe and secure electricity supply to their premises.

Energy Efficiency

Energy efficiency is a key area of focus in *The Path to Net Zero Energy* and includes a commitment to deliver energy savings of 25% from buildings and industry by 2030. It can deliver numerous advantages including deferred network interventions, reduction in end-use energy consumption, reduced CO_2 emissions and reduced network losses. Energy efficiency measures taken by our customers have the potential to suppress some of the demand increases caused by LCTs and has been considered in our investment plan.

On the primary network, our load indices methodology inherently considers energy efficiency through its trending based on historic data. Before including the impact of LCTs, some of our primary substations are experiencing load erosion due to energy efficiency measures taken by our customers. Two examples of this are shown below:



On the secondary network, we have modelled that all interventions required on the 11kV, 6.6kV and LV network are due to LCT growth. The exclusion of incremental non-LCT load growth in the RP7 plan mitigates for a potential reduction in electricity demand due to the Path to Net Zero Energy commitment to deliver energy savings of 25% by 2030. By optimising our modelling and factoring in this contribution from energy efficiency we have delivered £9.5m of savings in our secondary network investment requirements.

Scenario modelling – network capacity assessment

7.24 For RP7, with the support of our stakeholders we have developed a new approach and utilised new modelling tools to equip us with the best view of what network capacity will be required and where on the network it will be needed.

Scenario modelling – network capacity assessment – primary network (33kV)

7.25 Even though network loading is expected to significantly rise during RP7 and beyond, due to the localised and time-dependent nature of constraints and network powerflows, many parts of the network will continue to experience network constraints due to generation. The capacity on the primary network needs to be assessed in both the forward (due to demand increase) and reverse (due to generation increase) directions. This assessment is described in the following sections with the outcomes presented in Figure 21 below, which displays the Primary substations and 33kV circuits where investment is required due to growth in demand, generation or in some instances both.

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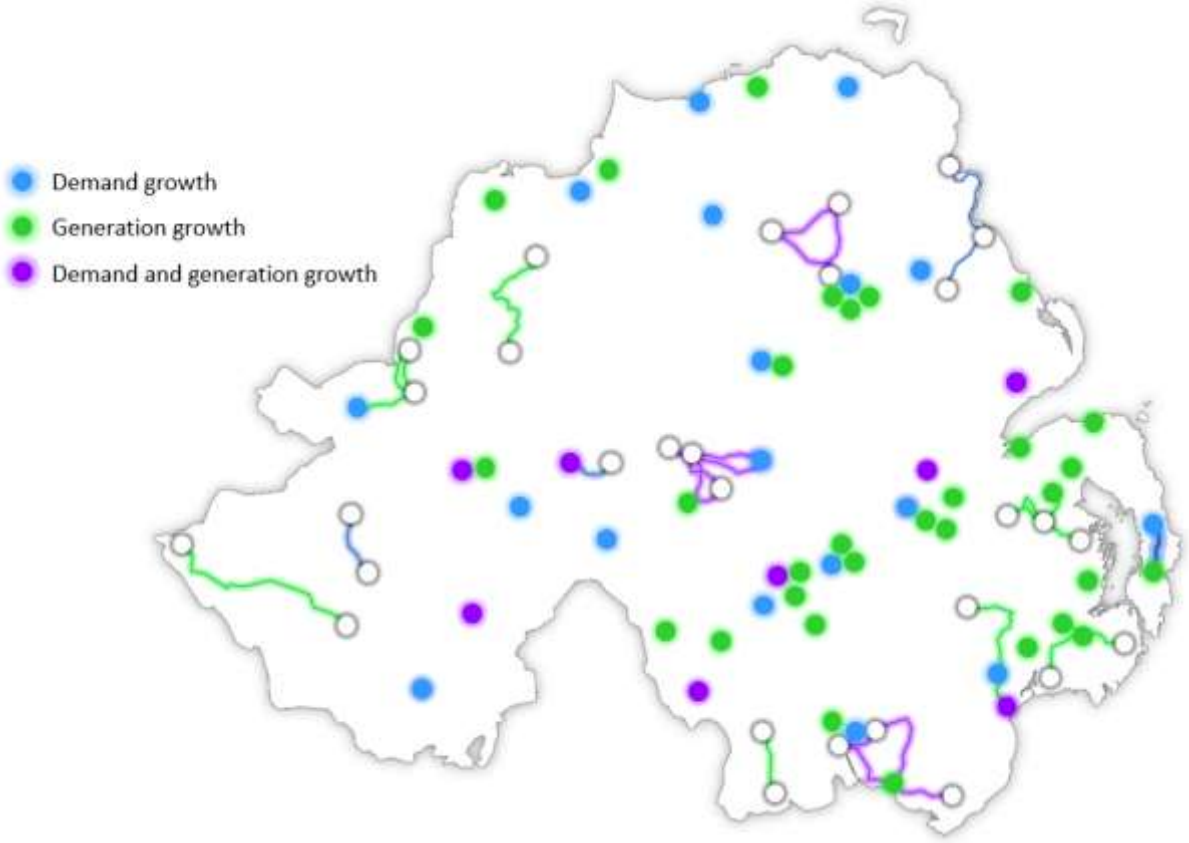
Figure 21 – primary network investment mapping



Scenario modelling – network capacity assessment – primary network (33kV) – forward powerflow

7.26 Given the significant growth forecast in the use of EVs by our customers, it is imperative that the likely 'EV hotspots' are identified to determine where customers will be using the network differently. To achieve this, and following extensive market research and regulatory approval, in RP6 we purchased a model called "EV Up" which has been utilised in GB. The model utilises a broad range of data sources including socio-demographic datasets to determine the likelihood of our customers adopting an EV, when they are likely to enter the EV market and to assign an expected mileage. EV UP forecasts where domestic EVs are likely to connect down to street level and allowed us to assign their uptake to individual network assets.

> More information on the methodology and outcomes of EV UP can be read in 'NIE Networks EV UP Modelling Project' and 'NIE Networks Public Charging Approach and Report Document'.

7.27 Please see the link below for an interactive display of the outputs of EV UP, showing the forecasted uptake of EVs across Northern Ireland to 2050.

Interactive EV Forecasted Uptake NI Map

7.28 Modelling on the distribution of heat pumps across Northern Ireland was carried out through a multi-parameter model which considers factors such as existing heat pump uptake, records of properties already served by the existing gas network and absolute customer numbers to allocate the overall heat pump forecast across our primary substations.

More information on the methodology for modelling the distribution of heat pumps can be read in 'Load Indices: Heat Pump Distribution Justification Document'.

7.29 These modelled outputs were then combined with measured demand profiles from real technology trials to create a diversified profile for both LCT types enabling them to be used in our network power flow simulations.

7.30 For the primary network, forecasted LCT uptake and profiles have been added to historic monitored trends to identify the expected demand growth at each primary substation. The network utilisation is then tracked using load indices developed by the Energy Networks Association (which we have also utilised in RP6) which compare the forecast loading to the firm capacity of each primary substation to identify those substations and sections of network which require intervention due to forward power flow (demand) constraints.

Our approach to accommodating the forecast demand growth on the primary network, including specific options appraisals for each intervention (conventional or flexible) can be seen in EJP 1.101 – Distribution Network Reinforcement – Forward Power Flow.

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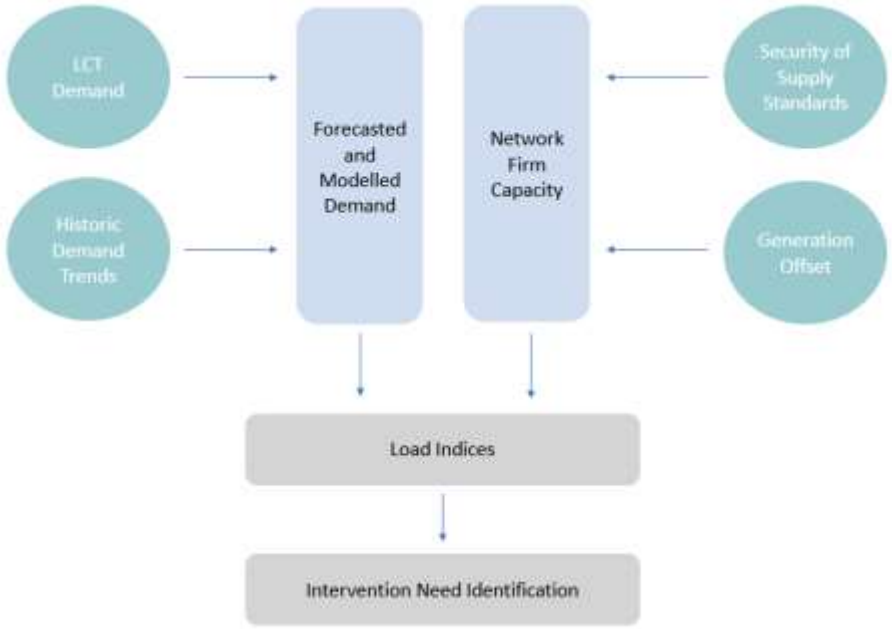
Figure 22 – identifying when intervention is needed



7.31 Figure 23 shows how load growth will erode the available capacity at many primary substations and drive the need for interventions over the coming years. As such, significant intervention is needed across the network to accommodate demand growth across NI during RP7, to ensure the network remains compliant with the Distribution System Security and Planning Standards.

'Everything possible should be done to clear the road to decarbonisation and it is regrettable that more has not been done already in this respect. have a lot of catching up to do. Our society has a lot of catching up to do.'

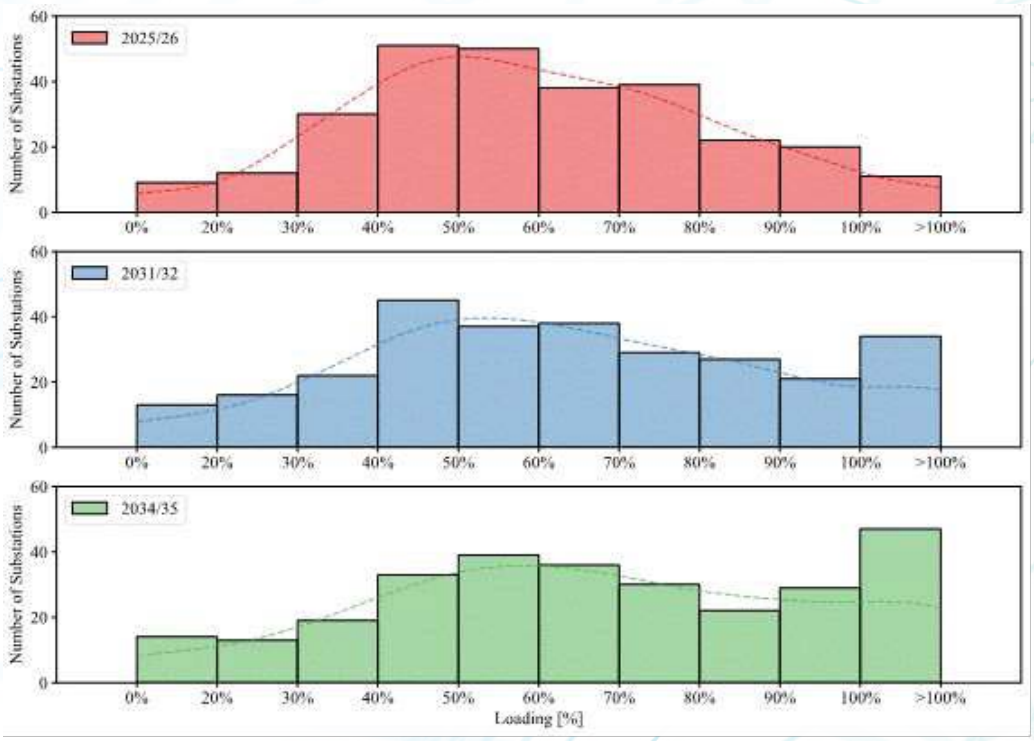
Advice NI

7.32 In our RP7 consultation we asked stakeholders if we should adopt the same intervention trigger as in RP6 or if we should go further. A clear majority of respondents thought that we should go beyond our RP6 intervention trigger (LI5 only) to resolve network constraints[17], citing reasons such as the priority for decarbonisation, anticipated growth in demand and the need for the network not to be an obstacle to roll-out of electrification.

7.33 Therefore, our RP7 investment plan for the primary network includes both LI4 (assets which are fully utilised, but for less than nine hours a year) and LI5 (assets which are fully utilised for nine or more hours a year), including sites expected to be LI4 or LI5 within the first two years of RP8. There are many clear benefits by adopting this strategy including reducing the risk that the network becomes severely overloaded due to unforeseen, sudden demand increases or unforeseen landowner or legality delays. Adopting this strategy brings an additional ten primary substations onto the RP7 plan when compared to an LI5 only intervention threshold; however, we can manage three of these sites via a flexibility solution.

7.34 In total we will intervene at 32 primary sites (15% of the primary network) over the course of RP7 due to forward power flow constraints, at a cost of £29.8m, of which 10 sites can be managed via a flexibility solution, delivering £7.5m of customer savings.

Figure 23 – primary substation percentage demand utilisation



[17] 6 stakeholders agreed with an LI5 only investment trigger, 12 thought that this should be extended to both LI4s and 50 stakeholders were neutral or didn't respond.

Facilitating net zero through a flexible and integrated energy system

Scenario modelling – network capacity assessment – primary network (33kV) – reverse powerflow

7.35 To facilitate Net Zero, we need to invest to ensure that sufficient capacity is available on the distribution network for the connection of additional renewable generation. According to our connection charging methodology, smaller generators connected to our secondary network at low voltage do not pay for reinforcement on our primary network (33kV). The Energy Strategy for Northern Ireland Action Plan, outlined that a renewable generation support scheme will be delivered in 2023. This is against a backdrop of an already heavily congested distribution network as a consequence of facilitating the 2020 40% RES-e target, causing much of the inherent generation capacity on the primary network to be exhausted.

7.36 As part of our RP7 consultation we presented three investment options with respect to primary network reverse power flow:

- **Option 1:** Do not include any allowances in our baseline RP7 plan but rather 'wait and see' which substations generators are seeking connection at. Once we have sufficient certainty around these locations we will seek allowances from the UR via an uncertainty mechanism.
- **Option 2:** Include conventional allowances in our baseline plan to upgrade substations which currently have no or low capacity and wait and see where generators are likely to connect at other substations. Once we have sufficient certainty at these locations we will seek allowances from the UR via an uncertainty mechanism.
- **Option 3:** Forecast where likely generation is going to connect, forecast likely constraints now and include the allowances within our baseline plan.

7.37 No stakeholders felt that option 1 was appropriate, five felt option 2 was appropriate and 17 felt option 3 was appropriate. Whilst we agree with the sentiment stakeholders shared in selecting option 3 – ensuring the network does not become a blocker to net zero – we consider that option 2, supported by an agile and efficient reopener mechanism is optimum. There remains significant uncertainty regarding the locations on the network that generators will seek to connect and committing to intervention decisions based on more speculative forecasts could have the unintended consequence of delaying interventions at other sites with a more acute need arising during the period. Instead, in option 2 we can progress interventions at sites where we already know there is no or low capacity at and wait until we have more certainty at other sites before intervening. This means that we can ensure that our delivery resources are effectively targeted and that customers do not pay for some interventions which may not be required in the short term. By selecting option 2 it does however place considerable importance on the need for an agile and efficient uncertainty mechanism to be agreed.

7.38 We have assessed the generation capacity on our network and worked with stakeholders to gauge the pipeline of likely future connections, targeting investment on the areas of the network that have less than 250kW of generation capacity to facilitate the further connection of small scale and micro generation. This equates to 80 primary substations, representing 37% of the entire population of primary substations. Where

Our strategy for Reverse powerflow constraints on the primary network can be seen in EJP 1.102 – Distribution Primary Network - Reverse Power Flow.

this constraint is not planned to be removed through other investment drivers such as forward powerflow or asset replacement, we will intervene at these substations through either conventional or flexibility solutions to facilitate further connection of small scale and micro generation to the associated LV networks.

7.39 By identifying sites which can be managed via a flexibility solution, our 'Flexibility First' approach to removing reverse power flow constraints has resulted in £1.4m of savings in our RP7 primary network reverse power flow plan.

Scenario modelling – network capacity assessment – secondary network (11kV, 6.6kV and LV)

7.40 The 11kV network has been developed over many years in response to customer connections. During the electrification period in NI (mainly during the 1950s, '60s and '70s), the cost of extending the network was partly borne by customers who required the lowest cost connection. Consequentially, the rural network is characterised by long circuits which can experience thermal, voltage and fuse-reach issues as demand increases, especially at the end of the circuit where capacity is lower.

7.41 The majority of Belfast has historically been supplied via a 6.6kV network which is generally an older network dating from the 1940s, originally designed to service the lower demand properties typical of this era. The limited capacity associated with operating the network at the lower 6.6kV voltage level has meant that there is limited headroom for future growth in parts of the city.

7.42 The LV network comprises of the assets which transfer electricity from local substations to our customers properties and will therefore experience the greatest impact from the increases in demand as customers adopt EVs and heat pumps. LV networks were never designed to host this predicted step change in demand and are particularly susceptible to consumer behaviour influences due to the small geographic areas. Historically the demand on the LV network has been predictable and has not required active management, reflective of customer behaviours in previous decades. Clustering of LCTs and aligned behavioural patterns, driven by similar socio-economic populations, will reduce load diversity that distribution network operators have traditionally relied on in their designs. There is currently a significant amount of data available for our HV network, but we have limited visibility of the power flows on our LV network. Given that the majority of our customers connect to this part of the network, and most LCTs are domestic-scale, LV data provision is now a necessity for DSO capabilities to allow efficient investment and facilitate active management.

7.43 Additional demand erodes the thermal capacity on a network, increases the voltage drop experienced and can reduce the capability of the electrical protection. This makes it challenging to operate the network, especially when attempting to access capacity under resupply conditions. Loading above design limits compromises the quality and reliability of supply standards delivered to our customers and may give rise to public safety issues.

7.44 Our RP7 strategy for our secondary network includes investment due to forecasted LCT load growth and an element of proactive investment for certain assets to facilitate the connection of future LCTs, and avoid network capacity and safety risks as the uptake rates increase.

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7.45 Due to the extensive nature of the secondary network, a parametric model[18] has been tailored to the NI network and used to model our forecasted LCT uptake scenarios and assess the corresponding impact this will have on secondary network in terms of capacity and investment needs. This software tool informs optimal investment requirements for long term development planning of electricity networks, considering the uptake of LCTs using a probabilistic techno-economic optimisation approach.

> The approach to assessing the required investment on the secondary network can be seen in EJP 1.105 – Load Related Secondary Network Investment, while the methodology and assumptions for the LCT Planner Tool can be found in 'Review and Update of The Low Carbon Technology Planner Tool'.

7.46 Due to relatively low demand growth levels and the predictable nature of customer demand profiles in the past, NIE Networks has historically taken a reactive approach to network congestion identification on the secondary network, planning network investment based on issues identified through other works on the network. Whilst this has been appropriate in the past, due to the forecasted significant increase in demand growth we do not believe it is appropriate for the future. To avoid the network from becoming a blocker to decarbonisation we intend to take a proactive approach to secondary network planning, systematically studying the network to identify both current and future congestion, and utilising network monitoring to inform optimal investment decisions, considering both flexible solutions and conventional reinforcement. This consideration of future constraints when dealing with the present constraints will ensure that the network is developed in the most efficient and economical way to deliver net zero.

7.47 Some of the assets which connect individual households to the LV network such as small capacity pole-mounted transformers and service cables are not sufficiently rated to facilitate even one heat pump or EV charge-point, meaning that potentially dangerous overloads will be experienced following a single LCT connection. Therefore, we propose to proactively remove these assets from the network in order to remove this barrier to customer LCT uptake.

[18] The LCT Planner tool was developed by Engineering Consultants WSP on behalf of the Energy Network Association (ENA) and in conjunction with all the UK DNOs.

Managing uncertainty

7.49 We have carefully considered the trade-offs between how much expenditure we include within our ex-ante plans and how much we fund through uncertainty mechanisms. This is particularly pertinent in the context of investments needed to facilitate the transition to net zero. We have decided to put forward ex-ante plans which are based on our 'best view' scenario forecasts, excluding primary network reverse power flow which is based on constraints that currently exist. Whilst we recognise that there is some risk that the pace of the energy transition is slower than our 'best view', we do not believe that this risk is material based our prudent modelling approach through which we have adopted a number of conservative modelling assumptions as detailed below.

Network	Prudent Modelling Assumption
Primary & Secondary	For modelling the demand increase through EV uptake it has been assumed that 80% of EVs will have a domestic charger. Current analysis suggests that 94%[19] of EV owners charge at home.
Primary & Secondary	Did not model the impact of Cold Load Pick Up (CLPU[20])
Primary & Secondary	Our modelling includes interventions required within RP7 only and does not include whole system opportunities.
Primary	Excluded future demand increases relating to rapid/ultra-rapid public charging hubs, HGV Electric Fleets or the commercial electrification of heat.
Primary	Did not explicitly consider substation demand increases through future large volume housing developments.
Primary	Assumed that 0.5MW of customer flexibility will emerge during RP7 at each primary substation, therefore increasing the number of sites at which customer flexibility can deliver savings.
Secondary	Excluded commercial and industrial demand on LV and Secondary substation load.
Secondary	Our modelling does not account for normal load-related growth on the secondary network, to reflect energy efficiency measures being introduced by customers, and therefore has been excluded from our baseline investment requirements. Normal load related growth accounted for £7.9m (in 2015/16 prices) in the RP6 final determination.
Secondary	Assumed minimum spec conductor on HV overhead network is 50mm^2 even though approximately 50% of HV circuits will continue to have 25mm^2 at the end of RP7.

[19] Based on EVANI survey results.
[20] A phenomenon following a planned or unplanned network outage where there is increased and sustained demand, particularly prevalent with heat pumps and electric vehicles.

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Secondary	Assumed minimum spec conductor on LV overhead network is 95mm^2 even though significant sections of LV will continue to be less than 95mm^2 conductor at the end of RP7.
Secondary	Assumed no phase imbalance within modelling.

7.50 We have deliberately taken a prudent approach to our network modelling to make sure that there is low risk of the ex-ante expenditure not being fully required. However, in doing so there is risk that this ex-ante funding is not sufficient enough during the RP7 period. We have therefore proposed a suite of agile and efficient uncertainty mechanisms to enable allowances to increase if required during the RP7 period.

For more information on how we have planned for future uncertainty, see Chapter 10.

7.51 Forecasting and modelling has been a building block of our load investment plan for RP7, but it is crucial that this is continued throughout the regulatory period. As a DSO we will have responsibility for forecasting the impact upon the network of Northern Ireland's decarbonisation pathways and providing data and information with external stakeholders. As part of our step-change in whole system engagement and collaboration, our stakeholders will be engaged on forecasting (including local area energy plans) and other technical discussions. This forecasting and information provision function co-located with flexibility service development creates an external-facing part of the organisation to engage and drive forward flexibility markets.

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Step 2 – network monitoring

7.52 Scenario forecasting and modelling will be used to identify likely future network constraints; however, aside from very small capacity assets, which cannot accommodate even one LCT, there is currently not enough certainty to reinforce based on forecasts and modelling alone. Instead, forecasting and modelling will identify where to install additional monitoring devices, particularly on the LV network where we currently have very little monitoring and network visibility. This real-time data from existing and new devices will be used to closely monitor load growth across all voltage levels and optimally trigger investment decisions. Monitoring will also enable the roll out of customer and network flexibility, greater data analytics capability and provide improved asset condition information. Without this information, conservative assumptions would be required which would ultimately lead to higher overall investment costs.

7.53 Our modelling has indicated that substantial reinforcement will be required during RP7 and over subsequent price control periods. While increased visibility alone does not resolve congestion, it is critical for cost efficient network planning and operation in the face of rapid growth in distributed generation and flexible low carbon technologies driving more dynamic and complex power flows. Real-time and granular LV network monitoring is now the minimum standard to enable DSO functionality, replacing traditional maximum demand indicators (MDIs) and offer an array of secondary benefits like harmonic monitoring, asset condition data, and supporting local flexibility markets and community energy schemes.

Figure 24 – why we need to monitor

7.54 Within our RP7 public consultation we proposed installing monitors on 50% of our LV network and asked our stakeholders if this was ambitious enough or should we aim higher (Q4). Respondents universally accepted the need for increased monitoring of the LV network (Q4) with the majority suggesting that we aim to monitor more that 50% of the LV network, in many cases proposing 100% of the LV network.

> *'50% is not ambitious enough given the urgency and gravity of the climate crisis. 100% would ideal but failing that, 80% might be a good second best as it would allow you to monitor higher levels of LCT connections while at the same time trying to avoid outages.'*
>
> Advice NI

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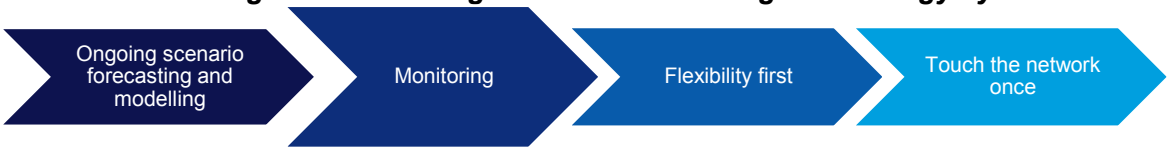

7.55 Taking this feedback into account and refining our modelling we have identified a need for 5,256 LV substation monitors within the RP7 period to track those network assets which are most likely to experience significant load growth in the coming years. This volume of monitoring will provide visibility at 43% of our ground mounted LV substations and 11% of our pole mounted substations; however, through enhanced use of existing meter data at single customer sites, we can extend the level of visibility to 70% of our ground mounted substations at no additional cost to our customers.

7.56 On our 33kV and 11kV network, many of our sites already have enhanced monitoring in place to monitor bi-directional power flows. We are proposing to invest in the remaining sites to mirror this capability so that we have the required visibility across our network to operate the dynamic distribution system of the future (EJP 1.103 – HV Monitoring Expansion).

7.57 As part of developing our DSO functionality, we will use this increased availability of network data to transform our analytical capabilities, enabling more data-driven decision-making in planning and operational timescales. Better data and analytics will drive more accurate forecasting and informed decision-making, leading to more efficient investments to enable a range of decarbonisation pathways. The data obtained from monitoring devices will also be of significant value to stakeholders, and where appropriate will be made 'open' for stakeholder use through our open data portal, which received positive sentiments by all stakeholders who responded to our open data portal question (Q5) in our RP7 public consultation.

> *'The "Open Data Portal" seems very comprehensive and easy to navigate. There is good detail available here which seems easy to find. The geospatial mapping included is also very helpful.'*
>
> Maxol

7.58 In order to equip us with the required monitoring capability for the beginning of RP7, we expedited the submission of our LV monitoring allowance with the UR, with subsequent approval for the spend in RP6 granted in February 2023. This accelerated roll-out of this monitoring equipment allows time for data to be gathered and trends to be analysed to track those assets which are approaching their capacity limit, enabling investment to be targeted appropriately.

7.59 Combining this increase in network visibility with our digitalised LV connected model project and LV support function initiative ensures we will have the resources and capability to enhance our near and real-time operational support for network management, congestion management and fault management.

7.60 Figure 25 below shows how monitoring data can be combined with data analytics techniques to deliver efficient and timely network interventions.

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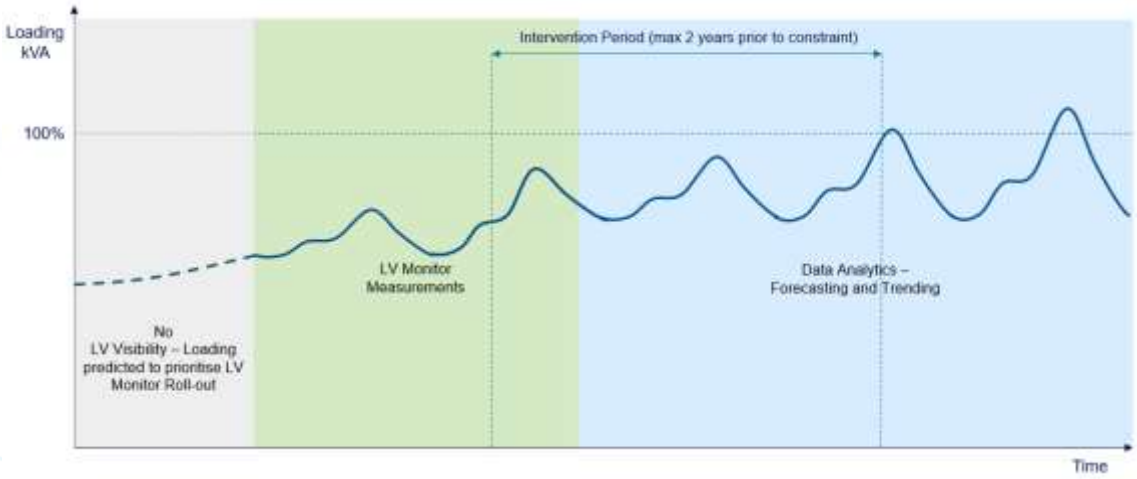
Figure 25 – monitoring and data analytics



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Step 3 – flexibility first

7.61 The distribution network is at the forefront of delivering net zero, resulting in significant investment being required across all voltage levels. However, we recognise that we are in the midst of a cost of living crisis and it is critical that we facilitate net zero at least cost to our customers. We also recognise that as low carbon and increasingly digitised technologies connect to our network that our customers will be able to offer demand or generation response services to assist with the management of increasingly complex network powerflows.

7.62 The investments we make to develop our DSO capabilities will ensure we are equipped to facilitate all credible decarbonisation pathways at least cost. The actions described in our DSO strategy are enablers we will put in place to support the investment in services and the network that will increase capacity and flexibility in the system – particularly digitalisation initiatives like monitoring and analytics. Our investments will create whole system benefits that extend well beyond our networks and will continue to enable us to unlock the value of the system for our customers.

7.63 Within RP6 the UR approved over £6m to allow NIE Networks to “fast follow” some of the successful innovation projects in Great Britain with a view to transition them to Business as Usual (BaU) for RP7. More recently the UR approved another £1.7m to run a new EV charging pilot project. These RP6 innovation technologies have delivered significant learning to inform preparation for BaU implementation and have been embedded into our RP7 business plan and have delivered significant customer savings.

7.64 Our flagship RP6 innovation project, FLEX, creates local markets where customers can offer demand or generation response services to help manage constraints on the network. Managing demand constraints in this way allows network reinforcement to be deferred or in some instances avoided. The RP7 period will be a time of significant uncertainty as we continue on the pathway to Net Zero. It is clear that government policy will drive a change in consumer behaviours; however, the exact blend of low carbon technologies that will emerge and at what pace is still uncertain. Whilst electrification will pay a key role in all pathways to decarbonisation, the electricity network will need to remain adaptable to the evolving decarbonisation landscape and the changing needs of consumers. As many homes and businesses embrace electric vehicles, adopt heat pumps and use energy storage, we envision the subsequent congestion on our distribution networks to be increasingly resolved by solutions that leverage the flexibility offered by these technologies rather than through traditional network reinforcement, thus keeping our options open. However, it should be noted that the flexibility market is still maturing and as such conventional reinforcement is likely to be required in a majority of instances during RP7.

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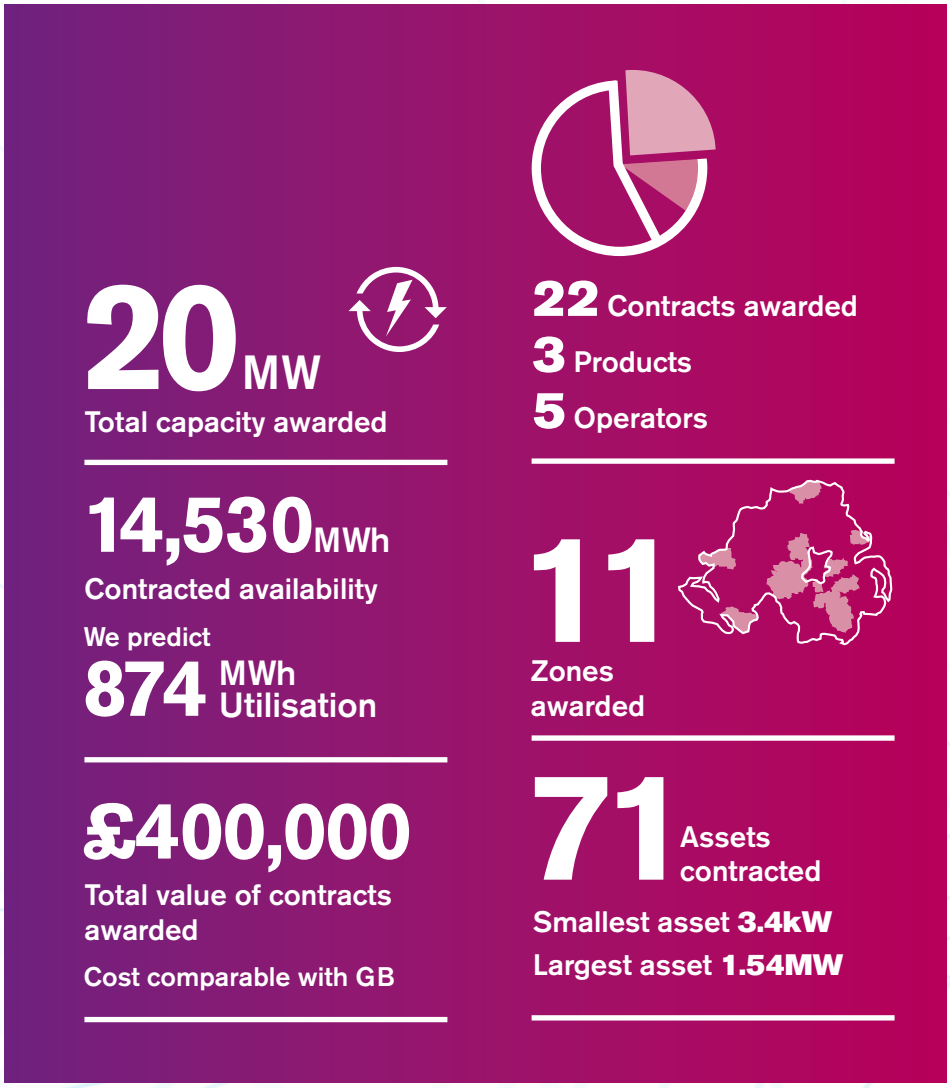
Figure 26 – FLEX in numbers



7.65 Our 'Flexibility First' approach, whereby we will test the market first before committing to major conventional reinforcement schemes, will allow us to defer network investment where this is in customers' best interest. This approach, which received unanimous support from the respondents to our RP7 consultation[21], has been shaped by our innovation projects in RP6 and is facilitated by our plans to increase network visibility across all voltage levels. This ultimately avoids unnecessary investment and minimises disruption to customers, whilst democratising the energy system and empowering consumers to provide flexibility, a critical component of managing the future energy system.

[21] 27 stakeholders agreed with our flexibility first approach, 0 disagreed and 41 did not respond or were neutral.

Facilitating net zero through a flexible and integrated energy system

Selecting the right intervention

To further ensure neutrality in decision making when choosing how best to provide capacity on the primary network, the Common Evaluation Methodology (CEM) which has been developed by the Energy Networks Association and used by our counterparts in GB has been adapted for use in NI. The CEM is a cost-benefit analysis tool which models the optimum investment option where both flexibility and conventional reinforcement options are available. The CEM has the capability of quantifying the wider societal issues to be considered when determining the optimum solution for network investment. This includes factors such as the carbon impact and network losses as well as placing a value on the benefits of deferring conventional investment until there is greater certainty (optionality). In doing so the true value of 'Flexibility First' is revealed, allowing a more sustainable approach to investments, whilst accommodating the uncertainty driven by the pathway to net zero.

Respondents to Q7 of our RP7 public consultation unanimously indicated that we should take these wider societal impacts into account when weighting up flexibility versus convention reinforcement, which we've reflected in our plan.

As well as being used in evaluating the role of flexibility in our business plan, the CEM will also be used throughout RP7 to ensure that each proposed investment on the primary network is assessed against the latest flexibility options. Further detail about the CEM can be found in 'Amendments to the ENA Common Evaluation Methodology Tool for Northern Ireland'.

Similarly, for the secondary network, using a combination of the LCT Planner Tool outputs and the learnings from the RP6 innovation projects, we have assessed the conventional reinforcement which can be deferred in RP7 and ensured that the optimal investment solution is selected.

7.66 The table below describes the types of flexibility which have been utilised as part of our 'Flexibility First' approach.

Table 4 – flexibility assessment in RP7

Flexibility Type	Description	RP7 Methodology
DSO contracted flexibility services	Services advertised and directly procured by the DSO and subsequently dispatched to relieve network congestion	Primary Network (Forward) – Use of CEM to evaluate optimal investment decision. Primary Network (Reverse) – Use of network modelling to assess the impact of adjusting power factor set points[22] at embedded generation to minimise voltage rise. Secondary Network – Use of Planner Tool for probabilistic techno-economic optimisation
Network flexibility	The establishment of more automated network switching positions, enabling networks to be dynamically controlled and reconfigured to meeting customer demand	Primary Network (Forward)– Use of CEM to evaluate optimal investment decision Secondary Network– Use of Planner Tool for probabilistic techno-economic optimisation
Price driven customer flexibility	Customers responding to localised or system wide price signals generally through their supplier tariffs	Primary (Forward) & Secondary Network – Existing 'time of use' tariff uptake analysed and extrapolated to reduce future LCT connections' contribution to peak demand.

[22] Adjusting power factor set points at embedded generation is facilitated by arrangements in the Distribution Code and customers' Connection Agreement

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Our Flexibility First Approach has delivered £24.7m of savings for our customers in our RP7 plan

7.67 Looking beyond RP7, flexibility markets will have an even more significant role to play in operating of the network. However, sufficient flexible assets and market liquidity will need to be available in the specific areas of the network where intervention is required ahead of time; otherwise the only option available will be conventional reinforcement. The following two-stage approach will help achieve this:

- **Signposting**. We will publish online detailed information about our future flexibility requirements well ahead of need. This will provide the initial signals to potential flexibility providers about upcoming opportunities, including technical requirements like location and value, and ensure they are ready to participate in future flexibility competitions.
- **Going further, faster** is an initiative designed to stimulate the development of local flexibility markets in areas where there is anticipated future need but insufficient flexible capacity available at present. A fundamental DSO role is the development of local flexibility markets, and it is critical that sufficient flexible capacity exists in the right locations during RP8, so that it can be considered as a viable option alongside conventional network reinforcement when investment decisions are being made.

7.68 Our stakeholders, in response to Q8 in our RP7 consultation, unanimously agreed with our approach of going further, faster with flex markets[23]. On that basis we have included within our plan a going further, faster allowance of £207k which could unlock a further £6.8m in savings during RP8 through additional deferred or avoided network reinforcement, as well as promoting wider system benefits. This investment is only proposed in where locations where it is considered likely that normal procurement activities and market development will not deliver sufficient additional capacity. Read more about our going further, faster approach in 'Flexibility Services – Going Further Faster'.

The first 3 stages of our 4-stage approach (including our Flexibility First approach) are enabled by the ongoing development of our DSO capabilities.

[23] 24 stakeholders agreed with going further, faster, 0 disagreed and 44 were neutral or didn't respond to this question.

Facilitating net zero through a flexible and integrated energy system

Adopting a DSO approach

7.69 **Our DSO vision is to deliver a smarter, more flexible energy system that enables our customers to decarbonise, delivering the objectives of the Northern Ireland Energy Strategy at least cost to our customers.**

7.70 Since electrification the needs of the NI consumer have steadily and incrementally evolved, however this slow evolution is now over and we must prepare for a step change in the requirements of our customers. In response to such a shift in the energy landscape we are expanding our capabilities and taking on the functions of distribution system operation.

7.71 We face the challenge of facilitating an overall increase in demand for electricity driven by the connection of LCTs while managing greater volumes of intermittent generation connecting directly to our network. To decarbonise efficiently and make the transition affordable, we must enable a smart, flexible energy system where distribution network operators (DNOs) now actively manage and optimise the more complex power flows on the distribution grids by evolving our functionality as a DSO.

7.72 Adopting a DSO approach requires us to further develop our networks and systems to meet the evolving needs of our customers throughout the net zero carbon transition, ensuring we are a trusted and neutral partner through open, transparent and technology-neutral decision making. To deliver a safe and reliable supply to our customers, we must manage our networks through whole system engagement and optimisation, and proactively share data and insights about our networks to facilitate effective decision making across the energy supply chain.

7.73 Shaped by the needs of our customers and networks, the expectations of our regulator and stakeholders and our overall RP7 commitments, we have defined five DSO principles, shown in Figure 27 below. Our five principles create five groups of objectives that will unlock benefits for our customers during RP7 and beyond, focusing on how we collect and use data, and how we support and utilise flexibility. These objectives build on our work to date, embedding data and flexibility at the heart of how we operate and will be supported by investment in other areas of our business plan.

7.74 We have used our DSO principles and objectives as the foundation upon which to construct our Network Investment Strategy allowing us to develop a plan for RP7 in keeping with our DSO vision. As well as being fundamental in developing our investment plan they also will be central in delivering it. These principles and objectives are shown in Figure 27.

Read more about our DSO Approach in our ‘DSO Strategy’.

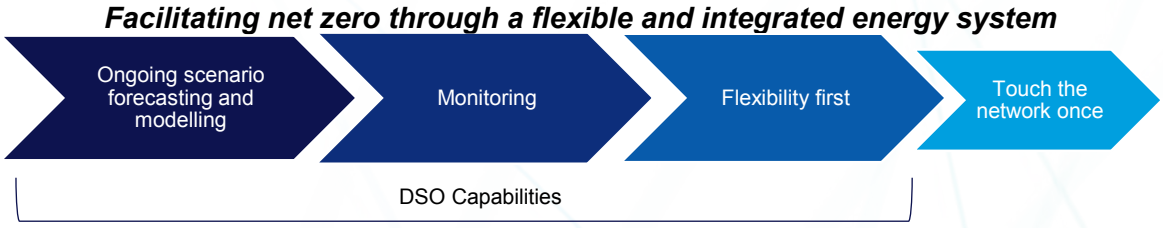
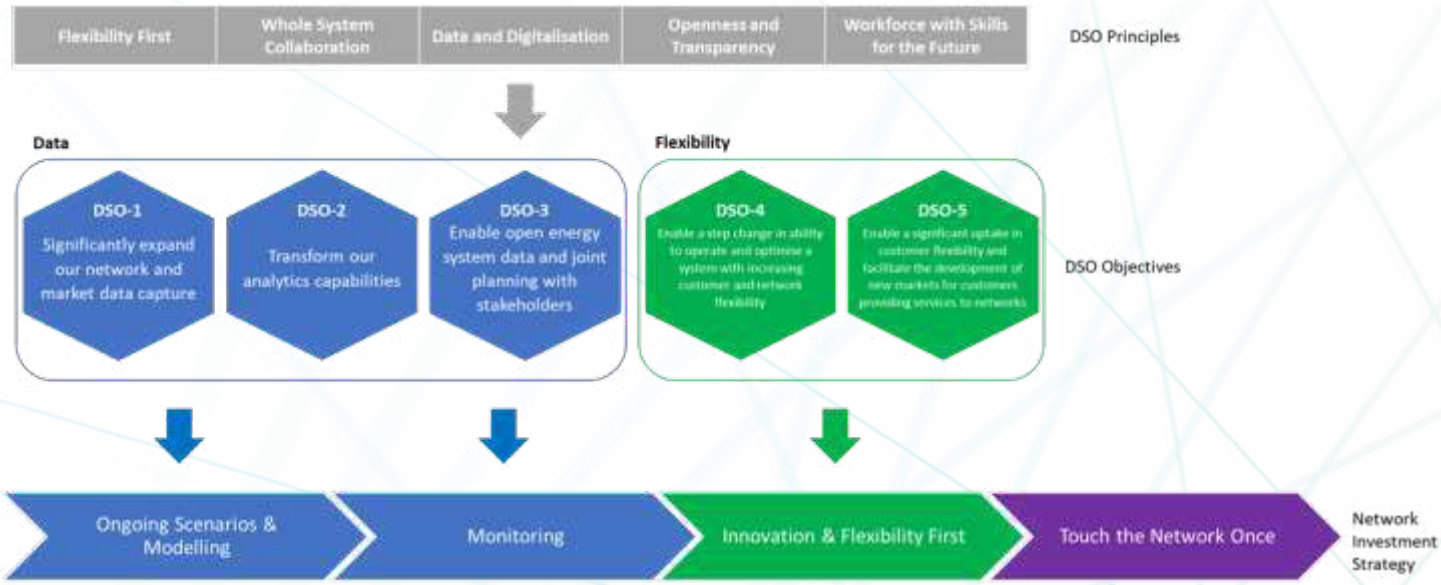


Figure 27 – DSO principles and objectives



Data

7.75 We will effectively harness technological innovation, communications and digitalisation to improve monitoring and control of our network and ensure better coordination with stakeholders across the energy sector. Enhanced data capture and analytics will enable more efficient use of existing assets, for example by identifying pockets of available capacity on the network; by maximising both network and customer flexibility they can help offset the need for conventional network reinforcement. Improved visibility from greater data openness can help steer investment into optimal technologies and locations, saving money for customers while cutting greenhouse gas emissions on the path to net zero.

Flexibility

7.76 We are preparing for a future where flexibility plays an integral role in the energy system. Through our DSO strategy we will unlock and maximise the benefits of the following types of flexibility:

Facilitating net zero through a flexible and integrated energy system

Flexibility Type	Description	RP7 Plan
DSO contracted flexibility services	Services advertised and directly procured by the DSO and subsequently dispatched to relieve network congestion	Recognising that distribution flexibility markets are still at a relatively nascent stage relative to where they will need to be in the future, we are planning changes that are scalable and robust for longer-term systemic change. These changes will lay the foundations that underpin an effective system for flexibility so that we are prepared to harness the flexibility our customers can offer as soon as it becomes available. Our plans will ensure we have scalable technology, systems and processes which will allow us to remain responsive and agile in light of the inherent uncertainty around whichever decarbonisation pathway unfolds, and can facilitate flexibility playing an optimum role on that pathway.
Network flexibility	The establishment of more automated network switching positions, enabling networks to be dynamically controlled and reconfigured to meeting customer demand	We will develop our technological innovation and digitalisation capabilities to improve monitoring and control of our network assets and ensure greater transparency and coordination with our stakeholders. This development can enable more efficient use of existing assets, for example by identifying pockets of available capacity on the network which can offset the need for conventional reinforcement.
Price driven customer flexibility	Customers responding to localised or system wide price signals generally through their supplier tariffs	As a result of increasing adoption of low carbon and digital technologies, we expect to see a significant increase in the number of customers who actively manage their energy usage and production to reduce the bills they pay. Building on learning from innovation projects during RP6 like our EV Managed Charging pilot, we will work collaboratively with energy suppliers, including through timely sharing of data and information about our networks, to ensure effective time-of-use signals and other smart charging incentives are passed through to final customers. These measures will unlock the potential for price-driven customer flexibility allowing customers to flex their consumption patterns in response to system conditions. In future, we expect smart metering will dramatically increase customers' ability to understand their energy consumption and generation and then react to price signals to reduce their bills.
Flexible connections and Active Network Management (ANM)	When connecting to the network, customers agree to flexibility in their import or export capacity to avoid network congestion thereby avoiding network reinforcement that their connection might have triggered	We will also continue to innovate and find new faster and cost-effective ways to connect customers to increasingly constrained networks. As part of more flexible arrangements, customers should have the option to enter into more flexible connection arrangements where their access to the distribution networks can be constrained during peak periods, in return for a faster and/or cheaper connection by avoiding connection specific network reinforcement.

Facilitating net zero through a flexible and integrated energy system

What DSO will deliver

7.77 Further developing our DSO capabilities will ensure that we are equipped to facilitate all credible decarbonisation pathways at least cost for our customers. Our DSO strategy will:

- Support decarbonisation, enabling customers to connect the low carbon technologies they need to decarbonise their lives.
- Enable total energy costs to be kept as low as possible as Northern Ireland decarbonises, embedding a Flexibility First approach to network investment.
- Where we do have to invest to repair and upgrade our network, better data and analytics will drive greater investment efficiency.
- Maximise the value of existing infrastructure, and endeavour to enable every low carbon kilowatt hour of electricity that is generated to be used.
- Roll out flexible connections and ANM, enabling customers to get connected more quickly and without the need for significant reinforcement works and associated costs.
- Allow our customers to earn revenues through participating in a range of markets facilitated by our DSO activities which will also deliver value to all customers by reducing the cost of our distribution network and of the wider energy system.

How we will deliver DSO in RP7

7.78 Our DSO Strategy sets out 28 separate deliverables and initiatives over the 6-year period between 2025 and 2031. These tangible actions will allow us to deliver our five DSO strategic objectives and realise the benefits for our customers and Northern Ireland as a whole. A selection of these deliverables is shown below.

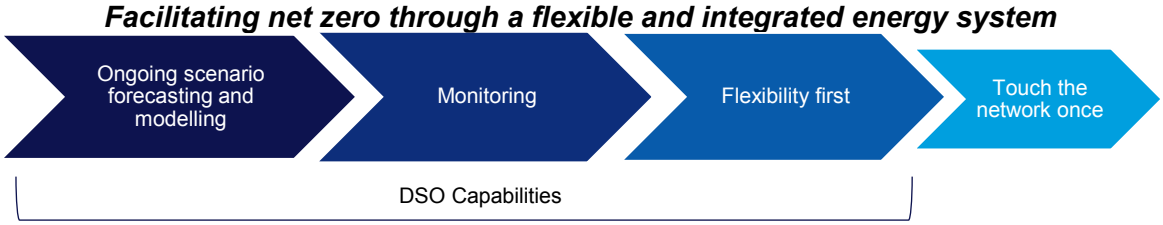


Figure 28 – selection of our DSO deliverables and initiatives

Step 4 – touch the network once

7.79 Whilst customer and network flexibility will be deployed where this represents the optimum solution for customers, it does not eliminate the need for a step-change in network reinforcement required over the next number of price controls to manage network constraints and to facilitate net zero.

7.80 It is incumbent on NIE Networks to ensure that disruption will be minimised and whole life cost efficiency maximised by aiming to 'touch the network once'. This approach is more cost-efficient and less disruptive to our customers compared to adopting a purely reactive approach to our interventions. Crucially, by taking a medium and long term view it also means that capacity is ready for our customers when they need it.

7.81 Our 'touch the network once' strategy will ensure that:

- When we deliver network investment due to capacity, asset condition or connections activity the network is future proofed for net zero requirements, delivering whole life cycle cost efficiency. This may mean, for example, increasing the size of the asset required or installing additional circuits. We will agree a forecasting methodology with the UR.
- We will not be able to extend this approach to fault scenarios due to the associated planning and delivery time. However, we have reviewed our specifications and updated them to ensure that we are replacing faulty assets with future proofed ones. We discuss this in more detail in Table 9.
- Adopting a whole system approach to identify optimal and efficient solutions, across the energy sector, to minimise cost, timelines and disruption for everyone.

What's the alternative?

If we did not adopt a 'touch the network once' approach, it would mean that we would take a shorter-term view when sizing our assets and designing the network. Whilst this approach would deliver small savings in the short-term due to the comparative differential in material costs of the smaller assets against those with larger capacity, it has the following disadvantages in the medium and long-term:

- Increased cost – repeated interventions may be required to the same network over the short term.
- Increased disruption – more interruptions of supply and disruptive excavations and roadworks outside our customers' premises.
- Increased deliverability burden – having to revisit the same network twice and plan multiple outages puts an unnecessary strain on deliverability resources.

In light of this we believe that the most prudent approach to take is to, where our forecasting and modelling indicate it to be appropriate to do so, size our assets and design the network not just to meet the needs of RP7 but also for regulatory periods to come.

Facilitating net zero through a flexible and integrated energy system

7.82 Key examples of how we'll 'touch the network once' in RP7 are outlined below:

Proactive network planning

7.83 Historically, NIE Networks has taken a reactive approach to network congestion identification on the secondary network, planning network investment based on issues identified through other works on the network. Whilst this has been appropriate in the past, to avoid the network from becoming a blocker to decarbonisation we need to take a proactive approach to secondary network planning, systematically studying the entire network to identify both current and future congestion. This consideration of future constraints when dealing with the present constraints will ensure that the network is developed in the most efficient and economical way to deliver net zero. This will also require significant IT development including a fully connected LV model and increased investment in planning engineers to perform the required studies.

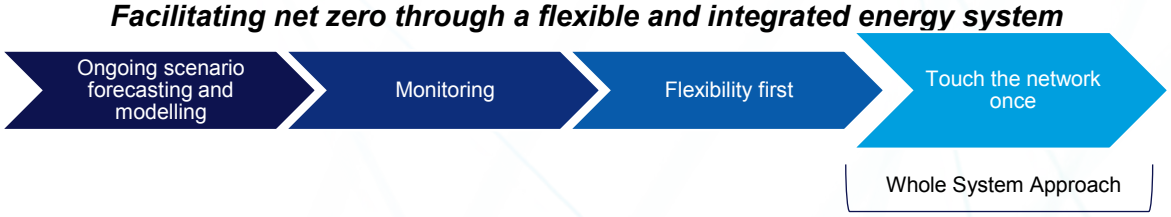
11kV rebuild specification

7.84 Some of our low capacity conductors used on our 11kV overhead lines are no longer suitable for the distribution system requirements of the future. The 25mm^2 conductor used on the 11/6.6kV network is no longer fit-for-purpose due to voltage and capacity constraints presented by its design and the anticipated LCT uptake.

7.85 We have therefore revised our overhead line specification by increasing the minimum size of the conductor we use. As well as providing asset health and resilience benefits, this is necessary to address capacity constraints in a way which ensures that when we visit our 11kV overhead line circuits as part of our rolling programme that we are performing the intervention works necessary to ensure these sections of the network are suitable for long-term network requirements. This is in keeping with our 'touch the network once' strategy.

7.86 We have already begun a 15-year rolling programme, recently approved by the UR as part of the RP6 'Green Recovery' investment programme, in which we will address every 11kV overhead line in NI to replace any low capacity overhead lines with suitably rated higher capacity lines, as well as upgrading any transformers on these lines which can become overloaded by the connection of even one LCT. We are planning to continue this 15-year programme into RP7 to ensure that the rural electricity network does not become a blocker to the decarbonisation of rural communities. Read more about this approach in EJP 1.104 – 11kV/6.6kV Overhead Line Rebuild.

7.87 However, to truly unlock our 'touch the network once' strategy, we must increasingly take a whole system approach. Our whole system vision is outlined below.



Our whole system vision

7.88 We strongly consider that net zero can only be achieved by working together, across the wider energy sector and society. By doing so, more optimal and efficient solutions will be identified, minimising cost, timelines and disruption for everyone. This means that solutions developed for electricity must be cognisant of potential impacts on and benefits to other energy sectors and society – this is a whole system view. This section sets out our whole system vision and the framework and solutions that we propose to implement.

7.89 The most critical whole system thinking begins within NIE Networks, particularly between departments responsible for developing the network. This is critical to ensure that we deliver our 'touch the network once' strategy and realise customer efficiencies. This thinking has been embedded within NIE Networks over many years and is one of the reasons why we are consistently among the top performing UK DNOs in terms of overall efficiency. However, we recognise there is more to do; we must continue to seek out further internal whole system opportunities and further embed this culture within the company, particularly as we embark on a period of sustained growth.

7.90 The benefits of whole system thinking are clear to NIE Networks as we seek to efficiently design the network for the future. The energy sector in Northern Ireland must develop a whole system approach through increased collaboration to ensure all investment is optimised. Our RP7 business plan reflects this approach where possible. This means developing a range of options for clean energy in all its various forms and developing integrated schemes and low carbon solutions to deliver value for customers, as well as keeping the energy flowing.

7.91 This important point has been outlined within Action 22 of the Energy Strategy for Northern Ireland 'The Path to Net Zero' Action Plan – "Build further evidence and understanding on the linkages across our whole energy system". Furthermore, the UR in its RP7 Approach document, requested that we outline "[how] the company intends to enable whole system solutions including working with the Transmission System Operator (TSO) which will deliver long-term whole system thinking and value to consumers."

7.92 This section sets out our whole system thinking within the context of RP7. Section 7a sets out the whole system cost optimisation that we have delivered in this plan.

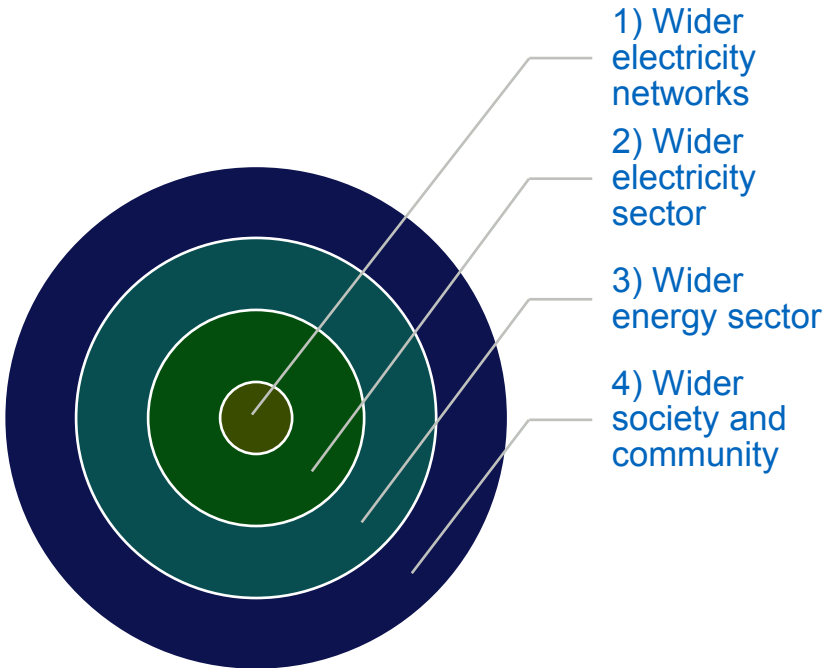
Facilitating net zero through a flexible and integrated energy system

RP7 whole system framework

7.93 Informed by our work with the ENA Open Networks project and influenced by stakeholder views we set out to establish a whole system framework which outlines the various sectors included within whole system and the activities involved.

7.94 In the figure and narrative below, we consider the various different whole system sectors.

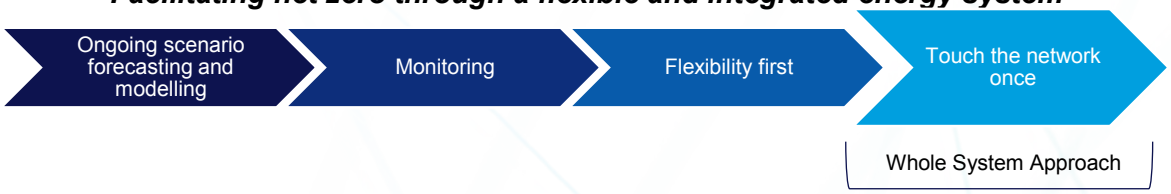
Figure 29 – whole system sectors



1. **Wider electricity networks** are our closest whole system partnership. It relates to our close engagement and collaboration with SONI as we collectively plan, build and operate the electricity network in Northern Ireland. We have tried and tested processes and collaboration with SONI; however, we recognise the need to do more. This also relates to our collaboration with other DNOs and TSOs via the Electricity Networks Association and with ESB Networks in the Republic of Ireland. Finally, this partnership encapsulates the emerging role of microgrids in Northern Ireland.

2. **Wider electricity community** encompasses generators, electricity suppliers, and aggregators who directly interact with the electricity network and markets. This sector also includes local energy communities as they seek to reduce, purchase, manage and generate energy for the local community[24].

[24] Community Energy - GOV.UK (www.gov.uk)



3. **Wider energy communities** include the decarbonisation of the heat and transport sectors. Importantly this includes other utilities such as the gas and water industries, where information, access to assets and collaboration between sectors has the potential to deliver significant whole system benefits.

4. **Wider society and community** relate to policy makers, local councils and authorities as they seek to decarbonise their respective areas. The fuel poor and most vulnerable in our society will likely be included within this group and as such must be supported to ensure a just transition to net zero. Finally, this sector includes academia as we seek out new and better ways of doing things.

Whole system solutions

1. **Engagement / collaboration** is the foundation of all whole system activity. Enhanced engagement and collaboration are necessary to understand each other's needs and seek out where whole system opportunities exist. We will also use our expertise to support stakeholders to develop and realise their own net zero aspirations.

2. **Data provision**. Data is essential to unlock whole system benefits for our customers and stakeholders. Increasing the data that we make available to stakeholders enables more informed and timely decision making regarding their energy needs and encourages increased participation in flexibility markets. It also enables entrepreneurs to come up with business propositions and create value from the data. That's why data is a fundamental cornerstone of our RP7 DSO strategy.

   Read about how we're already making our data open to the public through our open data portal.

3. **Coordinated planning and/or operation** involving local councils and energy sectors to avoid siloed solutions and enable whole energy system solutions to minimise cost, timelines and disruption.

4. **Shared infrastructure** between entities to avoid duplication of costs for customers and exploit synergies in objectives.

7.95 Figure 30 below provides a summary of the whole system activities that we are currently engaged in and plan to develop over the course of RP7.

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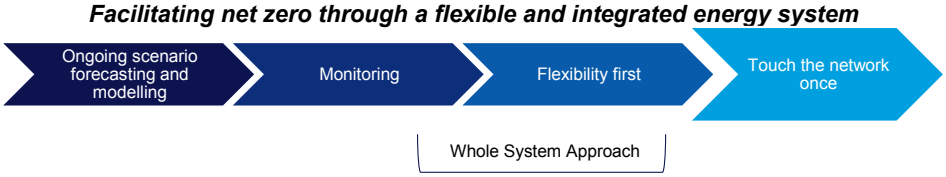
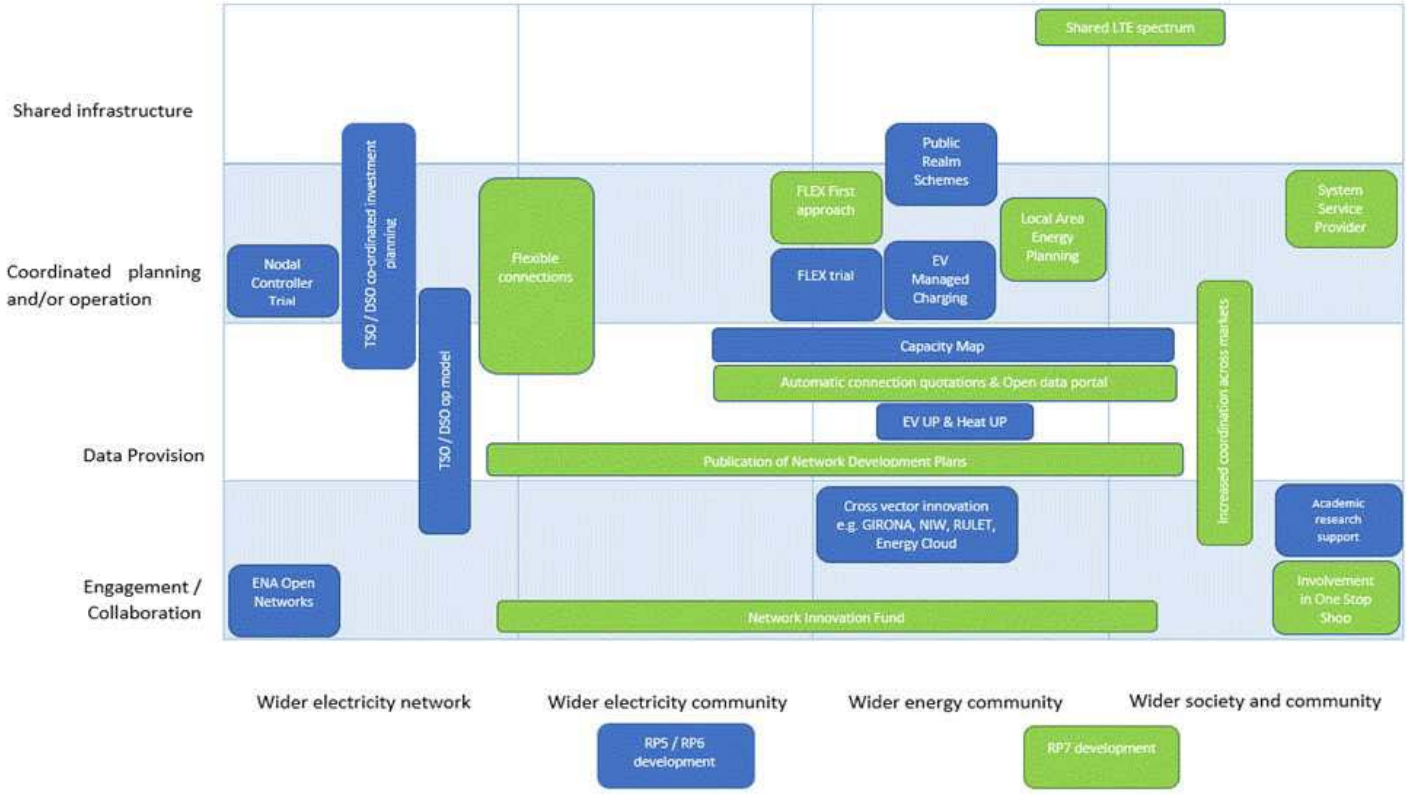


Figure 30 – whole system activity mapping



Facilitating net zero through a flexible and integrated energy system

Key whole system activities

7.96 Whilst not an exhaustive list, some key whole system activity examples are outlined below.

Activity 1: Local Area Energy Planning (LAEP)

7.97 As identified as part of the Open Networks project[25] there is a need to ensure a coherent and consistent approach for the development of energy network within local areas. This has been achieved to date, to a limited extent, through the joined-up approach to public realm schemes within Northern Ireland; however, as local areas and councils develop their net zero plans, there will be unprecedented development of energy networks, necessitating the need for a coherent and consistent approach across the wider energy sector.

'This ambition, if appropriately costed, aligns with consumers' desire for industry to demonstrate leadership in the journey to net zero.'

The Consumer Council

"Ensuring that NIE Networks can offer dedicated support will be an important part of the energy transition, particularly at local community level, where upskilling and education will be very important."

National Energy Action NI

7.98 Within our RP7 public consultation we asked "Do you agree with the mobilisation of an NIE Networks' Local Area Energy Planning team to support wider stakeholders including local authorities and councils in their journey to net zero? If so, what type of support should the team provide?" All respondents offering an opinion agreed with the proposal (33 in total). There was no dissent, although there were some cautionary comments about the availability of expertise in councils, which have not traditionally had an energy system planning role. There was also some encouragement to involve community initiatives. We have noted additional remarks from councils about their green energy planning initiatives and we are considering how best to support them in advance of the RP7 period.

7.99 On this basis we have included allowances for six experts within our RP7 indirect allowances to proactively engage with key players across the energy spectrum, seeking to leverage whole system opportunities including supporting LAEP.

'We anticipate in future that, across gas and electricity network development plans, the inability to show such a robustly 'joint-up' considered view of potential development requirements across the whole energy system may increase the risk of disapproval / delay to approval of plans developed separately. Therefore, continuing with the current approach employed in each sector is not in the interests of NI energy consumers, nor delivering governmental energy decarbonisation policy. The ongoing delivery of a suitable joint system planning approach should be a key commitment of, and output throughout, the RP7 period, and the work to scope such a framework should commence now, to establish it ahead of the RP7 period commencing.'

Mutual Energy

[25] Open Networks Whole Energy System workstream (WS4)).

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7.100 We agree with stakeholders in their response to our consultation that a framework should be developed to deliver joint system planning, and as part of the ENA Open Networks project we have developed a potential framework[26] to enable coherent and consistent LAEPs, summarised below:

Table 5 – proposed whole system planning framework

Step 1	Step 2	Step 3	Step 4
Local Authorities confirm the objective to be met, which could include clean air, decarbonisation, housing, business and industrial growth, renewable energy projects or waste to energy production. Constraints could include timescales to provide energy network capacity or to reduce emissions, and land or other physical constraints. The Local Authorities may include options/scenarios such as different low/zero carbon transport or heating solutions.	The energy networks (e.g. electricity and gas) independently identify the efficient sector specific investments required to their networks to provide the incremental capacity, including indicative timescales and delivery risks.	Where network reinforcements are required or where significant delivery risks are identified, the networks will work together to produce alternative options using available capacity on the other network. The networks can also consider conversion of existing customers to the other vector as a tool to derive a full range of options. Examples could be conversion of electric heating on to a district heating scheme, or switching a multiple occupancy building from individual gas supplies to electric heating (or a local CHP).	The networks present the options to the Local Authorities and respond to any supplementary questions.

7.101 Such a framework will require review, refinement and governance arrangements to be established; not least, once the whole system optimum solution(s) has been identified for an area, this must coincide with necessary promotion and support schemes to align customer behaviour with these solutions. However, we anticipate that a model akin to this will deliver necessary whole system outcomes. We will engage with the relevant stakeholders and authorities to develop such a framework, under the auspices of Action 22 of the Northern Ireland Action Plan.

7.102 We recognise that NIE Networks can take a leading role and offer support to Local Authorities as they grabble with net zero thinking for their local area (step 1 of our proposed LAEP framework). Our stakeholders have clearly told us that we should mobilise a team in RP7 to support wider stakeholders including local authorities and councils in their journey to net zero[27].

[26] open-networks-2020-ws4-p4-final-repot.pdf (energynetworks.org)
[27] In response to Q3 of our RP7 public consultation.

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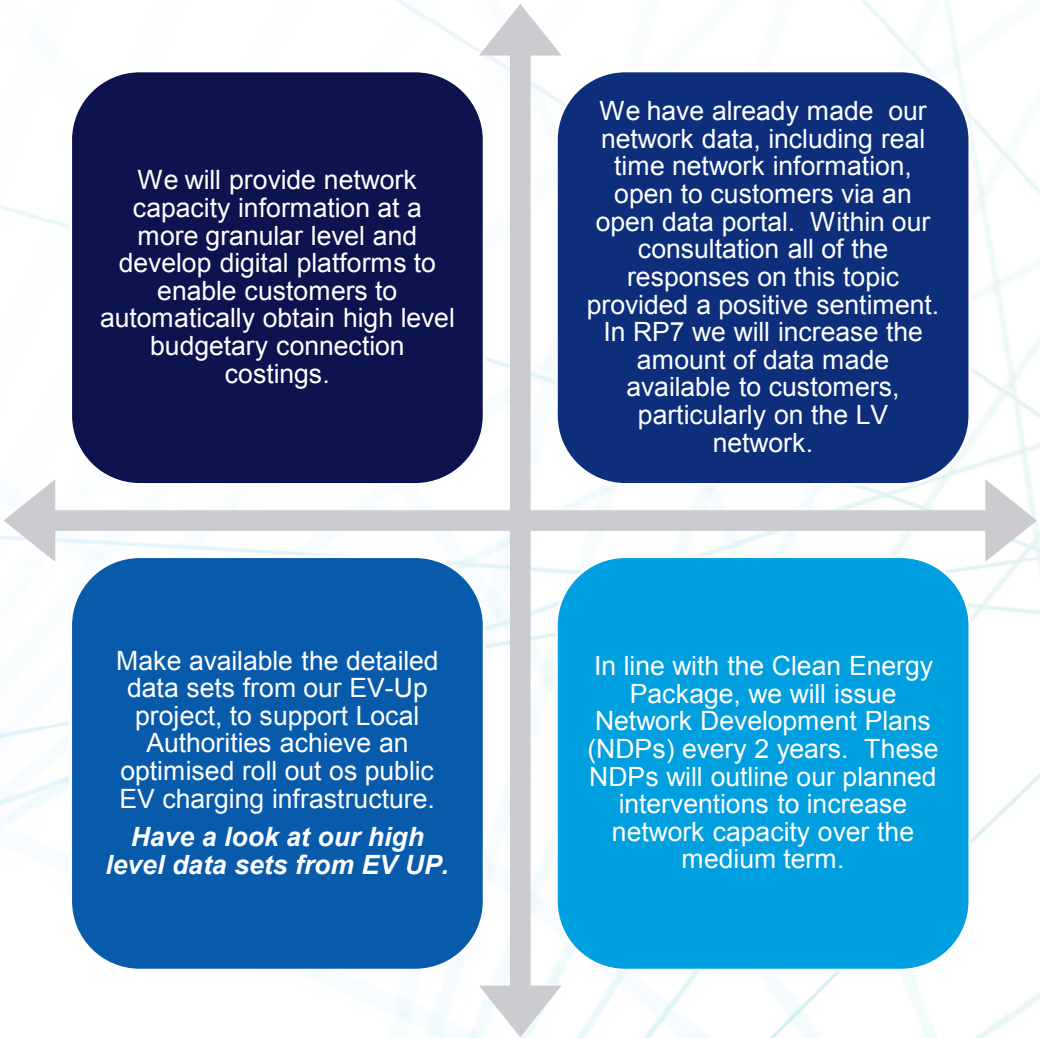
Activity 2: Data provision

7.104 As outlined, data is essential to unlock whole system benefits for our customers and stakeholders. Increasing the data that we make available to stakeholders enables more informed and timely decision making regarding their energy needs and encourages increased participation in flexibility markets. It also enables entrepreneurs to come up with business propositions and create value from the data. On top of what we already provide to customers we propose enhancing the data we make available through the following whole system and DSO initiatives.

Figure 31 – key data provision enhancement initiatives



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Activity 3: Long Term Evolution (LTE) Communication

7.105 To facilitate the development of DSO functionality and the achievement of net zero we will require higher speed, Internet Protocol (IP) based communications extending much further into the distribution network than the current reach. Our detailed analysis has concluded that the optimum solution is a Long-Term Evolution (LTE) network, which we plan on implementing in RP7.

7.106 However, we also believe that there are whole system shared infrastructure opportunities, by sharing this communication spectrum with other utilities and agencies, making the most efficient use of the spectrum and reducing costs to consumers. A focus group has been established to inform and gain support for critical utility spectrum by engaging with OFCOM, DfE and other interested stakeholders such as NI Water, gas sector, and PSNI.

For more information on our Telecommunication Strategy please refer to EJP 4.102 – DSO Operational Telecoms Network Transition

How will we deliver whole system solutions?

7.107 We consider that the following three steps will enable a whole systems approach to adopted in RP7:

Ensure we are appropriately resourced

7.108 To deliver the necessary step-change in whole system behaviour, we have included provision for six experts within our RP7 indirect allowance requests to proactively engage with key players across the energy spectrum seeking to leverage whole system opportunities including supporting LAEP. It should be noted that whole system and delivering DSO capability are closely linked and additional resources requested to deliver DSO capability will also be utilised to deliver whole system solutions.

Ensure allowances are adequate

7.109 Our ex-ante allowances do not include for whole system investment where this drives additional investment in the RP7 period to ensure whole life cost efficiency and minimisation of customer disruption. As such, we have proposed a suite of agile and efficient uncertainty mechanisms which unlock the potential for a whole system approach to be adopted in RP7 and beyond. You can read more about our proposed uncertainty mechanisms in chapter 10.

A connections charging review

7.110 Our 'touch the network once' strategy cannot currently be effectively applied to network reinforcement which is driven by new distribution connections due to the current connection charging arrangements in NI.

7.111 Connections charging is a key area of concern for our customers; however, this falls outside of our RP7 business plan, as required by the UR in its RP7 Final Approach paper[28]. Distribution connection charging in Northern Ireland involves the recovery of the total reinforcement costs at the connection voltage and one voltage up that will be incurred as a result of connecting new load or generation to the system, through an up-front connection charge required to be paid by the connecting customer.

7.112 Our customers have told us that high distribution connection fees are dissuading some from connecting to the network. This is slowing the uptake of LCTs including electric vehicles and heat pumps, and reducing the attractiveness of Northern Ireland as a region to connect for large energy users in the commercial and industrial sectors. It follows that the current distribution connection charging arrangements in Northern Ireland are a significant barrier to meeting decarbonisation and 2030 Energy Strategy targets.

7.113 The current distribution connection charging arrangements in Northern Ireland differ significantly from those in Great Britain and Republic of Ireland. While the overall connection cost is similar, it is who contributes to the cost that is different. In Northern Ireland the connecting customer pays a much higher proportion of the cost which has resulted in Northern Ireland becoming a less attractive jurisdiction for investment in distribution connections than its counterparts. It is apparent that steps are being taken in the rest of the UK to address the issue of deep distribution connection charging, and we feel it is important that Northern Ireland is not left behind in this space. The consequence of not keeping pace with neighbouring jurisdictions is a lack of investment in Northern Ireland, and particularly a negative impact on both load growth and economic growth.

7.114 This is an area that we cannot change on our own. Any change to current connections charging policy in Northern Ireland requires a UR decision. We welcome the Utility Regulators inclusion in its Draft Forward Work Plan for 2023/24 to commence a review of connections charging policy. We are advocating for a Connections Charging Review in Northern Ireland to more closely align connections charging methodology in Northern Ireland to that of neighbouring jurisdictions. The aim is to ensure there is a level playing field in connections charging in order to encourage investment in the wider economy in Northern Ireland.

7.115 Reinforcement costs associated with new or increased connections at the connecting voltage and the next voltage up are not included in the RP7 Business Plan, these costs are fully chargeable to the connecting customer based on the current connection charging methodology[29]. Reinforcement costs two voltages up from the connecting voltage are included within the RP7 business plan as this reinforcement is not chargeable to connecting customers based on the current connection charging methodology."

[28] https://www.uregni.gov.uk/news-centre/rp7-final-approach
[29] The exceptions to this are the Cluster Methodology, the Standard Housing Fee for housing developments greater than 12 houses and instances where reinforcement for domestic LCTs have been covered through Green Recovery funding.

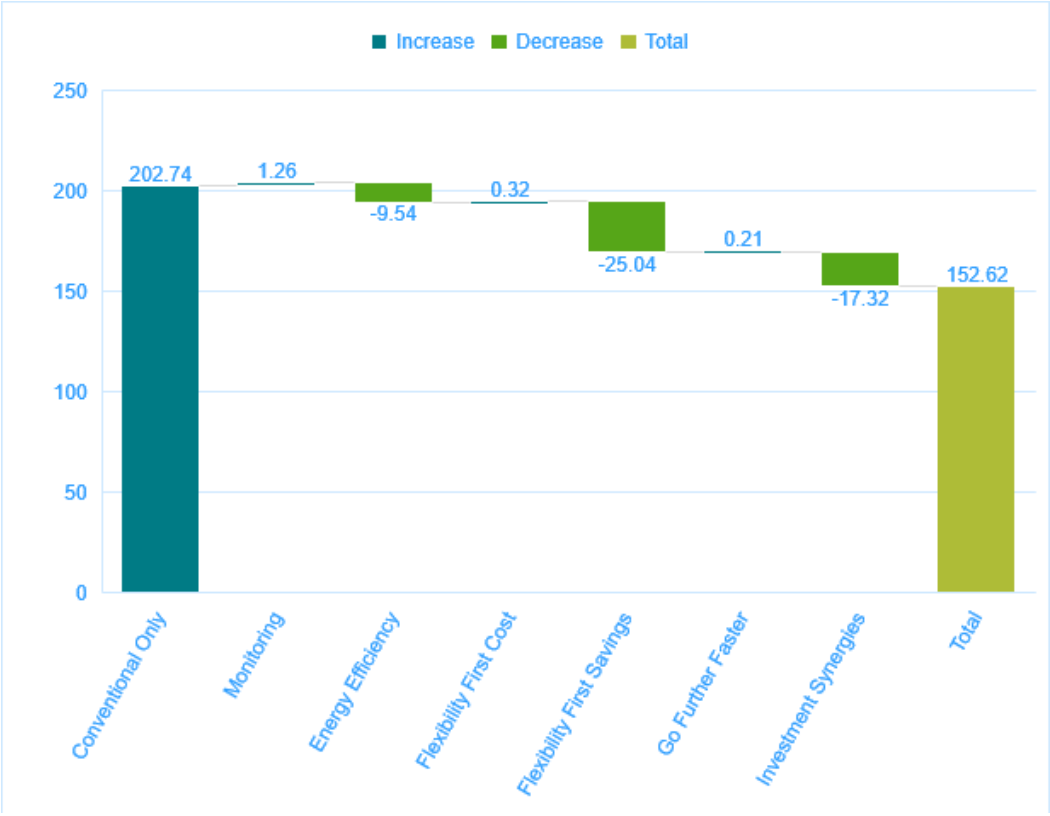
What we will deliver in RP7

7.116 The table below summarises the investment required in RP7 to facilitate net zero through a flexible and integrated energy system. Figure 32 presents the impact of our 4-stage approach on our baseline investment requirements, showing the impact of our 'flexibility first' approach and the identification of synergies with other investment drivers.

Table 6 – RP7 investment to facilitate net zero

		£m
Primary Network	Forward Powerflow	29.98
	Reverse Powerflow	19.96
Secondary Network	11kV and 6.6kV Network	33.64
	Distribution Transformers	41.40
	LV Network	26.38
Monitoring	33kV,11kV and 6.6kV	1.26
Total (Excluding 11kV Rebuild)		**152.62**
Secondary Network	11kV Rebuild Programme[30]	217.73
Total		**370.35**

Figure 32 – the impact of our 4-step approach to facilitate net zero



[30] Whilst its primary driver is to facilitate net zero, it will also have significant network health drivers and therefore it is not impacted by our Flexibility First approach.

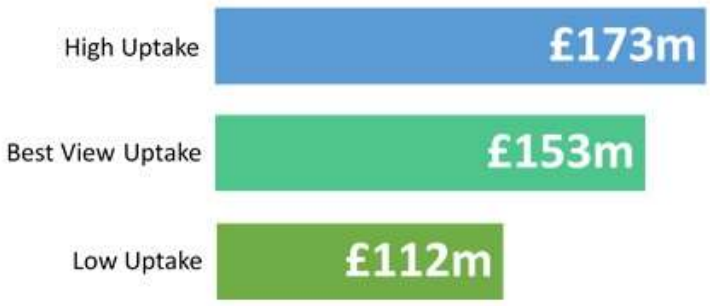
Conventional Only	Reference point for network costs before savings and optimisations are accounted for
Monitoring	As part of the DSO strategy the roll-out of increased network monitoring optimises investment decision making and smart or flexibility solutions
Energy Efficiency	Impact of incorporating energy efficiency measures taken by our customers into our modelling
Flexibility First Cost	Investment in network and customer solutions to release flexibility savings
Flexibility First Savings	Investment which is deferred through the use of flexibility rather than conventional network reinforcement solutions
Go Further Faster	Investment to stimulate flexibility market development in preparation for RP8 requirements
Investment Synergies	Reduction across the entire plan to account for synergies with the other investment programmes

Expenditure across scenario pathways

7.117 Our business plan is developed to deliver our best-view scenario and through our prudent modelling approach we do not consider that the low uptake scenario is representative of the future energy pathway for NI and the subsequent network requirements. When determining our investment requirements, where inherent uncertainty exists we have deliberately adopted prudent assumptions to ensure that there is low risk that our baseline expenditure will not be fully required during RP7. This is displayed in Table 6.

7.118 However, we have the capability to flex our modelling and in order to provide an indication of the impact of other scenarios on investment requirements we have conducted high-level analysis on the impacts that the other pathways would have on the overall investment requirements for RP7. Figure 33 below illustrates how these scenarios compare to our best view and how our plan would adapt across these scenarios. Where actual levels of uptake are higher than our baseline scenario, we will use uncertainty mechanisms to address the difference. Note that the costs presented above do not include the 11kV rebuild as it is a cyclic programme and does not flex based on LCT uptake.

Figure 33 – expenditure across scenarios



b. Maintaining a safe, reliable and resilient network

Overview

7.119 Our electricity network consists of c.2,200km of Transmission network and c.47,000km of distribution network, serving around 910,000 customers. The electricity network consists of and comprises a range of specialised equipment including overhead line conductor, wooden poles, steel towers sometimes referred to as pylons, underground cables, circuit breakers and power transformers. If these assets fail they can cause significant damage, safety issues and disruption to customers and therefore we manage our assets in a way to avoid them getting to the point of failure.

7.120 The vastness of the electricity network means that it traverses most parts of our country and in RP7 more people will be interacting with it than ever before as customers connect unprecedented levels of LCTs and generation and our own staff and contractors deliver a much bigger larger network investment programme. As such it is imperative that in RP7 our first and greatest concern is the safety of our staff, contractors and customers, aiming to provide a 'Zero Harm' environment for all those interacting with our network throughout the RP7 period and beyond.

7.121 A significant proportion of the network was built between the 1950s and 1970s and is now between 50 and 70 years old. Whilst asset age is not a reason in itself to qualify an asset for replacement, assets tend to deteriorate in condition significantly when approaching or exceeding the limit of their design life. The age profile of the network therefore represents a major challenge in the management of long-term network performance.

7.122 It is clear that customers will expect increasing levels of network performance as they become more reliant on electricity to heat their homes, charge their cars and work from home. In response to our RP7 public consultation, stakeholders told us that as a minimum, network reliability must be maintained into the future[31], with strong disagreement for any reduction in reliability, even for a cost saving. On the rare occasions when assets do fail, customers told us[32] that we should aim to reduce the impact that this has by installing automation devices, and additionally agreed with our proposed climate change resilience measures[33].

7.123 Both the reliability and resilience of the network have an important role to play in delivering increased network performance in RP7 and beyond.

Network performance = network reliability + network resilience

7.124 We define network reliability as the likelihood of our assets failing. Generally speaking we manage network reliability through asset maintenance and replacement activity. Whilst these activities can be costly, they minimise the risk of our assets failing in the first

> *"In our opinion, any plan that would assume a less reliable system would be deeply flawed, involve higher costs later, and might have unforeseen safety implications."*
>
> Maxol

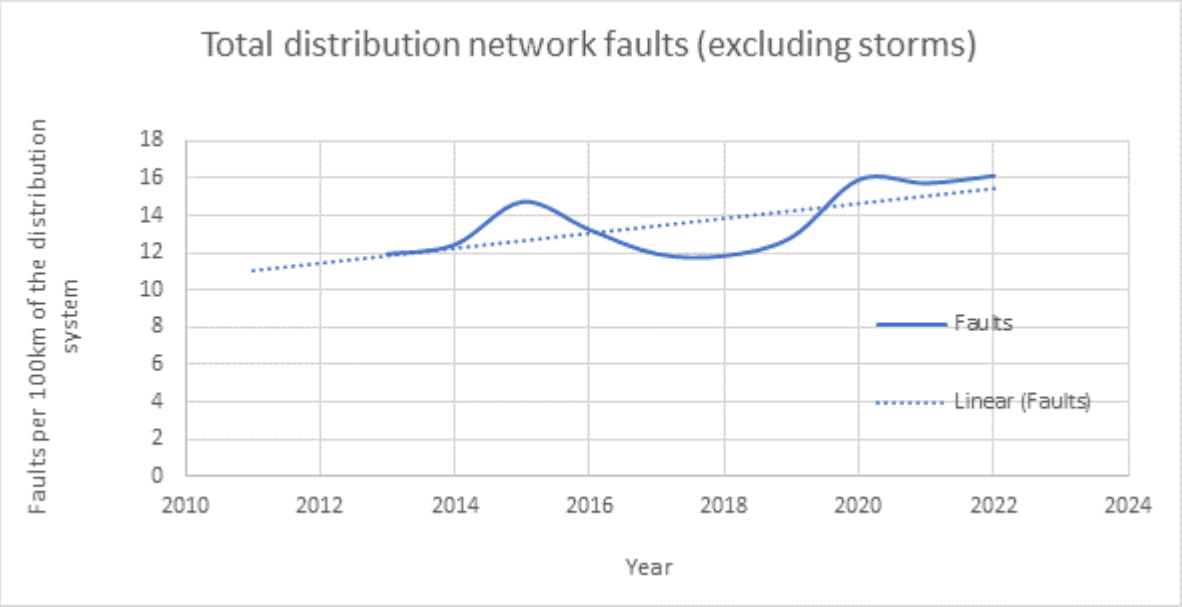
[31] 100% of respondents that voiced an opinion on Q38 agreed with maintaining the reliability of our network.
[32] Q15, 22 stakeholders agreed with automation proposals, 1 disagreed.
[33] Q18, 17 stakeholders agreed with our climate change adaption measures, 1 disagreed.

place, providing maximum benefit to customers and keeping the network as safe as possible.

7.125 Over time we have noticed an incremental increasing trend in the number of faults on the distribution network, shown in Figure 34 below, representing a slight deterioration in network reliability. We cannot allow this trend to increase further, otherwise the number of faults on the network will become unsustainable, increasing customer disruption and cost and posing significant deliverability challenges in RP8 and beyond when wholesale reliability improvements would be required.

7.126 Taking this into account, alongside stakeholder feedback and the fact that we're preparing this plan in the midst of a cost of living crisis, we plan to broadly maintain the health, and therefore reliability of the network over the course of RP7 period.

Figure 34 – total distribution network faults[34]



[34] Northern Ireland Electricity plc (nienetworks.co.uk)

7.127 Network resilience is the ability of assets, networks and systems to anticipate, absorb, adapt to and / or rapidly recover from a disruptive event[35] . Resilience can be improved through measures such as faster staff response time, deployment of network automation and preventative measures to mitigate against the impact of climate change and physical security threats. These interventions are generally less expensive than significant asset replacement projects, and whilst in many cases they may not prevent assets from failing in the first instance, customers will be impacted to a much lesser degree and for a lesser time period.

> *"Network resilience to infrastructure failure and damage will become even more important as energy provision further consolidates. The resulting impact of any large-scale electricity outage could have severe safety and/or economic consequences and the risks must be appropriately mitigated via appropriate levels of operational spend and capital investment.*
>
> *Another key consideration across each of these areas, is customer confidence. Network Operators must ensure customers' expectations of a guaranteed energy supply continue into the future. The ability to bring customers along the energy transition pathway would be severely curtailed if Network Operators allow any drop in historical levels of performance going forward."*
>
> Phoenix Natural Gas

7.128 We have made substantial resilience improvements during RP6 evidenced through a significant CML reduction over the period. However, customers expect continued network performance improvements as they decarbonise their lives and as such we propose improving the resilience of the network.

7.129 We will target a challenging 8.17% reduction in our unplanned CML target. We consider that this strikes the correct balance between delivering the network performance improvements that our customers require whilst ensuring costs are kept as low as possible.

7.130 We also acknowledge that as customers seek to electrify their lives it is no longer acceptable to have such a significant difference between the level of service that customers experience just because of where they live and the type of electricity network supplying their home. Our view is that if this is not addressed, it will become a blocker to some customers decarbonising their lives. We want to ensure that our RP7 plans facilitate a Just Transition to net zero and our stakeholders agree.

7.131 Within our RP7 consultation we asked if stakeholders agree with our proposed approach of targeting the top 6 worst performing circuits on the network. While approximately half of the respondents agreed with our proposals, the other half disagreed and thought we should go further[36]. On the back of this we propose taking a targeted levelling up approach by investing £3m in deploying network resilience improvements to the 15 poorest performing circuits and reducing the number of customers classified as worst served by 50% in RP7.

[35] House of Lords - The Resilience of the Electricity System - Science and Technology Committee (parliament.uk)
[36] Of those that responded to our worst served customer question 13 agreed with targeting the top 6 worst performing circuits and 12 thought we should go further.

Maintaining a safe network

7.132 Maintaining a safe network is our greatest responsibility. We aim to provide a zero-harm environment for all those interacting with our network. During RP6 we have prioritised investment activities to ensure our network is safe, delivered key public safety programmes to manage and reduce risk associated with the electricity network and initiated our safety culture transformational programme: Safer Together.

7.133 As our customers transition to net zero, the electricity network will be placed under greater pressure than ever before, with our staff, our contractors and LCT installers more frequently interacting with the network. We will ensure our network remains safe and effective by –

- continuing to transform safety culture within NIE Networks through our 'Safer Together' programme;
- doing more engagement and education with specific skills sectors, the public and schools; and
- continuing to prioritise safety-related investment to periodically replace assets according to their condition.

Continue to transform safety culture within NIE Networks through our 'Safer Together' programme

"Safer Together Our Pathway to Zero Harm" programme was developed as an enabling action plan to improve adherence to our safety value, reduce the risk of harm and improve the wellbeing of our staff within the organisation. The Safer Together Programme continues to refocus our commitment to our safety value, through promoting an open and proactive safety culture with the full involvement of all. This has been reinforced through strong and visible leadership and the implementation of a series of safety improvements throughout the latter part of RP6.

The Programme structure comprises a steering group, twelve working groups, sub groups and directorate improvement plans. To date, 470 staff have been involved in at least one of the groups.

In 2023 The Safer Together journey enters a new stage where it will evolve to become Safer Together Cultural Journey. The focus of this will be transforming the way we approach safety by developing the safety maturity of the organisation and enhancing the physiologically safety of all employees. This will be done by working with every manager to ensure there is visible felt leadership, the creation of a structure that facilitates employees to be empowered to take on local challenges and adaptive challenges that exist in the organisation.

This transformational journey will take place with support from external consultants for 3 years after which point the transformation will be sustained in the organisation by having our own people to fulfil the role that the consultants have played in the transformational journey.

Doing more engagement and education with specific skills sectors, the public and schools

7.134 Safety is central to everything that we do in NIE Networks and we are committed to protecting the Health, Safety and wellbeing of our employees, contractors, customers, members of the public and all other key stakeholders. The safety of the public is a key objective and forms part of our regulatory requirements. We aim to ensure that we will do all we reasonably can to protect the public and their property from injury and damage associated with the electricity network. Our public safety activities will be an area of focus and a core strategic priority. Our Public Safety Strategy has been developed to deal with emerging risks and take advantage of advancements in technologies. It sets out our commitment and intent on how we plan to raise awareness about the dangers of coming into contact with, or close proximity to, our electricity network and equipment.

7.135 Our aim is to reduce the number of incidents, accidents and 'Near Misses'. Our Public Safety Strategy is focused on –

- our at-risk stakeholders such as farmers, construction workers, tree-surgeons and other utility workers who are at risk of coming into contact, or in close proximity to, the electricity network due to their work;
- the general public, including children, who may come into contact with, or in close proximity to, the electricity network through fallen wires or through sports and leisure activities; and
- the general public who may come into contact with, or in close proximity to, the electricity network through accidental or deliberate actions; for example: carrying out domestic DIY close to electricity wires or entering an electricity substation.

7.136 In implementing the Public Safety Strategy, we will –

- collaborate with stakeholders and educate them on the safety risks and their responsibilities in the management and mitigation of these risks;
- raise public awareness and educate the public on the safety risks associated with our electrical equipment; and
- continue to educate or employees and contractors working on our behalf on public safety risks and how to manage these risks.

7.137 To deliver this strategy, in RP7 we will increase the reach of our public safety campaign to 50,000 people annually including 10,000 school children. This is a 100% increase on RP6 levels.

Continuing to prioritise safety related investment

7.138 In RP7 we will continue to invest to ensure the safety of the network by –

- identifying safety issues and preventing faults through routine inspection and maintenance;
- refurbishing and replacing assets that are in poor condition or insufficient capacity; and

- adhering to relevant safety and legislative requirements, in particular ESQCR legislation.

7.139 Whilst most of our network investment programmes will improve the safety of the network, we outline specific safety related investment programmes below.

*Maintaining a **safe**, reliable and resilient network*

Delivering a reliable network

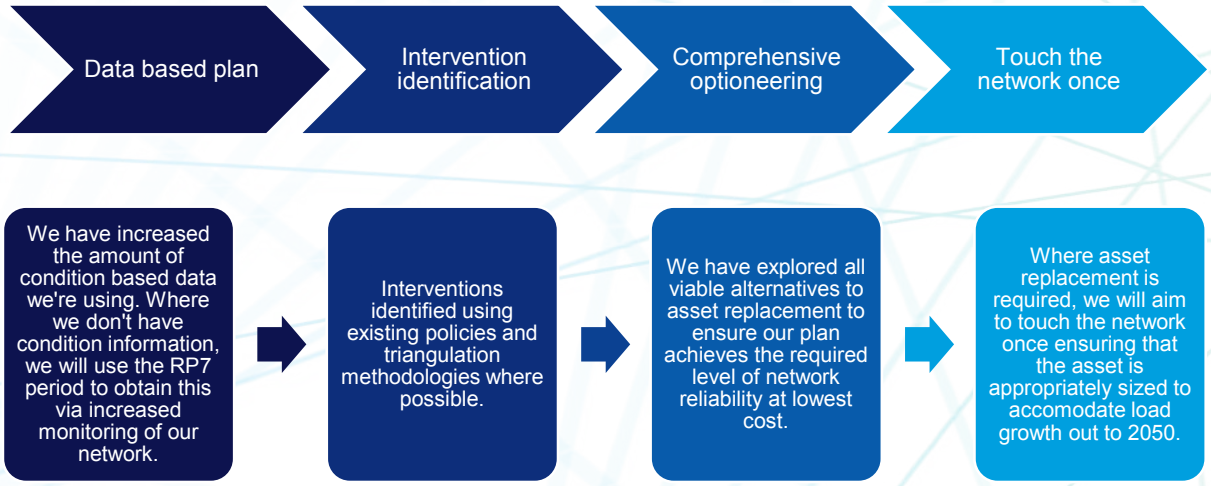
7.140 In RP6 the total value of distribution asset replacement expenditure was £174.6m representing 0.5% of the total asset base per annum. At this rate of asset replacement, assets would remain on the network until they were around 200 years old. Since assets have typical design lives ranging from 15 – 60 years, we were clear that we expect the rate of asset replacement to increase in the future. Combined with the increasing trend of asset failures on the distribution network, a significant increase in expenditure is required in RP7 to maintain the health and therefore reliability of the network.

7.141 Failure to maintain the health of the network would result in excessive degradation which would be more dangerous, less efficient in the long term, and would adversely impact customer service now and in the future. There are also further emerging challenges surrounding material and resourcing constraints availability that have been considered. The challenge is to manage this investment in a sustainable manner through careful planning and scheduling of investment.

7.142 During RP7, we will prioritise interventions based on assets in the poorest condition. We will optimise our investments by 'touching the network once' – only installing assets that have the capacity, functionality, and sustainability required to meet net zero by 2050.

7.143 On that basis, our overall Asset Management Strategy for RP7 is based on the 4-step approach shown below.

Figure 35 – approach to asset management



Maintaining a safe, reliable and resilient network

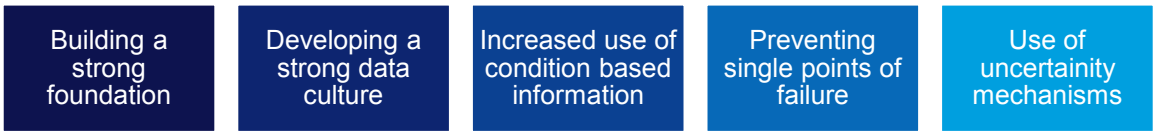
Data based plan

7.144 As an organisation we are more reliant than ever before on data. That is why we have embarked on a data journey with a mission of creating a culture where we value data as much as our physical assets. However, we acknowledge, like the UR in its RP7 approach document, that the robustness of our RP7 Business Plan is only as good as the data that it is based on. That is one of the reasons why during RP6 we have worked really hard to deliver continuous data improvements.

> *We expect NIE Networks to have developed its IT and data systems necessary to support its own robust assessment of expenditure and outputs, and we will work with them to ensure we understand these prior to the business plan submission.*
>
> UR RP7 Approach Document

> *As well as building on consumer surveys and engagement, the plan should demonstrate how targets and delivery take account of actionable data arising from day to day contact with consumers and are underpinned by good asset data and analysis, which links improved service to asset performance.*
>
> UR RP7 Approach Document

7.145 In this section, categorised into the 5-step approach below, we describe the improvements we have made throughout RP6 to provide further confidence in the data that underpins our plan.



Developing a strong data culture

7.146 To help cultivate a data culture where we value data as much as our physical assets, in 2018 we established a Data Governance & Assurance working group to deliver amongst other outputs:

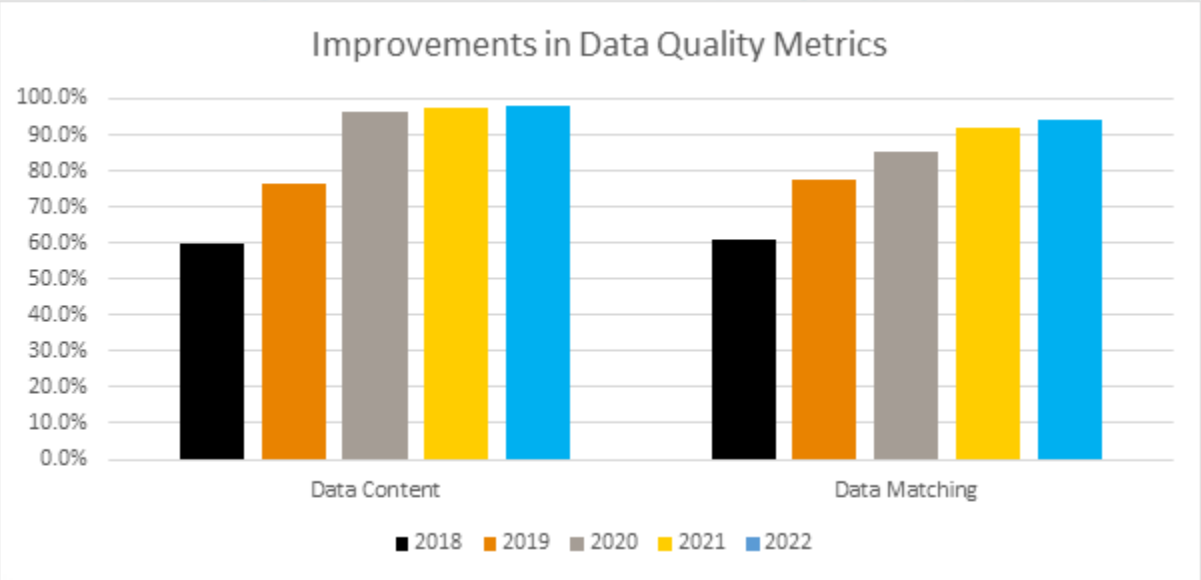
- data catalogues; data ownership and management model
- data metrics KPIs and recommendations for improvement
- introduction of new ‘data roles’ for each data type (e.g. data sponsor and data steward)
- implementation of a new ‘in-house’ data team

7.147 The working group has delivered significant improvements across various KPIs, but most notably across our two primary KPIs: data content[37] and data matching[38]. The year-on-year improvement is outlined below, illustrating the improving data culture within the organisation.

[37] How data is recorded and if this is in line with processes.
[38] Alignment of data across core enterprise systems.

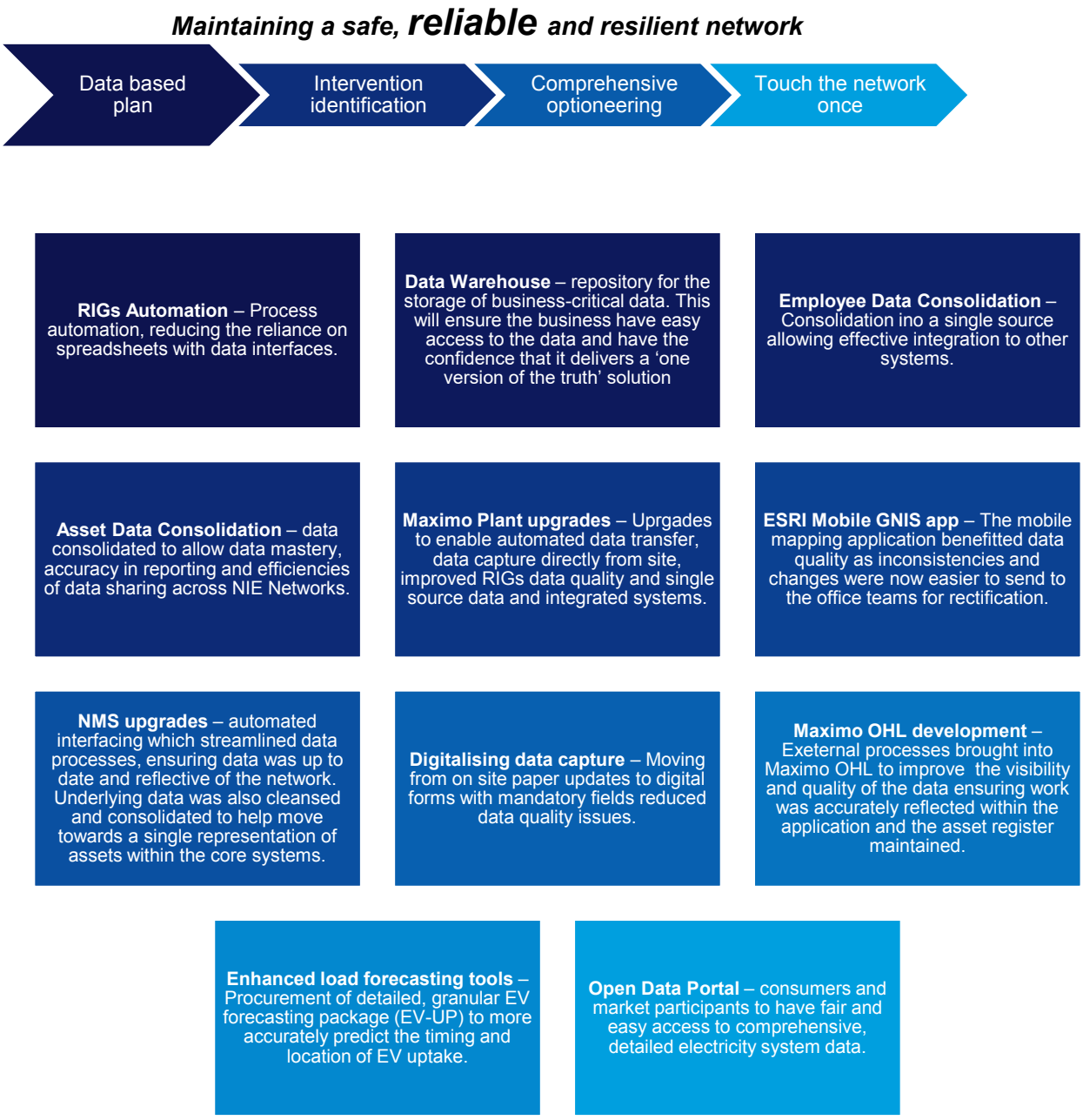
7.148 Further assurance was provided by Deloitte in September 2021 when they conducted an advisory audit of the end-to-end data flow across business areas and systems (e.g. GNIS, JMS, Maximo Plant) for a sample of Connections and Secondary Asset Replacement (SAR) jobs. A 'substantial' level of assurance (which is the highest score) was provided with a small number of recommendations which have all been implemented.

Figure 36 – improvements in data quality metrics



Building a strong foundation

7.149 Deriving improvements in our core data starts with building a strong foundation in our platforms and process. In RP6 we have made significant progress in this area, as illustrated in the non-exhaustive list set out below. Furthermore, in Table 7 below, it can be seen directly how this strong foundation is supporting our use of increased condition data with our business plan.



Increased use of condition-based information

7.150 The most appropriate asset management decisions are made when measured and observed condition information is available. This information enables better asset lifecycle management by providing knowledge which informs specifications, maintenance, refurbishment, life extension and end of asset life decision making. This is why in RP6 we have endeavoured to maximise the amount of relevant asset condition information at our disposal and have relied more heavily on it than ever before when developing our RP7 plans. In the table below, we outline some of the key input data sources, how these have improved in RP6 and how we are relying on increased levels of observed and measured condition factors.

Table 7 – data sources

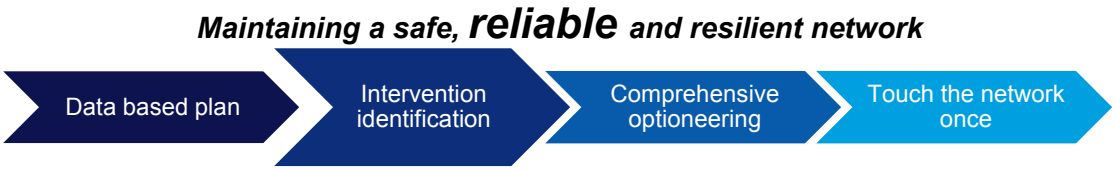
Data Group	Input Data Point	RP6 Condition Data Improvements	Data Source	Related RP6 Platform Improvements
Asset Details	Expected Life	Maintained	Maximo	Maximo Upgrade and ARCC Forms
	Current Duty factor	Maintained	Maximo	Maximo Upgrade and ARCC Forms
	Location factors	Maintained	Maximo & GIS	Maximo, GIS Upgrade and ARCC Forms
	Equipment Type	Maintained	Maximo	Maximo Upgrade and ARCC Forms
	Equipment Insulation Medium	Maintained	Maximo	Maximo Upgrade and ARCC Forms
	Equipment Construction	Maintained	Maximo	Maximo Upgrade and ARCC Forms
	Customer Impact of Failure	Maintained	Network Management System	NMS Upgrades and data consolidation
	Accounting for OEM Support	Increased	Vendor/Market Information	Continued interactions with market
	Active Investment	Maintained	RP6/D5 Plans	Programme Management Plan Enhancements
Observed Condition Factors	Condition defects	Increased	Maximo & Site Visits	Maximo Upgrade and ARCC Forms
	Photographs	Increased	Site Visits	Maximo Upgrade & 3rd Party Drone Inspections
Measured Condition Factors	Operational Adequacy	Increased	AORs & Site Visits	Continued using current platform
	Oil Tests	Maintained	External third-party results	Continued using current platform
	Thermal Imaging	Increased	External third-party results	Continued using current platform
	Fault History	Maintained	NaFIRS	Continued using current platform
	Insulation Condition	Maintained	SF_6 Database, Maximo Oil Defects	Continued using current platform
	Conductor Sampling	Increased	External third-party results	Increased amount of conductor samples completed.

Preventing single points of failure

7.151 Notwithstanding the aforementioned improvements and confidence in our input data, we acknowledge that like all DNOs it may not always be perfect. However, when making asset replacement decisions within our RP7 plan we have relied on multiple data inputs; for example: fault data, oil tests, age, etc. In the unlikely event that data inaccuracy exists in any individual data input field the impact on the final decision is mitigated through the inclusion of other relevant data inputs within the decision-making process.

Use of uncertainty mechanisms

7.152 In a small number of asset categories there is some uncertainty regarding the total volume of these assets on the network. Instead of including broad assumptions for these asset categories we have proposed uncertainty mechanisms to manage this risk. This is the case for looped services for example.



Intervention Identification

7.153 Within the RP7 plan our asset replacement strategy can we categorised as either 1) policy driven investment or 2) condition driven investment.

Policy driven investment

7.154 This approach is applied to linear assets as they are constructed from multiple components such as wooden poles, conductors, steelwork and fittings. This varied range of components degrade at different rates and are dependent upon many factors including quality of manufacture and the local environmental conditions e.g. assets close to the coast suffer from saline corrosion and assets on higher ground also suffer from environmental effects more so than those on lower ground.

7.155 Distribution linear assets investment decisions are driven by our overhead line policies. During RP6 this policy comprised of both a re-engineering specification, refurbishment specification and more latterly an 11kV rebuild specification as agreed under the RP6 green recovery process.

7.156 Overhead lines can be considered to be a perpetual asset and would not be subject to a wholesale like-for-like replacement across the network. Instead, they are subject to targeted component replacement where these components are no longer fit for service based on the results of a line survey. This ensures customer costs are kept as low as possible.

7.157 Our approach for RP7 is the continuation of our overhead line specifications established within the RP6 period, including refurbishment and re-engineering specifications for the 33kV network and re-build specifications for the 11kV network.

7.158 The 15-year rebuild programme will continue until into RP8 and RP9. After the rebuild programme is complete it is envisaged that we would revert back to a similar refurbishment and re-engineering programme.

Condition driven investment

7.159 Programmes which fall under the condition-based investment strategy, are assessed using a triangulation methodology where possible. This application of this methodology is outlined within the process below, with the 3-key steps described.

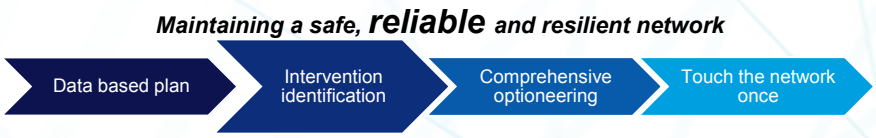
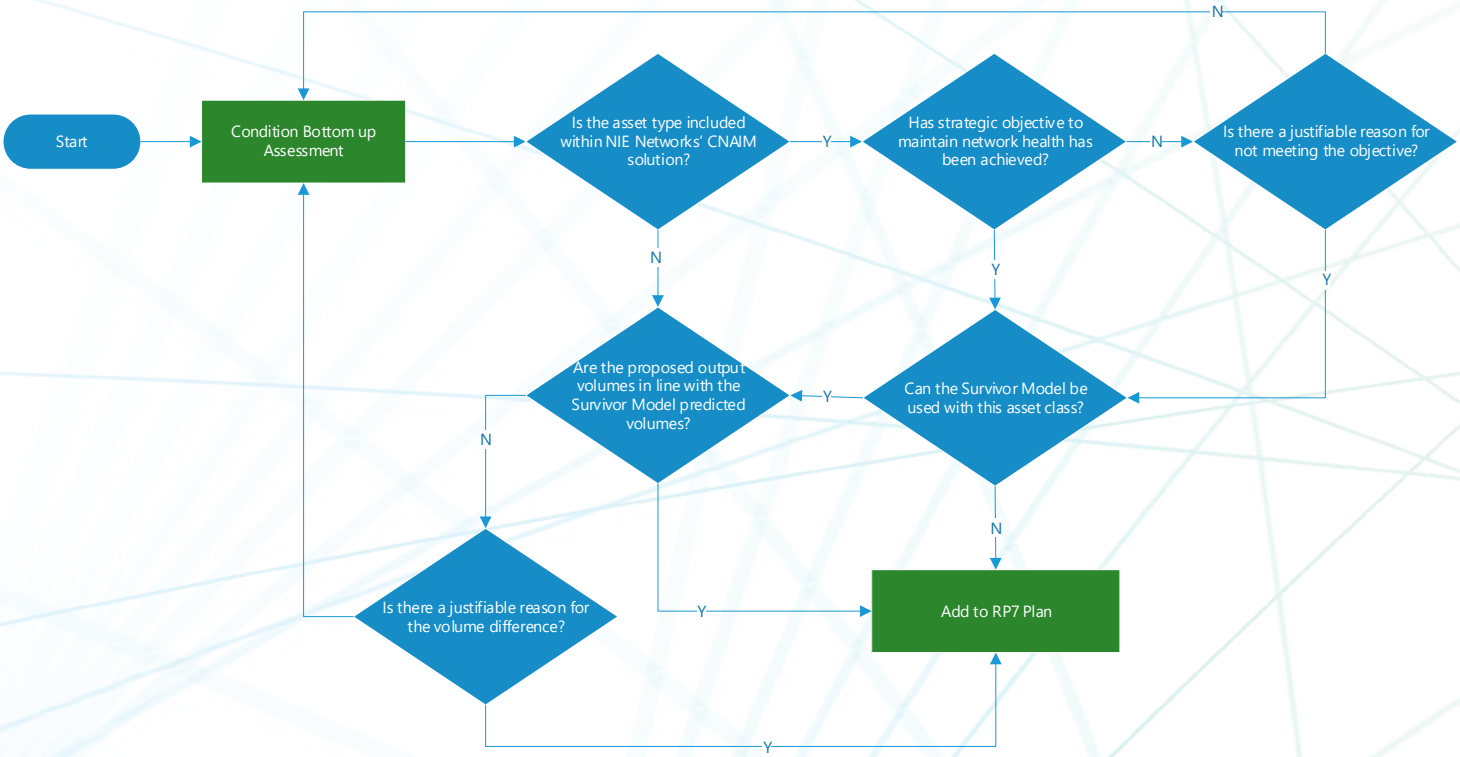


Figure 37 – condition driven investment process chart



Step 1: Condition based bottom up assessment

7.160 In keeping with the approach adopted in RP6 submission, initially the entire population of each type of asset is assessed by a condition-based bottom-up assessment. This is performed by setting the objective criteria for each asset type and then proceeding to score all the assets within that population against the criteria.

7.161 This allows for a prioritised list of the assets for each asset population to be created. Once the prioritisation is complete the level and type of intervention is determined to ensure that the health levels are broadly maintained throughout the period.

Step 2: Common Network Asset Indices Methodology (CNAIM)

7.162 CNAIM[39] is a common framework of definitions, principles and calculation methodologies, for assessment, forecasting and regulatory reporting. It was initially introduced to meet Ofgem requirements for RIIO-ED1, calculating individual asset health scores for assets within scope. CNAIM was subject to review and discussion with the UR in RP6 discussions and we were given allowances to develop it in within the RP6 period. This was achieved by implementing an inhouse Asset Decision Support Tool (ADST) to expand its usage from 5 asset categories within the RP6 business plan to 23 asset categories within the RP7 business plan.

7.163 In step 2, the volume of interventions of each asset type from step 1 above is inputted into CNAIM, which then determines the impact that the proposed intervention volumes have on the health score for that asset type. This is then compared against the health score if no interventions were carried out.

7.164 This approach enables us to determine if the intervention volumes proposed under step 1 meet our objective of broadly maintaining the health of the network. This is an iterative process as shown in **Figure 37** that is repeated until a finalised and prioritised list of interventions has been created. As shown in Figure 37, there will be justifiable scenarios where the intervention volumes outlined in step 1 does not maintain health within that asset category. In these scenarios the reasons for this will be described in the relevant engineering justification paper (EJP).

7.165 We consider that use of the condition-based bottom-up assessment and the CNAIM assessment work well to complement each other. By using each assessment to cross check against the other provides further robustness in the proposed intervention volumes.

[39] The latest version of CNAIM can be found here: Decision on distribution network operators Common Network Asset Indices Methodology | Ofgem.

Step 3: Survivor Age Based Assessment

7.166 Finally, the survivor model that NIE Networks requested WSP/PB Power to develop and validate on their behalf is used to sense check that the overall scale of investment being proposed by step 1 and step 2 is in line with the industry standard. As this model is purely an age-based model it is only used to form a longer-term strategic view of peaks and troughs in asset replacement that are expected in the future. Again, as shown in Figure 37 there maybe justifiable scenarios where the outputs are different from those proposed in step 1. In these scenarios the reasons for this will be described in the relevant engineering justification paper (EJP).

7.167 The survivor model utilises the same algorithms as were used in the Ofgem's RIIO-ED2 determination. For each year that assets were installed, the model calculates the historic and forecast percentage asset failure rate using a distribution curve with the standard deviation taken as the square root of the mean asset life. This approach calculates the predicted replacement volume of each asset type based on industry standard lifespans.

7.168 Considering the difference between the NIE Networks' structure of network investment interventions against the OFGEM asset categorisation, it is not possible to run the survivor model for every asset category and relate to the network investment intervention. Where there is a direct read across we've ran the model and included within relevant EJP. Where it has not been possible we have ran it at an overall level as outlined within the accompanying 'survivor model' paper.

7.169 Where all three approaches can be used, it generates confidence where the outputs agree and forces deeper analysis where there is variance in the results. This provides confidence that the relevant intervention levels proposed are robust and well justified. The application of both traditional and current 'best practice' models, evidences NIE Networks' asset management capability.

7.170 A summary of the intervention approach utilised for each of the main categories to maintain asset reliability is outlined below.

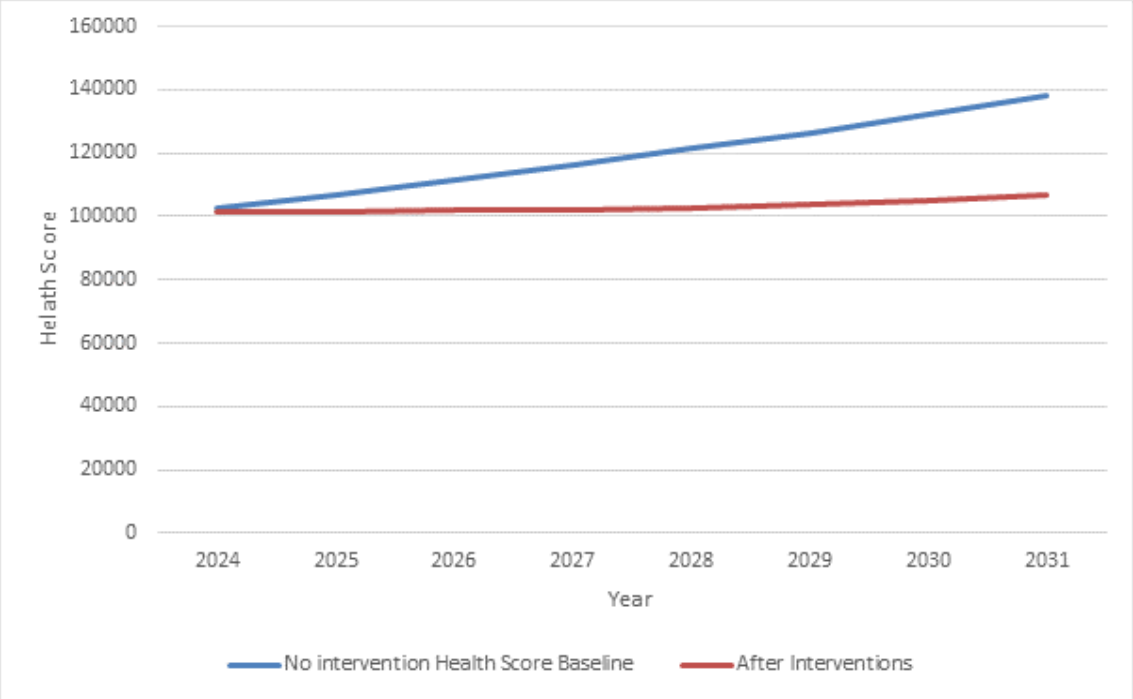
*Maintaining a safe, **reliable** and resilient network*

Table 8 – condition assessment approach for investment areas

Investment Category	Policy Driven	Condition Driven			Overview	% of Reliability Investment
		Bottom-up Assessment (step 1)	CNAIM (step 2)	Survivor Model (step 3)		
Distribution Overhead Lines	✓				Continuation of existing, established specifications which address the condition of the distribution overhead line network over cyclic periods.	49%
Transmission Overhead Lines		✓			Majority of the transmission overhead line plan is created by assessment from foot patrols and knowledge of the network to allow for targeted condition assessments to take place on the worst condition circuits. This assessment is completed by high definition photography using drones and provides a list of components with photograph evidence to inform the amount of work that needs to be completed.	10%
Plant		✓	✓	✓	In general, for the plant items the condition-based scoring approach is applied and followed up by comparisons of the CNAIM health score and survivor model volumes. In some scenarios particularly in the secondary asset replacement programme, it is not possible to use the survivor model. Where this is the case, this will be described within each EJP.	31%
Cables		✓		✓	The transmission and sub-transmission programme are created on a circuit by circuit review of all the fault history in conjunction with type of cable and the impact it would have on surrounding environment should a fault occur. Based on this analysis a list of circuits were identified for inclusion within the plan. The distribution programme is created based on the amount of cable faults per cable types. Other known safety issues, defects and non-approved jointing procedures are then considered to determine the overall amount of each type of cable that requires replacement to avoid. This is then compared to the overall volume of cable replacement as predicted by the survivor model.	7%
Protection		✓			The protection programme has assessed all the different type of relays currently on the network and prioritised them based on associated support arrangement, known defects and availability of spares. There is also consideration to other dependant work that has been included in other areas of the plan. Protection assets are not supported in either CNAIM or the Survivor Model.	3%

7.171 For those categories included within CNAIM we can determine the overall impact that our proposed RP7 interventions have on the health of those assets, displayed in Figure 38 below. It should be noted that an increasing CNAIM health score corresponds to a deteriorating condition. This analysis shows that our proposed interventions will result in the health of the asset categories within scope of CNAIM being broadly maintained throughout the period (only deteriorating by 3.8%). It also shows that in a 'do nothing' scenario the health would deteriorate by 27% over the course of RP7.

Figure 38 – health score with and without RP7 interventions



Comprehensive optioneering

7.172 As we have developed the RP7 plan, we have assessed all the viable alternatives to ensure we are able to maintain the health of the network at the lowest possible cost. This includes considering:

- Innovation, refurbishment and repair before replacement (considered within the EJPs).
- Synergies with other programmes. As outlined within our Whole system optimisation section we have identified £99.9m of whole system optimisation and removed this from our plan.
- Removal of assets from the network.

7.173 This includes assessment of whether the current assets identified for intervention are still required on the network or if we can take the opportunity to completely remove them, delivering longer term inspection, maintenance, fault and ultimately replacement cost reductions. In previous price controls, when demand and generation growth was not as substantial there were significant opportunities to completely remove assets from the network. However, moving into a period of significant growth, in general, there is limited opportunity to deploy this strategy as doing so would reduce network flexibility, increasing the impact of faults on customers and reducing the capacity to accommodate additional load and generation growth.

7.174 Notwithstanding our general position, we have sought out specific, justifiable opportunities to remove assets from the network, specifically in the following areas:

1. Secondary Switchboards – out of the 11 secondary switchboards due for replacement, we are replacing with 2 switchboards and the remaining will be replaced with RMUs.
2. Protection Relays – Multiple protection relays are being replaced by 1 modern equivalent protection relay. Typically, this results in a rationalisation of 3 relays into 1 relay at a primary circuit breaker.
3. MPs/UDBs – are assessed on a site by site bases to determine if they need to be replaced or if they can be jointed out and recovered. This is evidenced from RP6 trends, were we have recovered 57% of mini-pillars and 4% of UDBs requiring intervention.

Touch the network once

7.175 Within our 'touch the network once' strategy outlined earlier, we have reviewed our asset specifications to ensure that when we are installing new assets on the network we are not using legacy specifications insufficient for a net zero future. This approach ensures that an asset recently replaced due to condition would not require subsequent additional investment to increase the capacity before the end of its expected life; whilst minimising customer disruption and reducing network losses.

7.176 Minimum specifications that have been updated to accommodate this new approach are set out below.

Table 9 – minimum specification updates

Asset Type	Old Minimum Specification	New Minimum Specification
11kV OHL Mainline	25sq mm	50sq mm
11kV OHL Spurs	25sq mm	50sq mm
LV Cables	185sqmm	300sqmm[40]
11kV Cables	185sqmm	300sqmm[41]
GM Transformers	315kVA	500kVA
PM Transformers	16kVA	25kVA
Looped service replacements	Single Phase	Three Phase
New Cut Outs	Single Phase	Three Phase
New LV Service	Single Phase	Three Phase

[40] Minimum specification for all distribution feeders only i.e. those circuits directly connected to ground mounted distribution transformers.
[41] Minimum specification for cables on main circuits that connect between primary substations only.

Delivering a resilient network

7.177 As outlined earlier resilience relates to the ability of the network to anticipate, absorb, adapt to and / or rapidly recover from a disruptive event. We consider that electricity network resilience can be categorised as follows:

Network resilience

7.178 Network resilience relates to the ability of the network to anticipate, absorb, adapt to and or rapidly recover from a disruptive event. In RP7 we want to improve this in the following ways:

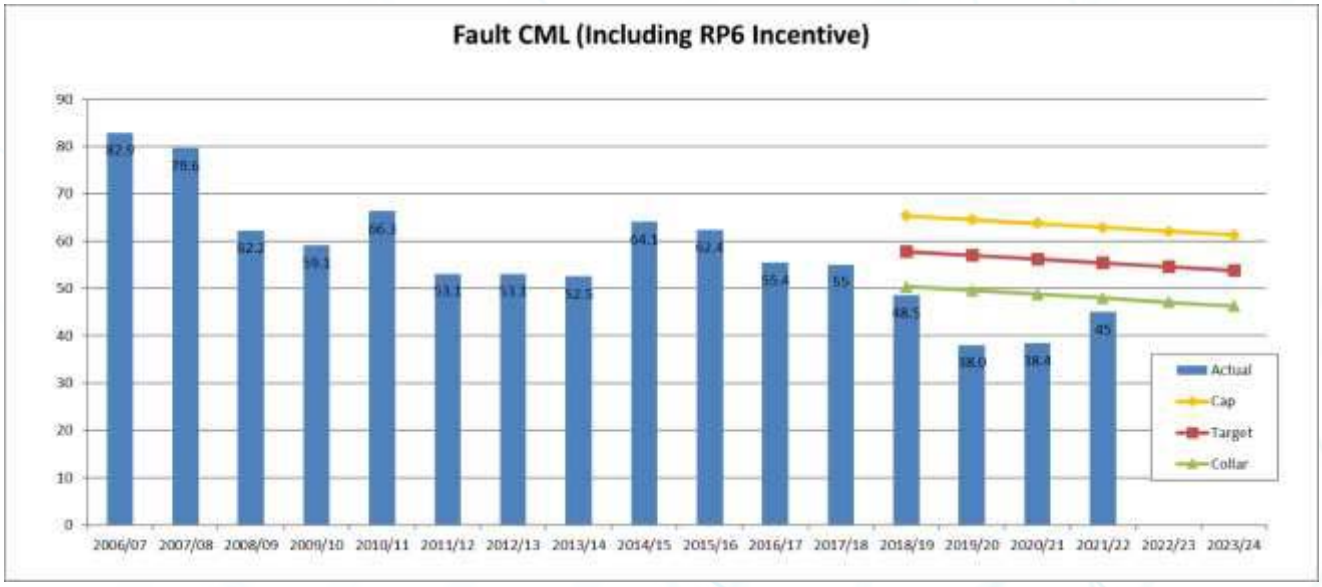
- Reducing customer minutes lost
- Reducing the number of 'worst served customers'
- Reducing the impact of High Impact Low Probability (HILP) events on customers
- Improved strategic spares holdings
- Ensuring an effective Operational Telecommunications Network (OTN)

Reducing customer minutes lost (EJP 1.801)

7.179 We have been incentivised to improve CMLs throughout RP6. Our performance against our target demonstrates a step change improvement against historic performance and undoubtedly enhanced customers' quality of supply experience during RP6. CMLs are now at an all-time low, achieved through a combination of:

- organisational realignment - additional resources were allocated to find and repair faults, facilitated through the introduction of a depot structure;
- employee awareness – a significant education and awareness exercise was conducted among applicable staff on the importance and value of improved CML performance for both customers and NIE Networks; and
- dispatch guidelines – a review of the numbers, types and timings of resources allocated to each fault was carried out. This resulted in a reduction in average HV fault duration from c. 80 minutes to 2017 to c. 60 minutes in 2019.

Figure 39 – fault CMLs



7.180 However, as customers increase the use of electricity for their heat and transport, a resilient electricity supply is more important than ever before. Aligned with our customer expectations, in RP7 we will aim to broadly maintain the reliability of the network whilst improving the resilience of the network. However, delivering year on year improvements to CMLs is becoming increasingly difficult as the improvement measures introduced in RP6 have reached a natural floor. In RP7 we must seek out new ways to deliver continued CML benefit which means deploying a significant mass of High Voltage Active Network Management (HVANM) devices on the network.

7.181 HVANM devices are items of plant which can be operated by means of remote control or automation. In comparison, other UK DNOs have a much higher penetration of these devices, stretching back over at least their two previous price controls. We currently have 367 HVANM devices deployed on the HV distribution network, which equates to approx. 1% of the total number of switchable devices. We plan to deploy an additional 900 HVANM devices in RP7, at a cost of £12m, on strategic circuits, which will enable a continued reduction in CMLs over the RP7 period and beyond. To ensure that out RP7 outturn target is sufficiently challenging and accounts for the benefits associated with the funded work programmes, we propose a final target of 39.51 CMLs in RP7, representing an overall reduction of 8.17% in unplanned CMLs over the period as compared to the 8.33% targeted reduction during RP6.

PICTURE OF AN HVANM DEVICE

Reducing the number of 'worst served customers' (EJP 1.801)

7.182 As noted, we acknowledge that as customers seek to electrify their lives it is no longer acceptable to have such a significant difference between the level of service that customers experience just because of where they live and the type of electricity network supplying their home. Our view is that if this is not addressed, it will become a blocker to some customers decarbonising their lives. We want to ensure that our RP7 plans facilitate a just transition to net zero and our stakeholders agree.

7.183 Within our RP7 consultation we asked if stakeholders agree with our proposed approach of targeting the top 6 worst performing circuits on the network. While approximately half of the respondents agreed with our proposals, the other half disagreed and thought we should go further[42]. On the back of this we propose taking a targeted levelling up approach by investing £3m in deploying network resilience improvements to the 15 poorest performing circuits and reducing the number of customers classified as worst served by 50% in RP7.

7.184 The proposed allowance represents an investment of £1,600 per worst served customer (WSC), which compares favourably with counterparts in GB; as part of their RIIO ED2 submission Scottish Power Energy Networks' proposed an average investment of £1,765 per WSC.

[42] Of those that responded to our worst served customer question 13 agreed with targeting the top 6 worst performing circuits and 12 thought we should go further.

Reducing the impact of High Impact Low Probability (HILP) events on customers (EJP 1.803)

7.185 Decarbonisation of heat and transport will increase customer reliance on electricity. While all Bulk Supply Points (110/33kV) in the Northern Ireland network comply with the requirements of the Distribution System Security and Planning Standards (DSSPS), for some BSPs there is limited resupply capacity in the event of two concurrent faults (e.g. the loss of two transformers). Whilst this is an unlikely event, the consequences are significant, resulting in widespread and protracted customer outages. We consider that this would be unacceptable for our customers regardless of DSSPS compliance. To reflect the increased reliance on electricity and the potential for major customer disruption if a high impact low probability (HILP) event occurs, consultants were commissioned to benchmark NIE Networks against all other UK DNOs and provide recommendations, as detailed within the accompanying paper 'BSP Network Security Benchmarking for NIE Networks'. The analysis performed by our consultants concluded that following a HILP event, on average 18% more customers will be off supply for a protracted time in NI when compared to the rest of the UK.

7.186 Following recommendations from our consultants and an economic review of the value this investment would deliver to our customers, c.£4m of reinforcement has been included within our RP7 plan to target investment at the locations with the potential for the largest customer disruption following an HILP event.

7.187 Our stakeholders agree. In response to Q17 of our RP7 consultation every stakeholder who provided a clear answer (25 in total) agreed with our proposal to improve the number of customers that we can keep on supply following a HILP event. Reasons included increasing reliance on electricity and moving up to the benchmark in GB. That said, a smaller number of comments emphasised the need to balance the costs of this work against the low probability of the scenario, which we have set out in EJP 1.803.

Improved strategic spares holdings (EJP 2.501)

7.188 When key assets do fail it is critical that we can get access to replacement assets within short timeframes to either get customers' supplies restored as soon as possible or to reduce the heightened risk that the network is exposed to. In the past, when supply chains have been well functioning, we have carried limited strategic spares as we've been able to manage this risk through the availability of assets within our planned replacement activity.

7.189 However, current macro-economic conditions are significantly impacting lead times of assets, that are built on order to NIE Networks' specification. These are assets that cannot be bought off the shelf due to unique design specifications required for the Northern Ireland electricity system e.g. voltage ratios required. To demonstrate this the relevant manufactures have advised that lead times for transmission transformers are currently closer to 4 years, rather than the historical 2.5 years. The result of this means that in the occurrence of a fault, large sections of the electrical network would remain with a single point of failure until a new asset can be ordered, manufactured, shipped, and installed. This is not acceptable in our view.

7.190 To manage this risk, we must now carry greater levels of strategic spares and as such we have requested c.£4.4m in RP7 to procure a small number of key strategic transmission assets, outlined within EJP 2.501.

Ensuring an effective Operational Telecommunications Network (OTN)

7.191 The Operational Telecommunications Network (OTN) infrastructure provides connectivity from the Transmission and Distribution Control Centres to, and between, generation units and substations. This infrastructure is used to monitor the state of the electricity network and reduce the number of customer interruptions and the length of time customers are without supply. Without a well-functioning OTN the resilience of the electrical network is compromised as visibility and control of the network is reduced or lost, exacerbating the impact of fault conditions.

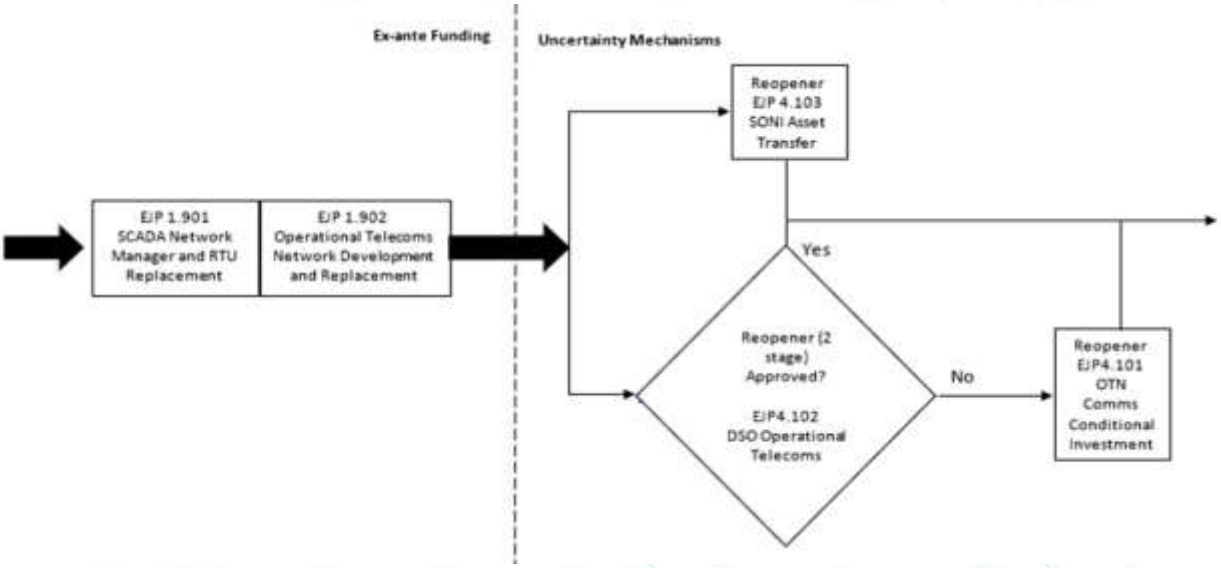
7.192 Investment in the Operational Telecommunications Network infrastructure has been driven primarily as a result of the rolling asset replacement programme to maintain vendor support, the need to move to IP based communications, and the needed expansion of the OTN due to network growth.

7.193 This investment will also address the required performance, resilience, and increased cyber security requirements, as well as third party product withdrawals.

7.194 The interaction between the telecommunications investment proposals is shown below in Figure 40; whereby:

- EJP 1.901 and EJP 1.902 outline Business as Usual (BaU) expenditure requirements, requested as ex-ante allowances.
- EJP 4.103 sets out the justification for the investment necessary to support the successful transfer of SONI assets to NIE Networks, as determined by the UR in RP6. Due to the uncertainties as to the timely completion of the investment programmes by SONI, and the service, legal and people issues contained within this paper it is proposed that this will be progressed via a reopener mechanism.
- Within EJP 4.102, following extensive analysis, a private wireless LTE network is recommended as the optimum solution to deliver an OTN that is scalable, reliable and resilient enough to facilitate net zero requirements for Northern Ireland. However, uncertainty exists with regards to the securing of spectrum from OFCOM and the potential for a shared utilities model. As such a two-stage reopener mechanism is proposed.
- EJP 4.101 sets out the necessary requirements if the LTE network isn't progressed within the RP7 period and will be progressed via a reopener mechanism. If the LTE network is progressed then these costs are not required.

Figure 40 – interaction between the telecommunication investment proposals



Climate change resilience

7.195 We are increasingly aware that electricity networks are not immune to the impact of climate change, illustrated in recent times by the impact of Storms Arwen and Barra on customers in Scotland and the north of England and the wildfires caused by the record-breaking heatwave in July 2022. That is why we are putting forward measures in RP7, endorsed by our stakeholders to adapt our network to mitigate the impact of a changing climate.

7.196 As our climate continues to change, alongside our DNO counterparts we are keen to understand how our networks need to adapt. In March 2021, the ENA Adaptation to Climate Change Task Group, published its 3rd Round Climate Change Adaptation Report, which is intended to provide a response to climate change adaptation on behalf of the Energy Networks. This has been provided as an accompanying paper 'Adaptation to Climate Change Task Group'.

7.197 Whilst some uncertainty remains regarding the likelihood and impact of these hazards, as of 2021, specific network risks which scored highest within the Climate Change Adaption Report relate to the likelihood of increased flooding due to increased precipitation, impact of warmer weather on various assets and increased vegetation growth due to warmer and wetter conditions. In line with our colleagues in GB we feel that it is appropriate to take the following actions in RP7.

As part of our RP7 consultation 17 stakeholders felt that our plans are going far enough to adapt out network for climate change and 1 felt we should be doing more.

"*Over RP7 then this is the correct level of investment. However, extreme weather will intensify with greater levels of global warming so this will need to be kept under review.*" - Centre for Advanced Sustainable Energy

"*I think that's a total no brainer. It's very clear that they need to do that really and to adopt changing circumstances with climate and whatever. And if you didn't do it, you would be really remiss in that.*" - Household and consumer Focus group A/B.

Increased flooding due to increased precipitation (EJP 1.804)

7.198 If flooding from any source affects a substation, it can cause supply interruptions to all surrounding properties and present a significant system and safety risk until inspection and remediation can take place.

7.199 Following the release of UK Climate Change Projections (UKCP18), the Department for Infrastructure (DfI) Rivers updated their flood maps. The DfI Rivers updates provided an additional level of map accuracy from those used for the RP6 assessment; subsequently, we reassessed all of our transmission, primary and secondary distribution substations for flood risk and have identified a number of additional sites requiring flood resilience measures

SUBSTATION FLOODING

7.200 Our RP7 strategy has been updated to address higher risk sites identified from this reassessment, which requires £1.4m of investment to improve flooding resilience of five primary substations and forty distribution substations and protective measures at 11 substations that are not within floodplains but are affected by high water tables. The number of substations that need intervention at in RP7 is lower than RP6 due to the good progress already made at strengthening our flood defences across the network. We have also achieved improvements in our unit costs such that the overall cost of our flood programme is 35% lower than in RP6.

Impact of warmer weather on assets

7.201 Most of our assets are designed to international standards and consequently are designed to operate safely in greater maximum and minimum temperature ranges than those found in the UK. Whilst we are not asking for any RP7 funding relating to this, we will continue to monitor for any impact over the RP7 period and beyond to inform future investment if required.

Increased vegetation growth due to warmer and wetter conditions (EJP 1.201 & EJP 3.301)

7.202 We maintain vegetation growth close to electricity lines primarily for safety reasons. In addition, under specified circumstances, trees that are within falling distance of the overhead lines, are given a resilience cut where necessary, to help maintain continuity of supply.

7.203 During RP6 it was identified that the three-year cycle to maintain safety clearances to overhead lines for the 33kV network needs shortened to 2 years. Due to increased vegetation growth, and restricted landowner permission to fell all vegetation, a two-year cycle is required to ensure there are no live zone infringements on this critical part of the network. The 33kV resilience cut that has been performed in RP6 is to be maintained and continued with on additional mainline sections of the network in RP7.

7.204 On the 11kV network, we are proposing to maintain the current three-year safety clearances cutting cycle. However, in RP6 we commenced a new resilience cutting programme as a trial to assess and target trees within falling distance of the main line network. As a result, the rate of proposed resilience cut was set low for the trial and if NIE Networks was to continue at this rate the programme would only allow for a 25-year cycle. The approach for this new programme was to be reviewed in advance of the following regulatory period. With increasing windstorm frequency and increased vegetation growing seasons as a result of climate change we have determined that a 25-year period to achieve resilience on the 11kV overhead line network is not sufficient.

7.205 Storm Arwen caused massive widespread disruption across the UK in 2021 (with some customers having no electricity for over a week) and a subsequent Ofgem review recommended that each GB DNO should consider their levels of compliance with the Energy Networks Association (ENA) Engineering Technical Report (ETR) 132[43] and ESQCR legislation. Due to this and as supported by the independent consultancy reports into the impacts of climate change on vegetation growth we have determined that an increase in rate of the resilience cut programme is required. It is proposed to align this programme to the same 15-year cycle as the rebuild programme to ensure that when the line is rebuilt it has also been made resilient to surrounding vegetation. This approach allows for efficiencies in work packages, and reduces the impact to customers both in terms of land access requirements and outages required for isolations. Further detail can be found in EJP 1.201.

7.206 An enhanced tree cutting programme to maintain safety clearances from our LV network is proposed for RP7. This is to be applied alongside the LV circuits that are due for refurbishment within the period. This change is required to provide mechanical protection to the covered conductors, hence avoiding interference with the circuit. From then on, each LV circuit is proposed to move from a six-year cycle to a three-year cycle to maintain these safety clearances. Further detail can be found in EJP 3.301.

[43] Improving resilience of overhead networks under abnormal weather conditions using a risk-based methodology.

Physical resilience

7.207 Whilst significant focus needs to be given to the resilience of our electrical components, we must not lose sight of the physical resilience of the network. This includes the physical security of our substations to ensure that unauthorised persons are prevented from entering them for their own safety and to protect the critical infrastructure; it includes our civil infrastructure within substations which is so important to ensuring the reliable and resilient operation of our electrical assets and it includes our substation legalities to ensure that substations can legally remain in place.

Security (EJP1.805)

Following a review by the Centre for the Protection of National Infrastructure (CPNI) and on completion of security checks completed by the independent security specialists Cherton Secure a number of substation security issues have been highlighted which require remediation in RP7 to reduce the probability of unauthorised entry and reduce the risk to staff and contractors when accessing sites. In RP7 we will spend c.£5.6m to complete necessary security upgrade works such as:

- Replacement of existing poor condition security fencing, gates and exterior doors.
- Installation of window security grills to reduce the risk of unauthorised entry
- Install CCTV and tannoy speaker systems at sites with known vandalism issues and previous history of break in.

Civils (EJP 2.601 Transmission) (EJP 1.806 Distribution)

The reliability and resilience of the electricity network is intrinsically dependant on the condition of our substation civil infrastructure. Many of our substation assets were installed in the 1960s and 70s and, whilst minor repair works have been undertaken since, much of the civil infrastructure requires more significant attention in RP7 to ensure the safety and resilience of the network is maintained.

Improved RP6 substation inspections have highlighted an increasing number of civil defects that will require c.£10m of investment in RP7. The majority of the proposed work, including building construction work, wiring, drainage, asbestos removal and substation ancillary work, has been planned to coincide with the replacement of the electrical assets within the substation, minimising disruption and maximising efficiency in delivery, consistent with our 'touch the network once' strategy.

Legalities (EJP 1.807)

The strategy for RP7 is the same as RP6. We own (or have long leases) for all of our transmission substations, therefore, there is no current requirement to renew leases for these assets. At all our primary substations we will plan the acquisition or renewal of leases as and when the existing lease is approaching expiry. At our secondary substations, we will only renew the leases at the landowners request or if future investment is planned at that substation. This approach is taken to ensure we minimise our costs and ensure that we are not renewing leases that may not be required when the existing equipment reaches the end of its life.

Whilst we're maintaining the same approach as RP6 an increase in expenditure is required in this area driven by the volume of new leases required for primary substations and the significant increase in costs associated with agreeing new leases.

In RP7 we need to spend c.£6.5m on substation legalities.

c. Meeting the needs of our customers

7.208 In order to ensure our plans for RP7 are aligned with what customers actually want from us, we have spent a lot of time and effort considering what this might mean. To inform this, we have drawn on the findings from the extensive engagement carried out with customers during RP6. NIE Networks commissioned Perceptive Insight, an independent market research agency, to undertake an ongoing programme of research throughout RP6 to ascertain the views and perceptions of our customers and stakeholders to understand what the network needs to be able to do to meet customers' expectations and the challenges of a rapidly changing energy landscape. This research has helped us to better understand attitudes, current experiences and relative priorities in relation to customer service, network performance, environmental performance and future strategy.

7.209 In addition, we have continued to work with the Customer Vulnerability Working Group (CVWG), which is an independently chaired group of consumer representative bodies who provide challenge and guidance on the development and practical implementation of our consumer protection policy. The group continues to support NIE Networks by providing unique insights and challenges on delivering fair outcomes to consumers in Northern Ireland. We also continue to engage and gain valuable insight from the UR's Consumer Protection Programme (CPP).

7.210 We have set out our commitments to our customers for RP7 in Chapter 6, all of which are clearly linked to three key themes at the heart of our customer service approach –

- **Key theme #1:** Protecting vulnerable customers. We will aim to ensure a fair energy transition for all, with no customers left behind.
- **Key theme #2:** Digitalisation – making it easy for customers to do business with us. We will ensure that our customers can engage with us in the most relevant and convenient way for them.
- **Key theme #3:** Enabling our customers to become more active in their energy usage. We will ensure customers have the opportunity to make best use of new connected technologies, to effectively manage their energy consumption.

7.211 Our customer measures and commitments have been informed using the independent research mentioned above, to complement NIE Networks' internal monthly customer satisfaction surveys with a sample of our customers who have experienced a power cut and customers who have experienced our connections process[44].

7.212 We recognise that the above themes and the commitments they drive, are interlinked. For example, if we are to achieve our ambition that no customer is left behind, it is essential that all customers are enabled to become more active in their energy use. Therefore, to ensure that we establish appropriate targets and measures to encourage and track delivery against our commitments during RP7, we will continue engaging with the UR and the Consumer Council of Northern Ireland via the Consumer Engagement Advisory Panel (CEAP), to ensure appropriate targets and measures are set and achieved.

[44] Feedback from customers has helped us determine not only those services we need to improve or enhance but also those services that customers are happy with. Where customers told us they are happy with the level of service, we are not proposing any enhancements.

d. Preparing our business for the future

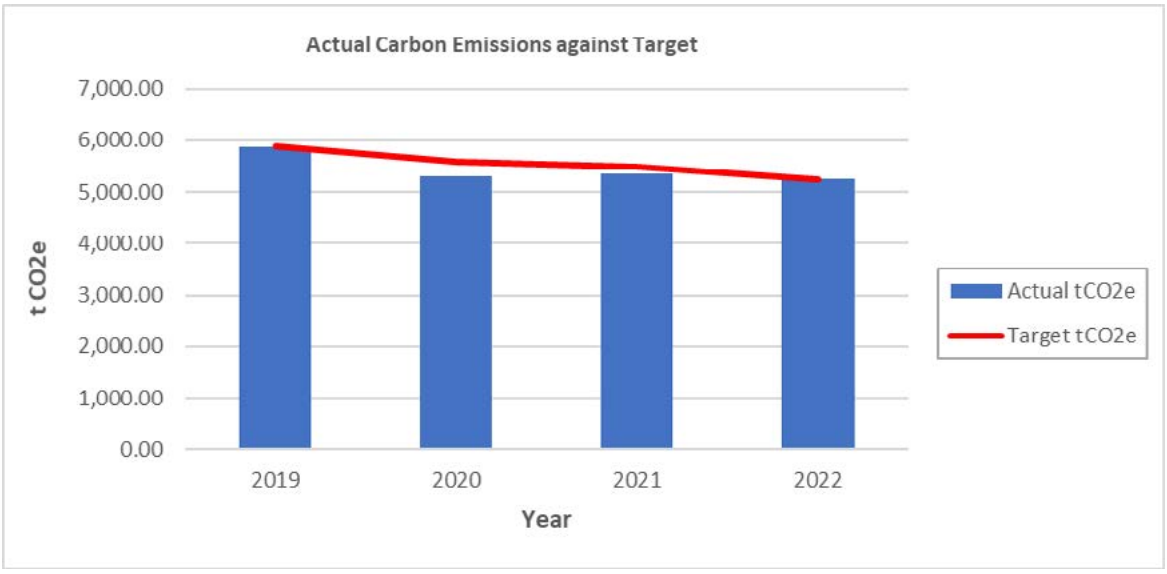
7.213 Our ambitions for the future are underpinned by a number of key organisational changes that we consider essential to driving transformational change in RP7 and beyond. Chief among these is addressing the challenges of environmentally sustainable operations, greater digitalisation and workforce resilience. We also need to re-shape our organisation to ensure we have sufficient capability to deliver the investments needed during RP7 and beyond.

An environmentally sustainable future

7.214 Sustainability focusses on meeting the needs of the present without ever compromising the ability of future generations to meet their needs, ensuring 'enough for all, forever'. Our company vision is to deliver a sustainable energy system for all and we believe this starts with behaving sustainably in our own practices, which means ensuring our business has a positive impact on the environment, communities and economy in which we serve. That is why we have developed an Environmental Action Plan (EAP) which is built upon two interconnected foundations: 'Becoming a net zero organisation' and enacting our 'Environmental Stewardship'. Implementing this Environmental Action Plan during RP7 will be essential in ensuring we play our part in meeting a net zero carbon future as well as increasing our corporate social responsibility, productivity and reducing waste.

7.215 However, RP7 is not the start of our sustainability journey, we are already making good progress, reducing our Business Carbon Footprint (BCF) by 12% to date compared to our 2019 baseline.

Figure 41 – NIE Networks' actual and target carbon emissions



Developing our EAP

7.216 To ensure that our EAP is the best that it can be we applied the following three-step approach when developing it:

Collaborate and learn from the experts	Benchmark our EAP against the GB DNOs	Test our EAP with our stakeholders
• We have sought to collaborate and learn from industry experts to make sure that our plan is aligned with industry best practise and based on the best available science. To this end we have: • Become a part of the European Association for Distribution System Operators Sustainable Grid Charter. • Become a member of the United Nations Framework Convention on Climate Change "Race to Zero" campaign. • Had a letter of Commitment accepted by the Science Based Target Initiative (SBTi)	• We have reviewed our priorities and level of ambition against the commitments made by other DNOs in the UK as part of their RIIO-ED2 submissions. This process has allowed us to evaluate our plans against other similar organisations in achieving net zero and managing the environment sustainably and responsibly.	• In January 2022, we held a virtual Sustainability Strategy stakeholder engagement event where there was broad consensus that the scope and ambition of our Environmental Strategy was appropriate. • In October 2022, we consulted on our approach to planning for the RP7 period and refined our EAP accordingly.

What is in our EAP

7.217 Our EAP is built upon two interconnected foundations: 'Becoming a net zero organisation' and enacting our 'Environmental Stewardship', described below:

Becoming a net zero organisation

- We acknowledge that the human contribution to post-industrial increases in global atmospheric carbon dioxide poses significant risk to maintaining a healthy, sustainable and just society. For this reason, our Environmental Strategy focusses on achieving net zero in line with the UK Government's target by 2050. Furthermore, we are committed to achieving 50% reduction by 2030 on our 2019 baseline energy usage as an intervening milestone on the journey to net zero by 2050. To achieve this we plan to target the following specific areas:
  - Network Operations
  - Business Carbon Footprint
  - Embodied Carbon Footprint
  - Science Based Target

Environmental stewardship

- We recognise that we have a duty to protect the environment in which we operate and therefore we aim to act in an environmentally responsible manner, minimising our environmental impact and preventing pollution. In RP7 we will focus on continued improvements in the following specific areas:
  - Resource use and waste
  - Supply chain management
  - Biodiversity and natural capital
  - Pollution prevention
  - Air and water quality

7.218 Under these two foundations we have set out our RP7 commitments, outlined within Chapter 6 of this document and described in detail within the accompanying paper 'Environmental Action Plan'; however, we have outlined some of the highlights below.

Our business carbon footprint commitment

NIE Networks' Business Carbon Footprint (BCF) is a measure of the impact that its operational activities have on the environment demonstrated through tonnes of carbon dioxide equivalent 'tCO2e' per employee. Emissions can be categorised three ways:

Scope 1: Direct emissions from owned or controlled assets.

Scope 2: Indirect emissions from purchased electricity used in company operations and the emissions associated with all of electrical losses on our network.

Scope 3: Indirect upstream and downstream emissions that occur in the value chain.

We have committed to **50% reduction in Scope 1 and 2 (excluding SF_6) carbon emissions by 2030** compared to our 2019 baseline and **Net Zero by 2050 or sooner**. Our Scope 3 emissions are not currently included in this target as they are not a material consideration in our Science Based Target.

We will achieve this by transitioning to a non-carbon fleet of vehicles, making our buildings more energy efficient and reducing our own electricity consumption amongst other initiatives. During RP6, 48 small vans (14% of the fleet) will be transitioned to electric equivalent vehicles. Throughout RP7 **all new fleet vehicles will be lower carbon than outgoing vehicles, with all new company vehicles having zero tailpipe emissions by 2030 where technically possible**. During RP7 we will work towards the target of **>70% electrification of our fleet vehicles by 2030** saving an additional 830 tonnes of carbon dioxide equivalent.

Supply chain commitment

During RP7 we aim to build upon our current relationships with suppliers and manufacturers to promote sustainability and environmental responsibility in our supply chain and services.

Currently 34% of our carbon emissions come from scope 3 factors from bought in services, suppliers and manufacturers outside of our direct control. We choose to take responsibility to address this impact by influencing our partnering organisations to take action in line with our own commitments. That is why we aim to start by introducing a new requirement in tender assessments for more than 80% of our top 250 suppliers by category / spend to have set carbon reduction targets as a bare minimum. We will work with our suppliers over the course of RP7 to set more stretch targets, for example, to set Science Based Targets where appropriate and commit to achieving Net Zero.

Natural capital and biodiversity commitment

Northern Ireland has a wealth of wildlife and a range of wild places, wild plants and wild animals, many in remote places - but some right on the doorsteps of our urban population. Collectively, the range of living things around us has been termed our 'biodiversity' and everyone in Northern Ireland has a role to play in protecting our local biodiversity and the wildlife that makes our countryside, towns and cities interact together. Bringing electricity to the people of Northern Ireland brings us into close contact every day with nature, wild places and the wide range of wildlife that shares our countryside and urban areas.

Regrettably, Northern Ireland is currently ranked the 12th worst performing country in the world for biodiversity loss. At NIE Networks we are committed to ensure our business activities minimise the impact on Protected Sites and Species by preventing accidental damage to protected habitats, local biodiversity and build heritage sites, while also progressing biodiversity enhancement projects identified for company-owned sites and 'rewilding' opportunities at existing substations.

Ahead of legislative direction in this area our stakeholders agree that we should go ahead and introduce a natural capital assessment tool to quantify and assess net changes in natural capital for relevant network projects.

We will improve the biodiversity at 91 substation developments over the RP7 period. We will continue to work with our corporate partners, such as RSPB NI, to deliver local bog land restoration projects, and participate in tree planting and seed collection through our ongoing partnership with The Conservation Volunteers (TCV) and the Belfast City Council 1 Million Trees project. **We will aim to plant two trees for every tree we fell in our resilience tree cutting programme**. These local projects will benefit communities as well as the environment.

A digital future

7.219 RP7 represents a critical period in the pathway to Net Zero, and NIE Networks understands the level of change that will be required to achieve the goals that have been set out by the UK and Northern Ireland governments. A step-change in the level of Digital and IT investment made during the RP7 price control period will be essential to ensure that NIE Networks can meet the changing demands relating to decarbonisation, changing customer preferences and network resilience, all while ensuring value for money.

7.220 During 2022, NIE Networks designed 'the future state' IT architecture required to meet our new business challenges. To support achievement of this objective, Ernst & Young (EY) was engaged to assist in the development of a data, digitalisation and IT roadmap to deliver the target architecture.

7.221 We have a proven track record of delivering necessary investment at cost efficient levels and successfully adapting our plans and delivery models to manage risks. This performance demonstrates our delivery capability; however, we have developed the investment plan for RP7 against a very different landscape to that of its predecessors. The current and future decarbonisation objectives, considerable developments in technology and changes in both our customers' and employees' expectations, mean that our RP7 plans need a programme for transformational change, not just a gradual development of what is done today.

7.222 In RP7 we expect to see a significant increase in the level of Digital and IT investment required as a result of Open Data, DSO and Digitalisation demands. Some of the key drivers for this increase include the following:

- **Changes in the electricity market**. The unprecedented changes that are being seen in electricity markets in Northern Ireland and across the globe, in conjunction with changing expectations from customers, employees and stakeholders, are all playing a significant part in the increase in investment for RP7. With each price control, the NIE Networks business must be more enabled by technology. This results in technology being increasingly fundamental to the business and the services we provide, leading to more frequent upgrades and enhancements, and the need for total cyber security and reliability.

- **Changing business requirements**. The functionality that provides the ability to meet the challenges and requirements of digitalisation, DSO and Open Data drives significant increase in IT related spend. This includes initiatives such as the need for the upgrade and expansion of our core Network Management System to implement essential DSO flexibility functionality. Without investment in RP7, NIE Networks will not be able to deliver on RP7 commitments which are largely dependent on our IT infrastructure and capabilities.

- **Generational shift in core ERP solutions**. The NIE Networks business has a large portion of the core business application infrastructure on SAP-based products. With the announcement that SAP is ending its extended support for on-premise SAP solutions in 2027, NIE Networks is faced with the inevitable need to undergo a major ERP transformation in RP7. The proposed approach has been challenged, refined and validated by EY and our managed service partners and this area represents a significant element of the increase in Digital and IT investment in RP7. This is a common theme being seen in UK DNO RIIO-ED2 plans, as well as in other industries.

RP7 digital and IT roadmap

7.223 The roadmap to deliver the RP7 target architecture includes 99 individual projects split across six distinct programmes of work as summarised below. Details of the projects and programmes of work are provided in the "*NIE Networks RP7 Digital & IT Business Plan*" document which supports the submission.

Programme	Programme Summary
Digital Transformation	Projects planned to transform Customer and Employee experience during RP7, through the development of platforms for self-serve functionality, digitalisation of our business processes and the integrated IT infrastructure required to support them. Major projects include the implementation of a customer engagement platform and self-serve portal, a number of process automation initiatives, enhanced data reporting capability, digitally enabled workforce initiatives and a new project management solution.
Open Data	Projects required to implement new systems and data collection arrangements needed for a successful transition to DSO, including delivering on NIE Networks' Open Data objectives. Major projects include implementation of the connected LV Model, increased integration of core asset systems, the introduction of a cloud-based data repository for network data and the implementation of an Open Data portal which will be used by customers, stakeholders and the public.
DSO Transition	Projects required to implement the network management and trading systems required to enable DSO activities. These will be delivered through the extension of the Network Management System to implement flexibility functionality as well as the implementation of HV and LV Monitoring solutions. Major projects include extension of the Network Management System (NMS) to implement DERMS functionality and market management / customer flexibility services. Also, the implementation of HV and LV Monitoring solutions and the pilot of a Digital Twin.
Enterprise & Resource Planning	Projects required to transform the systems that make up the core of our technology landscape, where most critical processes are executed. This includes the migration of existing on-premise SAP finance and market management solutions to cloud-based S/4 HANA solutions. The programme also contains major projects to implement an integrated Stock Management solution and a project to implement a corporate Work Management System to ensure a consistent approach to all types of work being issued, completed and the associated updating of all records.
Secure & Stable IT Environment	As with all other price control periods, there will be mandatory expenditure in RP7 required to maintain hardware and software vendor support. Without this support, systems could become inaccessible, insecure and unreliable, impacting business operations, electricity supply, the retail market and customer experience. During RP7, all hardware and software will be refreshed to ensure that all of the host infrastructure is running on the most up to date, fully supported operating systems. This investment is mandatory if NIE Networks' is to comply with its NIS Cyber Security obligations. Major refresh projects include the replacement of corporate hardware platforms, end user devices and data network devices. Also, the implementation of Artificial Intelligence functionality to enhance the cyber security environment and a new cloud cyber security service.
Sustainability	Projects required to support the delivery of NIE Networks' sustainability commitments and drive the reduction of our impact on the environment. The two projects within this theme relate to the implementation of an Embodied Carbon Footprint tool as well as a tool to manage project planning decisions that relate to Natural Capital impacts.

Comparison with DNOs

7.224 While NIE Networks has developed a plan that is reflective of the current and future operating environment in Northern Ireland, it is important that we remain in-step with our GB DNO counterparts against whom we will be benchmarked. To do this, NIE Networks undertook a detailed review of the DNO initiatives across the defined RIIO-ED2 investment areas, followed by a comparison exercise against our RP7 plan.

7.225 Following a review of the DNO investment themes, NIE Networks found clear alignment between both overarching themes and lower-level investments. The majority of DNOs have invested in areas such as ERP and CRM transformation, cyber security enhancement, digitalisation of business processes, development of self-serve capability for customers, enhanced data analytics capabilities and platforms and DSO enabling solutions and technologies.

7.226 The implementation of technologies in these areas will be central to NIE Networks' ability to deliver planned efficiency targets during RP7.

Reinventing our business for RP7

7.227 We are making a series of commitments that outline our approach to how we will reinvent our business for RP7.

7.228 In Q3 2023 NIE Networks will create an Organisational Renewal Programme to deliver an organisational change process lasting c.18 months to identify and implement the required people, process and structural investments required to be ready by the start of RP7 to meet the commitments outlined in our plan. The project will focus on the following themes:

- increased delivery and network capabilities
- improved organisational capability
- DSO readiness

Increased delivery and network capabilities

Delivery

7.229 We will grow our existing delivery capability as set out in other parts of this submission by bringing in new apprentices and graduates. We will grow our contractor fleet across all of our existing framework capabilities. We will seek opportunities to expand the deliverability role of these contractors by asking them to take on more end to end programme responsibility to increase output, reduce interfaces and keep downward pressure on unit costs. We will add in additional programme management, procurement and supply chain capability so that we are properly resourced and structured to live up to our commitment to "Touch the Network Once".

Major contracting

7.230 We will establish a team that will have responsibility for delivering large scale contracting projects. They will develop the alternative contracting models (Design and Build, Turnkey, EPC etc) to allow NIE Networks to deliver larger bespoke projects, including transmission asset replacement projects, cluster substations, offshore connections etc.

Improved organisational capability

IT and digital alignment

7.231 NIE Networks will review how we are organised to ensure that we deliver the parts of our plans related to –

- Cyber resilience
- SAP upgrade
- Operations technologies
- Data strategy
- Digital innovations for our customers and our business

7.232 We believe that a revised organisation will help us to ensure that we are more efficient in delivering the scale of investment required in RP7 while also being more focussed on leveraging the benefits of significant investment in digital skills and automation. We will also have clearer responsibility to deliver the required enabling processes for our customers and staff.

Strategy and innovation

7.233 We will reorganise our strategy and innovation activities so that they are embedded in each part of NIE Networks. We recognise the need to deliver on both the traditional well trusted work programmes while also ensuring that we are prepared for the customer, environmental and policy changes which will impact Northern Ireland. NIE Networks will seek to work more closely with stakeholders to create new ways of doing things, to become more efficient and faster to respond as opportunities arise. We will increase our commitment to listening to our stakeholders, and will build a capability to turn the things that we hear into business change. We believe that investment in digital engagement and increased organisational change expertise will make NIE Networks a more responsive business and will result in better delivery outcomes and increased efficiency for our customers.

Connections

7.234 By the start of RP7 we will have reorganised our connections activities in anticipation of a future change in connections charging policy. We will renew our processes to respond to customer feedback about speed and transparency of the connections journey. We will have a better way of providing connection offers to renewable generators – both small-scale and larger onshore and offshore generators – as well as the many demand customers who will want enhanced connections. We will work with industry to develop specific solutions for EV charging and housing so that the experience of these customers is more efficient.

People

7.235 We believe that we will need to grow our workforce to approximately 2,000 people by the end of RP7 to have the long run resource and organisational support capability to meet future work programmes. We will need to grow this capability safely and efficiently, scaling to deliver more for customers.

7.236 We are implementing an organisational culture programme called Safer Together which will be fully embedded in how we work by start of RP7. We believe that we must make sure that NIE Networks is a great place to work so that we build a resilient work force that are willing to commit to our long-term approach to developing the network. This will

help all of our people understand how their role contributes to the things that NIE Networks is committing to in our RP7 business plan. We believe that this will make us a safer and more efficient business that is able to recruit and retain in demand skills.

Asset modernisation

7.237 In RP7 we are committing to make our network resilient enough, and to have enough capacity to, meet the climate change targets out to 2050. This means that the assets that we deploy in RP7 must be technically capable of providing the electrical performance that a citizen may require in 2060. This means we need to change our approach to asset specification and procurement to ensure that this 2050 resilience is as important as unit cost. We will do this by –

- ensuring that asset specifications are flexible to allow for changing future demands;
- continuing to operate to best practice asset management techniques to maximise the technical life and performance of the network assets; and
- developing flexible decision-making processes to ensure that developments in asset capabilities can be incorporated into our work programmes while meeting planned commitments on volume and cost.

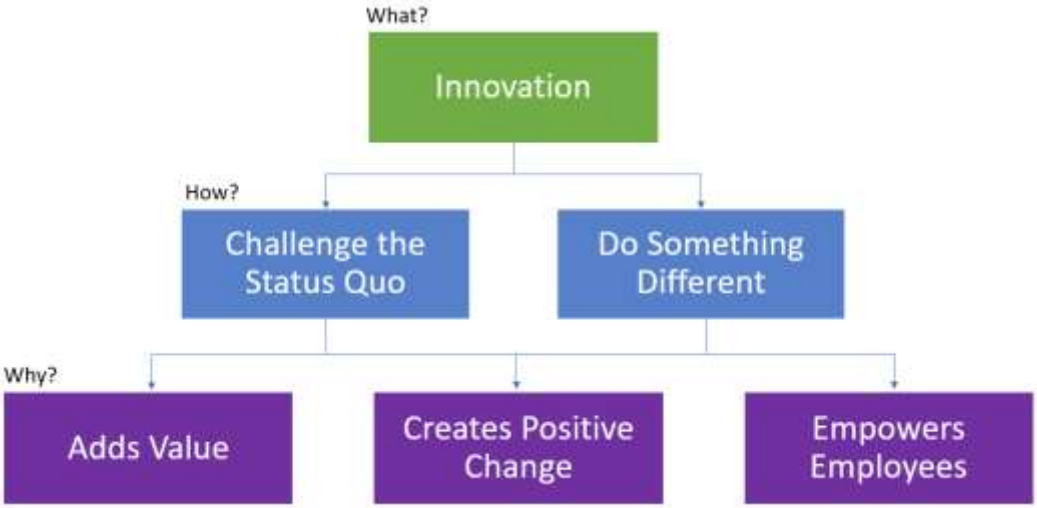
DSO transition

7.238 We will establish an organisation structure that gives distinctive effect to NIE Networks' role of DSO in Northern Ireland so that the right activities are carried out in the right area and provides the independence of thought, process and structure to ensure that the best decisions are made for the future development of the network, and maximum energy market opportunities are created and exploited to reduce end user cost. We will also build capability to increase collaboration with SONI to eliminate any potential overlap and speed up decisions on transmission network development.

e. Innovation in everything we do

What is innovation?

7.239 By 'innovation' we refer to doing something new or doing something in a different way. This means novelty in the sense that the activity has not been delivered before in NIE Networks. That definition covers a very wide range of activities, from more risky, early stage research and development, to adoption of working practices that have been proved in similar businesses elsewhere. In all cases the activity is new to NIE Networks.



Our track record and learnings

7.240 Innovation is not new to NIE Networks; we have always engaged in many forms of innovation – in our electricity network and across our business functions, enabling us to deliver efficiencies which are passed onto our customers. Within the RP6 period we ramped up our innovation activity, spearheaded by the UR approving funding for six innovation projects enabling us to invest more than £6.36 million (2015/16 price base) in network innovation, trialling and integrating new, smart and flexible solutions on our network as alternatives to conventional network reinforcement.

7.241 The leadership shown by the UR in approving this funding and the excellent work by our innovation engineers has meant that we are able to deliver £24.7m in savings back to customers in the form of reduced primary and secondary net zero allowances in our RP7 business plan. These solutions will continue to deliver savings during RP8 and subsequent regulatory periods highlighting the enduring benefit of investing in innovation.

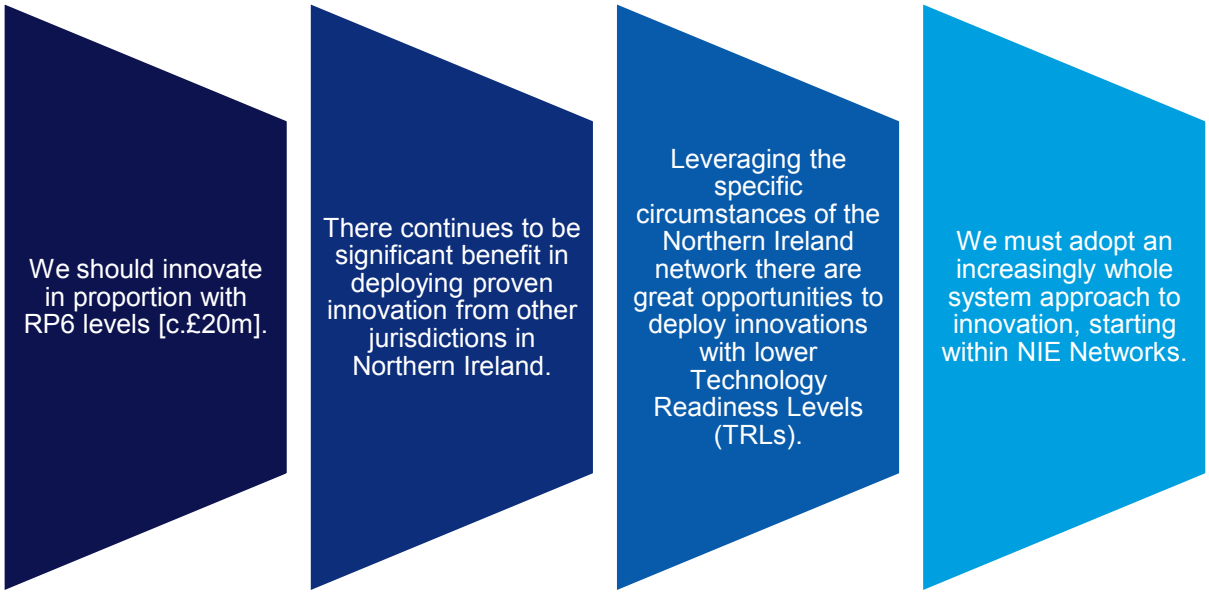
7.242 However, through extensive customer engagement, our own experiences in delivering innovation projects and through policy trends we continue to refine our approach to innovation to ensure that we continue to deliver for the people of Northern Ireland. Whilst not exhaustive, we outline below some of the key learning which underpins our RP7 approach and asked our stakeholders for their opinion on them within our RP7 consultation document.

7.243 Stakeholders provided strong support with 27 stakeholders agreeing with these or suggesting increased ambition and none suggesting that we are being too ambitious.

7.244 Specifically relating to the size of the RP7 innovation allowance, 13 stakeholders felt that the proposed level (2%, c.£20m) was appropriate, 9 stakeholders felt our allowance should be higher and none suggested it should be less than that proposed.

7.245 We have made sure to reflect this strong stakeholder support within our refreshed innovation vision and within the scale, type and structure of our RP7 innovation allowance request.

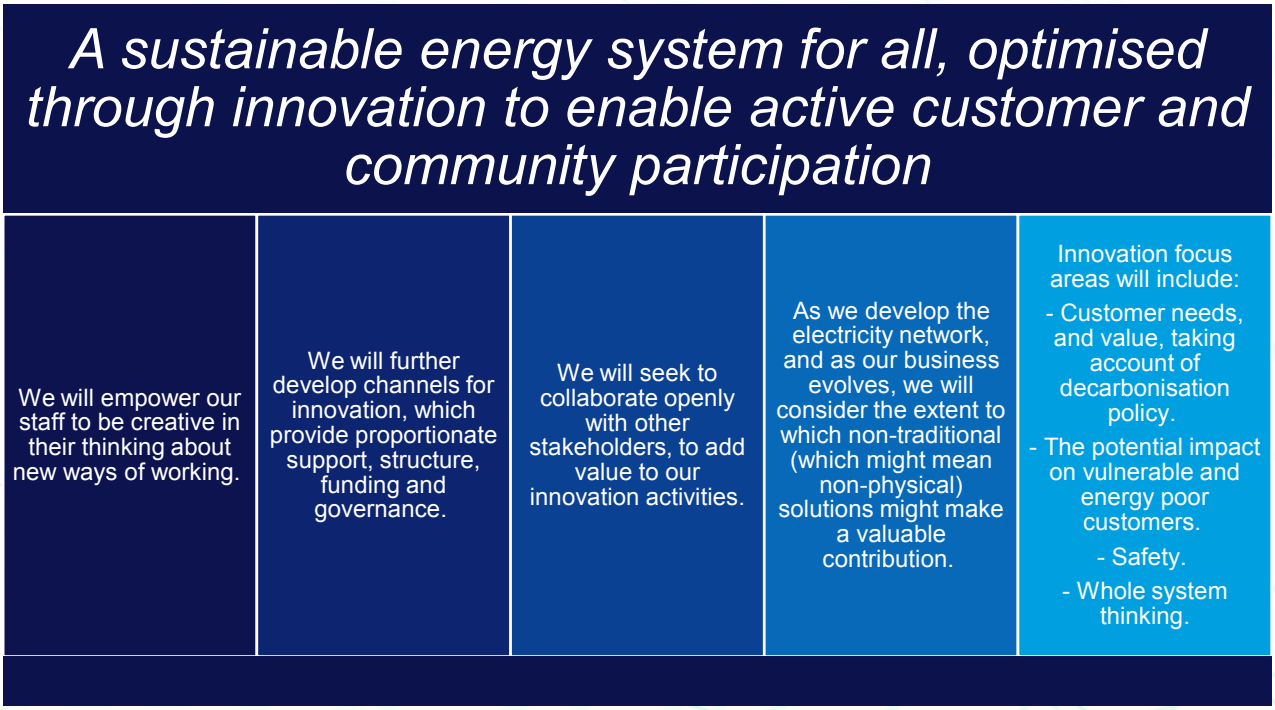
> *'IoD believe that NIE Networks has a major role to play in supporting innovation and technologies that deliver a longer-term solution and reduces Northern Ireland's exposure on these issues. NIE are perfectly placed to be leaders in innovation in the integration of renewable generation onto the network and thus creating new business opportunities which further aligns with the DfE 10X strategy.'*
>
> IOD NI



Our vision for innovation

7.246 Aligned with our corporate vision we have established our innovation vision and supporting principles within NIE Networks which reflect stakeholder feedback, our own learnings from delivering innovation and policy trends, with the needs of our customers at its core. This is shown in the figure below.

Figure 42 – innovation vision and principles



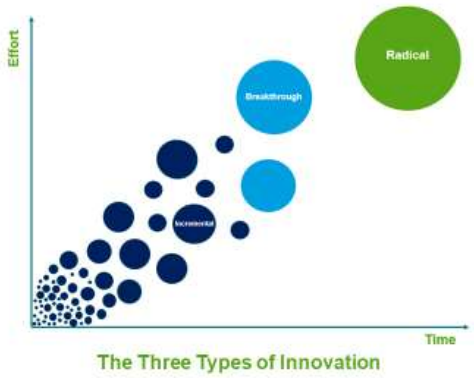
7.247 To help structure our innovation activities and embed this vision and supporting principles we have established a framework for categorising innovation, outlined in Figure 43. We recognise that there is no 'one size fits all' approach to managing innovation – indeed our framework should itself have room for innovation – it is convenient to group projects by certain characteristics. The definition of these categories of innovation is not intended to be exclusive, but we consider generally three categories:

- Business Innovation. We define the business innovation category as projects which have the potential to improve our business, where the improvement might be anywhere within our business functions, both internal and customer-facing.

- Network Innovation. Network Innovation projects are defined as those which have an impact on the physical network. In recent years network innovation has become core activity, with a series of discrete projects which have been funded through a regulatory allowance in the price control mechanism.

- Whole System Innovation. This includes the widest range of projects, from ad-hoc coordination with the TSO, to strategic multi-year R&D collaborations with universities and others.

Figure 43 – innovation categorisation framework



Innovation can be split into three main categories at NIE Networks, Business Innovation, Network Innovation and Whole System Collaboration. These can further be classified into Incremental, Breakthrough and Radical, examples of which are given below.

	Business Innovation	Network Innovation	Whole System Collaboration
R	New Business Venture	Direct Current Distribution	Joint Ventures
B	Structural Change	Network and Customer Flexibility	Common Investments e.g. telecoms network
I	Process Improvement	LV Monitoring	Local Area Energy Planning

7.248 Within business, network and whole system innovation these can be further classified as incremental, breakthrough or radical.

7.249 Most of our innovation, particularly incremental innovation, does not require standalone allowances as in most cases there is a clear net benefit to the business from the innovation which can be realised over the short term. Indeed, to achieve of our vision and the supporting principles, outlined in Figure 43, there must be a continued focus on incremental innovation across our business.

7.250 Breakthrough and radical innovation projects are typically substantial multi-year projects in the delivery phase, with the benefits after conversion to business as usual returned to customers over many years. Therefore, the increasing levels of risk associated with breakthrough and radical innovation projects accompanied with the scale of investment and the timing of any return on investment over subsequent regulatory price control periods makes them unsuitable for investment through a reward-sharing arrangement. This is even more true as we propose a broader range of projects, including some at an earlier stage of technology readiness, in the RP7 price control period. As such, and similar to RP6 we are seeking dedicated allowances for innovation within the RP7 period.

7.251 Read more about our company wide innovation vision and framework in our accompanying paper 'Innovation Strategy Delivering Customer Value Through Change'.

Our requested allowances in RP7

7.252 The investment in our networks required to decarbonise our energy system and enable the electrification of heat and transport to deliver net-zero by 2050 represents a significant uplift in RP7, with similar or greater levels of investment required across RP8 and RP9.

7.253 However, the scale and timing of this investment also presents a substantial opportunity to make significant savings for our customers by using smart and flexible solutions to delay or avoid investment and manage uncertainty. In order to unlock these savings, we must innovate at pace and scale to ensure that solutions are tried, tested and available ahead of when irreversible investment decisions are being made. Failure to do so will mean that we will likely make many sub-optimal decisions to replace assets or reinforce

networks and the opportunity to use new solutions and the associated savings for our customers will be missed.

7.254 Investment in network innovation during RP6 has delivered, and we propose building on this and investing further in innovation during RP7 to enable even more savings to be reflected in our RP8 business plan and beyond. However, as outlined above, one of the key learnings from RP6, and supported by stakeholders, was that we need a more agile and flexible approach to support innovation. That is why we are proposing that our innovation funding should have two distinct elements:

- Ex-ante funding to deliver defined projects which are fully scoped with the business cases submitted as part of this RP7 process.
- A flagship Network Innovation Fund (NIF) that enables us to respond to emerging innovation needs and technologies in an agile and flexible manner.

Defined innovation projects

7.255 Our approach to selecting RP7 innovation projects is based on a comprehensive review of the latest innovation strategies from GB DNO's and their associated projects, industry engagement, horizon scanning and our anticipated needs in RP8. This process outputted five broad innovation themes under which 11 separate innovation projects were identified. This corresponded to a funding requirement of £8.8 million, representing a 15% increase over the RP6 ex-ante allowance while delivering almost twice as many projects. Our themes and projects are outlined below. You can read more about our RP7 innovation request in our accompanying 'EJP 5.101 Network Innovation' and the specific business cases for the 11 defined innovation projects in the EJPs outlined below.

Network monitoring and data	*Connections, network capacity, distributed energy resources and low carbon technologies*	*Customer participation and demand-side flexibility*	*Customer satisfaction and bills reduction*	*Whole system integration*
• Data Analytics (EJP 5.201) - £653k • Real time fault level monitoring (EJP 5.202) - £1,030k • High voltage active network management (EJP 5.203) - £659k	• Vehicle to X (EJP 5.301) - £1,255k • Direct current readiness (EJP 5.302) - £501k	• Flexibility market development (EJP 5.401) - £880k • Virtual statcom (EJP 5.402) - £480k	• Micro resilience (EJP 5.501) - £362k • Supporting vulnerable customers in a digital, net zero era (EJP 5.502) - £740k	• Customer load active system service (EJP 6.01) - £1,432k • Real time thermal rating AT 110kV (EJP 6.02) - £777k

Network Innovation Fund (NIF)

7.256 As part of our recommended approach towards innovation funding during RP7 and as strongly supported by our stakeholders, we are proposing a NIF in RP7. The NIF would emulate many of the features of GB innovation funds, functioning as a reopener mechanism which is designed to flexibly address new needs and support new and worthwhile initiatives that emerge over the course of RP7 as well as provide guidance for NIE Networks on the direction and scale of network innovation we should be undertaking.

7.257 We have carried out an innovation expenditure benchmarking exercise with other DNOs and jurisdictions. On the back of this exercise, and strongly supported by our stakeholders, we propose a continuation of the RP6 level of innovation funding as a

percentage of our network investment plan (c.2%), representing £19.1m based on a £900m direct capex investment plan during RP7.

7.258 Our defined innovation projects equate to £8.8 million, resulting in an overall expenditure cap on the NIF of £10.3 million. Functionally, the Network Innovation Fund would operate as a light touch reopener mechanism; whereby, if it can be demonstrated that the proposed project(s) meets pre-agreed criteria[45], then an expedient regulatory assessment process pursues.

7.259 Underpinning this light touch reopener mechanism, is the establishment of an 'electrification council', a group comprising relevant NI-based organisations and academia to support Northern Ireland's decarbonisation journey. While the remit of this group is still to be defined we believe that it would have two main functions:

- Advise on the RP7 innovation projects and steer the development of new innovation proposals brought forward under the NIF.

- Provide a level of assurance to the UR that the projects being submitted for approval under the NIF are aligned with customer interests and stakeholder views, supporting the proposed UR light touch assessment.

7.260 We propose an annual submission of project proposals from us to the UR for consideration. The normal submission date would be the end of each financial year.

[45] Detailed criteria proposed within ourEJP 5.101 Network Innovation Annex.

f. Whole system optimisation

7.261 Considering both the scale and nature of the RP7 price control, it is more integrated and transformational than ever before. That is why we have meticulously sought out whole system optimisation opportunities and included these within our RP7 plan from the outset:

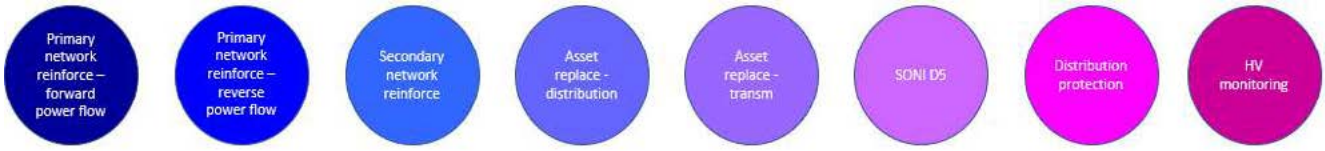
1) 'Two for one' – £99.9m.
2) Innovation and 'Flexibility First' – £24.7m.

'Two for one' optimisation between programmes

7.262 Considering the scale of investment required to facilitate net zero whilst maintaining the health of our network it is inevitable that there will be optimisation opportunities whereby we can reduce the amount of investment required to deliver the same customer outcomes. As outlined in **Figure 36** we've done this via the following 2 stage approach:

Step 1: Bottom up investment category plans developed

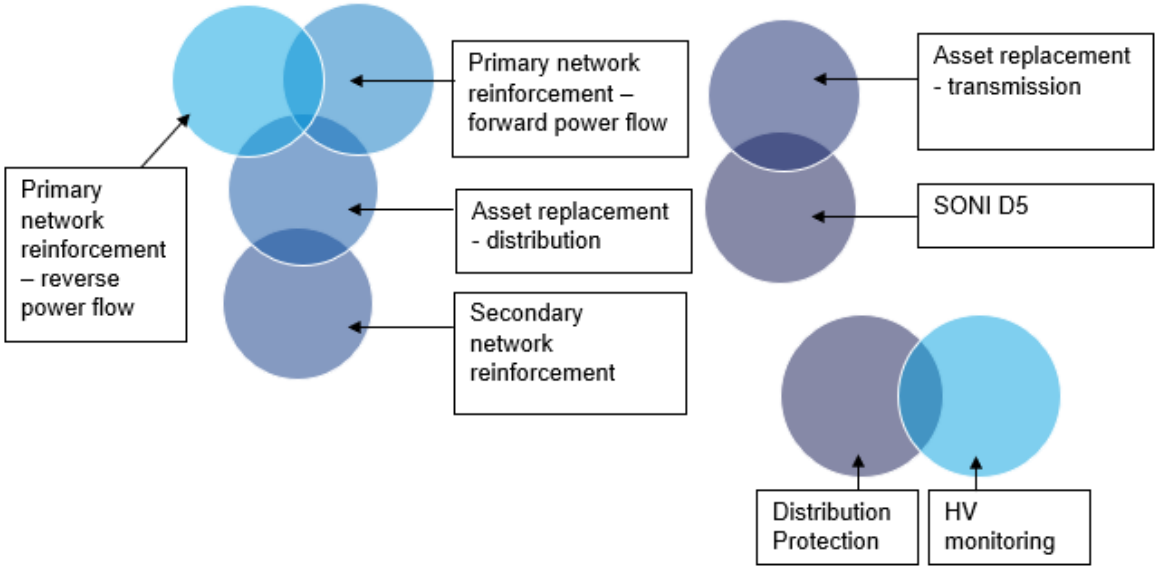
7.263 Each investment category is built up based on the specific needs of that particular category.



Step 2: Optimisation opportunities are identified and customer efficiencies delivered

7.264 All 'two for one' optimisations have been identified across the entire plan, and are outlined below:

Figure 44 – identifying 'two for one' optimisations



7.265 Optimisation 1: £14.1m of optimisation identified and removed from the RP7 plan with respect to the following primary network investment programmes:

- Primary network reinforcement - forward power flow (EJP 1.101).
- Primary network reinforcement -reverse power flow (EJP 1.102).
- 33/11kV Transformers (EJP1.306).
- Distribution primary network – High Impact low probability (HILP) investment (EJP 1.803).

7.266 Optimisation 2: £3.3m of optimisation identified and removed from the RP7 plan with respect to the following secondary network investment programmes:

- Secondary network reinforcement (EJP 1.105).
- 11kV overhead line rebuild (EJP 1.104).
- HV underground distribution cables (EJP 1.602).
- 11kV and 6.6kV GM secondary substations (EJP 1.401).
- LV overhead lines (EJP 1.508).
- LV cables underground distribution cables (EJP 1.603).

7.267 Optimisation 3: £1m of optimisation identified and removed from the RP7 plan with respect to NIE the following monitoring investment programmes:

- HV monitoring expansion (EJP 1.103).
- Protection substation monitors (EJP 1.703).

7.268 Optimisation 4: £81.5m of optimisation identified and removed from the RP7 plan with respect to the NIE Networks' transmission network investment plan and projects that SONI will bring forward under the D5 mechanism. This includes earthwire replacement and the redevelopment of a number of 275kV substations.

'Flexibility first' efficiencies

7.269 Implementing our 'flexibility first' approach within our RP7 business plan, as outlined from paragraph **7.61** onwards, has enabled us to include £24.7m of cost savings to our customers from the outset.

g. Assessing cost efficiency

Comparative benchmarking

7.270 We commissioned NERA Economic Consulting (NERA) to assess the efficiency of our current and forecast levels of expenditure by benchmarking ourselves against the GB DNOs. To perform this assessment, NERA drew on a range of methods used by Ofgem as part of its RIIO-ED1 and RIIO-ED2 price control reviews, and also from the benchmarking work carried out by the UR as part of the RP6 determination.

7.271 More detail on NERA's modelling approaches is set out in the sub-sections below, and in the report(s) prepared by NERA which accompany this business plan.

Benchmarking of overall capex levels and capex unit rates

7.272 NERA carried out a benchmarking exercise to assess the level of capex relative to the size our business. The purpose of this exercise is to test the reasonableness of the proposed total cost of the network investment programme. NERA concludes that our proposed increase in capex for RP7 is in line with what the GB DNOs proposed in their submission for RIIO-ED2.

7.273 NERA also performed unit cost benchmarking to assess the efficiency of our distribution capex programme between 2012/13 and 2021/22. This involved comparing the unit costs of all the distribution capex we undertook in this period, to the unit costs of similar projects undertaken by the GB DNOs. NERA's analysis shows that, based on the work undertaken during this period, NIE Networks is among the most efficient DNO with lower average unit costs than the majority of the GB DNOs.

7.274 Further details on capex benchmarking can be found in NERA's report 'Comparative Benchmarking to Support the Preparation of NIE Networks' RP7 Business Plan'.

Benchmarking of indirect and IMF&T costs

7.275 NERA benchmarked our indirect costs, and inspections, maintenance, fault and tree cutting (IMF&T) costs between 2012/13 and 2021/22 against the GB DNOs, using cost data provided by NIE Networks and the same cost data and models used by Ofgem for its RIIO-ED1 and RIIO-ED2 price control reviews. NERA's findings show that –

- NIE Networks consistently appears to be the most efficient network operator overall across all the modelling suites used by NERA; and
- NIE Networks' costs for indirects and IMF&T could have been up to 24% higher and still be confirmed as efficient.

7.276 NERA also tested and quantified the relationship between increases in capex and increases in indirect and IMF&T costs. Using NERA's findings, we propose it would not be unreasonable to assume that a 10% increase in capex will lead to approximately a 1.5% increase in gross indirects and IMF&T costs.

Using NERA's findings as a test of reasonableness

7.277 We have assessed our forecast expenditure on indirect and IMF&T for RP7 using a "bottom-up" approach. That is, we have considered and assessed the amount of resource needed i.e. manpower, materials, bought-in-services etc to deliver the RP7 investment programme.

7.278 This bottom-up assessment reveals a total cost requirement of £658m for indirects and IMF&T over RP7, or £110m per annum on average[46]. This compares to actual expenditure of £76m on indirects and IMF&T in the base year 2021/22 – representing an increase of £34m per annum or 45%, during RP7.

7.279 We recognise that this is a significant increase on the current levels of expenditure; but we also believe the increase is reasonable, justifiable and efficient, and we can demonstrate this using the standard methods applied in good regulatory practice.

7.280 Our understanding of the approach which would be utilised in assessing this area can be summarised into four stages –

- **Stage 1**. The UR will benchmark historic costs to determine an "efficiency gap" (an efficiency gap being the difference between the company's actual expenditure and the expected expenditure for a company operating at the upper quartile of efficiency).
- **Stage 2**. The UR will apply the determined efficiency gap to base year expenditure. This gives a starting point for allowances.
- **Stage 3**. The UR will consider if any additional allowances are appropriate, for example if there are new activities to be carried out in future that do not feature in the base year. Any such additional allowances are then added to the starting allowance determined at Stage 2.
- **Stage 4**. The UR will roll forward the allowances determined at Stage 3 year-on-year, applying adjustments for real price effects (RPEs) and productivity improvements.

7.281 NIE Networks has used NERA's findings from its comparative efficiency assessments to determine an efficient level of expenditure using the above process, as follows.

Stage 1 – benchmarking historic costs to determine an efficiency gap

7.282 NERA's benchmarking analysis suggests that NIE Networks' historic costs for indirects and IMF&T could have been up to 24% higher and still be confirmed as efficient. So, there is a negative efficiency gap of up to 24%.

Stage 2 – apply the determined efficiency gap to base year expenditure

7.283 Applying a negative efficiency gap of 24% to actual expenditure in in 2021/22 of £76m, the starting point for allowances is £94m i.e. £76m x 1.24.

[46] The figures for RP7 exclude additional costs directly related to the RP7 IT programme. Historically, both Ofgem and the UR has considered and assessed IT expenditure separately. So, in keeping with this approach, we have removed all RP7-related IT programme costs from the analysis.

Stage 3 – consider if any additional allowances are appropriate

7.284 Using NERA's modelling of the relationship between capex and indirects / IMF&T costs, we propose it would not be unreasonable to assume that a 10% increase in capex will lead to approximately a 1.5% increase in gross indirects and IMF&T costs. During RP7 capex will increase by £545m compared to RP6. This suggests gross indirects and IMF&T costs will increase by £82m over RP7, or £14m per annum.

7.285 Adding the £14m to the £94m determined at Stage 2 gives a total "top-down" assessment for allowances for indirects and IMF&T costs at £108m per annum.

7.286 This supports NIE Networks' bottom-up assessment of £110m per annum as reasonable and at a level that should be considered efficient.

Further explanation to support "Stage 2" and "Stage 3" upwards allowance adjustments

7.287 The scale of the negative efficiency gap identified at Stage 2 of the above process, merits some further consideration.

7.288 NIE Networks is seeking cost allowances that are materially above base year costs because the current levels of expenditure will not be sustainable going forward. Firstly, NIE Networks will be undertaking new and/or additional activities in future, which will increase our cost base. Secondly, input prices are increasing.

New and/or additional activities

7.289 Regarding new activities, the costs for which do not feature in base year expenditure, we highlight the following –

- **The DSO function**. The GB DNOs are further ahead in developing this function and so will have costs included in the comparator years, whereas NIE Networks does not. We will incur costs in this area in RP7 so will need an increase from 2021/22 base year costs to cover this.

- **Guaranteed standards of service (GSS)**. The GB DNOs have been operating to differing GSS than NIE Networks, in particular the requirement to restore power supplies within 12 hours (although it will have been 18 hours for some of the comparator years). By contrast, our requirement is currently restoration within 24 hours. This will change in RP7 however, as work is underway by UR to update GSS in Northern Ireland and this will drive a different level of spend to meet this more onerous standard.

- **ESQCR expenditure**. Our programme to address ESQCR requirements lags that of the GB DNOs, meaning our costs in the comparator years will be relatively lower. The situation will reverse however in future years, as our programme ramps-up while the DNOs' programmes come to an end.

Input prices are increasing

7.290 NIE Networks is facing the end of some older contracts and the outputs from the competitive processes that we have accrued out to replace these indicate that there will be upward pressure on expenditure from 2022/23 onwards. In particular –

- We are facing increasing cost pressures from our contractors. Historically we have managed to negotiate good rates with contractors given the scale of the work that we were able to offer and their own cost base being well managed. We are already facing challenges in this area however, and we have had to engage with many of our contractors and agree to pay them higher rates, in order to ensure they can continue to provide services to us as their own costs have increased significantly in recent years and the demand for their services has also grown. More details are available in NERA's report 'Special Factors Affecting NIE Networks' Benchmarking for RP7'.

- Our IT managed service provider has reduced its annual charges in previous years to reflect challenges in meeting contractual commitments. This reduction is reflected in our cost base right up until 2021/22, thus pushing our costs downwards. However, our IT managed services provider has now made significant improvements such that we do not expect the reduction in costs to continue into the future.

7.291 Taking the above factors together, it is clear that NIE Networks' will face much higher levels of expenditure on indirects and IMF&T during RP7. Accordingly, the UR will need to consider how to ensure that NIE Networks has sufficient allowances to cover the expected increase in costs driven by the anticipated increase in activity and external costs during RP7. We believe that the appropriate mechanism for this would be for the UR to grant allowances in line with the benchmark level of efficiency identified for the GB DNOs. This would ensure that NIE Networks is still held to a high regulatory standard of efficiency in its costs while recognising the changing circumstances in RP7.

8. EXPENDITURE

a. Summary

8.1 This chapter sets out at a summary level forecast expenditure in respect of the distribution and transmission network. In total £2,551m will be required in RP7; £1,834m for distribution expenditure and £717m for transmission.

8.2 The elements of the distribution and transmission expenditure are shown in the tables below and summarised in the following pages. A more detailed explanation is provided within accompanying paper 'RP7 Business Plan – Detailed Expenditure'.

8.3 Where we have experience in delivering work programmes for the RP7 period in RP6 we have based our cost estimates on our performance to date. As discussed in Chapter 7, an independent benchmarking exercise was performed by the economic consultancy NERA on the first three years of actual direct capital expenditure undertaken in RP6. The results of this exercise place us as amongst the most efficient of the DNO's within the UK. Therefore, this high level of efficiency can be considered to be similarly embedded in our RP7 expenditure estimates having been derived from RP6 unit costs. Where we are proposing new areas of investment in the RP7 period, our cost forecasts have been referenced back to existing material and labour contracts.

Table 10 – summary of core distribution expenditure, £m

Core expenditure funded through DUoS (£m, 2021/22 prices)									
Costs excluding RPEs	**Average p.a.**		**Spend profile in RP7**						**Total RP7**
	RP6	**RP7**	**25/26**	**26/27**	**27/28**	**28/29**	**29/30**	**30/31**	
Distribution network capex	**70.8**	**133.5**	118.8	135.2	133.8	134.6	139.3	139.1	**800.8**
Inspections, maintenance, faults & tree cutting (IMF&T)	**17.6**	**23.7**	23.6	23.6	23.7	23.8	23.8	23.8	**142.3**
Indirects	**50.3**	**72.6**	68.5	69.0	73.1	74.7	75.1	75.1	**435.7**
Non-network IT	**7.7**	**19.5**	23.3	27.8	27.7	20.4	13.5	4.3	**117.1**
Market operations	**22.8**	**28.2**	28.6	27.3	27.9	28.1	28.2	29.1	**169.3**
RP7 efficiency savings*	**0.0**	**-16.0**	-9.0	-12.4	-15.1	-17.5	-19.9	-21.9	**-95.8**
Total core distribution expenditure	**169.3**	**261.5**	**253.8**	**270.6**	**271.1**	**264.2**	**259.9**	**249.5**	**1,569.3**
Other expenditure	**26.4**	**44.1**	14.6	44.6	48.1	50.1	52.9	54.4	**264.7**
Total expenditure	**195.7**	**305.7**	**268.4**	**315.2**	**319.3**	**314.3**	**312.8**	**304.0**	**1,834.0**

** Efficiency savings achieved during RP6 are reflected within the RP6 actual costs.*

Table 11 – summary of core transmission expenditure, £m

Core expenditure funded through TSC (£m, 2021/22 prices)									
Costs excluding RPEs	**Average p.a.**		**Spend profile in RP7**						**Total RP7**
	RP6	**RP7**	**25/26**	**26/27**	**27/28**	**28/29**	**29/30**	**30/31**	
Transmission network capex	**27.6**	**97.9**	80.8	99.5	127.3	127.4	80.7	71.6	**587.4**
Inspections, maintenance, faults & tree cutting (IMF&T)	**1.7**	**2.1**	2.2	2.2	2.1	2.0	2.0	2.0	**12.5**
Indirects	**7.9**	**11.7**	10.9	11.1	11.9	12.0	12.1	12.1	**70.1**
Non-network IT	**0.6**	**1.9**	2.2	2.4	2.4	2.4	1.8	0.5	**11.6**
RP7 efficiency savings*	**0.0**	**-1.8**	-1.0	-1.3	-1.8	-2.1	-2.3	-2.5	**-10.9**
Total core transmission expenditure	**37.8**	**111.8**	**95.1**	**113.9**	**141.8**	**141.8**	**94.3**	**83.7**	**670.7**
Other expenditure	**7.8**	**7.7**	0.2	7.8	9.1	9.7	9.7	9.8	**46.4**
Total expenditure	**45.6**	**119.5**	**95.4**	**121.7**	**151.0**	**151.4**	**104.0**	**93.6**	**717.1**

** Efficiency savings achieved during RP6 are reflected within the RP6 actual costs.*

a. Network capex

8.4 A more detailed breakdown of the required RP7 network capex expenditure is shown in the tables below.

Table 12 – Distribution network capex, £m

Costs excluding RPEs	Average p.a.		Spend profile in RP7						Total RP7
	RP6	RP7	25/26	26/27	27/28	28/29	29/30	30/31	
Facilitating net zero through a flexible and integrated energy system	**29.2**	**61.7**	51.9	56.3	62.8	62.5	68.5	68.3	**370.4**
Maintaining a safe, reliable, resilient network	**32.8**	**62.3**	59.6	69.5	61.1	62.2	60.8	60.8	**374.0**
Innovation in all we do	**2.0**	**3.2**	1.1	3.2	3.7	3.7	3.7	3.7	**19.1**
Other non-load	**4.7**	**4.6**	4.6	4.6	4.6	4.6	4.6	4.6	**27.8**
Network access and commissioning	**2.2**	**1.6**	1.6	1.6	1.6	1.6	1.6	1.6	**9.5**
Total	**70.8**	**133.5**	**118.8**	**135.2**	**133.8**	**134.6**	**139.3**	**139.1**	**800.8**

Table 13 – Transmission network capex, £m

A safe reliable and resilient network expenditure (£m, 2021/22 prices)									
Costs excluding RPEs	Average p.a.		Spend profile in RP7						Total RP7
	RP6	RP7	25/26	26/27	27/28	28/29	29/30	30/31	
Projects to be advanced under uncertainty mechanisms									
Facilitating net zero through a flexible and integrated energy system	**0.0**	**71.1**	67.9	85.6	92.6	93.2	48.3	39.2	426.9
Maintaining a safe, reliable, resilient network	**19.3**	**11.1**	0.0	0.0	16.6	16.6	16.6	16.6	**66.5**
Ex-ante allowance requests									
Maintaining a safe, reliable, resilient network	**7.8**	**15.3**	12.5	13.5	17.7	17.2	15.4	15.4	91.8
Network access and commissioning	**0.4**	**0.4**	0.4	0.4	0.4	0.4	0.4	0.4	2.3
Total	**27.6**	**97.9**	**80.8**	**99.5**	**127.3**	**127.4**	**80.7**	**71.6**	**587.4**

Facilitating net zero through a flexible and integrated energy system

8.5 Investment in this category is essential to facilitate the ambition outlined within Northern Ireland Climate Change Act. Specifically, this investment will ensure the electricity network is developed to facilitate 300k electric vehicles, 120k heat pumps and an additional 2.2GW of renewable generation by 2030.

Transmission network

8.6 SONI is responsible for the high-level planning associated with the capability and capacity of the transmission system to facilitate net zero. Chapter 9 describes potential transmission related projects, totalling £426.9m that are to be considered, and potentially approved and funded, by the UR on a project-by-project basis.

Primary network

8.7 £30m of our facilitating net zero expenditure relates to primary network reinforcement to accommodate demand growth (forward power flow) and £20m to accommodate generation growth (reverse power flow), driven by our 'best view' LCT forecasts.

Secondary network

8.8 Most of the LCTs will connect to the secondary network (11kV, 6.6kV and LV) and as such significant network investment is required in the RP7 period representing £319m. This includes a change of specification, introduced in RP6, to upgrade legacy, low capacity conductor used on the 11kV network which is not fit for the future.

8.9 By adopting a 'flexibility first' approach we have included £24.7m of customer savings within our primary and secondary plan from the outset.

Maintaining a safe, reliable and resilient network

8.10 Diligent stewardship of our network is key to managing risk and ensuring our network is reliable and resilient in the longer term to deliver upon our stakeholders' net zero ambitions. This requires striking the right balance in keeping costs low today and investing for tomorrow. Our evidence is indicating that we must start to increase the level of investment on our reliability programmes if we are to maintain the health of the network and avoid deterioration of the reliability of the network. This combined with increased investment to address legislative requirements under ESQCR, is increasing the level of expenditure that we are proposing to invest in our core safety, reliability and resilience programmes.

8.11 Investment in safety and reliability have been grouped because improving asset reliability automatically improves safety.

Maintaining a safe and reliable network

8.12 We define network reliability as the likelihood of our assets failing which we manage through asset maintenance and replacement activity. £401m of expenditure is required in RP7 to maintain the safety and reliability of the transmission and distribution network. £16.6m will be spent on ESQCR safety-related investment such as removing looped services and sites categorised as very high risk; this programme is in addition to our overhead lines programmes in which we are investing £227.3m which, in order to ensure that efficiencies are captured and we 'touch the network once', also addresses ESQCR clearance issues. We also aim to broadly maintain the health of the network in RP7 by investing £117.3m on plant, £26.4m on cables, £11.6m on protection and £2.5m on earthing.

Maintaining a resilient network

8.13 Network resilience is the ability of assets, networks and systems to anticipate, absorb, adapt to and / or rapidly recover from a disruptive event[47]. In RP7, £45.1m of expenditure is required to improve the resilience of our network to faults, climate change and physical disruptions.

8.14 This investment will provide a reduction of 8.17%% in unplanned CMLs over the period as compared to the 8.33% targeted reduction during RP6 and will help ensure a just transition to net zero by reducing those customers categorised as worst served by 50% over the period. It will ensure that our civil assets, buildings and substations are in good condition and prevent unauthorised entry, protecting the public, our staff and the environment. Finally, it will ensure that our network is more resilient to climate change

[47] House of Lords - The Resilience of the Electricity System - Science and Technology Committee (parliament.uk)

by increasing the flooding defences at five primary substations and forty distribution substations.

Innovation in all we do

8.15 Our approach to selecting RP7 innovation projects is based on a comprehensive review of the latest innovation strategies from GB DNO's and their associated projects, industry engagement, horizon scanning and our anticipated needs in RP8. This process outputted five broad innovation themes under which 11 separate innovation projects were identified. This corresponded to a funding requirement of £8.8 million, representing a 15% increase over the RP6 ex-ante allowance while delivering almost twice as many projects.

8.16 As part of our recommended approach towards innovation funding during RP7 and as strongly supported by our stakeholders, we are also proposing a Network Innovation Fund in RP7, with an expenditure cap of £10.3 million. The NIF would emulate many of the features of GB innovation funds - a reopener mechanism which is designed to flexibly address new needs and support new and worthwhile initiatives that emerge over the course of RP7.

Other non-load

8.17 Other non-load expenditure comprises connections driven system work and non-recoverable alterations.

8.18 Connections-driven system work is carried out along with a new connection to the assets to which the new connection will connect. For example, an overhead pole may be in a condition where replacement is required to ensure the longevity of that connection and indeed the safety of our staff who must climb the pole to make the connection. This lower level asset replacement achieved alongside the connection job itself is not chargeable to the customer but compliments the planned asset replacement programmes carried out through condition and risk assessed methods. Connections-driven system work expenditure of £9.6m is forecast for the RP7 period based on our experience to date in RP6.

8.19 Non-recoverable alterations arise where a customer cannot be charged for an alteration to electricity equipment on their land. This arises where the alteration complies with conditions 12 and 13 of an established Wayleave Agreement or where a notice to remove equipment is enforced. For example: where electricity infrastructure is impeding a bona fide development.

8.20 Non-recoverable alteration expenditure of £18.2m is forecast for the RP7 period based on our experience to date in RP6, however, this will ultimately be driven by customer behaviour and as such we have little control over the volume of work to be undertaken during the period. It is on this basis that we recommend to UR that this area of the price control should be subject to a pass-through style uncertainty mechanism. This will ensure that in a situation that customer activity decreases from that experienced in RP6, the costs will be minimised for the Northern Ireland customer.

8.21 As outlined in detail in EJP 1.506, we consider that raising an overhead line to ensure safety clearance where a landowner wants to develop the land on which electricity apparatus is situated is no longer technically acceptable. Such a practice continues to create high risk sites on the network as defined by ESQCR and puts our staff and

contractors at greater safety risk when inspecting, maintaining or refurbishing these assets.

8.22 This change in approach is forecast to cost a further £5.4m over and above the £18.2m outlined for non-recoverable alteration expenditure. However, this amount will be dependent on customer behaviour and given its uncertainty we have not included this cost in our base line plan.

8.23 We consider that this further supports the need for non-recoverable alteration expenditure to be subject to a pass-through style uncertainty mechanism in RP7.

Network access and commissioning

8.24 Network access and commissioning expenditure relates to two direct network activities which are not incorporated into specific projects or projects outlined in previous sections: (1) commissioning; and (2) network access.

8.25 Commissioning activities are required each time a new network asset is connected to the network to ensure safe and proper operation. Testing activities are carried out on a routine basis on equipment and protective devices.

8.26 These are necessary to isolate relevant assets to enable work or the connection of new assets to the network and then subsequently to restore supplies and carry out voltage checks.

8.27 Expenditure required during RP7 to support the network investment plan is £11.8m and is consistent with RP6 levels of expenditure.

b. Inspections, maintenance, faults, severe weather and tree cutting

Table 14 – IMF&T expenditure for transmission and distribution, £m

Transmission and distribution IMF&T expenditure (£m, 2021/22 prices)									
Costs excluding RPEs	**Average p.a.**		**Spend profile in RP7**						**Total RP7**
	RP6	**RP7**	**25/26**	**26/27**	**27/28**	**28/29**	**29/30**	**30/31**	
Inspections	**2.6**	**5.9**	5.9	5.9	5.9	5.9	5.9	5.9	**35.4**
Maintenance	**4.6**	**6.5**	6.5	6.5	6.5	6.5	6.5	6.5	**38.8**
Faults	**9.4**	**9.8**	9.8	9.8	9.8	9.8	9.8	9.8	**58.7**
Tree cutting	**4.2**	**6.2**	6.2	6.2	6.2	6.2	6.2	6.2	**37.2**
Severe weather	**0.9**	**0.9**	0.9	0.9	0.9	0.9	0.9	0.9	**5.6**
Network access and commissioning	**1.7**	**0.7**	0.7	0.7	0.7	0.7	0.7	0.7	**4.4**
Income	**(4.1)**	**(4.2)**	(4.2)	(4.2)	(4.2)	(4.2)	(4.2)	(4.2)	**(25.4)**
Total	**19.3**	**25.8**	**25.8**	**25.8**	**25.8**	**25.8**	**25.8**	**25.8**	**154.8**

8.28 Investment made in the normal day to day operation of the network is classified as Inspection, Maintenance, Fault & Trees (IMF&T) expenditure.

8.29 Some of the work such as reaction to faults, is by definition unplanned. In setting the programmes for this work, a view is taken of historic costs and trends. However, the other three categories (Inspection, Maintenance and Trees) all consist of planned expenditure. These programmes are determined based on meeting legislative requirements, cost/risk optimisation and industry best-practice.

Inspections

8.30 Inspections are carried out on all network assets with the frequency of inspections dictated by best practice industry guidance and legislation. By inspecting our assets regularly, we can ensure that they do not present a safety hazard to the public, or our employees and contractors. We also gather condition information which is critical to informing our future investment and maintenance plans.

8.31 Inspections expenditure of £35.4m is required during the RP7 period. This compares to a forecast spend of £16.6m during the RP6 period (excluding the extension year). The primary driver for the increase in spend is the additional inspections work required as part of the 11kV overhead line rebuild programme. More detail on the expenditure requirements for RP7 are included in EJP 3.101.

Maintenance

8.32 Preventative maintenance addresses routine wear and tear and also helps to identify any arising defects. Preventative maintenance is carried out in line with industry best practice guidelines and the regularity of maintenance is typically dictated by either a period of time or a number of operations. More detail on the expenditure requirements for RP7 are included in EJP 3.102.

8.33 Maintenance expenditure of £38.8m is required during the RP7 period. This compares to a forecast spend of £30.1m during the RP6 period (excluding the extension year). The primary driver for the increase in spend is largely attributable to increased defects identified as the age of the network equipment increases.

Faults

8.34 Faults on the network can be due to deteriorating and ageing assets, as a result of third-party damage or interference or as a result of bad weather. Fault expenditure of £58.7m is forecast as being required during the RP7 period. This forecast is based on our experience to date in RP6 however the unknown nature of where and when a fault will occur makes it difficult to accurately forecast the required level of expenditure.

Severe weather

8.35 The Fault category of expenditure covers normal day to day faults and those faults that result from bad weather. However, extreme weather circumstances place the predominantly overhead network under exceptional strain and can result in widespread damage; for example, affecting more than 75,000 customers.

8.36 Severe weather expenditure of £5.6m is forecast as required during RP7 however the impact and scale of severe weather during the period is impossible to accurately predict, particularly considering the impact of climate change. A more detailed discussion regarding severe weather is available in EJP 1.801.

Tree cutting

8.37 Overhead lines are susceptible to damage from growing trees, falling trees and windborne vegetation. Climbable trees near overhead lines also pose a danger where

physical contact with conductors is possible. To mitigate these risks, we undertake a programme of cyclical tree cutting.

8.38 Tree cutting expenditure of £37.2m is required during the RP7 period. This compares to a forecast spend of £27.3m during the RP6 period (excluding the extension year). The primary drivers for the increase in spend is additional work required to facilitate the 11kV rebuild programme together with a change in approach at LV whereby trees will be cut as opposed to fitting shrouds. This change in approach at LV reflects the change in growth patterns forecast as a result of hotter, wetter weather arising from climate change during the period. The impact of our changing environment on electricity networks is outlined within the accompanying paper 'Adaptation to Climate Change Task Group' and a more detailed discussion regarding our tree cutting requirements is available in EJP 3.301.

Network access and commissioning

8.39 As with undertaking capital investment activities in the network, network access and commissioning expenditure is required to support IMF&T activities on the network.

Income

8.40 Income relates to monies received for third party damage to the network and is forecast at £25.4m for the RP7 period.

c. Indirects

8.41 Further to the direct expenditure incurred in physically constructing and maintaining the network, NIE Networks also incurs costs related to 'indirect' functions that serve to support these direct activities. These include functions such as planning, project management, and business support.

8.42 We categorise indirect costs into the following main areas –

- engineering management;
- IT and telecoms opex;
- vehicles, property and engineering equipment;
- corporate and business support;
- wayleaves;
- operational training; and
- non-operational premises.

8.43 Expenditure incurred under the above listed categories is required to support the core capex plan set out earlier in this chapter. Should we be required to undertake any additional works if any of the projects set out in Chapter 9 are approved and proceed, we will seek additional indirect allowances to support the additional capital works.

8.44 As is clear from the summary tables at the beginning of this chapter, the level of indirect costs will be materially higher during RP7 compared to RP6. An explanation for why this is so, and justification for why the levels of allowances sought remain reasonable, are discussed in Chapter 7 from paragraph 7.275 onwards.

d. Non-network IT

8.45 As in previous price control periods, we will focus upon delivering a value for money IT programme during RP7. The investment plan has been developed to ensure that all investment is closely aligned to the RP7 commitments and that projects are prioritised and scheduled in the most efficient manner.

8.46 A significant expansion of the existing Project Management Office will be required to oversee these major programmes of work, ensuring that projects are scoped, planned and delivered on time, to budget and that expected business benefits are realised. RP7 forecast expenditure has been developed based upon external best practice information acquired through engagement with Ernst & Young (EY) and information gained from previous projects and assumes that significant savings in third party costs will be achieved through robust tendering processes.

8.47 Due to the changing nature of IT expenditure (for example the move to cloud-based services rather than traditional premise-based solutions), a more significant element of the Non-Network IT expenditure during the period will be treated as opex from an accounting perspective rather than capex.

8.48 As is clear from the summary tables at the beginning of this chapter, the level of non-network IT costs will be materially higher during RP7 compared to RP6. During RP7 we expect to see a significant increase in the level of digital and IT investment required as a result of open data, DSO and digitalisation demands and hence the average annual non-network IT investment during the RP7 period is higher than expenditure incurred during RP6.

8.49 More detail is provided on non-network IT in accompanying paper 'RP7 Digital & IT Business Plan'.

e. Market operations

8.50 Our market operations activities relate to metering services including installation and certification services, meter reading and market services activities including the provision of metering data and registration services, which is a key role in supporting the operation of and enabling competition within the retail and wholesale electricity markets. We manage the major IT systems that are central to the daily functioning of these markets.

8.51 The arrangements in respect of metering and market operations in Northern Ireland are different from those in GB. In Northern Ireland, NIE Networks is the common service provider for all metering operational activities including meter reading, whereas in GB there are a variety of independent providers of metering services contracted directly to suppliers. Other activities carried out by our market services team which are not carried out by the GB DNOs include the provision of metering data to support the retail and wholesale markets, maintenance of the market website and data communications infrastructure and retail market design and governance.

8.52 Our forecasts in this plan assume no change in relation to NIE Networks' metering obligations during RP7. In particular, in accordance with the UR's RP7 Approach Document, in which it stated that it expected NIE Networks to develop its RP7 Business Plan based on the current approach to metering i.e. excluding smart metering. Therefore, the plan has no provision for a smart metering rollout in Northern Ireland.

8.53 Our forecast for average annual costs in RP7 is higher than RP6, primarily reflecting the growing ambitions of our customers to engage in the energy transition through connection of LCTs, together with IT and digital requirements which are crucial to our market operations functions. The significant increase in LCT connections forecast for RP7 will impact across all of our market operations activities, including higher volumes and more specialised metering to facilitate the connection of LCTs, together with expected growth in retail market competition driven by the green economy.

8.54 Further details can be found in accompanying paper 'Market Operations RP7 Business Plan'. Issues regarding smart metering are also discussed further in a separate accompanying paper 'Smart Metering'.

f. RP7 efficiency savings

8.55 Notwithstanding the finding from the benchmarking work carried out by NERA and described in Chapter 7, that shows we are among the most efficient of the DNOs in the UK, we plan to continue to improve our efficiency through improvements in technology and working practices.

8.56 Our business plan assumes we will target annual efficiency savings of 0.8% per annum, in line with advice received from economic consultancy, Ernst & Young (EY). EY has estimated that an efficiency factor in the range of 0.5% to 1.0% per annum represents a challenging target that is consistent with data on long-term productivity trends[48]. These long-term trends have been widely used by regulators when setting efficiency targets for utilities.

8.57 During RP7, our Digital Transformation programme is designed to deliver a fully integrated workforce equipped with digital tools, data insights and connected services to enable smarter working, efficient resource usage and empower them to provide a better customer experience. In addition, we are planning to re-organise our business activities to be more streamlined in delivery. The combination of these initiatives, together with our enduring focus on cost management, will enable us deliver efficiency savings in the region of £100m through a variety of areas, including –

- use of digital technologies to better connect our processes, data and platforms leading to further integration of teams and working practices;
- modernising business processes to provide experience driven, digitalised and intelligently automated key processes, for example, process automation programmes;
- improved data access and information provision to facilitate more efficient usage of existing network assets;
- enabling continuous improvement through learning from employees, customers and stakeholders e.g. other DNOs / utility operators;
- effective procurement strategies;
- continued use of in-house resource to undertake core activities; and
- design of the right engineering solutions to network problems.

[48] See EY's report 'Real price effects and ongoing productivity in RP7' which accompanies this business plan.

g. Other expenditure

8.58 Costs categorised under 'Other expenditure' are as follows –

- real price effects (RPEs);
- business rates;
- licence fees;
- pensions; and
- "logged-up" costs from RP6.

8.59 These are described further in accompanying paper 'RP7 Business Plan – Detailed Expenditure'.

8.60 As is clear from the summary tables at the beginning of this chapter, the level of costs is higher during RP7 compared to RP6. The main driver for this is that the RPE allowance is higher when using CPIH as the price index, as the UR has proposed for RP7, compared to RPI which was used at RP6. Full details of the factors driving the RPE allowance request is set out in EY's report 'Real price effects and ongoing productivity in RP7' which accompanies this business plan.

9. TRANSMISSION EXPENDITURE: CAPABILITY / CAPACITY

9.1 This chapter describes potential transmission demand- / generation-related projects that are to be considered, and potentially approved and funded, by the UR on a project-by-project basis.

9.2 SONI is responsible for the planning of the demand- / generation-related projects which can take many years to proceed to construction through a number of key stages, including an initial identification of the need; a detailed process of evaluating technical design options; extensive consultation with stakeholders and the public; and a rigorous assessment of environmental impacts. This is an integrated process that can involve the acquisition of property, planning applications and other important consents before construction can begin.

9.3 Following completion by SONI of the work required to provide NIE Networks with a functional specification, NIE Networks is responsible for the detailed design and specification, procurement, construction and commissioning. NIE Networks is responsible for the full works including design of asset replacement projects through to delivery.

9.4 During RP6, a process of project-by-project approval by the UR was followed for these projects. The mechanism continues to be known as the 'D5' mechanism, a name that originates from the RP5 determination.

9.5 The original scope of the D5 mechanism was specific to projects which increased the capacity and capabilities of the transmission system i.e. SONI driven projects. In RP6, this was expanded to include two larger transmission asset replacement projects (Ballylumford Switchboard and CPS-Magherafelt) whose particular risk-profiles were more akin to project remunerated through the D5 mechanism. NIE Networks views that this mechanism has worked well through RP6 for both SONI-driven and larger asset replacement projects.

9.6 The projected volume of Transmission D5 projects will significantly increase over the next number of years as SONI and NIE Networks develop the transmission network to facilitate 80% renewable targets. Within SONI's Transmission Investment Plan out to 2032, the construction cost for the projects within the RP7 timeframes are estimated at £500m.

9.7 NIE Networks would propose that larger asset replacement projects where the scope of works cannot yet be determined would also be accepted as D5 projects in RP7 again, for example a 275kV overhead line refurbishment where the conductor choice is not yet known. There are several larger transmission overhead line projects planned for the RP7 and RP8 periods. There are varying challenges across these projects such as unknown conductor configuration or the potential for partial replacement with underground cable.

9.8 The pace of change required on the transmission network to facilitate the 80% renewables target by 2030 makes it essential to have a more streamlined regulatory approval process. We welcome the opportunity to look at ways in which the D5 mechanism could be improved for RP7 to include efficiencies that could be realised in the submission and approval process thereby reducing the resource required by both NIE Networks and UR. The climate emergency demands that we all look at practical ways to progress works at speed.

9.9 The pre-construction works are carried out early on in the project. However, the overall programme and the construction phase works will be determined by when this first phase can be completed. In many cases (such as overhead line projects), outages are required to complete some or all of the work. As the outage window runs from March to October, a delay in the project could mean waiting for the following spring to complete the work.

9.10 Given the scale of projects forecast both by SONI and NIE Networks to be completed during the RP7 period and the impact that a delayed pre-construction phase can have on overall project completion it is necessary to explore options to streamline the process and we propose the consideration of a 'Minimum Value Submission' as outlined below.

Minimum value submission

9.11 This proposal would allow two different processes depending on the magnitude of the pre-construction works. A limit would be set, through agreement with the UR, whereby only pre-construction works estimated to be above this value would be submitted to the UR. Projects with a lower value would be recorded throughout the pre-construction phase and the cost included within the construction phase allowance.

9.12 Those projects below the threshold would not require an approval paper, reducing the workload associated with this. The UR would not be involved at the pre-construction phase, reducing the workload at this time.

9.13 Pre-construction work can commence as soon as the contracts are in place, removing the need for the three-month approval time. This time saving could have a greater impact on the completion date depending on outage requirements.

9.14 The expectation would be that the UR would separately approve only the largest and most risky projects at the pre-construction stage. Considering the projects planned for RP7 and the estimated pre-construction phase costs, the minimum value limit would need to be set at around £3m.

9.15 No changes are currently being proposed to the Construction phase approval process.

9.16 The effectiveness of this option could be monitored on an annual basis and if the expected benefits are not realised offers the possibility of returning to the status quo that operated during RP6.

9.17 NIE Networks will not incur any expenditure in relation to any of these projects without the UR's approval unless the minimum value mechanism is agreed.

a. Transmission demand / generation D5 projects

9.18 The transmission network carries power to and from interconnector circuits and between generating stations and the distribution network. The power flows in the network will change as flows on the interconnector circuits with GB and RoI change, as the pattern of generation changes and also as load and generation on the distribution network changes.

9.19 It is therefore necessary for SONI to keep the level of future power flows on the transmission network under review to ensure that the network remains compliant with the relevant licence standards. If prospective non-compliance situations are identified, for example, the inability to resupply load following a fault, it is necessary for SONI to

bring forward projects to reinforce the network. Such projects may be designed to increase line or transformer capacity, install additional plant to improve voltage or to control power flows. In some situations, a new line or substation may be required.

9.20 The projected volume of Transmission load D5 projects will significantly increase over the next number of years as SONI develops the transmission network to the meet government targets. In order to achieve at least 80% clean electricity by 2030, SONI needs to add more energy from renewable sources, such as wind and sun, to the power system. This means that the electricity grid will need to carry more power from energy sources that vary depending on the weather over longer distances.

9.21 As a result, the NI grid needs to be made stronger and more flexible. SONI have outlined its approach to this in its report 'Shaping our Electricity Future'.

9.22 The interactions between SONI and NIE Networks around transmission demand- / generation-related projects are defined in the Transmission Interface Arrangements (TIA). Under the TIA, SONI maintains a Transmission Investment Plan and NIE Networks provides information to inform the development of this plan. This is a living document, which will change over time. The table below shows the current list of potential network reinforcement projects identified by SONI for RP7 in its most recently published Transmission Development Plan for Northern Ireland (TDPNI) 2023-32.

9.23 Whilst the total value of the projects in the TDPNI is in excess of £700m, the amount that will be incurred during RP7 is anticipated to be less than this amount and will depend on:

- the validation of the case of need and optimal solution for each project;
- the pace at which SONI is able to progress the necessary pre-construction, taking account in particular of the very significant uncertainties around securing landowner and statutory permissions;
- the pace of delivery of the construction work and dependence on network outage availability.

9.24 NIE Networks recognises the critical importance of the North-South Interconnector project, and we are working closely with SONI, Eirgrid and ESB Networks to ensure that this strategically important project is delivered successfully.

9.25 The inclusion of these projects in this submission is not a request for funding for them. As and when individual projects are deemed to be required to proceed by SONI, SONI and NIE Networks will submit the necessary individual funding requests to UR.

9.26 The projects detailed below should not be considered to be a definitive listing of what will be submitted to the UR for consideration. Before issuing a functional specification to NIE Networks, SONI will undertake more in-depth analysis of the case of need for each project as well as developing the optimal solution. This could result in SONI deciding that some of these projects are not required, and/or that alternative solutions are more economic. It may also decide that other, as yet unspecified projects are required.

Table 15 – potential transmission load-related projects

Project	Description of preferred option	Investment driver
INTERCONNECTION		
Proposed North-South Interconnector	Construction of new 400kV circuit from a new substation at Turleenan in Northern Ireland to Woodland in Ireland.	This project is designed to: • increase the net transfer capacity between Northern Ireland and Republic of Ireland; • reduce constraints which restrict the efficient operation of the Single Electricity Market; • improve security of supply; and • facilitate the connection of renewable generation.
Moyle 275kV Reinforcement	Installation of two new 275kV cables from Ballycronan More to Ballylumford.[49]	This project is designed to • raise export level at Moyle to full utilisation of 500MW capability • reduce constraints which restrict the efficient operation of the Single Electricity Market; • improve security of supply; and • facilitate the connection of renewable generation.
DEMAND (SUBSTATION CAPACITY)		
Airport Road Substation	Construction of new 110/33kV substation and uprate of existing tower line from 33kV to 110kV from Rosebank to Sydenham road.	The driver of this project is security of supply and transmission reinforcement of Belfast city and the wider harbour area due to increasing load.
Armagh and Drumnakelly Reinforcement	Establishing a new 110/33kV substation at Armagh, extending Tandragee 110kV busbars and compound and establishing two 110kV circuits from Tandragee to Armagh Main.[50]	The driver of this project is security of supply. There is a need to reinforce the distribution system supplying Armagh city and the surrounding area due to increasing demand. It is also forecast that demand will exceed capacity at the existing Drumnakelly 110/33kV substation.
East Tyrone Reinforcement	Two additional 110/33kV transformers will be installed at Dungannon Main.[34]	The driver for this project is security of supply on the distribution system supplying Cookstown and the 110/33kV substation at Dungannon. It is forecast that demand will exceed capacity at the existing Dungannon 110/33kV substation.
Newry Reinforcement	Additional capacity is required at Newry Main. This project is at an early stage but options will likely include expansion of the existing Newry Main Bulk Supply Point, as well as construction of an additional BSP in the Newry area.	The driver for this project is security of supply on the distribution system and the 110/33kV substation at Newry. It is forecast that demand will exceed capacity at the existing Newry 110/33kV substation.
CIRCUIT UPRATES		
Energising Belfast Castlereagh - Hannahstown	Install a fourth Interbus transformer at Castlereagh and establish a 110kV cable connection between Hannahstown and Castlereagh substations through Belfast city centre. This will enable removal of the existing 110kV double circuit between Carnmoney & Castlereagh.	The driver for this project Is security of supply. The existing conductor on the Castlereagh – Carnmoney 110kV double circuit is due for replacement due to the condition of the assets. However, refurbishment of the existing line is not practical due to proximity of housing, and would not provide long term capacity where it is most needed (Belfast city centre). This project will deliver security of supply at Castlereagh and long-term capacity for demand growth in Belfast.

[49] This is the preliminary preferred option and is subject to conclusion of SONI's options assessment and UR preconstruction approval.
[50] This is the preliminary preferred option and is subject to conclusion of SONI's options assessment and UR preconstruction approval.

Project	Description of preferred option	Investment driver
Carnmoney- Eden refurbishment	The existing tower line between Eden and Carnmoney will be refurbished, with sections in urban areas replaced with underground cable. A second 110/33kV transformer will be installed at Glengormley. [34]	The driver for this project is security of supply. The existing tower line is due for refurbishment due to the condition of the assets. As with Energising Belfast, a full refurbishment is impractical due to proximity of housing to existing towers.
Coolkeeragh Tx 110kV Cable Uprate	Replace c100m of existing 110kV cabling at Coolkeeragh site.	The driver for this project is security of supply. The increase in wind generation in the north-west of NI has resulted in an increase in power flows at Coolkeeragh. The existing cable has a lower rating than the transformer it connects, and upgrading this will accommodate these flows.
Coolkeeragh - Killymallaght - Strabane 110kV Uprating	Restring of both Coolkeeragh - Strabane circuits (c.27km) and Coolkeeragh - Killymallaght (c. 14.5km) -Killymallaght- Strabane (c. 11.2km) with higher capacity conductor	The drivers for this project are security of supply and RES integration. As a result of increasing growth in renewable generation in the northwest of NI there will be a need to uprate the 110kV circuits between Coolkeeragh, Killymallaght and Strabane with a higher capacity conductor to prevent risk of overloads.
Omagh - Strabane 110kV Uprating	Restring of both Omagh - Strabane circuits (one line is 35.5km & 36.1km) with higher capacity conductor	The drivers of this project are to facilitate RES integration. With increasing generation in the North West there is a risk of overload of the 110kV circuits between Strabane and Omagh and capacity in the area needs to be increased.
Coolkeeragh - Limavady - Coleraine 110kV Uprating	Restring of 110kV circuits from Coolkeeragh to Limavady with higher capacity conductor	The drivers for this project are security of supply and RES integration. As a result of increasing growth in renewable generation in the northwest and potential for voltage instability there will be a need to reinforce the 110kV transmission system near Rasharkin, Coleraine, Limavady and Garvagh cluster.
Drumnakelly - Tamnamore 110kV Uprating	Restring of the existing Drumnakelly-Tamnamore circuits with higher capacity conductor, including partial undergrounding of one circuit. [35]	The driver of this project is security of supply and RES integration. These circuits may be subject to overload under high wind generation conditions and are operated out of service. This project is to replace the conductor on these circuits with higher capacity conductor. This will allow these circuits to fully return to service.
Ballylumford - Ballyvallagh Uprate	Restring of both Ballylumford – Ballyvallagh circuits with higher capacity conductor.	The drivers for this project are security of supply and RES integration. The removal of the Carnmoney – Castlereagh circuits and connection of new generation and demand in the area will increase flows between Ballylumford and Ballyvallagh, requiring a higher capacity conductor to minimise constraints and prevent overloads.
FAULT LEVEL UPRATES		
Castlereagh 275kV Redevelopment	Redevelopment of the existing substation and/or replacement with an alternate site. [51]	The driver for this project is security of supply. A re-appraisal of the original design using modern standards has found that the concrete structures at Castlereagh are not sufficient to meet expected mechanical loading under a fault. This is being managed through a risk assessment and risk mitigation process at present however this work will redevelop the substation to remove this issue.
Coolkeeragh 275kV Redevelopment	Redevelopment of the existing substation and/or replacement with an alternate site.[35]	The driver for this project is security of supply. A re-appraisal of the original design using modern methods has found that the concrete structures at Coolkeeragh are not sufficient to meet expected mechanical loading under a fault. This is being managed through a risk assessment and risk mitigation process at present however this work will redevelop the substation to remove this issue.

Project	Description of preferred option	Investment driver
Tandragee 275kV Redevelopment	Redevelopment of the existing substation and/or replacement with an alternate site. [35]	The driver for this project is security of supply. A re-appraisal of the original design using modern methods has found that the concrete structures at Tandragee are not sufficient to meet expected mechanical loading under a fault. This is being managed through a risk assessment and risk mitigation process at present however this work will redevelop the substation to remove this issue.
Kells 275kV Redevelopment	Redevelopment of the existing substation and/or replacement with an alternate site. [35]	The driver for this project is security of supply. A re-appraisal of the original design using modern methods has found that the concrete structures at Kells are not sufficient to meet expected mechanical loading under a fault. This is being managed through a risk assessment and risk mitigation process at present however this work will redevelop the substation to remove this issue.
Magherafelt 275kV Redevelopment	Redevelopment of the existing substation and/or replacement with an alternate site. [35]	The driver for this project is security of supply. A re-appraisal of the original design using modern standards has found that the concrete structures at Magherafelt are not sufficient to meet expected mechanical loading under a fault. This is being managed through a risk assessment and risk mitigation process at present however this work will redevelop the substation to remove this issue.
Castlereagh 110kV Switchgear Uprating	Replace existing 31.5kA circuit breakers and CTs with 40kA units	The driver for this project is safety. Due to increasing fault levels it is planned, subject to detailed study, to replace 110kV circuit breakers and current transformers at Castlereagh.
Tandragee 110kV Switchgear Uprating	Replace existing 31.5kA circuit breakers and CTs with 40kA units	The driver for this project is safety. Due to increasing fault levels it is planned, subject to detailed study, to replace 110kV circuit breakers and current transformers at Tandragee.
IMPROVED OPERABILITY AND SECURITY OF SUPPLY		
22kV Switchgear	Uprating of 22kV switchgear on the tertiary windings of a number of 275/110kV transformers	The driver for this project is safety. Due to increasing fault levels it is planned, subject to detailed study, to replace 22kV circuit breakers at Grid Supply Points.
Filter Tuning or New Filters	Harmonic filters will be tuned and/or installed where necessary on the transmission system. [52]	The driver of this project is security of supply. With increasing use of cable on the transmission system as well as an increase in non-linear load and generation, harmonic levels on the transmission system are increasing. This project will analyse the requirement for harmonic filters and re-tune/augment these accordingly.
RES		
Mid Antrim Upgrade	Construction of a new 110kV switching station at Terrygowan, with a new 110kV circuit constructed from here to Rasharkin. The Terrygowan – Kells 110kV double circuit will be uprated with higher capacity conductor.	The drivers of this project are security of supply, 110kV network capacity and RES integration. As a result of increasing growth in renewable generation there is a need to increase grid capacity south of Rasharkin 110/33kV cluster substation.
Northwest 110kV Reinforcement	Construction of an additional 110kV circuit in the Limavady – Coleraine – Rasharkin area.[35]	The drivers for this project are security of supply, 110kV network capacity and RES integration. As a result of increasing growth in renewable generation in the northwest and potential for voltage instability there will be a need to reinforce the 110kV transmission system near Rasharkin, Coleraine, Limavady and Garvagh cluster. As well as likely uprating of the circuits from Coolkeeragh to Limavady.

Project	Description of preferred option	Investment driver
Mid Tyrone Upgrade	New 110kV single circuit from Dromore to Tamnamore. [35]	Due to the increase in the renewable generation in the north and west there is a need to address expected overloads in the grid between Omagh and Tamnamore and reduce constraints. Several options will be looked at in this project including uprating the existing 110kV circuits, construction of a new 275kV circuit from Tamnanore/Turleenan and a number of HVDC solutions.
New NW 110kV Switching Station	Establishment of a new 110kV switching station south of Coolkeeragh. Turn-in of 2x Lisaghmore, Coleraine, Limavady, Killymallaght and 2 x Strabane circuits. [35]	Driver for this project is RES integration. Additional capacity in the 110kV network in the NW is low and the configuration south of Coolkeeragh is suboptimal. There is a lack of capacity at Coolkeeragh 110kV substation for future connections. This project will establish a new 110kV switching station south of Coolkeeragh rationalise the 110kV network in the area.
Coolkeeragh 110kV Extension	Extension of the existing busbars and installation of a 2nd bus coupling circuit breaker.	The driver for this project is renewable integration and security of supply. An extension of the Coolkeeragh 110kV busbar is required for system development projects and also for the connection of future demand/generation and/or system services. This will also enable the connection of a third interbus transformer, the restoration of the second busbar coupler and section switches and other improvements.
Larne Transformer Replacement	The two 45 MVA transformers at Larne are to be replaced with 90 MVA units.	The drivers for this work are a combination of the age, condition and capacity of the existing transformers at Larne, as well as integration of new generation capacity at Larne.
Feeny Cluster System Operator Preferred	A cluster substation is planned in the Feeny area. This project will, if necessary, modify the proposal for this substation to reduce constraints on existing generation in the area. [35]	The driver for this project is RES integration. Generation in this area is subject to a high degree of constraint. This project provides an opportunity to reduce these constraints and thus improve RES penetration through reconfiguration of the network.

b. Transmission asset replacement D5 projects

9.27 NIE Networks proposes that larger asset replacement projects where the scope of works cannot yet be determined or where the project scale leads to greater uncertainty in construction cost, would also be accepted as D5 projects in the RP7 period as we believe this will be more effective for management of these projects as they cannot be defined in full detail at this stage. As previously noted this mechanism has been used during RP6 for two large asset replacement projects.

9.28 High-level assessments of the overhead line refurbishment projects below have been completed by an external design consultant. These assessments have highlighted a number of issues which will require a detailed pre-construction phase in order to accurately estimate the scope and cost of the works. These issues include landlocked towers with no access and a number of full tower replacements. It is possible that some undergrounding may be required if access is not possible in heavily built-up areas. The uncertainty around the conductor choice, scope of works and access issues make the D5 mechanism a better option than seeking an ex-ante allowance. Further detail on these two projects is provided in accompanying paper '275kV Overhead Line Refurbishment Projects – D5 Justification Document'.

Table 16 – potential transmission asset replacement projects[53]

Project	Description	Investment Driver
ASSET REPLACEMENT		
Castlereagh - Rosebank Tower Line removal[54] (£1.5m)	Removal of 110kV tower line which is no longer required.	This tower line has been de-energised since 1989. It was planned to replace the poor condition conductor and fittings as part of RP6 asset replacement works. However, SONI has since completed a study to confirm that this circuit is no longer required. Due to the condition of the existing line, significant work would be required in order to maintain this asset as a strategic spare. NIE Networks plans to remove this circuit, commencing towards the end of RP6.
Ballylumford - Hannahstown 275kV Overhead Line Refurbishment (£30.6m)	Works will include: • Replacement of phase conductors and associated fittings (both circuits) • Replacement of earthwire and associated fittings with fibre optic equivalent • Tower refurbishment, strengthening and painting • Foundation refurbishment and strengthening There is scope to replace the conductor with Zebra ACSR (like-for-like replacement) or to increase the capacity of the circuits for an incremental price increase (e.g. Rubus AAAC). These options will be considered as part of the D5 pre-construction and approval process.	The majority of the 275kV network was constructed in 1966-70 and final circuits completed in 1978. Until RP4, the 275kV overhead network had received limited investment, as the age of the network was such that deterioration was limited and allowed satisfactory performance to be maintained. However, several failures from RP3-RP6 have highlighted the onset of age-related wear in some critical components, which are now demonstrating accelerating deterioration. The majority of the 275kV network has reached or will reach the 50-year age mark by the end of RP6. It would not be feasible from a resource, cost or outage perspective to replace all the 275kV circuits at the same time. It is therefore imperative that these circuits are prioritised and a programme of works continued through several price controls in order to ensure the safety and performance of the 275kV network. The Ballylumford-Hannahstown 275kV overhead line was built in 1967. It is approximately 46km in length and constructed on L2 and L8 double circuit towers. The line is strung with twin ACSR Zebra conductor and a single ACSR Lynx earthwire. Conductor sample testing has shown that there is 10-15 years operational life left in the phase conductors but only 5-10 years in the earthwire. The overall condition of the line and the amount of remedial work required means that it is more cost effective to complete a full refurbishment and restringing at the same time rather than completing two separate refurbishment projects, with the potential for some of the earlier works becoming redundant. Significant levels of surface rust and corrosion have been identified on the tower steel members, requiring these to be replaced and painted. The level of corrosion is consistent with its location on the peninsula. The Suspension towers are of the L2 type and would require the TGN 161 modifications to be carried out during any planned refurbishment works. Foundation assessments indicated some honeycombing of the concrete and muffs requiring repair and painting. It is likely that foundation reinforcements and tower replacements will be

[53] Costs set out in this table do not include pre-construction or advanced mobilisation costs.
[54] An allowance of £211k (2015/16 prices) was included in RP6 under T19a to replace 8 spans of conductor on this circuit. As there were no other

Project	Description	Investment Driver
		required during restringing due to the forces of the new conductor (and updated modelling/calculation standards). There is also a requirement for a fibre path between the two sites to support the OTN expansion and provide diversity to the fibre on the 110kV line. This would be facilitated by replacing the earthwire with OPGW. Severe shackle wear (50-75%) has also been noted on the earth-wire fittings.
Hannahstown – Castlereagh 275kV Overhead Line Refurbishment (£14m)	Works will include: • Replacement of phase conductors and associated fittings (both circuits) • Replacement of earthwire and associated fittings with fibre optic equivalent • Tower refurbishment, strengthening and painting • Foundation refurbishment and strengthening There is scope to replace the conductor with Zebra ACSR (like-for-like replacement) or to increase the capacity of the circuits for an incremental price increase (e.g. Rubus AAAC). These options will be considered as part of the D5 pre-construction and approval process.	The majority of the 275kV network was constructed in 1966-70 and final circuits completed in 1978. Until RP4, the 275kV overhead network had received limited investment, as the age of the network was such that deterioration was limited and allowed satisfactory performance to be maintained. However, several failures from RP3-RP6 have highlighted the onset of age-related wear in some critical components, which are now demonstrating accelerating deterioration. The majority of the 275kV network has reached or will reach the 50-year age mark by the end of RP6. It would not be feasible from a resource, cost or outage perspective to replace all the 275kV circuits at the same time. It is therefore imperative that these circuits are prioritised and a programme of works continued through several price controls in order to ensure the safety and performance of the 275kV network. The Hannahstown-Castlereagh 275kV overhead line was built in 1968. It is approximately 18km in length and constructed on L2 double circuit towers. The line is strung with twin ACSR Zebra conductor and a single ACSR Lynx earthwire. While conductor sample testing has shown that there is 10-15 years operational life left, the overall condition of the line and the amount of remedial work required means that it is more cost effective to complete a full refurbishment and restringing at the same time rather than completing two separate refurbishment projects, with the potential for some of the earlier works becoming redundant. Significant levels of surface rust and corrosion have been identified on the tower steel members, requiring these to be replaced and painted. The location of this line has meant increased levels of corrosion caused by urban pollution. The Suspension towers are of the L2 type and would require the TGN 161 modifications to be carried out during any planned refurbishment works. Foundation assessments indicated some honeycombing of the concrete and muffs requiring repair and painting. It is likely that foundation reinforcements and tower replacements will be required during restringing due to the forces of the new conductor (and updated modelling/calculation standards). There is also a requirement for a fibre path between the two sites to support the OTN expansion, which would be facilitated by replacing the earthwire with Optical Ground Wire (OPGW).

Project	Description	Investment Driver
Coolkeeragh 110kV Capacitor Bank (£1m)	Upgrading of 110kV capacitor bank at Coolkeeragh site	Studies are to be completed to ascertain if the capacitor bank at the Coolkeeragh power station substation needs to be upgraded due to network changes. This requirement has been highlighted due to ongoing capacitor failures which may be age/condition related issues or as previously stated caused by network development/expansion. It has been agreed with SONI that if the report highlights the need to upgrade the capacitor bank that this will be brought forward an asset related issue in RP7.

PART 3: UNCERTAINTY & INCENTIVES, AND CONNECTIONS

10. UNCERTAINTY AND INCENTIVE MECHANISMS

a. Dealing with uncertainty

10.1 The proposals in this plan have been derived by using the best information available to us at the time of developing the proposals. However, there are areas of uncertainty which need additional funding mechanisms due to the external nature of the uncertainty and its potential impact.

10.2 The design of our proposed uncertainty mechanisms for RP7 have been underpinned by the following guiding principles, which we believe align with the interests of our customers, the UR and NIE Networks.

Uncertainty with respect to net zero

10.3 Significant certainty exists regarding the role of electrification in the journey to net zero, as outlined within the Climate Change Act (Northern Ireland) 2022[55], the Path to Net Zero[56] and the UK Government's ban on the sale of all new petrol and diesel cars by 2030. This will inevitably drive increased levels of demand and generation connecting to the electricity network; however, uncertainty exists regarding the exact timing and location of this which needs to be reflected within the RP7 price control determination.

10.4 We have carefully considered the trade-offs between how much expenditure we include within our ex-ante plans and how much we fund through uncertainty mechanisms. This is particularly pertinent in the context of investments needed to facilitate the transition to net zero. For most of our investment relating to the facilitation of net zero[57], we have decided to put forward ex-ante plans which are based on our 'best view' scenario forecasts. Whilst we recognise that there is some risk that, if the pace of the energy transition is slower than our 'best view', customers may be funding investment sooner than it is actually required, we do not believe that this is a material risk, based on the following.

- In developing our RP7 scenario forecasts, in collaboration with SONI, we have been through a rigorous process, involving stakeholder testing and expert verification.

- Deliberately taking a prudent network modelling approach to ensure that there is low risk of the ex-ante expenditure not being fully required. However, in doing so there is risk that this ex-ante funding isn't sufficient enough during the RP7 period, necessitating a suite of agile and efficient uncertainty mechanisms to enable allowances to increase if required during the RP7 period.

[55] Climate Change Act (Northern Ireland) 2022 (legislation.gov.uk)
[56] Northern Ireland Energy Strategy 'Path to Net Zero Energy' | Department for the Economy (economy-ni.gov.uk)
[57] Excludes primary network reinforcement - reverse power flow.

10.5 Further information is set out within accompanying paper 'RP7 Uncertainty Mechanisms', with respect to the approach taken to scenario forecasting and prudent network modelling.

Uncertainty mechanisms are key to unlocking 'whole system'

10.6 If not properly designed, 5- or 6-year price control regulation can have the unintended consequence of promoting short term decision making which is not in the consumers' interest in the long term.

10.7 Our RP7 net zero baseline costs have been prudently modelled based on the interventions required to ensure the network remains within standard during the RP7 period. However, there will be many opportunities that exist in RP7 when we are doing other work on the network from an asset condition or connections perspective to 'touch the network' once and build in future capacity, avoiding double customer disruption and costs in the RP8 or RP9 period. As set out within our whole system strategy in Chapter 7 of this business plan, we will also seek out opportunities to deliver whole system optimum solutions across the energy sectors.

10.8 Our RP7 net zero baseline costs will not account for these additional costs. As such we believe that agile, efficient uncertainty mechanisms are a key enabler to deliver whole system solutions and a 'touch the network once' strategy within RP7, ultimately delivering significant cost efficiencies and minimised customer disruption over the longer term.

Summary of proposed uncertainty mechanisms for RP7

10.9 In RP6, several uncertainty mechanisms were included within the final determination. In RP7 we propose that many of these are retained, either as they are or with some modifications. We further propose some new mechanisms, most of which are intended to address inherent uncertainties surrounding the pathway and timing for transitioning to net zero. This should be designed to allow for regular and ongoing (preferably annual) adjustments to revenue entitlement in the course of RP7. In the table below, we summarise the full suite of mechanisms we propose for RP7.

Table 17 – summary of proposed RP7 uncertainty mechanisms

Uncertainty / risk	RP6 framework	Proposal for RP7
Primary network – forward power flow	• Ex-ante allowance with 50/50 mechanism	• Ex-ante plus reopener
Primary network – reverse power flow	• Reopener	• Ex-ante plus reopener
Secondary network investment	• Ex-ante allowance with 50/50 mechanism	• Ex-ante plus volume driver with mid-point review
Low rated cut outs	• Ex-ante allowance with 50/50 mechanism	• Volume driver
Looped services	• Ex-ante allowance with 50/50 mechanism	• Volume driver and mid-point review
Net zero	• n/a	• Reopener
Environmental	• n/a	• Reopener

Uncertainty / risk		RP6 framework	Proposal for RP7
Sub-sea cables		• n/a	• Ex-ante allowance for inspection and testing and reopener as business case materialises
Telecoms	SONI asset transfer	• n/a	• Reopener
	DSO Operation Telecoms	•	• Reopener (2- stage)
	OTN Comms conditional investment		• Reopener
Creosote poles		• n/a	• Reopener
Non-recoverable alterations		• Ex-ante allowance with 50/50 mechanism	• Pass through
Innovation		• UIOLI allowance approved through reopener mechanism	• Ex-ante for defined projects plus reopener (light touch) for Network Innovation Fund (NIF)
Capex asset replacement Asset replacement requirements may change as needs arise		• Limited substitution offered in RP6 • 50/50 mechanism	• Broader use of substitution mechanism
Transmission capacity and capability projects For projects brought forward by SONI		• Reopener: the 'D5 mechanism'	• Refinement to the D5 mechanism
Large scale capex asset replacement For large scale projects whose costs are uncertain at the time of setting the price control		• Reopener: the additional capex reopener. Specific projects cited for both transmission and distribution	• Retain RP6 arrangement
Transmission protection philosophy Philosophy set by SONI. Changes can have cost implications		• Reopener	• Retain RP6 arrangement
Severe weather		• Ex-ante allowance with 50/50 mechanism	• Pass-through
Distribution undereaves		• Volume driver	• Retain RP6 arrangement
Cluster developments		• Connecting customers bear the costs through the SoCC • Unrecovered costs added to the RAB	• Retain RP6 arrangement
Distribution connection charging policy Cost implications of change of policy		• n/a	• Reopener
Meter installations / replacement Costs driven by volumes		• Volume driver	• Retain RP6 arrangement
Smart meters Cost implications if smart meters are mandated		• No explicit method to address costs	• Reopener (2-stage)

Uncertainty / risk	RP6 framework	Proposal for RP7
I-SEM Cost implications if there are changes to the wholesale market	• Some opportunity for additional allowances through the ESt term (for the Enduring Solution)	• Retain RP6 arrangement
IT systems New requirements	• Some opportunity for additional allowances through the NESt term (for new energy strategy IT solution or market services IT systems)	• Refinement of the RP6 arrangement to incorporate the delivery of the S/4 HANA project in RP7
Injurious affection Cost implications of IA claims	• Reopener: the IAt term	• Retain RP6 arrangement
Business rates Cost implications following revaluations	• Ex-ante allowance with 50/50 mechanism	• True-up mechanism
Corporation tax Tax rates are outside our control	• Applicable rate varies according to the prevailing rate set by HMRC	• Retain RP6 arrangement
Pension historic deficit repair Cost implications if deficit worsens	• Customers bear 100% of deficit repair costs for pre-April 2012 deficit. The balance is borne by the company	• Retain RP6 arrangement
UR licence fees	• Pass through	• Retain RP6 arrangement
Change of law	• Reopener: the CoL provision	• Retain RP6 arrangement
Price indexation	• RPI used to adjust allowances	• CPIH used to adjust allowances
Real price effects	• Ex-ante allowance with 50/50 mechanism	• True-up adjustment based on indexation

10.10 More detail is provided in accompanying paper ‘RP7 Uncertainty Mechanisms’.

b. Incentives and risk-sharing

10.11 In the context of a price control, incentives are mechanisms that incentivise a regulated company to provide additional benefits to customers over and above its core plan.

Cost risk-sharing

10.12 During RP6, a 50:50 cost risk-sharing mechanism has operated on the basis that to the extent NIE Networks' costs exceed its regulatory allowances, then 50% of the excess cost is charged to customers and 50% is borne by NIE Networks. Similarly, to the extent NIE Networks' costs are lower than its regulatory allowances, then 50% of the saving is rebated to customers and 50% is retained by NIE Networks. The 50:50 cost-risk sharing applies to both capex and opex.

10.13 The mechanism provides an incentive for NIE Networks to improve the efficiency of its operations and we propose that the mechanism is retained during RP7.

Network performance incentive

10.14 During RP6 an incentive mechanism was developed and introduced in relation to network performance (the "CML incentive"). We propose that this mechanism is largely retained during RP7, with some amendments, principally to focus the incentive on reduction of unplanned CMLs (due to faults). Full details are set out in accompanying paper 'Network Performance Strategy'.

Evaluative Performance Framework (EPF) incentive

10.15 The UR has asked that we consider introducing in RP7 an Evaluative Performance Framework (EPF) incentive similar to the EPF incentive in SONI's most recent price control[58].

10.16 NIE Networks is happy to engage with the UR on the development of a suitable EPF for RP7. More details on our outline proposals are set out in accompanying paper 'RP7 Evaluative Performance Framework proposal'.

[58] UR's guidance document for the SONI EPF is available here – https://www.uregni.gov.uk/files/uregni/documents/2022-09/epf-guidance.pdf

11. CONNECTIONS

a. What our connections business does

11.1 NIE Networks' provides safe, secure and reliable electricity connections to the distribution system within Northern Ireland.

11.2 Our connections services are delivered by highly skilled planning and construction teams based throughout Northern Ireland.

11.3 NIE Networks has a licence obligation to publish a SoCC on an annual basis setting out the methodology to be applied when assessing the cost of any new connection, along with indicative costs. Accordingly, we revise the Statement of Connection Charges (SoCC) every year with any changes being reviewed by the UR.

11.4 Currently the cost of new and increased connections at the connecting voltage and one voltage up from the connecting voltage is fully chargeable to the connecting customer in accordance with the SoCC. Any costs chargeable directly to connecting customers through the SoCC are therefore excluded from the price control. Accordingly, and in general, our Connections business is self-funded. The only exceptions to this are for housing sites with 12 or more dwellings and Clusters which are outlined below.

11.5 Under the charging arrangements for connecting housing sites with 12 or more dwellings to the electricity network, NIE Networks develops the necessary infrastructure for a complete housing site and the costs associated with these works are added to the Regulatory Asset Base (RAB). The customer (i.e. the site developer) is then charged a standard connection charge per dwelling, as each dwelling becomes connected, and contributions received from the customer are deducted from the RAB.

11.6 To facilitate the connection of large-scale renewable generation to the electricity network whilst respecting Northern Ireland's landscape, NIE Networks may group or 'cluster' generators, in appropriate circumstances, so that they share network infrastructure. The purpose of grouped or 'clustered' connections is to reduce the number and length of new overhead lines needed for these connections. The UR's approval is required for each cluster as required by NIE Networks' Distribution Licence. This is because electricity customers may contribute initially to the cost of the cluster. Authorised Generators connecting into clusters are charged on the basis of the MVA of capacity installed, or to be installed, in accordance with NIE Networks' SoCC. As with housing sites with 12 or more dwellings, cluster costs are added to the RAB and contributions received from customers are deducted from the RAB.

11.7 In RP6, the costs associated with connecting housing sites with 12 or more dwellings and clusters are added to the RAB and for balancing contributions received from connecting customers are deducted from the RAB, referred to as the connections charge pass-through. The RAB is there to balance the additions and deductions such that in the long-term the wider customer base is kept whole. NIE Networks is required to set connection charges at a level which will enable it to recover a reasonable rate of return, in accordance with the SoCC.

11.8 In RP7, in order to cover the additional business costs incurred on these works, it is proposed to retain the RAB pass-through mechanism for housing sites with 12 or more dwellings and clusters, retain the housing standard connection charge and set charges equal to estimated costs plus a mark-up equivalent to the agreed RP7 Weighted Average Cost of Capital. This would require an amendment to the current Licence

wording. For more details see accompanying paper 'Proposed RP7 Approach for Housing and Clusters'.

11.9 Network reinforcement costs associated with new or increased connections at the connecting voltage and one voltage up from the connecting voltage are chargeable to the connecting customer under the SoCC. This reinforcement is not included in the RP7 Business Plan as the costs are fully chargeable to the connecting customer. Network reinforcement associated with two voltages up from the connecting voltage are included within the RP7 business plan as this reinforcement is not chargeable to connecting customers based on the current SoCC.

11.10 Connections charging policy is a key area of concern for our customers. However, this falls outside of our RP7 Business Plan as outlined in the UR RP7 Final Approach paper[59] We cannot change this on our own. Any change to current connections charging policy in Northern Ireland requires a UR decision. We welcome the UR's inclusion in its Draft Forward Work Plan 2023/24 to commence a review of connections charging.

11.11 Our customers have told us that high distribution connection fees are dissuading some from connecting to the network. This is slowing the uptake of low carbon technologies including electric vehicles and heat pumps, and reducing the attractiveness of Northern Ireland as a region to connect for large energy users in the commercial and industrial sectors. It follows that the current distribution connections charging arrangements in Northern Ireland may be a significant barrier to meeting decarbonisation and 2030 Energy Strategy targets.

11.12 The current distribution connection charging arrangements in Northern Ireland differ significantly from Great Britain (GB) and Republic of Ireland (ROI). While the overall connection cost is similar, it is who contributes to the cost that is different. In Northern Ireland the connecting customer pays a much higher proportion of the cost which has resulted in Northern Ireland becoming a less competitive jurisdiction for investment in distribution connections than its counterparts. Ofgem has announced that a fully shallow connection policy will come into effect in April 2023 in GB, which leaves NI out of step with neighbouring jurisdictions. The risks of not keeping pace with neighbouring jurisdictions are a failure to meet the 2030 climate change targets and a lack of investment in Northern Ireland. We consider that maintaining the status quo will have a particularly negative impact on both load growth and economic growth.

11.13 We have connected 1767MW generation to the Northern Ireland grid to date. We are currently planning and working on a number of generation projects which will bring the total amount of generation connected to the grid in the next few years to around 2.2GW. Around 77% of these projects are for onshore wind, 14% for solar, 8% for biomass and 1% from other renewables. It is anticipated that a total of 3.9GW of renewables will be required to be connected to the network to meet the target of 80% renewables by 2030.

11.14 For the 12-month period January 2022 to December 2022, 51.0% of total electricity consumption in Northern Ireland was generated from renewable sources located in Northern Ireland[60]. This represents an increase of 9.7 percentage points on the previous 12-month period (January 2021 to December 2021) and is the second highest proportion on record with 51.6% achieved in the 12-month period December 2021 to November 2022. In terms of the volume of electricity consumption between January 2022 and December 2022, some 7,494 Gigawatt hours (GWh) of total electricity was consumed

[59] https://www.uregni.gov.uk/news-centre/rp7-final-approach
[60] Issue 26 - Electricity Consumption and Renewable Generation in Northern Ireland January 2022 to December 2022 | Department for the Economy (economy-ni.gov.uk)

in Northern Ireland. Over the same period, some 3,825 GWh was generated from renewable sources located in Northern Ireland. This is the second highest rolling 12-month renewable generation volume on record with 3,868 GWh generated from renewables between December 2021 and November 2022.

11.15 Throughout RP6 we have seen an increased number of connections customers engaging with us digitally. Currently around 86% of customers are applying online. This is a process we want to develop and refine further in RP7.

11.16 In 2021, NIE Networks introduced an online Customer Job Tracker enabling new applicants to utilise the system to send and receive information relating to their connection job and for that information to be retained in one convenient to access location. Customers with multiple applications are able to access each job individually and monitor its progress. This provides customers with the ability to track the progress of their job online, to receive notifications as their job progresses through key stages and if the customer has multiple jobs, a dashboard showing all active jobs.

b. Contestability in connections

11.17 Since March 2018 all new connections in Northern Ireland have been opened to competition. For 'contestable' elements of connections, customers can choose whether to accept a quotation from NIE Networks or to engage an accredited Independent Connections Providers (ICP) to design and construct the connection.

11.18 We provide our customers seeking connections with choice. ICPs accredited through the National Electricity Registration Scheme, can undertake contestable parts of the connection works and once constructed NIE Networks then adopt the assets.

11.19 Following a consultation process to explore the possibility of further establishing contestability in electricity connections, the UR published a paper entitled 'Expanding the Scope of Contestability in Northern Ireland – Next Steps' in July 2021. The aim is to establish contestability for low voltage final connections to the distribution network. NIE Networks is at the final stages of implementing this important change, and we continue to engage with the UR and the relevant stakeholders to establish contestability for low voltage final connections during 2023.

11.20 We continue to promote fair and open competition in connections in Northern Ireland. We will continue to work with the UR and ICPs to evolve competition in connections.

c. What we will do for connections customers in RP7

11.21 Customers and stakeholders have advised us that grid connection is an area where NIE Networks can continue to improve the service we deliver to customers and we have therefore developed a number of key improvements we intend to deliver in the lead up to and during the RP7 price control. Three key themes that we are continually striving to improve are cost, speed of connection and communication with customers.

Our commitments to Connections customers in RP7 are set out in Chapter 6.

PART 4:
MAKING IT HAPPEN

12. DELIVERING THE PLAN

a. Delivering the network investment plan

12.1 The RP7 investment plan represents a significant step change for the business both in terms of work volumes and value compared with the equivalent RP6 investment plan as we step-up to the challenges of developing a network for Net Zero. A Net Zero future will involve a much greater role and dependency on electricity in society, with the expected need for the rapid electrification of heat and transport a key requirement.

12.2 NIE Networks is committed to facilitating this by adopting a flexibility first approach, however we recognise that to deliver the capacity that customers will need, traditional reinforcement of the network will still be vital. The asset base in NI is also getting to an age where the asset life needs to be addressed and these two elements are coalescing to present a significant challenge in delivering a larger asset renewal programme.

2025-31 will require a step change in network investment

12.3 During RP7, we are committed to deploying flexibility first where practicable. However, with the level of growth expected and the current condition of many of our assets, we will still require a material increase in network reinforcement to meet the ambitions of the NI Energy Strategy. Network investment costs will increase by over £500m in RP7 compared to RP6 to –

- facilitate the connection of 300k electric vehicle (EV) chargers and 120k heat pumps by 2030. This will require c.£400m of investment on the distribution network in RP7, of which the most significant increase in expenditure will be on the 11kV network to upgrade low capacity conductor which is not able to accommodate the power flow associated with electric vehicles and heat pumps; and

- maintain the reliability of the network and improve its resilience. This will require c.£500m of expenditure, of which the most significant increase is on the low voltage network which requires extensive refurbishment works during RP7.

12.4 Our current Deliverability Strategy (see accompanying paper ‘RP7 Deliverability Strategy’) for much of the work that is required in 2025-31 is to continue our hybrid model with a mix of our staff and contractors working across Northern Ireland. This strategy sets out how we have assessed what is required to deliver the increased scale of investment in RP7.

12.5 We assess that our RP7 network investment plan is deliverable against a backdrop of strong delivery during RP6 despite the challenges that Brexit, the COVID-19 pandemic and the war in Ukraine have presented. We have identified the key RP7 deliverability enablers as: internal workforce, contractor workforce, material supply chain and embracing turnkey delivery approach.

i. **Our internal workforce**. We anticipate that our internal delivery workforce will need to grow from c. 700 people to c. 1,250 people and have already developed recruitment and training plans to make this a reality. We will focus on building on our successful apprenticeship and graduate programmes to develop a workforce with the right skill-set to deliver the challenges that we face in RP7. Whilst we believe the depot-based approach to delivery adopted in RP6 is the right delivery

model, we have commenced a review of our overall organisational structure to ensure we optimise our people capability into the future. Overall, in addition to the delivery capability growing, we also have an expectation that the entire workforce at NIE Networks will grow to support the ambitions of RP7 as shown in the table below.

Table 18 – full time equivalent (FTE) employees at NIE Networks

21/22	22/23	23/24	24/25	25/26	26/27	27/28	28/29	29/30	30/31
1,203	1,375	1,481	1,631	1,852	1,974	2,088	2,089	2,091	2,093

ii. **Our contractor workforce**. After positive engagement with our main contractors, they are committing to diversify their portfolio into other NIE Networks workstreams and significantly increase their resource capacity in RP7 based on forward order visibility. Furthermore, we expect larger GB and Ireland contractors to commence tendering for works here as increases in scale will make Northern Ireland a more attractive marketplace. This will bring new contractor capacity and capability to NIE Networks.

iii. **Our material supply chain**. We recognise there are currently some concerns regarding UK material supply chain capacity. However, the steps we have taken (and continue to take) to nurture and develop existing and new suppliers, and increase our stock holdings, as we did during Brexit and COVID, will mitigate these risks. The feedback from our material supply chain about our RP7 plans has been positive and does not indicate any issues with obtaining what we need for RP7.

iv. **Embracing a turnkey delivery approach**. NIE Networks currently does not deliver network projects through a turnkey approach whereas GB DNOs and ESB Networks do. After benchmarking with GB DNOs and ESB Networks and initial market enhancement with EPC/Turnkey providers, we believe there is significant opportunity in this space to deliver c20% of total RP7 capex. We have commenced work in this important area to be ready for RP7. We believe that this approach will deliver benefits for consumers as it gives suppliers more scope to be innovative in their proposed solutions.

12.6 Further detail on the above can be found in our Deliverability Strategy.

2025-2031 will require new ways of working

12.7 We will deploy flexibility and engage customers to work with us to help manage the network efficiently. Building on activities in the current price control period, some key elements of our strategy include –

- investing £11m in rolling out LV monitoring and when combined with data analytic initiatives will enable visibility of 70 per cent of our ground-mounted substations 2031;
- continuing to build upon our Flex trial, encouraging customers to ‘flex’ their demand and defer the need for costly reinforcement. By taking a ‘flex first’ approach we have included £10m of customer savings in our plan from the outset;
- continuing to build whole system thinking within our organisation which has enabled ‘2 for 1’ synergies to be identified within our RP7 plan and with SONI. We included £83m of whole system efficiencies within our plan from the outset;

- installing 900 HV Active Network Management devices to automatically reconfigure the network, reducing the impact to those customers worst served and helping ensure a just transition to net zero; and
- doubling our innovation funding (£19m) to ensure that we are embedding new and innovative ways of planning and operating the network to keep costs as low as possible for customers.

12.8 To achieve this our business must evolve our Distribution System Operator (DSO) capabilities including our approaches to data management and digitalisation. Given the changing nature of skills required to facilitate a new operating model, our workforce resilience strategy is essential to how we meet the evolving challenges.

12.9 To successfully deliver DSO functions, we must attract people with new skills and expertise to our business, as well as upskilling our existing workforce.

12.10 To ensure we achieve this, our plan will see us –

- evolving our training programmes to upskill our workforce;
- improving the digital capabilities of our current colleagues;
- increasing our training delivery capabilities and capacity to accommodate the higher volumes of people to be trained; and
- bringing colleagues with specialist digital and data management skills into the business, through both recruitment and procurement.

12.11 Further information can be found in our RP7 Deliverability Strategy, our DSO Strategy, our Workforce Resilience Strategy, our Digital & IT Strategy and our Property Strategy, all of which accompany this business plan.

b. Delivering the Digital & IT business plan

12.12 NIE Networks' ability to meet our ambitious objectives in RP7 has been a core consideration throughout the development of the Digital & IT Business Plan. While the delivery of our DSO, Data and Digitalisation initiatives will require our business to make significant changes, we are confident that we have developed a plan that supports them. To do this, we applied stringent measures from the beginning of plan development to ensure deliverability.

12.13 Given the significant increase in scope and size of our RP7 plan compared to that of RP6, we carried out detailed resource planning for each project. This involved the detailed planning of resources for each project based on business area, then the mapping of these against the RP7 timeframe to identify resource peaks and troughs. Consideration was given to business, internal IT and external client-side resources and over 100 resource / role types were identified.

12.14 Where required, business backfill resources were identified and costed into the individual projects. Recognising the need to drive delivery and manage resources throughout the period, a suitably scaled programme delivery team has also been costed into the programme.

12.15 Table 19 below summarises the various resource types required to deliver the programme of work over the RP6 Extension year and the RP7 period. These figures do not include resources that will be deployed by system integrators, vendors and the managed service partners.

Table 19 – RP7 IT programme resource requirements

Average FTE (rounded to nearest whole number)	24/25	25/26	26/27	27/28	28/29	29/30	30/31
Business resources involved in projects							
Backfilled resources	29	58	57	40	27	15	4
Non-backfilled resources	22	27	20	23	28	26	7
Total	**50**	**84**	**77**	**63**	**55**	**41**	**10**
Internal IT resources	9	20	19	14	11	10	4
External client-side resources	24	33	32	41	36	25	13

12.16 Whilst overall numbers of business resources are very significant, they are distributed across all directorates and resource types, which will help to minimise business impact. In a number of areas, the backfill business resources will come from new employees included in the NIE Networks RP7 manpower plan, and filling these roles which will be critical to create more delivery capacity.

12.17 It should be noted that the current scope of IT projects in RP7 does not include any work relating to Smart Metering or the infrastructure that would be required to support it. If Smart Metering is mandated by the UR in advance of or during RP7, a significant review of the proposed projects will be required, with changes to the investment requirement reflected accordingly.

c. Workforce resilience

12.18 We have been an accredited Investors in People (IIP) Gold organisation since 2014 and we have maintained and improved on this in two subsequent reassessments. Following our last re-accreditation, we had made strong progress towards achieving IIP Platinum / High Performing status and this will be our aim when the next assessment is due in Q4 2023.

12.19 We have recently completed our third company-wide employee engagement survey and the initial results are showing increases in performance across all categories assessed and an overall engagement score of 84%. Studies have shown that staff who are engaged are more productive and effective in their work.

12.20 These results have been achieved against a backdrop where the focus has been on keeping employee numbers flat and re-organising to deliver as effectively and efficiently as possible during RP6. We have also had to adapt and adjust to the challenges presented by the Covid-19 pandemic and the enduring impact this had on the overall business and delivery of our RP6 programme.

12.21 We will rely on this strong engagement and people-focus into the future where we are facing both internal retention and external recruitment challenges which have necessitated a review and different approach on how we attract and retain talent.

12.22 Following a much quicker than expected economic recovery post-Covid, recruiting staff has been an extremely challenging task. Whilst there has been a reported reduction in economic output within Northern Ireland[61], this has had limited negative effect in the jobs market. Figures from the Northern Ireland Statistics and Research Agency (NISRA) show the employment rate for October to December 2022 had a statistically significant

[61] NI Statistics and Research Agency figures suggest output fell by 0.3% in the second quarter of 2022 and a further 0.3% in the third quarter.

increase over both the quarter and year to 71.9%. This represents an estimated 872,000 employed people, up 21,000 on the previous quarter and up 38,000 on the same period a year ago. The October to December quarter showed the highest employment rate since just before the pandemic at the end of 2019 when it was 72.4%.

12.23 During a similar time period we have experienced a shortage of skilled candidates for roles at all levels with a very high demand for certain roles, in particular engineering, IT and analyst positions. Competition for talent has been fierce and the pace of candidates receiving multiple offers or counter offers from their current employer has been unprecedented. The low supply and high demand have driven up both salaries and candidate expectations, which on a number of occasions we have been unable to meet.

12.24 Employees at all levels within the organisation have been approached directly from across the UK and beyond to consider roles offering higher salaries and bonuses. Some of these roles would not have been attractive pre-Covid due to the travel and the requirement to be away from home. Post-Covid the travel required has been vastly reduced and overtaken by remote working opportunities. On a number of occasions in the last two years we have found ourselves being unable to compete with GB-based salaries being offered for roles predominantly based here in Northern Ireland.

12.25 We are competing with hundreds of similar employers in Northern Ireland[62] for skills. Some of these are well established employers and others are new entrants to the market. We predict that the pressure for skills and the need to focus on retention of key staff will be an area for us to focus on for the foreseeable future.

12.26 In order to position ourselves to both attract new talent and retain current talent within the business, we have to ensure we are nurturing future talent, positioning ourselves correctly in a competitive jobs market and being an employer of choice for our current employees. As an Investors in People Gold company we have many initiatives in place and planned to address this. Our strategy to continue being an employer of choice is described in accompanying paper 'Workforce Resilience Strategy'.

[62] Green Energy Skills Reference Group.

13. FINANCING THE PLAN

13.1 Our proposed core expenditure during RP7 is set out in Chapter 8. This expenditure will be financed through operating cash flows from revenue receipts and raising of new debt. We estimate that our borrowings will increase to around £2.36bn by the end of RP7 and that we will need to raise £1.95bn of debt (of which £1.20bn will be new debt and £0.75bn of re-financing). To calculate our allowed revenues, we have assumed a weighted average cost of capital (WACC) of 4.8%.

a. Financeability

13.2 Under its Licences NIE Networks must ensure that it has sufficient resources to meet its regulated activities and maintain an investment grade credit rating.

13.3 To ensure NIE Networks can meet these obligations the UR is required to have regard to the need to secure that NIE Networks is able to finance its regulated activities. This is commonly referred to as the "financing duty".

13.4 NIE Networks will finance its activities through a mixture of debt and equity. It follows that this should be provided through a reasonable cost of equity and cost of debt in the WACC.

13.5 GB and European regulatory precedent indicate that a strong investment grade credit rating of A- / BBB+ is appropriate for a high performing network operator. NIE Networks is currently rated by Standard & Poor's (BBB+).

13.6 Retention of at least a BBB+ credit rating is essential if NIE Networks is to compete effectively for new funding in the market – especially given the scale of new borrowing that will be required to finance the RP7 plan.

13.7 Our adviser, Frontier Economics, has previously assessed the long-term impact to customers of differing credit ratings for distribution network operators (DNOs). It found that it is beneficial to customers as a whole that DNOs maintain a strong investment grade rating as it results in lower long-term financing costs, which means lower bills for customers over the long term.

13.8 A satisfactory overall price control incorporating a WACC at the level set out below will support a strong investment grade rating over RP7 and allow NIE Networks to raise debt efficiently over the RP7 period.

b. Weighted average cost of capital (WACC)

13.9 We have engaged economic advisers, Frontier Economics, to estimate the appropriate WACC for RP7. Based on their advice, the proposed financing cost associated with the Regulated Asset Base (RAB) is shown below.

Table 20 – WACC assumptions

	RP7
Cost of debt	4.03%
Cost of equity	5.95%
Gearing	60%
Vanilla WACC (real)	4.80%

13.10 The WACC (also referred to as the rate of return) reflects the cost of funding the RAB based on NIE Networks' average cost of debt; and equity.

13.11 The proposed RP7 vanilla WACC of 4.8% reflects gearing of 60%, the pre-tax cost of debt and the post-tax cost of equity.

13.12 An overview of the key parameters of the WACC calculation is set out below.

Inflation – 2.0%

13.13 An inflation assumption is needed to convert the nominal coupon on our debts into a real value.

13.14 The UR highlighted in the Approach document for RP7 that the general measure of inflation will be changed from RPI to CPIH in RP7. This means that the cost of capital will be expressed in CPIH-deflated terms.

13.15 CPIH is not specifically forecasted, however historically CPI has tended to track CPIH closely. We therefore view that the CPI forecast is indicative for the path of CPIH too.

13.16 Whilst CPIH inflation has recently been at a significant level, looking ahead to the 2025 to 2031 period, inflation rates are expected to reduce significantly. The Office of Budgetary Responsibility (OBR) and the International Monetary Fund (IMF) forecast a marked decrease in inflation by 2025, tracking closer to the Bank of England's 2.0% CPI target by around 2026 to 2027. Therefore, we conclude that the Bank of England's target of 2.0% is an appropriate inflation rate to assume in the WACC calculation.

Cost of debt – 4.03%

13.17 The cost of debt measures the interest rate charged to NIE Networks by banks, corporate bond holders or other lending institutions.

13.18 The total amount of debt held by the company will change over the course of the price control period. New debt will be drawn down at differing rates to historic liabilities. As such, the cost of debt is based on a weighted average cost of existing debt and new debt to be issued in RP7.

13.19 The cost of debt for NIE Networks' existing bonds is 6.375% (£400m), 2.500% (£350m) and 5.875% (£350m) nominal. Weighting by the amounts outstanding, the nominal cost of embedded debt at the start of the RP7 on these bonds is 5.02%. However, only one of the bonds remains outstanding by the end of the RP7 period (5.875% £350m bond maturing in 2032). Therefore, taking into account the maturity profile, the nominal average cost of embedded debt over the periods as a whole, increases to 5.79%.

13.20 We anticipate a requirement to raise £1.95bn of debt during RP7. The cost of new debt is forecast at 5.89% nominal. This is based on an estimate of the cost of new debt by considering recent short-term market evidence on gilt yield and debt spread on any forward projection. In addition, an issuance cost of 25 basis points has been assumed, consistent with market evidence and recent regulatory precedent.

13.21 Using the assumptions set out above results in share of new debt of 75% for the RP7 period – reflecting the large scale of new issuance that is planned. Taking the cost of embedded debt and new debt together, the weighted average cost of debt is estimated at 6.11% nominal.

13.22 Applying the inflation assumption detailed above, we estimate the real cost of debt for RP7 to be 4.03%.

Cost of equity – 5.95%

13.23 The cost of equity is the return an equity investor will require to provide equity financing.

13.24 The standard methodology used to calculate the cost of equity is the capital asset pricing model (CAPM).

13.25 The cost of equity comprises a risk-free rate plus a degree of non-diversifiable risk that is inherent to the market.

13.26 The risk-free rate is determined by reference to inflation linked government bonds and regulatory precedents. On this basis, NIE Networks has estimated the risk-free rate at 1.61%.

13.27 In estimating the cost of equity, we have also considered the equity risk premium (ERP) and equity beta. The ERP is the premium expected by shareholders in return for holding risky equities rather than risk free securities. The equity beta reflects the systematic risk of the business sector.

13.28 The ERP is estimated by calculating historical total market returns of equities over an extended period against a benchmarked risk-free asset. On this basis NIE Networks has forecast the total ERP as 5.59%.

13.29 The asset beta (equity beta assuming zero gearing level) is estimated by comparing betas of listed comparators. NIE Networks has determined the appropriate asset beta is 0.36.

Table 21 – cost of equity assumptions

	RP7
Risk-free rate	1.61%
Equity market return	5.59%
Total market return	7.20%
Asset beta	0.36
Cost of equity	5.95%

13.30 Combining the above using the CAPM methodology results in a post-tax cost of equity of 5.95%.

Gearing – 60%

13.31 Gearing is the proportion of the regulated asset base that is funded through debt.

13.32 When determining an appropriate gearing level for RP7 we have considered: the current level of gearing; the forecast funding requirement; industry precedent; and rating agency guidance.

13.33 NIE Networks has determined that an average gearing level of 60% across RP7 is appropriate.

Vanilla WACC – 4.8%

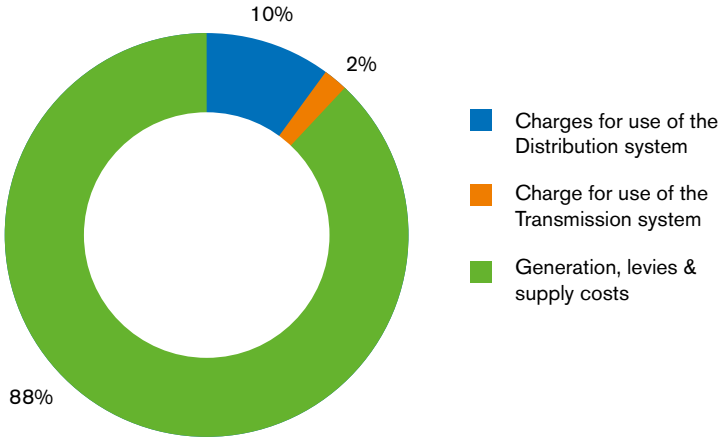
13.34 The Vanilla WACC is derived from the post-tax cost of equity, pre-tax cost of debt and gearing assumptions above.

13.35 Further details of the assumptions used for the WACC calculation and the application to the CAPM methodology is provided in accompanying paper 'Cost of Capital for RP7'.

14. IMPACT ON CUSTOMERS' BILLS

14.1 NIE Networks derives its revenues principally through charges for use of the distribution system levied on electricity suppliers and charges for use of the transmission system levied on SONI. Our network costs currently represent approximately 12%[63] of Power NI's final bill to domestic customers before the Energy Price Guarantee discount[64] is applied.

Figure 45 – NIE Networks costs as a % of Power NI's Domestic Standard Home Energy tariff



14.2 These percentages will vary each year depending on electricity wholesale prices and other costs which make up the final bill.

14.3 Generally, the percentage of the final electricity bill attributed to network costs for non-domestic customers is less than that for domestic, potentially as low as 5% for some large energy users. This is because large energy users may be connected at the 33kV level and thus do not pay for the use of the 11kV and LV networks.

14.4 Tariffs are set annually for the period 1 October to 30 September. The prices are calculated to recover the annual revenue requirements and all tariffs are approved by the UR.

a. Revenue request for RP7

14.5 In the previous chapters of this business plan we have explained and shown forecasts for expenditure during RP7. Our core expenditure costs (totex costs) are split between fast pot and slow pot. Fast pot costs are allowed in the year in which the expenditure is incurred; and slow pot costs are added to the Regulated Asset Base (RAB) and allowed over a number of years to reflect the long-term value of network assets.

14.6 The cost for the network investment programme planned for RP7 will generally be spread over 40 years.

[63] This assessment is based on Power NI's tariff rates effective from 1st January 2023 for their Standard Home Energy tariff excluding the EPG, compared to NIE Networks' prices for the 2022/23 tariff year.
[64] The EPG discount as set out in the UR's review of Power NI's Maximum Average Price https://www.uregni.gov.uk/files/uregni/documents/2022-12/Utility%20Regulator%20Electricity%20Tariff%20Briefing%20Paper%20.pdf

14.7 Our distribution revenue request for RP7 amounts to £1,717.9m in 2021/22 prices as shown in the table below.

Table 22 – distribution revenue request for RP7, £m

Distribution Use of System (DUoS)	Average p.a.		Revenue profile in RP7						Total RP7
	RP6	RP7	25/26	26/27	27/28	28/29	29/30	30/31	
Financing costs	**44.1**	**86.2**	73.6	78.8	84.3	89.2	93.6	97.6	**517.1**
Depreciation on slow pot costs (RAB)	**86.4**	**118.5**	98.5	107.0	116.5	124.8	130.8	133.6	**711.2**
Taxation payments	**11.3**	**14.9**	14.0	13.8	14.4	15.3	15.8	15.8	**89.2**
Fast pot cost	**52.3**	**58.4**	57.8	57.5	57.6	59.5	58.9	59.0	**350.3**
Rates and licence fees	**14.5**	**11.7**	12.2	12.0	11.7	11.5	11.5	11.5	**70.4**
Pension deficit repair payments	**11.9**	**-3.3**	-19.8	0.0	0.0	0.0	0.0	0.0	**-19.8**
Other	**2.7**	**-0.1**	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	**-0.4**
Total	**223.3**	**286.3**	**236.2**	**269.1**	**284.4**	**300.2**	**310.5**	**317.4**	**1,717.9**

14.8 Our transmission revenue request for RP7 amounts to £463.4m, as shown in the table below.

Table 23 – transmission revenue request for RP7, £m

Transmission Service Charge	Average p.a.		Revenue profile in RP7						Total RP7
	RP6	RP7	25/26	26/27	27/28	28/29	29/30	30/31	
Financing costs	**12.9**	**33.6**	24.4	27.6	31.8	36.4	39.8	41.8	**201.7**
Depreciation on slow pot costs (RAB)	**19.4**	**32.5**	24.5	27.3	30.9	34.7	37.8	39.8	**195.0**
Taxation payments	**2.4**	**2.0**	2.5	2.1	1.6	1.4	2.0	2.4	**12.1**
Fast pot cost	**5.2**	**5.7**	5.7	5.6	5.6	5.8	5.7	5.7	**34.1**
Rates and licence fees	**4.2**	**4.4**	4.0	4.2	4.4	4.6	4.7	4.7	**26.6**
Pension deficit repair payments	**3.6**	**-1.0**	-6.1	0.0	0.0	0.0	0.0	0.0	**-6.1**
Total	**47.8**	**77.2**	**55.1**	**66.9**	**74.3**	**82.9**	**89.9**	**94.3**	**463.4**

b. How we set distribution network tariffs

14.9 Distribution tariffs are set annually to recover allowed revenues under the price control. Our distribution licence requires us to set tariffs such that they are (1) non-discriminatory between customer groups, and (2) treat all customers the same irrespective of geographical location.

14.10 To satisfy these requirements we use cost reflective principles such that customers only pay for the parts of the network they use.

14.11 There are approximately 50 individual tariffs covering domestic, SME, unmetered and large energy users. The tariffs are determined by customer characteristics i.e. customer type, connected voltage, max capacity and meter type.

14.12 Each distribution tariff will have fixed and/or load related charges:

- fixed charges levied per customer (standing charges); and
- load related charges (kWh, kVarh and kVA).

14.13 Fixed charges recover costs which will not vary with customer load such as meters, meter reading and billing.

14.14 Load related charges recover costs associated with providing, operating and maintaining the distribution network.

14.15 Annual changes in tariff prices will first take account of the change in volumes associated with each charge type (e.g. customer numbers, units) before changes are made to the prices to recover the distribution revenue allowed for the tariff year.

c. Transmission network charges

14.16 We recover the cost of the transmission network through Transmission Service Charges (TSC) to SONI levied as 12 fixed monthly charges.

14.17 SONI is responsible for the billing and allocation of these charges to suppliers and generators. Currently SONI allocate 75% of the TSC to its TUoS charges recovered from Suppliers in respect of its NI customer consumption. The remaining 25% of the TSC is recovered from generators who then trade in the all-island market.

d. Impact on customers' bills

14.18 The annual distribution and transmission revenue requirements to be recovered through network charges in RP7 are set out in Table 22 and Table 23 above.

14.19 With the anticipated increase in the adoption of electrification for heating and transport out to the end of RP7, it is anticipated that electricity sales will increase by c27% on average by the end of RP7 compared to the annual average consumption at the end of RP6; the projected increase in total unit sales is made up of a forecast 37% growth in domestic electricity consumption and a 20% growth in electricity consumption by the non-domestic sectors.

14.20 The anticipated growth in electricity sales will put downward pressure on network prices.

14.21 The table below shows the key customer groups considered when setting network charges. The number of customers in each and their typical annual consumption is provided for illustration.

Table 24 – key customer groups and their typical electricity consumption

Customer group	No. of customers at end Dec-22	Typical MWh per annum
Domestic customers	837,355	3.4
Small businesses, MIC[65] < 70kVA	69,105	16.4
Small and medium sized enterprises (SME), connected at LV	5,149	275
Small and medium sized enterprises (SME), connected at HV	214	1,664
Large energy users (LEU) connected at HV	196	5,457
Large energy users (LEU) connected at 33kV	19	31,075

[65] MIC is the maximum import capacity agreed with NIE Networks. For small and medium enterprises, the MIC is greater than 70kVA while large energy users have a MIC greater than 1MW.

14.22 Forecast network charges for the final year of RP6 and the final year of RP7 are summarised in the table below. For illustrative purposes we have used typical customer electricity consumption in both years as shown in the table.

Table 25 – average network charges for the final year of RP7 versus the final year of RP6

Customer group	Typical MWh per annum	Average network charges in 2024/25, £ p.a.			Average network charges in 2030/31, £ p.a.		
		Distribution	Transmission	Total	Distribution	Transmission	Total
Domestic	3.4	144	18	162	147	25	172
Small businesses	16.4	583	87	670	627	122	749
SME, LV connected	275	8,585	1,457	10,042	9,467	2,045	11,512
SME, HV connected	1,664	29,740	8,091	37,832	32,812	11,360	44,172
LEU, HV connected	5,457	64,994	26,535	91,529	71,430	37,255	108,685
LEU, 33kV connected	31,075	126,683	149,324	276,007	136,725	209,649	346,374

14.23 If we were to assume customer consumption did not change over RP7 then network charges for domestic customers are projected to increase by approximately £10 from the last year of RP6 (2024/25) to the last year of RP7 (2030/31). This is equivalent to an average annual increase of less than £2 across RP7, although in practice the annual variations in network charges will depend on the phasing of costs such as network investment.

14.24 However, we anticipate customers will embrace electrification for heat and transport and, that being the case, we expect that customers will increase their consumption of electricity which will lead to higher spend on electricity because of the higher volumes and the increase noted above in network charges.

14.25 Accordingly, while customers may pay more for their electricity they will pay less for home heating oil if their homes are heated with a heat pump; or for petrol / diesel for their cars if driving an EV. We have been working with economic advisers Ernst & Young (EY) to quantify the impact of these off-setting cost savings. Using its findings of the potential macro-level benefits that could be realised from the electrification of heating and transport, EY estimates a household that is able to fully embrace electrification and purchases low carbon technologies that are widely available now, could expect to make net savings of around £2-3k per year.

15. GLOSSARY

Capital expenditure (Capex)	Expenditure on investment in long-lived distribution assets, such as underground cables, overhead electricity lines and substations.
CCNI	Consumer Council for Northern Ireland.
Cost-benefit analysis (CBA)	A methodology that compares the costs of carrying out an investment against the benefits (such as risk reduction or service improvement) to compare different options and demonstrate value for money.
Cost of debt	The effective interest rate that a company pays for its loans.
Cost of equity	The rate of return on investment required by a company's shareholders.
CPI	Consumer Price Index.
CPIH	Consumer Price Index including housing costs.
Customer Interruptions (CIs)	The number of times customers experience supply interruptions of more than one-minute duration per 100 connected customers.
Customer Minutes Lost (CMLs)	The average number of minutes customers are off supply per annum.
DfE	Department for the Economy
Distributed generation (DG)	Generation connected to the distribution network. It includes wind turbines, domestic solar panels, large scale photo-voltaic farms, hydro-electric power and biomass generators.
Distribution network	33kV and lower voltage networks. The networks forming part of the distribution network, including in each case any electrical plant and/or meters used in connection with distribution.
Distribution network operators (DNOs)	The holders of an electricity distribution licence in GB are commonly referred to as the GB DNOs. There are 14 DNOs in GB, which are owned by six different groups.
Distribution system operator (DSO)	A DSO actively manages the power flows on the network using flexible connections and/or services, in addition to the traditional distribution network operator approach of reinforcement and switching.
Distribution Use of System (DUoS)	These are the charges levied to suppliers for distribution network costs that can be recovered from customers. The amount is determined by the UR through price control reviews.
ESQCR	Electricity, Safety, Quality and Continuity Regulations (Northern Ireland) 2012 specify safety standards which are aimed at protecting the general public and customers from danger.
Enduring Solution (ES)	An IT project directed at facilitating the competitive supply market and customer switching.
Fast pot	Fast pot is the revenue that is recovered in the year of expenditure.
Gearing	A ratio measuring the extent to which a company is financed through borrowing.
GB	Great Britain.
Guaranteed Standards (and Overall Standards) of Performance	Guaranteed and Overall Standards of Performance set minimum service levels to be met across a range of activities covering supply interruptions, appointments and connections.
Health and Safety Executive Northern Ireland (HSENI)	A Government organisation that has the responsibility of enforcing health and safety legislation.

Health Index (HI)	Framework for collating information on the health (or condition) of distribution assets and for tracking changes in their condition over time.
IME3 Directive	Directive 2009/72/EC of the European Parliament and of the Council of 13 July 2009.
IMF&T	Inspections, maintenance, faults and tree-cutting.
Injurious affection	The diminution in value to a property caused by the existence and/or use of public works carried out under, or in the shadow of, compulsory powers.
Large-scale generation (LSG)	In context of renewable generation, this term is used to describe generator installations typically in the size range 5MW to 40MW. LSG mainly takes the form of wind farms but solar farms feature as well, and are likely to play a more significant part going forward. LSG connects to the transmission network (at 110kV) and the distribution network (typically at 33kV).
Load Index (LI)	Framework, introduced as part of DPCR5, demonstrating the utilisation of individual substations or groups of interconnected substations. It is used as a secondary deliverable capturing the effects of load related investment.
Low Carbon Technology (LCT)	This is the collective term for devices that reduce the amount of carbon being used for heating, transport and generation. It includes electric vehicles, heat pumps and solar generation.
Micro-generation (MG)	In context of renewable generation, this term is used to describe very small generator installations with generation capacity in the range of 4kW to 12kW. Typical examples are photovoltaic (PV) panels on domestic rooftops. MG normally connects directly to customer premises at 230V single phase or 400V three phase. Whereas applications for large scale generation (LSG) and small-scale generation (SSG) are assessed in some detail to determine their impact on the NIE Networks distribution network, most MG is connected on a 'fit and inform' basis, in a category referred to as 'G83 connections'. This means that NIE Networks has very limited control over the rise in G83 connections.
NI	Northern Ireland.
NIE Networks	Northern Ireland Electricity Networks Limited.
NIEPS	Northern Ireland Electricity Pension Scheme.
Office of Gas and Electricity Markets (Ofgem)	Ofgem is responsible for regulating the gas and electricity markets in Great Britain to ensure customers' needs are protected.
Opex	Operating expenditure. The costs of the day to day operation of the network such as staff costs, repairs and maintenance expenditures, and overhead.
Prosumer	A prosumer is an individual who is both a consumer and producer.
RAB	Regulatory Asset Base. The value ascribed by the Utility Regulator to the capital employed in the NIE Networks' regulated businesses. The RAB is calculated by summing an estimate of the initial market value of the regulated asset base at privatisation and all subsequent allowed additions to it at historical cost, and deducting annual depreciation amounts calculated in accordance with established regulatory methods. The revenues NIE Networks is allowed to earn under the price control include allowances for the regulatory depreciation and also for the return investors are estimated to require to provide the capital.
RASW	Road and Street Works legislation.
Real Price Effects (RPE)	Increase in prices, of materials, direct staff or contract labour, over and above increases in the relevant inflation index used.
Resilience tree cutting	This is the full removal or extensive cutting of trees that are found to be within the falling distance of overhead power lines. This is planned to ensure that they cannot cause damage to the power lines in the event of severe weather.

Revenue = incentives + innovation + outputs (RIIO)	Ofgem introduced a new regulatory framework in 2010 replacing previous RPI-X regime. It places more emphasis on incentives to drive the innovation needed to deliver a sustainable energy network at value for money to existing and future consumers.
RIGs	Regulatory Instructions and Guidance.
RIIO-ED1 and RIIO-ED2	The first (ED1) and second (ED2) electricity distribution price controls by Ofgem under the RIIO framework.
RoI	Republic of Ireland.
RP3 (Regulatory Period 3)	This is the name given to the price control for NIE Networks covering the period from 1 April 2002 to 30 March 2007.
RP4 (Regulatory Period 4)	This is the name given to the price control for NIE Networks covering the period from 1 April 2007 to 30 March 2012.
RP5 (Regulatory Period 5)	This is the name given to the price control for NIE Networks covering the period from 1 April 2012 to 30 September 2017.
RP6 (Regulatory Period 6)	This is the name given to the price control for NIE Networks which will cover the period from 1 October 2017 to 31 March 2025.
RP7 (Regulatory Period 7)	This is the name given to the price control for NIE Networks covering the period from 1 April 2025 to 31 March 2031.
RPI	Retail Price Index.
SEF	Strategic Energy Framework, produced by the DfE to outline the direction for energy policy in Northern Ireland.
Slow pot	Slow pot is where costs are added to the RAB and revenues allow recovery of the costs over time together with the cost of financing this expenditure in the interim.
Small-scale generation (SSG)	In context of renewable generation, this term is used to describe generator installations including single wind turbines, anaerobic digesters or small solar installations in the size range 20kW to 500kW. Popular sizes are 250kW for single turbines and 500kW for anaerobic digesters, which aligned with incentive (ROCs) bands. SSG connects to the distribution network; normally to LV and 11kV lines fed from 33kV/11kV primary substations.
Smart grid	A generic term for a range of measures that are used to operate electricity networks allowing more generation or demand (load) to be connected to a given electricity circuit without the need for traditional reinforcement (or upgrade) of that equipment.
Smart technology	The application of innovation to develop a smarter electricity network that uses information and communications technology to gather and act on knowledge from the network and customers to improve the efficiency, reliability, economics and sustainability of the transmission and distribution of electricity.
SoCC	Statement of Connection Charges.
SONI	Transmission System Operator for Northern Ireland.
TIA	Transmission Interface Arrangements. A document developed by NIE Networks and SONI, and approved by the UR, which sets out the processes and working arrangements that NIE Networks and SONI will follow and adhere to, when working together on transmission system activities and/or projects.
Transmission network	110kV and above. The network of high voltage electric lines and cables operating at 110kV and above, which is used for the transmission of electricity.
TSO	Transmission System Operator. In Northern Ireland, this role is carried out by SONI.

Utility Regulator (UR)	The Northern Ireland Authority for Utility Regulation.
Vanilla Weighted Average Cost of Capital (Vanilla WACC)	This is the combined cost rate of funding calculated using a pre-tax cost of debt and post-tax cost of equity weighted by notional gearing.
Vulnerable customers	Customers who are critically dependent on electrically powered equipment (including life-protecting devices, technologies to support independent living and medical equipment) or are identified as needing extra support due to their personal characteristics or circumstances.
WACC	Weighted average cost of capital. Also referred to as the “rate of return”.
Wayleave	Provides rights for an electricity company to install and retain its apparatus, either underground cables or overhead lines across land with annual payments being made to the landowner and occupier.

CUSTOMER SERVICES

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