

Environment Report

2020/21





Contents

1	Introduction	4
1.1	Executive summary	4
1.2	Our business - who we are	4
1.3	Purpose of the report	6
2	Managing our environmental impact	7
2.1	Introduction	7
2.2	Visual amenity	7
2.3	Oil leakage from cables	8
2.4	Carbon impact and climate change	9
2.5	Other environment related activities	13
3	Smart grids, innovation and our role in the low carbon transition	15
3.1	Introduction	15
3.2	Progress of the innovation strategy	16
3.3	Roll out of smart grids and innovation into business as usual	22
4	Appendices	25
5	Glossary	26

1 Introduction

1.1 Executive summary

We are dedicated to achieving the highest standards of environmental performance, not only by minimising the environmental risks created by our activities, but also through targeted investment in outputs that deliver a positive environmental impact.

We are also determined to play our part in enabling the UK's transition to a net zero carbon future and the environmental benefits this will bring. This desire influences both our asset investment plans and the investments we make in measures to reduce our own carbon footprint.

To reflect our environmental ambitions, we included four environmental commitments in our business plan for the RIIO-ED1 period and have made further progress against achieving these in the sixth year of the RIIO-ED1 period;



Table 1: RIIO-ED1 Environment commitments

Commitment	Measurement	Target	Target date	2020/21
Reduce losses	Annual gigawatt hours (GWh) saved	11	2021	Programme completed
Reduce carbon footprint	Tonnes of Carbon Dioxide Equivalent (tCO ₂ e)	10%	2020	26%
Reduce oil lost from cables	Litres lost	<30,000 per year	2023	21,626l
Undergrounding overhead lines in Designated Areas	km removed	80	2023	7km for a total of 34km

We have continued to connect new low carbon generation, developing innovative solutions to connect **2,427 units** of low carbon technologies with a combined capacity of **213.5MW** along with investing over **£3m** in the smart meter roll-out in 2019/20.

Despite the challenges of the pandemic and national and regional lockdowns, we remain focused on achieving the responsible business goals that we set out, flexing our approach to meet our commitments during these unprecedented times. We have still been able to make a significant difference in our communities, environments and ensuring the wellbeing of our colleagues and partners.

As with the other DNOs, we are transitioning towards a Distribution System Operation model which will transform how we operate and also deliver major benefits. The definition of a DSO, (as defined by the ENA), is an active distribution system comprising networks, demand, generation and other flexible distributed energy resources to deliver security, sustainability and affordability in the support of whole system optimisation.

1.2 Our business / who we are

We operate an electricity distribution network delivering power to five million people with 13,000 km of overhead lines, over 44,800 km of underground cables, almost 84,000 items of switchgear and more than 35,000 transformers. We do this through a workforce of 2,000 people; a large contractor workforce; a fleet of over 1,000 commercial vehicles, trailers and items of mobile plant; and 15 depot and office sites. Consequently, our activities create both risks and opportunities in regard to their impact on the environment.

The environmental risks we manage include those associated with holdings of electrical insulating oil (some of which may contain a constituent of polychlorinated biphenyl), waste management, vehicle emissions, holdings of sulphur hexafluoride gas (SF₆) and work in environmentally sensitive areas.

We have opportunities to minimise resource use and reduce waste to landfill. As the electricity distribution network operator for the north west of England we also have a key role to play in enabling the transition of our region to zero carbon energy, supporting the UK as a whole and our region in meeting its climate change targets.

Our Network covers the most beautiful scenery within the UK and some of the areas are most challenging to maintain our assets due to the rural locations and distance that are covered. We have a duty to maintain the network as well as maintain, protect and improve the environment we operate in, including:-

- Ensure environmental planning is considered through all our design, planning and construction phases
- Reduction of our carbon foot print
- Protecting areas of outstanding natural beauty
- Continue to improve distribution losses
- Reduce SF₆ emissions and oil leaks
- Use innovation and stakeholder engagement to reduce our environmental impact

Recognition of these obligations is reflected in our environment and energy management policy.

1.2.1 Environment and energy management policy

We are committed to achieving excellence in environmental and energy management performance, minimising any adverse impacts our operations might have and fulfilling our obligation to manage energy and improve the environment that we operate in.

We will:

- Identify the environmental and energy using aspects associated with our activities, minimising those with any adverse impact whilst promoting those with beneficial impact.
- Comply with all applicable environment and energy management law and other relevant requirements and, where possible, exceed them.
- Integrate environmental performance and energy management considerations into business as usual processes including the setting and reviewing of objectives and targets.
- Operate and maintain systems of work that minimise adverse environmental impacts and seek to minimise energy usage whilst delivering beneficial impacts.

- Inform, instruct, train, supervise and equip people to identify and minimise adverse environmental impacts, maximise energy management opportunities and deliver beneficial impacts.
- Make environmental and energy management performance a factor in the selection of suppliers of goods and services.
- Implement and maintain a robust environmental management system that is certified to the ISO 14001 standard and an energy management system which is certified to ISO 50001.
- Manage the waste generated by our activities according to the principles of reduction, re-use and recycling.
- Minimise the carbon footprint of our business and actively contribute to the low carbon economy.
- Manage our business operations to prevent pollution and wasteful use of energy.
- Maximise the sustainability of natural resources used in our activities.
- Develop and promote a culture of continuous improvement with regard to environmental and energy management performance.

To deliver this policy commitment we work to an environment strategy that is based on:

- A clear understanding and visibility throughout the business of environmental issues and impacts;
- Targeted investment and expenditure in environmental control measures;
- Strong corporate governance and performance management;
- Continuous learning and improvement; and
- A systematic approach to environmental management.

In line with this policy and to support our drive for excellence in environmental performance our environment and energy management system is certificated to the ISO14001 Environmental Management and ISO50001 Energy Management standards. Both these systems have been audited and verified by external auditors during 2020/21.



1.2.2 Role of stakeholders in environmental management

We have a stakeholder engagement strategy that includes working with a number of advisory panels. These are made up of stakeholders who are subject experts and represent our communities. One of our panels, the Sustainability Advisory Panel (SAP), focuses on sustainability challenges; ensuring our network can adapt to future challenges, such as the transition to zero carbon and Distribution System Operation (DSO), growth and development of community and local energy etc whilst keeping bills affordable.

Working in partnership with our SAP and a range of other stakeholders, including Greater Manchester Combined Authority, we have developed an ambitious new plan called 'Leading the North West to Zero Carbon'. This includes activities to drive down our own operational business carbon emissions, as well as those associated with the distribution network, and support our colleagues, business customers and partners to lower theirs. We propose to invest £63.5million over the remainder of RIIO-ED1 to deliver the plan, working with the SAP and other stakeholders to make it happen and to hold us to account;

<https://www.enwl.co.uk/go-net-zero/our-plans-to-go-net-zero/leading-the-north-west-to-net-zero/>

As part of our leading the North West to Zero Carbon plan we have increased engagement with our employees around their opportunities for supporting the transition to Net Zero and are proud to have been the first DNO to be awarded the Bronze Carbon Literacy standard. We are working towards Silver accreditation however these plans have been impacted by the restrictions due to the Coronavirus pandemic.

We also meet regularly with our regional partners in relation to visual amenity in designated areas. Through this process our stakeholders play a key role in shaping our environmental strategy and investment priorities. This is covered further in section 2.2.

Over the last year, stakeholders and colleagues have also been involved in developing our 'Transforming our Communities' responsibility framework. This framework, launched in January 2019, part of our Corporate Social Responsibility (CSR) Strategy. The framework articulates our ambition to be a responsible business and creates a framework which captures our environmental, social and community ambitions. We are increasingly also working with our supply chain to raise awareness of our framework. We report our progress annually. It can be found at the following link:

<https://www.enwl.co.uk/about-us/transforming-our-communities/>

Stakeholder and customer engagement is critical to our existing activities and development of future plans and we were pleased to be one of the first distribution network companies to create an independent Customer Engagement Group (CEG). The role of the CEG is to challenge the company to ensure that we are prioritising our customers' needs in our future plans.. This process has included extensive customer and stakeholder research on priorities and willingness to pay.

Details of all our stakeholder engagement and how customers and stakeholders are able to get involved can be found via the following link:

[Engaging with our stakeholders \(enwl.co.uk\)](https://www.enwl.co.uk/engaging-with-our-stakeholders/)

1.3 Purpose of the report

It is important to our business that customers and other stakeholders have a clear understanding of how we endeavour to minimise any adverse impact our activities might have on the environment and how we are taking advantage of opportunities to play our part in moving to a zero carbon economy.

The purpose of this report is to provide the detail on the progress we have made in the sixth year of the RIIO-ED1 (2015-2023) period in terms of our overall strategic environmental objectives and meeting the environmental targets we set out in our RIIO-ED1 business plan.

In parallel with delivering a reliable and safe network, we have continued our commitment to leading the north west to net zero. Collaboration is pivotal to our approach and working with our customers and stakeholders will ensure we provide the best support to our communities.

The report also gives an insight to how we are creating a low carbon network and our future by developing the technology and systems along with a low carbon mindset to preserve biodiversity and ecosystems by driving down our carbon emissions.



2.1 Introduction

This section provides detail on the progress we have made in 2020/21 in regard to the environmental risks and opportunities we encounter, including those for which we have set targets in our RIIO-ED1 business plan.

2.2 Visual Amenity

There are three National Parks and four Areas of Outstanding Natural Beauty (AONB), collectively known as Designated Areas, either wholly or partially within our region. These are:

- Arnside and Silverdale AONB
- Forest of Bowland AONB
- North Pennines AONB
- Solway Coast AONB
- Lake District National Park
- Peak District National Park
- Yorkshire Dales National Park

We have a programme of undergrounding overhead lines for visual amenity benefits in Designated Areas and we have worked closely with regional partners to ensure its success since its inception in 2005. As part of our wider stakeholder engagement plan, we meet annually with representatives from the above Designated Areas to share information on the individual programmes of work in each of

the areas and current topics of interest. Each of the designated area statutory body representatives, together with Friends of the Lake District and Friends of the Peak District, meet with ENWL planners on a regular basis to identify the lines to be undergrounded in their area and to ensure programmes are progressed.

Our investments have also been leveraged by regional partners to deliver greater environmental value and secure additional funding from other sources. This includes £7.9m of National Lottery Funding for a range of landscape improvement programmes in two of the Designated Areas above. In our RIIO-ED1 business plan we planned to invest £10.8m (20/21 prices) undergrounding overhead lines by 2023. This was equated to 80km in our published Business Plan commitments based on assumption as to the average unit cost of undergrounding the overhead circuits.

In 2020/21 we increased our activity inside Designated Areas, removing a further 11.2km of overhead line and installed 14.8km of underground cable. At the end of the fifth year of RIIO-ED1, we have now removed a total of 34.4km of overhead line and invested £6.9m (20/21 prices). We still intend to invest the totality of our entitlement of £10.8m (20/21 prices) over the RIIO-ED1 period but some of the sites selected by stakeholders, whilst high in amenity value, are costlier than originally anticipated. Hence, it is likely that the total length undergrounded over the period will be around 71km.

Table 2 gives details of the schemes completed in 2020/21 and Table 3 shows the projects planned for completion in 2021/22.

Table 2: Visual Amenity Completed Projects Summary 2020/21

Designated Area	Scheme	Overhead Line Removed (km)	Underground Cable Installed (km)	2020/21 Expenditure (£k)
Yorkshire Dales	UVA Alpha ABS-Sannat Hall	2.7	3.5	15.3
Forest of Bowland	UVA Bleasdale Nr Chipping	3.4	4.7	8.1
Forest of Bowland	UVA Holden Clough to Wycongill	2.4	3.5	294.4
Lake District	UVA Bootle Station	0.3	0.2	37.5
Lake District	UVA Welcome Nook-Fell Lane Corney Fell	1.4	1.8	264.4
Lake District	UVA Charlesground-High Corney	1.0	1.1	174.2
TOTAL		11.2	14.8	793.9

Table 3: Visual amenity planned projects 2020/21

Designated Area	Scheme	Overhead Line to be Removed (km)	Underground Cable to be Installed (km)	2021/22 Expenditure (£k)
Peak District	UVA Reaps Farm-Higher Deep Clough	1.8	2.7	75.4
Lake District	UVA LV Dacre	0.3	0.4	22.6
North Pennine	UVA RSPB Tindale Tarn	1.9	2.1	315.5
Lake District	UVA Hole House Farm Pooley Bridge	0.7	1.7	291.8
Yorkshire Dales	UVA Raisebeck Stone Circle Orton	1.8	2.3	344.9
Lake District	UVA Dacre Village South	0.2	0.2	59.4
Lake District	UVA Meathop Moss	0.7	1.0	199.9
Lake District	UVA Redmire Mungrisedale	0.5	0.6	89.9
North Pennine	UVA Swindalehead Brough	1.5	2.0	298.6
Arnsdale & Silverdale	UVA Warton-Barrow Scout	1.8	1.5	331.0
TOTAL		11.2	14.5	2,029.0

Details of our strategy for project assessment and delivery, analysis of costs and benefits, stakeholder engagement and support and our approach to the assessment of projects is included in our document Undergrounding for Visual Amenity – Scheme Selection and Design Process 05 May 2016 which can be downloaded from the following link;

<https://www.enwl.co.uk/globalassets/stakeholder-engagement/documents/engagement-publications/undergrounding-for-visual-amenity/2016--underground-for-visual-amenity.pdf>

This strategy is pivotal in the planning and preparation of any work being carried out and is visited each year to ensure continual deliver against the strategy and compliance. The data relating to our visual amenity activity can be found in worksheet E1 of the Environment and Innovation Reporting Pack in the appendices.

2.3 Oil leakage from cables

Fluid-filled cables were installed from the late 1950s to the early 1970s as part of the extra high-voltage distribution network at 132,000 and 33,000 volts. The fluid acts as an electrical insulator and will be either mineral naphthenic oil or linear alkyl benzene or a mixture. In all cases the fluids have a low viscosity and colour, not unlike water. Leaks from fluid-filled cables can occur for varying reasons including:

- cable damage by third party excavations;
- cable damage due to installation failure;
- failure of ancillary oil equipment such as pipe work, monitoring gauges and oil tanks; and
- cable joint failure.

Whilst only a very small percentage of cables ever develop leaks, a leak can present a significant environmental risk if it is adjacent to a water course or an aquifer. Our strategy to address leakage from fluid-filled cables is to replace them with alternative modern fluid-free cable. We have also have started to dose circuits with perfluorocarbon tracers which enables leaks to be detected more quickly reducing oil lost and time finding leaks.

We have committed in our RIIO-ED1 business plan to maintain a leakage rate of less than 30,000 litres per year by 2023. With the practice of dosing and replacing the circuits which have leaked, we have seen a reduction in leakage to 16,998 litres in 2020/21. During the year, we have removed 1.03km of fluid filled cable, meaning that in the first six years of RIIO-ED1 we have removed 71.75km of 33kV and 7.9km of 132kV fluid-filled cable taking the total removed to 79.6km (16% of the total in service at the start of the period). In the last two years of RIIO-ED1 we plan to remove a further 24km.

When leaks are detected we act in accordance with the requirements of the joint Environment Agency and Electricity Companies Operating Code on the Management of Fluid Filled Cable Systems Issue 3, 2013. The data relating to our oil leakage activity can be found in worksheet E2 of the Environment and Innovation Reporting Pack.

2.4 Carbon impact and climate change

2.4.1 Business carbon footprint

Within our Environment and Energy Management Policy we have committed to minimise the carbon footprint of our business and actively contribute to the transition to a zero carbon economy. The carbon footprint is a measure of the impact of our business on the environment through our emissions of greenhouse gases.

The target set in our RIIO-ED1 business plan was to reduce our 2014/15 business carbon footprint (excluding losses) by 10% by the end of 2020/21. We have exceeded this target, achieving a reduction of 42%, and will target further reductions throughout the final two years of the RIIO-ED1 period. The cumulative benefits of this reduction are the equivalent of 10,325 tonnes of CO₂ emissions saved including a reduction of 3,458,061 kWh of energy used in powering our buildings and substations.

In 2020/21, we continued to realise the benefits from our investment in fuel efficiency including reduced vehicle weights, installation of engine rev limiters and educating our drivers on the most efficient manner in which to use our fleet. Further investment in the refurbishment of our buildings also took place including the installation of more energy efficient equipment. This investment, alongside continued promotion of energy reduction behaviour with our employees, is driving down the electricity used to power our buildings.

The higher CO₂ contribution from generators was mostly off-set by our improved performance for electricity in our buildings, meaning that our business carbon footprint (excluding losses) for 2020/21 was 14,090 tCO₂e, a reduction of 3,961 tCO₂e on the previous year. This means that we have delivered an average saving of over 3,772 tCO₂e per year over the first six years of the plan compared to the baseline.

Table 4: Business carbon footprint 2020/21

Emissions	2020/21 tonne CO ₂ e	2019/20 tonne CO ₂ e	2018/19 tonne CO ₂ e
Scope 1			
Operational transport (direct labour)	4,419	3,653	4,020
Operational transport (contractors)	1,578	3,196	3,850
Business transport – road	925	1,343	1,319
Fugitive emissions - SF ₆	1,488	1,772	867
Fugitive emissions – other	16	16	87
Fuel combustion	1,967	2,560	4,435
TOTAL	10,393	12,540	14,578
Scope 2			
Buildings energy usage	3,995	4,845	5,773
TOTAL	3,995	4,845	5,773
Scope 3			
Business transport – rail	0.29	21	22
Business transport – air	1.34	99	44
TOTAL	1.63	120	66
Business Carbon Footprint (exc. losses)	14,090	18,051	20,417
Losses	283,209	293,793	347,010
Business Carbon Footprint (including losses)	297,299	311,844	367,427

The data relating to our business carbon footprint can be found in worksheet E3 of the Environment and Innovation Reporting Pack in the appendices.

2.4.2 Sulphur hexafluoride emissions (SF₆ emitted)

SF₆ is a gas with excellent electrical insulation and other properties, which have led to its widespread use in electrical switchgear and in a number of other industrial applications. However, there is concern over any SF₆ that escapes into the atmosphere since it is a potent greenhouse gas.

In terms of our strategy to address the level of SF₆ emitted, we contribute to the overall UK electricity transmission and distribution industry in supporting Government initiatives to ensure the implementation of sound policies for the control and use of SF₆. The European electricity industries have also agreed a set of actions to reduce emissions of the gas to the atmosphere with manufacturers of electrical equipment. Leakage rates are being reduced in cooperation with power equipment manufacturers under a programme of continuous improvement.

On a company level our current policy is to continue to install modern SF₆ equipment with lower leakage rates and leakage monitoring. Over the RIIO-ED1 period we plan to reduce our leakage rate by over 20% from a rate of 0.38% (as a proportion of the mass in service) in 2013 to 0.30% by 2023.

In 2020/21 a total of 65.26 kg of SF₆ was lost from our system, with a carbon equivalent of 1,488 tCO₂e. The data relating to our SF₆ holding, leakage and associated carbon footprint can be found in worksheets E2 and E3 of the Environment and Innovation Reporting Pack in the appendices.

We can proactively target losses reduction and our strategy is to continually review the options for reducing the losses on our network.

2.4.3 Distribution losses

When electricity is generated not all of the electrical energy which flows through the power network reaches the customer. This is because power networks use some of the energy in the process of transporting the electricity to customers. In the broadest sense, distribution network losses are the difference between the electrical energy entering the distribution network, and the electrical energy that leaves it. Some losses are associated with the technical characteristics of the electricity network ('technical' losses), whilst other losses are more to do with measurement and billing ('non-technical' losses).

Losses cost customers money and contribute to carbon emissions. They can be reduced in various ways but these measures also cost money. At Electricity North West we act on behalf of our customers to determine the appropriate balance between spending money on reducing losses, and saving money for customers by lowering the energy lost during transportation.

The overall level of losses will be influenced to a greater extent by electricity usage i.e. the more electricity consumed, the more power transmitted and distributed, the more losses and vice versa. This movement in losses is reflected in the total losses associated with our network.

In 2020/21 losses¹ were 1,214,760,647kWh or the equivalent of 283,209 tCO₂e. This was an increase of 65,333,070kWh from 2019/20 which, together with a change in the UK government electricity conversion factor, equated to an equivalent reduction of 10,584 tCO₂e.

We can proactively target losses reduction and our strategy is to continually review the options for reducing the losses on our network. We have examined the potential for reductions through the application of various alternative investment strategies during the RIIO-ED1 period and are adopting, as policy, only those strategies that deliver clear positive benefits for our customers.

We also plan to maintain and expand our activities to investigate and minimise non-technical losses, such as theft, while continuing to establish a more reliable reporting baseline for losses within RIIO-ED1.

As part of this strategy we have identified a number of priorities for reducing both technical and non-technical losses summarised in Table 5 below.

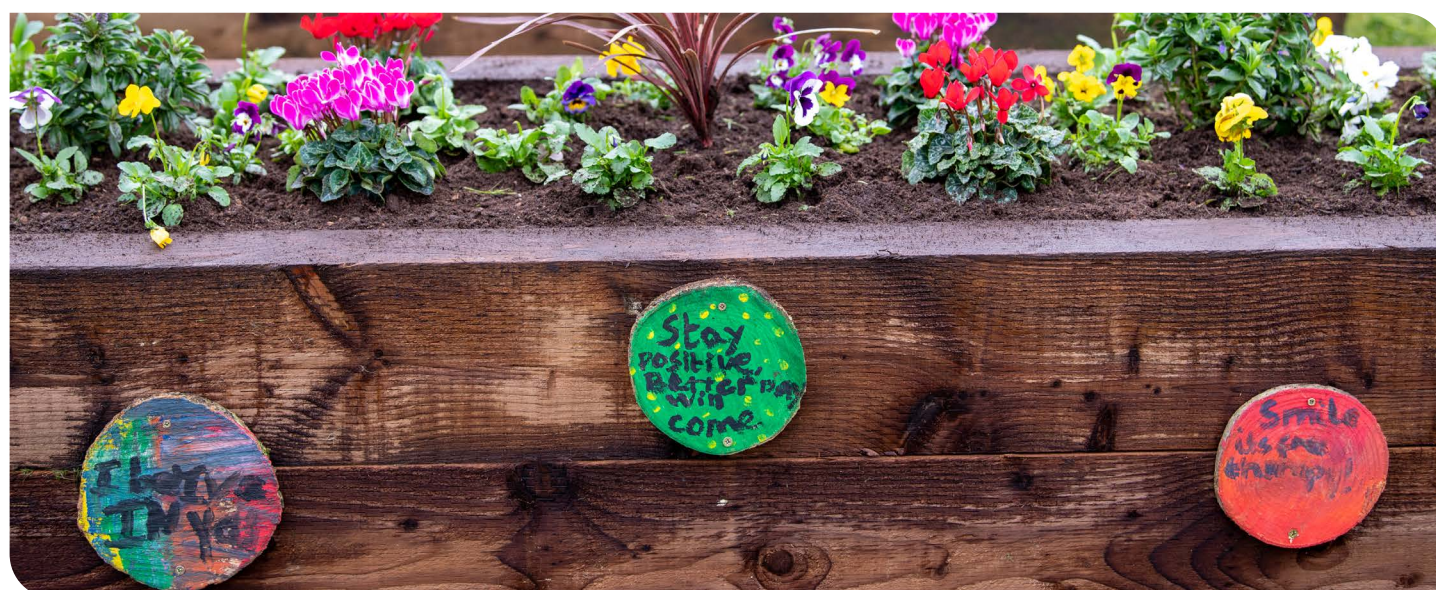
¹ It should be noted that the reported losses figure is a snapshot of received data as of the date of the 2020 RRP submission and will change as further settlement reconciliation runs are carried out (up to 28 months after each relevant settlement date).

Table 5: Losses strategy summary

Investment	Actions	
Technical losses		
Distribution transformers (ground-mounted)	Replace old (pre-1990) large, ground-mounted, secondary network transformers with capacities of 800kVA and 1000kVA with lower loss EU Eco design	Proactive
Primary transformers	When installation or replacement required, replace with lower loss EU Eco design	Opportunistic
Grid transformers	When installation or replacement required, determine best type to reduce losses with all new transformers lower loss EU Eco design	Opportunistic
Distribution transformers (pole-mounted)	When installation or replacement of larger pole-mounted secondary network transformers required, replace with lower loss EU Eco design	Opportunistic
Cables (high voltage and low voltage)	Install large-cross section cables (300mm ²) at both HV and LV as standard	Opportunistic
Non-technical losses		
Transactional theft	Continue to work alongside suppliers to help reduce transactional theft	Proactive
	Monitor / share best practice with other DNOs	Proactive
Theft in conveyance	Develop our theft in conveyance services	Proactive
	Contribute to the development of the National Revenue Protection Code of Practice	Proactive
	Increase number of investigations undertaken	Proactive
	Monitor / share best practice with other DNOs	Proactive
Unmetered supplies	Undertake regular audits of unmetered supply inventory	Proactive
Network Innovation Strategy		
Ofgem Innovation Funding	Review and analyse the details of the innovation projects	Proactive

Our losses strategy can be found at the following link:

<https://www.enwl.co.uk/go-net-zero/our-plans-to-go-net-zero/electrical-losses/>



2 Managing our environmental impact

A summary of our activity in reducing losses in 2020/21 is presented in the tables below.

Table 6: Summary of losses costs and benefits from activities in RIIO-ED1

Programme/ project title	Regulatory Reporting Year 2019/21			RIIO-ED1
	Distribution Losses – Justified Costs	Reduced Losses	Reduced Emissions Associated with Losses	Cumulative reduced losses to date
	£m	GWh	tCO ₂ e	GWh
Standardise use of 300mm ² HV cable	1.11	9.71	2,263	31.22
Standardise use of 300mm ² LV cable	0.87	4.40	1,026	13.30
Proactive replacement of pre-1990 1000kVA transformers	0.05	5.65	1,317	17.60
Proactive replacement of pre-1990 800kVA transformers	0.08	4.77	1,112	11.21
Opportunistic primary transformer replacement	0.19	2.26	528	6.45
Opportunistic 200kVA pole-mounted transformer replacement	0.02	0.19	44	0.57
Relevant theft of electricity action	0.04	11.56	2696	42.59
TOTAL	2.37	38.54	8,985	122.95



Table 7: Summary of losses activity in 2020/21 and estimate for 2021/22

Programme / project title	Description of unit	Volumes in 2019/20	Forecast volumes for 2020/21
Standardise use of 300mm ² HV cable	km of cable	142	64
Standardise use of 300mm ² LV cable	km of cable	50	14
Proactive replacement of pre-1990 1000kVA transformers	Transformers	4	0
Proactive replacement of pre-1990 800kVA transformers	Transformers	7	0
Opportunistic primary transformer replacement	Transformers	4	8
Opportunistic 200kVA pole-mounted transformer replacement	Transformers	48	17
Relevant theft of electricity	Theft cases identified	570	332

The data relating to our loss reduction activities can be found in worksheet E4 of the Environment and Innovation Reporting Pack in the appendices.

The cost and benefit analyses for our innovative solutions are included in the appendices.

2.5 Other environment related activities

2.5.1 Energy management system

To underpin our target of reducing our business carbon footprint, we have implemented an energy management system across the company. This system has driven us to carry out a full review of our energy use and consumption, identify opportunities for improving energy performance, set energy reduction targets and put procedures in place for managing energy use. The system was audited and verified by an external organisation during 2020/21 and we have maintained certification to the ISO 50001 Energy Management Systems standard.

2.5.2 Hazardous waste

Our oil recycling facility at Blackburn continues to play a significant part in managing our environmental impacts by allowing us to minimise the use of raw materials and disposal of waste oil.

2.5.3 Noise complaints

We received one noise-related complaint in 2020/21 compared to 16 in the previous year. The complaint in the year related to substation noise was dealt with through our customer service processes.

The data relating to noise complaints can be found in worksheet E2 of the Environment and Innovation Reporting Pack in the appendices.

Enhancing Biodiversity and Ecosystems

Following an annual Stakeholder Engagement workshop, feedback received wanted a review on how to mitigate any negative impacts that our operational activities have on wildlife and biodiversity. The Youth Focus North West members also stressed the importance of replacing trees felled and preserving others.

Working closely with councils, residents and local community groups, a number of substations were identified and ground clearances and a planting programme was put together during Covid-19 lockdown following all the guidelines to turn the sites into colourful wildflower meadows and creating a safe home for wildlife and helping pollinating insects and reducing the amount of ongoing maintenance was previously needed in the substation areas.

The project will be scaled up to 42 sites by 2023, and 142 by 2028.

We have an established biodiversity working group who meet regularly to discuss opportunities to enhance our work around biodiversity. This year the group completed a review of our Biosecurity Guidance, providing advice to colleagues and contractors. The management and control of invasive species has been a focus this year, particularly Himalayan Balsam, Japanese Knotweed and Giant Hogweed.

We have removed a number of sites off the knotweed control list this year, successfully eradicating the colonies which are incredibly damaging to local biodiversity, and also to nearby properties' and structures. Colleague communication campaigns have successfully enhanced colleague awareness and early identification of Giant Hogweed has prevented colleagues coming to harm.

We also actively work with local communities to restore and preserve nature and this year we have also developed the 'Green book' which is a ready to use internal guide to help raise awareness with our colleagues of tree hazards and invasive species within our region so that we can have our entire workforce combating these issues.

In the coming year we hope to identify an appropriate biodiversity net gain tool which can be used to measure our impacts.

New Tree Planting Partnership

This year GMCA (Greater Manchester Combined Authority) announced plans for 3 million new trees to be planted in the city area over the next 25 years.

We have entered into a new partnership with City of Trees, which has lead us to donate two sites for tree planning leveraging the newly grated Defra fund (Trees for Climate). Up to 800 trees will be planted and we are reviewing the feasibility of donating other sites and offering volunteering opportunities to our staff for next year's planting season.

We have publicly committed to planting 10,000 trees per year within our licence area from 2023.

Sustainability Advisory Panel

We have engaged substantially with our Sustainability Advisory Panel, made up of subject matter experts from across a range of environmental and sustainability issues, including those from local authorities, the Environment Agency and other utility providers. This has included sessions which have identified focus areas, including the need to be more mindful of our impacts on biodiversity and natural capital, as well as to understand and address our indirect environmental impacts.

The Sustainability Panel has provided a direct impact on our future Environmental Action Plan by recommending the inclusion of our scope 3 carbon emissions for inclusion within science-based targets for the reduction of our overall business carbon footprint.

We have publicly
committed to planting
10,000 trees per year
within our licence area
from 2023.

Big Zero Carbon Survey - Employee Carbon Literacy Training

The Carbon Literacy journey started when ENWL were awarded with Bronze level accreditation in March 2019 with ambitions to deliver carbon literacy training to all our leadership team to enable them to consider how they can modify their behaviour to reduce their own carbon emissions and those they are responsible for within the workplace, and to create awareness and drive cultural change.

A large proportion of our colleagues travel all over the North West for their roles and business transport contributes to our business carbon footprint. Our company car list offered very limited hybrid or electric vehicles and many drivers used large 4 x 4 vehicles. Prior to delivering carbon literacy training, a survey of colleagues was carried out to understand their knowledge on things like energy efficiency, transport, renewables and community energy. 56% of colleagues took part in the survey which resulted in understanding the help they needed to make a difference. This was a major driver for us to deliver this training internally and supports our Leading the North West to Zero Carbon plan where we have invested to spend £63.m over a four year period up to 2023 to support our customers and colleagues to decarbonise.

The training programme started in 2020 and delivered face to face training to 102 colleagues. These sessions were pre Covid-19 and were very interactive with six activities and several opportunities for discussion. We used a mixture of videos and graphics for visual learning, and an optional role play activity at the end.

Then national lockdown happened, and we were forced to pause our training programme. We recommenced training December 2020 with another face to face session, then we were back in lockdown. Our final cohorts were trained during June and July 2021 and were all delivered face to face. We considered delivering carbon literacy to our colleagues via online learning and webinars, however we felt that our colleagues benefited more from face to face learning and so we completed training to all our leadership teams. All of our sessions over the last 16 months have been interactive with opportunities for delegates to take part and contribute.

Covid-19 was our largest challenge in delivering this training, with smaller more technical issues on the day. 92% of colleagues who took part in the training would recommend the course to others and rated the delivery Very good/Excellent.

Our colleague's motivation to communicating climate change increased significantly after completing the training, the feedback we received was largely positive and actions committed that would see change within how departments operate in the organisation, questioning the need to travel for meetings if they can be taken online, and better coordination of operational engineer's work compared to base locations.

After completing the training, it was agreed that all colleagues would carry forward their group action pledge into their personal company objectives for FY21/22. We have seen a shift towards the uptake of electric vehicles as part of our [low carbon transport policy](#), with demand so high we are quickly reviewing our 100 charge point infrastructure to add more chargers across our estate to meet this demand.

3.1 Introduction

As the electricity distribution network operator for the north west of England, we have a key role to play in enabling the transition of our region to Net Zero and supporting the UK as a whole in meeting its climate change targets.

Innovation is key to the success of our organisation. At the core of our innovation strategy is delivering value to customers through maximising the use of existing assets and offering new services and choice for the future. We are generating value for customers now by deploying proven technology providing innovative solutions to real problems.

This section describes our activity in 2020/21 in regard to smart grids, innovation and how we are fulfilling our commitments in this area.

3.1.1 Key challenges

The long term challenges our business and industry face regarding energy use remain the same;

- Government initiatives on energy efficiency, carbon costs, renewable energy generation and electric vehicles combined with increasing customer awareness of energy issues will drive changes in customer behaviours that will impact significantly on electricity consumption in terms of patterns and levels of demand.
- Increased use of electricity for heating and transport will increase customer demand for electricity, improved reliability of supply and information when the supply is interrupted.
- Our assets are ageing with many now approaching their previously assumed end of life at a time when we are asking them to perform new functions.

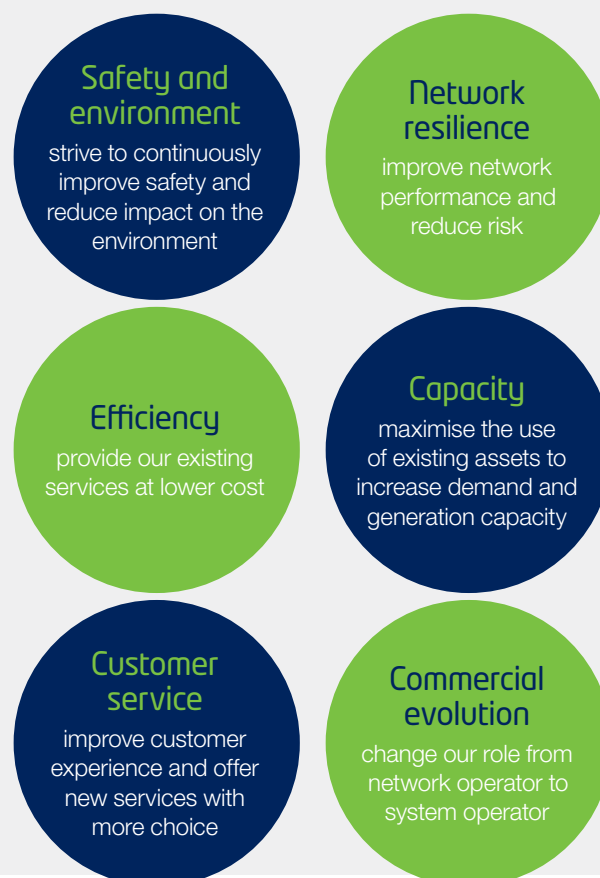
Equally the opportunities these challenges present and the new technologies that are emerging to tackle them are broadly consistent;

- New technology itself has the overall ability to add value to our business by enabling improvements in customer service and reducing costs.
- Energy storage can help us manage demand uncertainty and help customers and communities improve energy efficiency.
- Smart meters will allow us to monitor how much power our customers are using or producing in near real time and allow us to positively influence usage and operate the network more responsively.
- New markets are emerging through which customers can earn value while helping solve network constraints.
- Regulatory models can be developed that support changes needed.
- The Distribution System Operation (DSO) will have a central role in determining where innovation is required.

Our innovation strategy is built to resolve these new challenges and to realise the opportunities. It is made up of five objectives with the aim of delivering value to our customers.

- Maximise the use of existing assets
- Apply innovative solutions to real problems
- Deploy proven technology today
- Generate value for customers now
- Offer new services and choice for the future

In line with this strategy we have developed a range of projects, some of which have been completed and a number of which are currently in flight. All projects are designed to support one or more key innovation themes:



Full details of our innovation work can be found on our dedicated 'Future' web pages through the following link:

<https://www.enwl.co.uk/innovation>

Our innovation strategy can be found at the following link:

<https://www.enwl.co.uk/go-net-zero/innovation/our-innovation-strategy/>

The data relating to the benefits of using innovative solutions to respond to the challenges set out above can be found in worksheet E6 of the Environment and Innovation Reporting Pack in the appendices.

The cost and benefit analyses for our deployed innovative solutions are included in the appendices.

3 Smart grids, innovation and our role in the low carbon transition

3.1.2 Low carbon technologies connected

In 2020/21 we connected 3,529 low carbon technologies (LCTs) with a total capacity of 66.8 megawatts (MW). 3,527 of these were connected onto our secondary² network, with 66% of these being electric vehicle charging units. On our primary³ network we connected two low carbon technology, non-G83 distributed generation units.

Overall, the volume of LCTs installed has been increasing over the last three years, driven by electric vehicle installations. The volume of heat pumps has remained consistent with 2019/20, however the volume of photovoltaic installations has been decreasing since the beginning of RIIO-ED1 which is assumed to be associated with the deadline for the removal of the feed-in-tariff support. However, the data relies on installers accurately reporting installations to Electricity North West and therefore may not reflect actual installations.

In our RIIO-ED1 Business Plan we concluded that the DECC Low carbon scenario was the most probable estimate for our region over the period. The uptake during the RIIO-ED1 period so far is indicating that overall uptake during the period is likely to be significantly below the forecast.

The data relating to deployed Low Carbon Technologies can be found in worksheet E7 of the Environment and Innovation Reporting Pack in the appendices.

3.2 Progress of the innovation strategy

During 2020/21:

- We closed two Network Innovation Allowance (NIA) funded projects including our Reflect project which highlighted that we need to enhance our EV charging profiles in our DFES. Therefore, we will use the profiles produced by the REFLECT tool to update our BSP and primary substation EV charging profiles for our 2021 DFES to enhance the demand forecasts that will support our 2022 Network Development Plan.
- We have not registered any new NIA projects but we started work on our Network Innovation Competition (NIC) project QUEST which is looking to produce an overarching, holistic, control system which optimises the performance of our existing systems
- We have eight NIA projects in-flight including Interface which is looking to rationalise the data architecture in our distribution substations, allowing us to gain greater visibility of loadings at a more granular level.

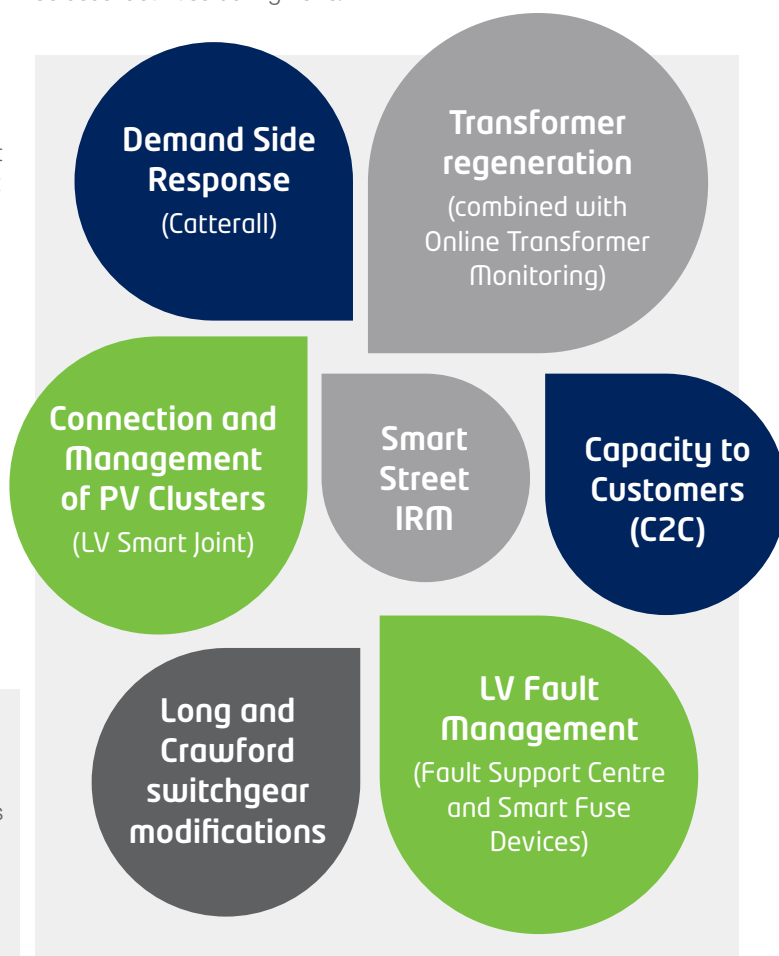
Further details of our innovation projects and how they address our strategy can be found in our Network Innovation Allowance annual summary report via the following link:

<https://www.enwl.co.uk/globalassets/innovation/nia/nia-reports-and-literature/nia-annual-summary-report-2021.pdf>

Several innovative solutions have now become business as usual and are being used to reduce costs and improve quality of service.

3.2.1 Summary of innovative solutions deployed

There are seven Innovative Solutions which form part of our business as usual activities during 2020/21:



Oil Regeneration and Online Transformer Monitoring are presented below as separate projects; however, for the purpose of the CBA (Transformer Regeneration) they are brought together in combination to provide the innovative solution, to avoid double counting of the associated costs and benefits.

² 11kV and below. ³ 33kV to 132kV.

Demand Side Response

What the solution is:

Catterall Waterworks Primary Substation has a single 7.5 MVA transformer and a firm capacity of 5 MVA, limited by High Voltage transfer capacity. The peak demand at the substation is 7.41 MVA, which exceeds the firm capacity by 2.41 MVA causing a compliance issue with ENA Engineering Recommendation (EREC) P2/6. The non-compliance issue only exists when the system is operating abnormally due to the loss of the transformer or the circuit supplying the transformer (i.e. under a fault situation), as the demand exceeds the transfer capacity.

By entering into a commercial agreement for the purchasing of DSR services, ENWL is able to defer the reinforcement of this primary substation and maintain compliance with EREC P2/6 as it ensures that the demand does not exceed the capacity when the system is abnormal.

How it is being used:

Under system abnormal conditions, ENWL will switch out a circuit at Catterall Waterworks primary to reduce the demand at the customer's site, to enable the restoration of supplies connected to Catterall primary so the transfer capacity of 5 MVA is not exceeded. The customer has agreed to have their demand reduced by 3 MVA for up to eight hours to allow time for ENWL to identify and resolve the issue.

How it is delivering benefits:

Demand Side Response limits the demand on Catterall Waterworks primary which is constrained by the transfer capacity for the loss of the transformer. With continuous monitoring this provides the opportunity to defer or mitigate the need for reinforcement in the future if demand increases or arrangements change.

Transformer regeneration

What the solution is:

The condition of the oil in the transformer main tank is a good proxy of the general condition of the transformer as a whole. It has been shown from recent research that via unique application of transformer oil regeneration (a process whereby transformer oil is cleaned through an on-site process) can result in an improvement in overall condition of the transformer. When this is used in conjunction with enhanced transformer monitoring, this can improve the Health Index and extend the expected life of the transformer.

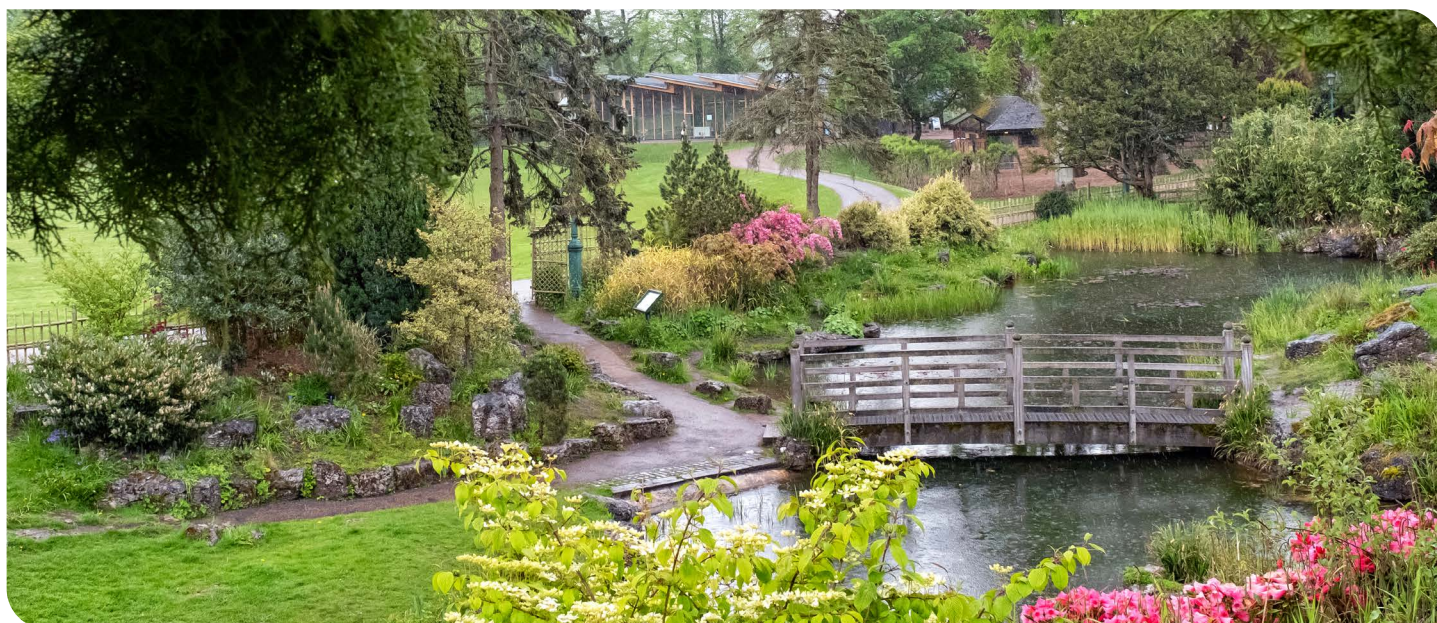
How it is being used:

Transformer regeneration is being used as an alternative to traditional asset replacement. The regeneration activities are being undertaken on those assets which are categorised as 'end of life' due to their Health Index and/or criticality level. Regeneration activities are also being undertaken on those transformers categorised as 'mid-life' in order to determine the optimum point in a transformer's life cycle to implement oil regeneration activities to further extend the life of the asset.

How it is delivering benefits:

The financial benefits from this innovative solution are derived from transformer life extension and hence deferment of asset replacement costs. Other benefits include quality of supply benefits which relate to improved understanding of the risk of failure of older transformers and a better insight into the oil ageing process. The environmental benefits result from extending the life of an existing transformer and its oil therefore reducing the requirement for disposal of and/or recycling of used oil and scrapping the transformer. However additional losses are incurred due to the delayed implementation of modern equivalent transformers.

This is used in conjunction with the Online Transformer Monitoring (described below).



Online Transformer Monitoring

What the solution is:

As transformer life is extended through the use of techniques such as transformer oil regeneration, network operators must be certain that the refurbished units will continue to operate both safely and reliably. To support this, a real-time condition monitoring system has been developed which provides us with enhanced information on each refurbished transformer via an on-line information dashboard.

How it is being used:

Transformer monitoring is being fitted to all transformers which have had their oil regenerated in RIIO-ED1 for a period of time to confirm (via observable data) that both the initial condition of the transformer is improved and that this improved condition is maintained thereafter. The solution is being used as part of our intervention plan to extend the life of a large number of 132kV and 33kV transformers. The technology is fitted to targeted transformers for a short period prior to the commencement of the oil regeneration process and continues for a defined period thereafter.

How it is delivering benefits:

The condition monitoring provides us with confirmation that the transformer regeneration process has been successful in improving the condition of the transformer oil and thus the main tank. The combined online transformer monitoring is a key enabling technology for the refurbishment of large volumes of 132kV and 33kV transformers under the transformer regeneration innovative solution.

LV Fault Management – Fault Support Centre

What the solution is:

The Fault Support Centre (FSC) is an enhanced Low Voltage network fault management solution which makes use of the increased penetration of intelligent devices such as the Bidoyng coupled with an innovative commercial partnership with a third-party provider (Kelvatek). The FSC provides a real-time operational management of low voltage networks to allow for the proactive management of faults. The data obtained can be further used to target areas of the network which would benefit from asset replacement.

How it is being used:

This solution is being used as the business-as-usual approach for how all transient faults are managed. In the event that a transient fault is detected, a smart fuse device such as the Bidoyng or Weezap is fitted to the suspect LV network. Kelvatek is informed of the installation event and data recorded by the Bidoyng/Weezap in real-time to monitor the suspect network.

Kelvatek will continue to monitor the affected networks until they have determined the potential location of the fault causing the transient supply interruption and issued an instruction to our field teams to investigate with the aim of locating and removing the fault or proving that the transient fault is no longer active. In both cases, the equipment will be recovered and redeployed elsewhere.

How it is delivering benefits:

The Fault Support Centre allows for the proactive management of LV transient faults. Our customer engagement activities have shown that these types of fault are one of the biggest cause of customer dissatisfaction. The ability to repair these faults before they have chance to progress into a permanent fault will significantly reduce the number of associated faults and reduce customer disruption accordingly.

Further benefits flow from the reduced CI and CML and associated fault costs that the proactive management of faults delivers.



LV Fault Management – Smart Fuse Devices

What the solution is:

The smart fuse devices produced by Kelvatek such as the Bidoyng and the Weezap act as an innovative replacement for the standard low voltage fuse. They provide a multi-shot re-close feature as opposed to the single operation offered by the standard fuse. This means that customer supplies can be automatically restored in the event of a transient fault, reducing the number of customer interruptions and customer minutes lost and the costs associated with managing our response to a loss of supply. This enhanced approach to LV faults also improves customer satisfaction.

In addition, this equipment provides increased network visibility via its ability to measure and transmit to our Network Management System key network parameters and make this available in near real-time.

How it is being used:

These smart fuse devices are used to reduce the customer impacts of faults, facilitate increased understanding of the impact of the connection of low carbon technologies and improve the management of network faults.

These devices are acting as enablers for a number of innovation solutions and applications. In particular, they are a key tool in the management of low voltage transient faults. These faults are intermittent in nature and are often difficult to find and repair. The Bidoyng is used to both minimise the customer disruption associated with a fault (i.e. by automatic restoration of supplies) and to help engineers to locate the fault (using travelling wave technology built into the smart device) thus allowing proactive repair of the fault.

How it is delivering benefits:

The Bidoyng smart fuse is a key enabling technology. It is being used as the main technology deployed on faulty parts of the LV network as part of the Fault Support Centre. In addition, it is providing information on the performance of the network to facilitate the application of the Connect & Manage approach to domestic PV clusters connected to the LV network.

Over the last two years there has been a further roll out of Weezap smart fuses. These devices have the capacity for five auto-recloses, whereas the Bidoyng has the capacity for only two. The further recloses offered by the Weezap saves additional subsequent customer interruptions while providing us with further information regarding the fault location enabled through the monitoring service managed by the FSC.

Connection and Management of PV Clusters

What the solution is:

As a result of the learning outcomes of the LCN Fund Tier 1 Project – Low Voltage Network Solutions (LVNS), we have been able to successfully implement a streamlined approach to the connection of domestic scale PV systems to the LV network. These systems are often connected in clusters and can give rise to associated network voltage and thermal issues.

Traditionally, a network operator would undertake detailed and time-consuming network assessments to be performed in advance of allowing the connection to proceed. These assessments are aimed at understanding if the connection could give rise to any of the aforementioned problems. However, as a result of the research that was undertaken as part of the LVNS project and the sophisticated network modelling that underpinned it we have adopted the alternative approach of connecting PV and monitoring the LV network.

We have successfully shown that up to a certain threshold (i.e. percentage of customers with PV systems) it is acceptable to allow the connections to proceed. Once the threshold is met however we will install network monitors to assess, using actual recorded data, if the network requires a further intervention.

How it is being used:

The solution is being actively used across our network. We use this to avoid the often costly and time-consuming network assessments that can accompany generation connections. We have established a business process supported by internal policy that provides for continued monitoring of the PV volumes. Specific actions are triggered when these volumes exceed pre-determined limits and follow up actions are performed as appropriate.

How it is delivering benefits:

The solution delivers benefits to customers in the form of avoided waiting times associated with the connection of PV systems to the LV network. We have also been able to avoid expensive and resource intensive network connection studies, thus reducing internal costs and freeing up resources to concentrate on other parts of our connection services.

Capacity to Customers

What the solution is:

Managed connections provide customers wishing to connect to the network with a lower cost connection and reduced waiting times versus traditional network reinforcement-based connection arrangements. It utilises advances in network automation and communications alongside innovative commercial terms. It is a form of Active Network Management (ANM) which may seek to disconnect managed customers from the network for agreed periods when the network is running abnormally.

How the solution is being used:

Managed connections are now the standard connection offer provided to all generation customers connecting to the HV and EHV network. Managed connections afford customers a lower cost connection and as such have become the default connection offer provided to all Distributed Generation (DG) customers.

To support decision making by customers, information on the potential 'curtailment factor' (i.e. the typical period of time that a customer could expect to be at risk of disconnection) is provided alongside the connection offer.

Customers may choose to reject the managed connection offer and instead opt for a more traditional connection arrangement without the managed elements.

How the solution is delivering benefits:

Managed connections are providing a number of benefits. Economic benefits flow to connection customers from lower reinforcement costs and reduced time to connect. Benefits also flow to all customers from lower reinforcement costs recovered through lower DUoS charges. Environmental benefits also accrue because of removing barriers to support the connection of low carbon generation such as solar/wind farms.

Long & Crawford switchgear modification

What the solution is:

The urban parts within the ENWL operating area have HV networks operating predominantly at 6.6kV. A proportion of the switchgear in these areas is fault rated at 13.1kA below our design standard of 21.9kA. Although the current fault level may not exceed this design rating, the lower rated switchgear often represents a significant barrier for new connections, particularly low carbon technologies (LCTs) and distributed generation (DG).

Type testing undertaken by KEMA of Long & Crawford (L&C) 6.6kV switchgear resulted in an innovative technique which allows the use of enhanced fault ratings following a defined modification on specified L&C switchgear types to be implemented.

How the solution is being used:

Two upgrade kits/procedures were developed by Long Controls Limited of St Helens and included in the test series. Such upgrades extend the short circuit withstand capabilities of J3 Ring Switches and T3GF3 Ring Main Units from 13.1kA at 6.6kV to 20kA at 6.6kV for 3 seconds.

This solution enhances the fault level capability of this lower-rated switchgear from the network to coincide with increased penetration of LCT which may otherwise be constrained or unacceptably delayed.

How the solution is delivering benefits:

L&C 6.6kV switchgear represents 31% of ENWL's total switching assets, which shows the prevalence of L & C switchgear and the prioritisation of these sites to achieve maximum impact in alleviating these fault level constraints.



Smart Street Innovation Roll-Out

What the solution is:

The full solution is designed to reduce customer bills by reducing the total amount of energy consumed when supplied to customers. This involves reducing the energy consumed in losses in the ENWL network by reducing energy distributed to customers and by meshing the LV network; reduced carbon emissions flow as a result of these energy reductions and capacity released to connect new LCT technologies by improving control of the LV network.

The Innovation Roll-out Mechanism project (18 October 2019 award from Ofgem) focusses on areas of high fuel poverty to deliver benefits to those most in need. In those targeted areas it will replace 180 distribution fix tap transformers with on load tap changing (OLTC) equivalents and by using LV fuse way circuit breakers (LVCB) and link box switches enable the LV network supplied from these sites to be meshed with adjacent LV networks.

All these new devices will ultimately be autonomously controlled by our central network management system (NMS), periodically optimising the network configuration for maximum benefit.

How the solution is being used

When all technology elements are complete it will operate autonomously in the background, unless operational activity curtail its operation for safety reasons. The equipment is remotely operated by connection to the central NMS and the autonomous software takes control of the remote operation to deliver the full benefits described in the IRM bid submission.

Each OLTC transformer is being recorded as a distribution transformer (additional detail is captured in ENWL Asset systems). The LVCB are single phase devices, with three required for each LV way/Feeder. Each single-phase unit is being counted as an individual LVCB. No LV linkbox switches have yet to be installed

How the solution is delivering benefits

The project will deliver the benefits as described out above, however these will not be realised until all counterparts of the solution are installed at each site. The IRM bid outlined anticipated saving and methodology for the complete solution which has yet to be implemented.

Note: The savings, against previous operational practise, will vary every time the optimisation model is run and the network re configured.

The full solution is designed to reduce customer bills by reducing the total amount of energy consumed when supplied to customers.

Further details of our strategy can be found in our Network Innovation Allowance annual summary report which can be found on the following link:

<https://www.enwl.co.uk/globalassets/innovation/nia/nia-reports-and-literature/nia-annual-summary-report-2020.pdf>

3.3 Roll-out of smart grids and innovation into business as usual

All our innovative solutions are designed, implemented and monitored through a set process.

Figure 1: Innovation lifecycle



The cost and benefit analyses for our innovative solutions are included in the appendices.

3.3.1 Transfer to business as usual (BAU)

Managing the transition of an innovative solution, device, technology or new operating arrangement into BAU is perhaps the most important stage in delivering benefits to customers. This phase generally represents the final stage of a project's time line and is the culmination of its successful outcome.

The ability to transition the innovation to BAU is an important consideration when innovation investment opportunities are assessed. We recognise that some projects are aimed at informing

our understanding and learning and in such instances BAU transition normally involves updates to business processes, procedures and specifications. The BAU assessment also considers the technology risk, the development time line and our ability to support the developers in a meaningful manner before embarking on a project.

To ensure the successful transition to BAU, we select innovation investments that are assessed as having a good chance of delivering value for customers. We focus on challenges that have been identified in our business plan and use innovation to address these issues. We use a cost benefit analysis approach to ensure that best value projects are taken forward.

We have developed a five-stage initiative tracking process which enables us to take innovation and other business initiatives into BAU.

Figure 2: Innovative solutions transfer to business as usual



3.3.2 Benefits and impacts

With the continued roll-out of the above innovative solutions in 2020/21, the following benefits have been realised:

Table 8: Innovative solutions benefits and impacts

Innovative Solution	Additions	Benefits		
		Estimated Gross Avoided Costs (£m)	CI Impact (Interruptions)	CML Impact (Minutes)
Demand Side response	0	0.00	N/A	N/A
Transformer Regeneration	0 sites	0.00	N/A	N/A
Fault Support Centre and LV Reclosing Device Installations	981 installations	1.21	44,630	4,016,700
Connect and Manage PV Clusters on LV Networks	942 new PV installed	0.54	750	45,000
Capacity to Customers	2 new connections	1.83	N/A	N/A
Long & Crawford Fault level modification	20 modifications undertaken	0.3		
Smart Street IRM	62 sites completed	0.00	0.00	0.00

In 2020/21, we successfully applied for funding under the Innovation Roll-out Mechanism for a rollout of our Smart Street initiative which commenced in 2020/21. The details of this solution correspond to worksheet E8 of the Environment and Innovation Reporting Pack for the reporting of costs, in addition to table E6 where the expected benefits of the roll-out will be documented, however it should be noted that these will not be realised until all counterparts of the solution are installed at each site. The IRM bid outlined anticipated saving and methodology for the complete solution which has yet to be implemented.

3.3.3 Smart metering

Energy supply companies (Suppliers) are responsible for the roll-out of smart meters. We are supporting this process and preparing to maximise the benefits from the data they will provide.

Our strategy is to help customers and work in collaboration with Suppliers, for example by upgrading our service positions where necessary to accommodate a smart meter. We actively participate in various industry groups aimed at making the roll out as smooth and efficient as possible.

There are now 1,124,640⁴ smart electricity meters installed in our distribution service area. The majority of these are an early version of smart meter referred to as SMETS1. There are 820,916 in our area and we can communicate with approximately 203,887 of them. More are scheduled to be brought on-line by Suppliers. The latest type of smart meter is referred to as SMETS2 and we can communicate with approximately 261,932 of these.

There is the potential for approximately 2.3 million smart meters to be installed within our area. Having established a communications gateway to access smart meter data, we have identified ways in which it can deliver benefits and are incorporating these into our business processes.

In 2020/21 we incurred:

- £3.05m in Smart Meter Communication Licensee Costs. Each DNO must contribute towards the Smart Meter costs of the Data and Communications Company (DCC) which delivers communications from electricity meters to industry stakeholders who need it. They are payable by us to the DCC, as required by the Smart Energy Code and defined by DCC's published charging methodology statement. The costs have increased by £0.6m compared to last year as a result of the DCC increasing the monthly fixed charges for Electricity Distributors.
- £989k in IT costs. This covered the continued support and maintenance of the gateway infrastructure connecting our IT systems to the DCC central systems as part of the Smart Meter Implementation Programme (SMIP) and required by the Smart Energy Code, additional design work required for the uplift of systems to be compatible with the DCC User Interface Specification (DUIS) to v2.0 and v3.0 specifications and continuing with a data cleanse. The costs have decreased since last year by £0.47m as there has not been the same requirement for infrastructure build activities as the previous period.

⁴ This volume is lower than that previously reported owing to improvements in the reporting process.

3 Smart grids, innovation and our role in the low carbon transition

In the longer term, we expect benefits from the use of this non-elective data, procured as part of the Smart Meter Communication Licensee Costs, to enable us to manage our network more effectively and cost efficiently for customers. Distribution companies have previously assessed the benefits of half hour consumption data as being attained once a smart meter installation level approaching 70% penetration is reached (noting that there may be some geographic clustering which, in some cases, may allow us to begin achieving benefits earlier).

A SMETS2 meter provides us with proactive notification of a customer losing their electricity supply whereas a SMETS1 does not. This functionality is not fully effective because of constraints with the national communications hub covering the north of England. There are no plans at present for existing SMETS1 meters to be upgraded or replaced to provide power outage notification.

Our Distribution Licence does not permit us to access any household electricity consumption data from smart meters which relates to a period of less than one month before approval of a Data Privacy Plan by Ofgem. This has been approved⁵.

We are now seeing a significant growth in the volume of smart meters in our area that we can communicate with. This provides actual data for us to develop and refine our management systems. Solutions to several common industry issues (relating to both smart meter device and DCC functionality) are being investigated but have a high potential to negatively impact medium term benefits realisation. These issues cover areas such as: significant volumes of false positive alert notifications; extremely high volumes of nuisance alerts; and incorrect/inconsistent meter functionality. In conjunction with other DNOs, we are liaising with industry parties to attempt to resolve these.

Throughout the year, we have continued to play an active role at industry level through the Energy Networks Association Smart Metering Operations Group and its sub-group looking specifically at the safety aspects of the roll-out.

We are moving forward with systems integration and business transformation plans that will allow us to take advantage of smart meter benefits⁶.

The data relating to smart meter readiness expenditure can be found in worksheet E5 of the Environment and Innovation Reporting Pack and in section E5 of the Environment and Innovation Commentary in the appendices.

Throughout the year, we have continued to play an active role at industry level through the Energy Networks Association Smart Metering Operations Group and its sub-group looking specifically at the safety aspects of the roll-out.



⁵ [enw-dpp-v5.0-redacted-v2.pdf \(enwl.co.uk\)](#) ⁶ [Smart Meter Info \(enwl.co.uk\)](#)

These documents can be found on the following link:

<https://www.enwl.co.uk/about-us/regulatory-information/environment-report/>

Regulatory Reporting Pack and Commentary:

- ENWL Environment and Innovation Reporting Pack v6.0 2021
- ENWL Environment and Innovation Commentary v6.0 2021

Cost Benefit Analyses (Losses):

- 2021 CBA for E4 Install 300sqmm HV Cable versus 185sqmm HV
- 2021 CBA for E4 Install 300sqmm LV Cable Versus 185sqmm LV
- 2021 CBA for E4 Proactive 1000kVA GMT Replacement CV21
- 2021 CBA for E4 Programme 23MVA Replacement
- 2021 CBA for E4 Theft of Electricity

Cost Benefit Analyses (Innovation):

- 2021 CBA for E6 C2C CBA FY21 RIIO ED1 CBA V1.0
- 2021 CBA for E6 Demand Side Response FY21 RIIO ED1 CBA v1.0
- 2021 CBA for E6 Long Crawford FY21 RIIO ED1 CBA v1.0
- 2021 CBA for E6 LV fault management FY21 RIIO ED1 CBA v1.0
- 2021 CBA for E6 PV Connect & Manage FY21 RIIO ED1 CBA V1.0
- 2021 CBA for E6 Smart Street IRM FY21 RIIO ED1 CBA V1.0
- 2021 CBA for E6 TX Regen CBA FY21 RIIO ED1_v0.1

Glossary of Abbreviations

Abbreviation	Meaning
SF ₆	Sulphur Hexafluoride
SAP	Sustainability Advisory Panel
DSO	Distribution System Operation
CSR	Corporate Social Responsibility
CEG	Customer Engagement Group
AONB	Areas of Outstanding Natural Beauty
HV	High Voltage
LV	Low Voltage
kVa	Find
EV	Electric Vehicles
BSP	Bulk Supply Point
NIA	Network Innovation Allowance
NIC	Network Innovation Competition
C2C	Capacity To Customer
CBA	Cost Benefit Analysis
FSC	Fault Support Centre
CCCM	Common Connections Charging Method
DUoS	Distribution Use of System
DSR	Demand Side Response
DCC	Data Communications Company
tCO ₂	Tonnes Carbon Dioxide
kVA	Kilo Volt Ampere (unit of power)



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