NORTHERN POWERGRID

Annual Environmental Report

2023-2024

Our strong environmental performance and commitment to powering a just transition to net zero reflects our unwavering dedication to our region, the environment and our customers.

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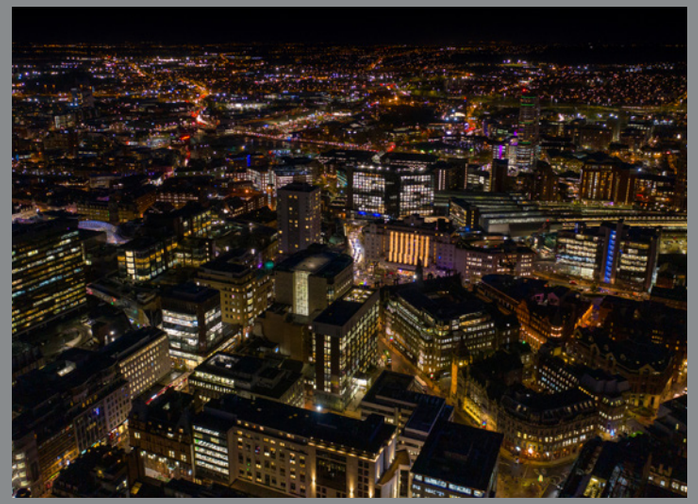

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Part 1 Introduction

We are responsible for managing the network that delivers electricity from power stations and smaller generators to 3.9 million homes and businesses across the Northeast, Yorkshire and northern Lincolnshire.

Introduction

About us

We are Northern Powergrid. We are responsible for managing the network that delivers electricity from power stations and smaller generators to 3.9 million homes and businesses across the Northeast, Yorkshire, and northern Lincolnshire. Operating 24/7, 365 days a year, we ensure electricity reaches you safely, wherever and whenever you need it. If your power is interrupted, we are the ones who will respond, day or night, to restore it.

Our infrastructure includes over 63,000 substations, and more than 98,000 kilometres of overhead power lines and underground cables, spanning approximately 25,000 square kilometres.

This report reviews our environmental performance against the goals we set for the five-year period from 1 April 2023 to 31 March 2028 (ED2). Our business plan, shaped by extensive stakeholder engagement, emphasises the importance of decarbonisation for our region.

As well as addressing our own environmental impact, we must play a leading role in helping the UK meet its clean energy transition and net zero targets, and enable a just transition for our customers and communities. We are therefore making a significant investment in digitalisation, smart grid solutions and increasing network capacity to support the transition to clean energy and the growth of low-carbon technologies.

As part of our business plan, we have embarked on a transition to expand our capabilities and become a local optimiser of the energy system. We have a key role to play in facilitating regional decarbonisation by fulfilling the functions of Distribution System Operation (DSO).

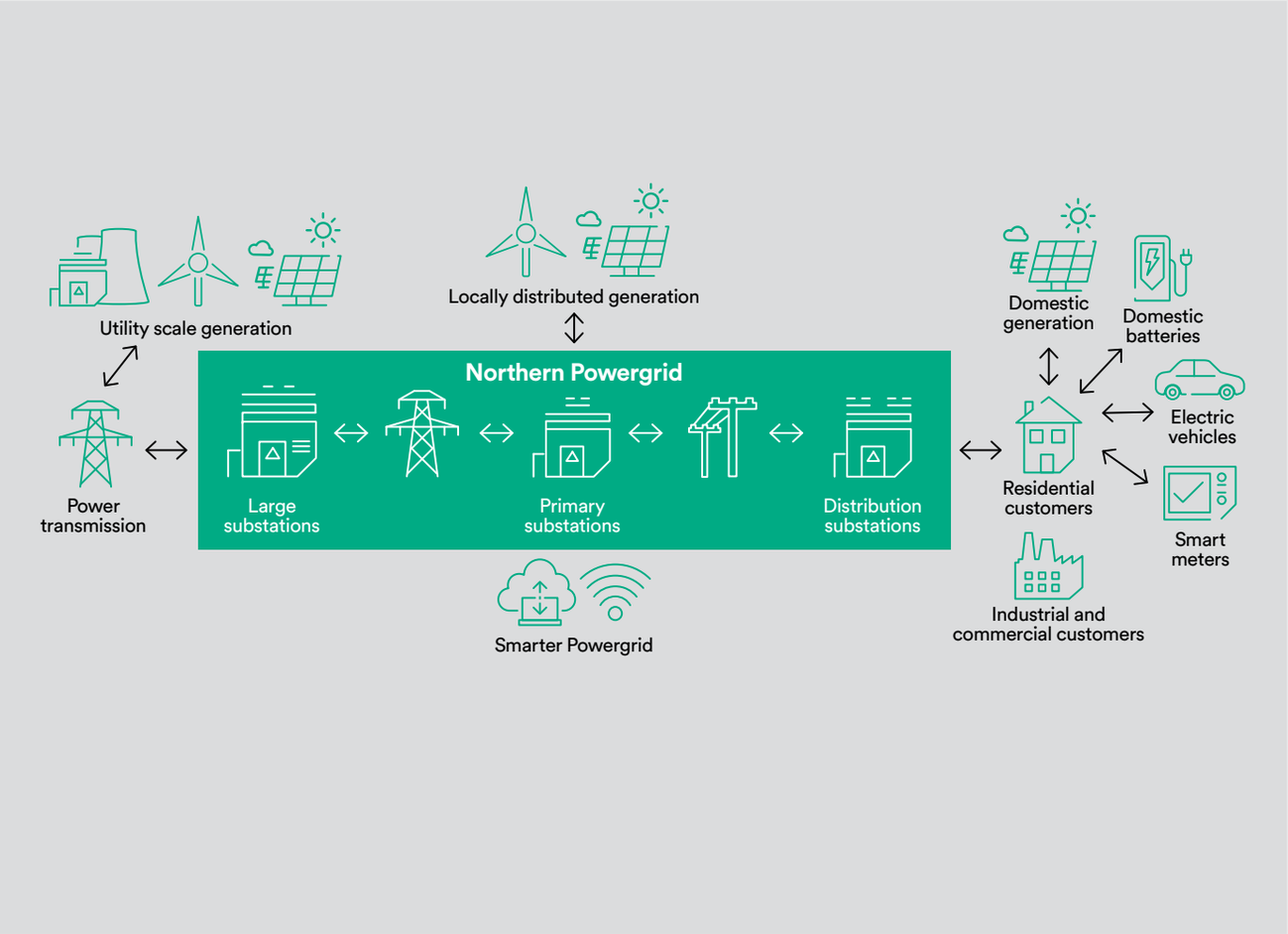
The shift to a low-carbon economy, driven by new technologies and digitalisation, is changing the way energy is produced and consumed. As an electricity infrastructure provider, we must ensure our network can safely and reliably adapt to these changes while maintaining the high standards of service our customers expect.

3.9 m
Number of homes and businesses we deliver electricty to

98,000 km
Distance of overhead power lines and underground cables

Introduction

Where we fit in the electricity industry



Introduction

Mark Nicholson,
Director of Engineering

A word from our Director of Engineering, Mark Nicholson

I am delighted to share this update on our progress towards our ED2 Environmental Action Plan which delivers an ambitious set of outputs for our customers. Through our investments, our operations and working collaboratively with partners and our supply chain, we will minimise carbon emissions, pollution and waste. In doing so, and where possible, we will seek to enhance the local environments in which we operate.

We have worked with other network operators and our partners to introduce a range of innovative solutions and technologies to deliver on our environmental commitments.

Electricity distribution plays a vital role in helping the UK meet its ambitious net zero targets and, at Northern Powergrid, we are committed to playing our part. The newly-elected government has set a bold mission to “deliver a cheaper, zero-carbon electricity system by 2030”, acknowledging that “the grid has now become the single greatest obstacle to both deploying cheap, clean power generation and electrifying industry”.

At Northern Powergrid, we are ready to meet this challenge head on and align our environmental plans with the government’s accelerated net zero goals. Our aim is to create a sustainable, resilient network that supports the widespread adoption of low-carbon technologies and decarbonisation.

In the context of the climate emergency and the UK’s net zero target, carbon reduction continues to be a key area of interest and a clear priority for our customers and stakeholders. We’ve listened closely to their environmental concerns through extensive engagement, and we are on track to meet the goals outlined in our plan. This report details those areas where we are exceeding expectations but also identifies where we must make further improvements.

I’m incredibly proud of the work my colleagues at Northern Powergrid do every day to enhance our environment, reduce emissions and facilitate our region’s transition to net zero. I’m confident that, together, we will continue to rise to the challenge.

> “Our strong environmental performance and commitment to powering a just transition to net zero reflect our unwavering dedication to our region, the environment, and our customers.

Introduction

Purpose of this report

Environmental Respect is one of six core guiding principles for all Berkshire Hathaway Energy companies, including Northern Powergrid.

Environmental Respect

We are committed to using natural resources wisely and protecting our environment for the benefit of future generations. Our Environmental RESPECT Policy details this commitment in the areas of Responsibility, Efficiency, Stewardship, Performance, Evaluation, Communication and Training.

We recognise the wider role and impact our activity can have in the communities where our customers live and work because we live and work there too.

We believe our reputation and the trust held in us by our customers, stakeholders and regulators, special interest groups, the energy industry and partners should be nurtured. This report shows how we turn words into action, providing a clear account of what we are doing to address our environmental commitments, with a focus on the environmental impact areas set out in our Environmental Action Plan:

Environmental Action Plan – Impact areas

Business carbon footprint	Environmental protection
Scope 1 and 2 emissions	Resource use and waste
Sulphur hexafluoride (SF_6)	Biodiversity
Losses	Fluid-filled cables
Scope 3 emissions	Noise pollution
Embodied carbon	PCBs
	Visual amenity
Supply chain management	

The key performance indicator information included in Annex A to this report gives a detailed account of performance in the first year of ED2. The data presented in Annex A is the best available information at the time of publication.

The information presented in this report meets the guidance issued by our regulator, Ofgem. The structure of the report is also consistent with Ofgem requirements to aid comparison and cross-referencing between Distribution Network Operator (DNO) companies.
If you have any views or additional questions, please get in touch at

engage@northernpowergrid.com

Executive summary

Our environmental performance in 2023/24 reflects two key elements: our work to address our own environmental impact; and the wider context of our role to enable our region's progression towards net zero in a way that supports growth and prosperity. As such, this report measures and reflects on our environmental performance both in terms of metrics reported against our key performance indicators and the degree to which we are delivering a "just transition" or sustainable path to net zero – one that carefully considers social, economic, and environmental impacts.

This creates some inevitable challenges. For example, our electricity distribution losses remain higher than we would like. However, optimising losses is a key part of our asset management decision making process, reflecting a whole system approach. This remains a positive outcome if the increased adoption of green energy and low-carbon technologies to enable decarbonisation of the grid is increasing consumer use of electricity, whilst we also facilitate a reduction in transmission losses and wider carbon reduction. Decarbonisation of the grid – reducing the carbon intensity of electricity distribution – is a fundamental enabler to net zero.

Another example is considering the impact of our decarbonisation work on local nature. Where we build new infrastructure and equipment to reduce carbon emissions, we must also mitigate any impacts on nature to deliver biodiversity net gain and actually improve the local habitats which are vital to sustain life.

*RAG status
- Favourable to target
- Within 10% of target
- Adverse to target by more than 10%

Key measures		ED2 performance 2023/24			
Outputs	Units	Targets	Actual	Comments	*RAG
Business carbon footprint	tCO_2e	13,720	**11,180**	Significantly favourable to target	
Buildings energy usage	tCO_2e	6,300	**5,953**	6% favourable to target	
Operational transport	tCO_2e	3,870	**3,916**	Slightly adverse to target due to vehicle charging infrastructure challenges and availability of low emission vehicles	
Fugitive emissions	tCO_2e	1,130	**2,438**	Adverse to target – 68% of total due to SF_6 losses from just five assets, all of which are scheduled for repair	
SF_6 lost	kg	48.7	**103**		
Science-based target scope 1 and 2 emissions (excluding losses)	tCO_2e	11,180	**12,307**	Adverse to target due to SF_6 losses and operational transport emissions	
Science-based target scope 1 and 2 emissions (including losses)	tCO_2e	468,790	**494,422**		
Responsible Procurement Charter	%	90%	**89%**	On track to meet target in year 2 of ED2	
Waste – diversion from landfill	%	82%	**83%**	% diversion from landfill above target. Improvement required on recycling and reuse rate	
Waste – recycled and re-used materials	%	79%	**73%**		
Overhead lines removed from national landscapes and national parks	km	12.2	**16.4**	Favourable to target – an additional 4.2 km of overhead line removed	
Noise pollution – interventions	Count	6	**5**	On track and all substantiated incidents resolved	
Biodiversity – improvement/facilitated on site	Count	40	**20**	Reflects conservation mowing only. Further work in this area is underway to bring this measure back in line with the overall ED2 target	
Oil/fluid lost	Litres	26,500	**20,955**	Significantly favourable to target	
Indicative inputs					
Losses – low-loss (LV and HV) cable	km	280	**270**	Slightly adverse to target but on track to meet ED2 requirements	
FFC – replacement	km	8	**15.5**	Replacements almost double the target	
FFC – dosing (PFT)	km	53.4	**7.1**	We are currently reviewing our strategic plans in this area and are putting new contracts in place for this work	
PCB – pole mounted transformers	Count	3,200	**6,412**	Number of assets PCB contaminated or statistically likely to be contaminated. This data is a snapshot in time. The data is revised on a frequent basis as the statistical model is updated with PCB results	
PCB – ground mounted transformers	Count	163	**429**		

Executive summary

Summary of key measures

Business carbon footprint

4.5%

Reduction in scope 1 and 2 emissions (excluding losses)

As outlined in the summary table, our overall business carbon footprint is performing favourably against the targets we set in our Environmental Action Plan and has reduced year on year in ED1 and into ED2. The key contributing factors to our overall scope 1 and 2 carbon footprint (excluding electricity distribution losses) are business transport, sulphur hexafluoride (SF_6) losses and energy use, and this report details the programmes and interventions we have in place to address these.

15%

We are committed to reduce SF_6 emissions by 15 per cent between 2023-2028

SF_6 losses
Whilst this year's SF_6 loss performance is an improvement on previous years, we acknowledge that this is not where it needs to be and requires improvement. We are leading on the development of innovative solutions to reduce SF_6 losses, with various proactive interventions described later in this report.

6%

We outperformed on our energy use target by 6%

Energy use
We have undertaken retrofit activities at a number of our regional offices to improve the energy efficiency of the buildings. These activities include installing efficient heating and cooling systems, replacing existing fluorescent light fittings with new LED fittings, and identifying and using materials which are assessed in terms of environmental impact across their life cycle.

Business transport
A key area of customer and stakeholder interest is electrification of our fleet of operational vehicles. To enable this, we are investing in improving the charging infrastructure at our operational sites and at colleagues' homes.

We are also working with suppliers to invest in the most appropriate vehicle types to ensure continuity of service.

Scope 3 and our supply chain
We acknowledge the requirement to expand our emissions reporting across the supply chain and have already made strides towards understanding our scope 3 position, working in partnership with the Supply Chain Sustainability School. Our suppliers play a key role in helping us achieve all our environmental targets; To this end, we are pleased that 89 per cent of our suppliers to date have signed up to our Responsible Procurement Charter, which sets out the standards we expect from our partners.

Executive summary

Summary of key measures

Environmental protection

83%
Of waste diverted from landfill

Sustainable resource use and waste
Our overall waste position (the waste produced by Northern Powergrid and our supply chain partners) has outperformed our waste diverted from landfill target. We are slightly behind on recycling which is an area for improvement in 2024/25.

£1.9 m
Spent improving visual amenity in designated areas

Visual amenity
We have outperformed our target to improve visual amenity in the National Parks and National Landscapes within our operating region and have invested £1.9 m to install 16.4 km of underground cable.

Noise pollution
We are excelling in noise pollution interventions with only five substantiated incidents in year, all of which have been resolved for the customer.

Polychlorinated biphenyls (PCB)
Compliance with the regulatory requirement to remove all non-compliant equipment by 31 December 2025 is monitored closely. We continue to work with the Energy Networks Association (ENA) and the other Distribution Network Operators (DNO) to feed into the PCB statistical model to enable each transformer to be categorised and dealt with appropriately.

Biodiversity and natural capital
The number of biodiversity initiatives we've undertaken in year is lower than forecast. However, we are actively working on several improvement initiatives, which we expect to report on in 2024/25, with the aim of bringing this measure back on track. Importantly, we are working with the Environment Agency and other stakeholders to take a catchment-based approach to improvement in this area.

Fluid-filled cables
Our work to reduce leakage from fluid-filled cables has outperformed against the losses target in our plan. In addition, our cable replacement programme has delivered significantly over target for the year, further reducing risk to the environment. We have continued to implement fluid-filled cable dosing with PFT (Perfluorocarbon Tracer), an innovative technology that enables us to detect leaks quickly.

For more detailed information on each of our Environmental Impact Areas, including performance updates and the actions we are taking to ensure continuous improvement, please continue reading.

Part 2 Business carbon footprint

We are committed to minimising the impacts our activities have on the environment.

Business carbon footprint (BCF)

In the context of tackling climate change and delivering on the UK's net zero target, carbon reduction continues to be a clear priority for all our stakeholders. In this section, we focus on what we are doing to reduce carbon emissions across our business operations, including those of our supply chain.

Our BCF is a measure of the total amount of greenhouse gas emissions (GHG) produced by Northern Powergrid directly or indirectly. This is an essential baseline starting point from which our carbon reduction targets are set. Our targets for ED2, outlined in our Environmental Action Plan, follow the methodology set out by the Science-Based Targets Initiative (SBTi). Targets are considered 'science-based' if they are in line with what the latest climate science deems necessary to meet the goals of the Paris Agreement – limiting global warming to 1.5°C above pre-industrial levels to help slow and prevent the worst impacts of climate change.

We report our BCF in accordance with the Greenhouse Gas Protocol and the Streamlined Energy & Carbon Reporting requirements.

The Greenhouse Gas Protocol categorises the emissions that make up a BCF into three scopes:

Scope 1
Direct GHG ocurring from sources owned or controlled by Northern Powergrid.

Scope 2
Indirect emissions from the generation of purchased electricity, steam, heating and cooling consumed by Northern Powergrid.

Scope 3
All other indirect emissions that occur across our value chain. Scope 3 emissions are a consequence of the activities of a company in its upstream and downstream supply chain.

The following sections provide an update on our current scope 1, 2 and 3 emissions status and reduction pathways.

Business carbon footprint (BCF)

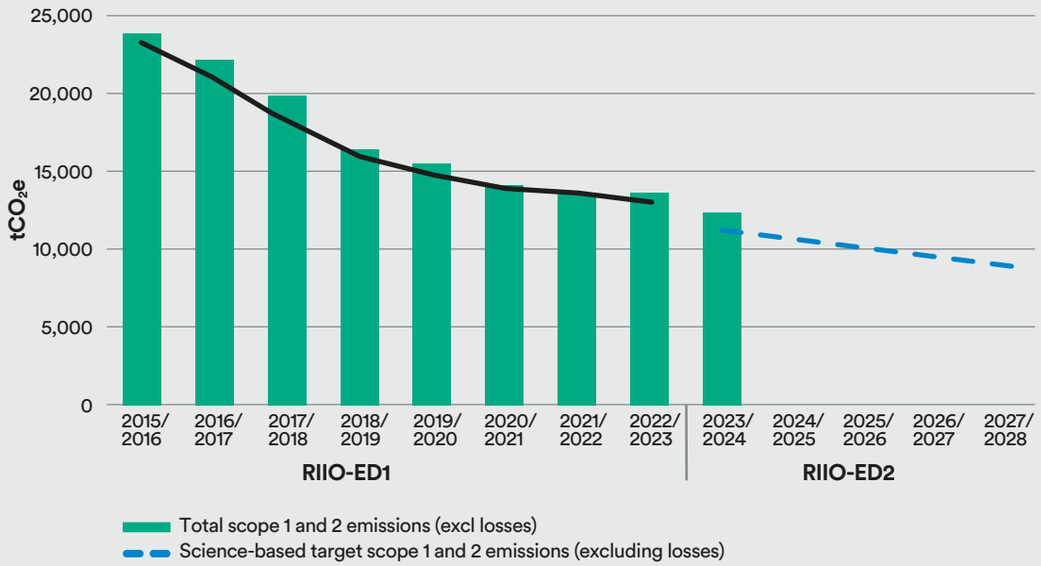
Scope 1 and 2 emissions

As illustrated in the below chart, we have continued to reduce our scope 1 and 2 emissions throughout ED1 and into ED2. Total scope 1 and 2 emissions (excluding losses) for 2023/24 were 12,307 tCO_2e, representing a 4.5 per cent reduction on the previous year. However, this level is slightly above the science-based target set to achieve net zero, indicating that further action is required for us to reduce emissions at the necessary rate.

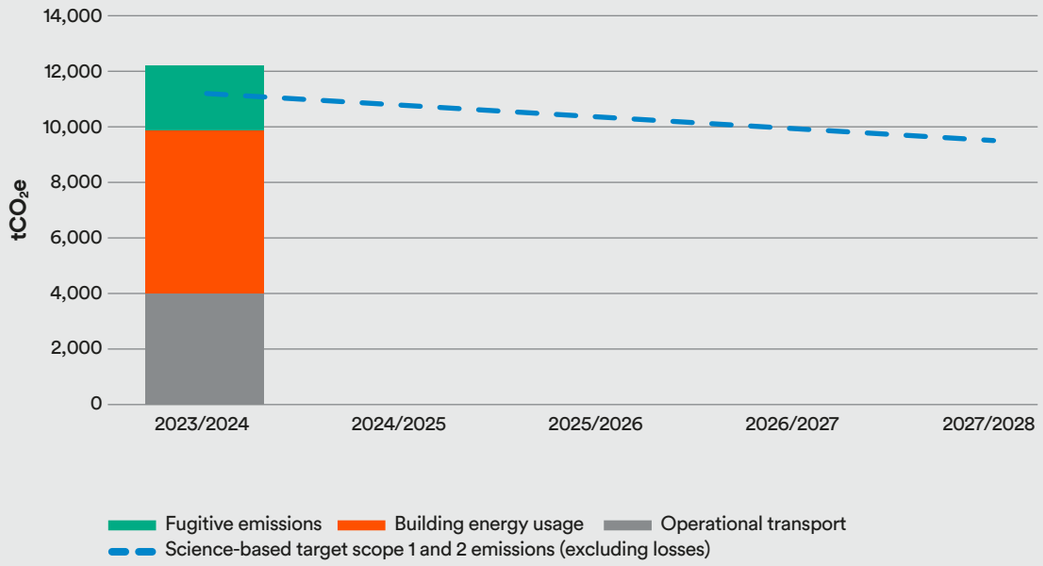
This section provides an overview of our scope 1 and 2 performance in 2023/24. Details of the specific contributors, together with what we are doing to continually improve performance, are given in the relevent sections later on in this report.

The split of our BCF scope 1 and 2 emissions for 2023/24 is shown below:

Total scope 1 and 2 emissions (excl losses), ED1 and ED2



Scope 1 and scope 2 emissions sources (excluding losses) tCO_2e



Business carbon footprint (BCF)

Fugitive emissions

Fugitive emissions are unintentional and undesirable losses of the greenhouse gas, sulphur hexafluoride, through leakage from our assets. Sulphur hexafluoride (SF_6) is used in the electricity industry to keep networks running safely and reliably. In common with other network operators, we use SF_6 as an insulator in high voltage electrical equipment and it is a significant contributor to our carbon footprint.

In 2023/24, 103kg of SF_6 was emitted by our network. Whilst this represents a significant reduction on levels seen in the previous year, it is still higher than we would like. Further details on this Environmental Impact Area and what we are doing to manage fugitive losses can be found in the Sulphur Hexafluoride (SF_6) section of this report.

Building energy use

Substation electricity use represents 70 per cent of the total energy used in our buildings and substations. This is estimated using the agreed Ofgem calculation methodology.

The kilowatt-hour values given below for building energy use (gas and electricity) converts to 5953 tCO_2e which is significantly lower than the target we set out in our Environmental Action Plan of 6300 tCO_2e.

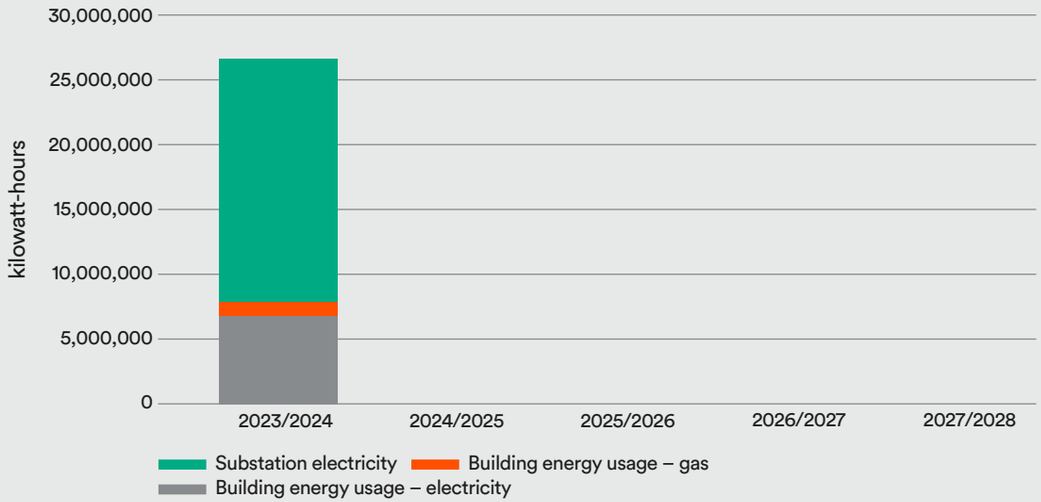
Energy efficiency schemes at our Riverside House and Shiremore offices

We have recently opened the doors at our new office, Riverside House, Sunderland. In order to make the building as energy efficient as possible we replaced all existing fluorescent light fittings with new LED fittings (including external building and car park lighting).

We also installed new variable refrigerant flow (VRF) and heat recovery units for the air conditioning system.

Our Shiremoor office has also undergone a makeover to improve energy efficiency. We replaced all existing fluorescent light fittings with new LED fittings. All external walls have been lined with an insulation backed plasterboard to improve thermal performance and reduce heat loss. We also replaced all steel framed external single glazed windows with new aluminium framed double glazed units and installed a new air handling unit.

Energy consumption at licensee buildings and substations



Business carbon footprint (BCF)

Operational transport

EV charging and the electric fleet

Through our external engagement, we know that the use of electric vehicles is of particular interest to our customers and stakeholders. The use of diesel fuel within our commercial operational fleet is a significant contributor to our BCF, contributing 3,916 tCO_2e in 2023/24, which is 32 per cent of our overall scope 1 and 2 emissions (excluding electrical losses). To address this, we have published fleet decarbonisation targets within our ED2 Environmental Action Plan (EAP), which requires us to reduce emissions (expressed as tCO_2e) from operational transport by approximately 33 per cent during the ED2 period.

One way to achieve this reduction is to replace approximately 40 per cent of our 850 commercial vehicles with Ultra Low and Zero Emission Vehicles (ULEVs/ZEVs) by the end of ED2 in 2028. This equates to the replacement of approx. 350 diesel vehicles with battery electric vehicles (BEVs), and plug-in hybrid vehicles (PHEVs).

40%

Percentage of our 850 vehicles to be replaced with ultra low and zero emission vehicles

Wherever possible, BEVs are the preferred vehicle replacement within the ED2 period as they maximise the reduction of CO_2e emissions; however, there are challenges to this transition due to limitations to payload, range and towing capabilities of currently available BEVs, meaning that other vehicle types still need to be considered.

Our commercial vehicles include Utility AWD (all-wheel drive), specialist vehicles such as MEWPs (mobile elevating work platforms) and HGVs (heavy goods vehicles), which may not have suitable battery alternatives within the ED2 period. Therefore, we will initially prioritise replacing our commercial van fleet vehicles with ULEVs and ZEVs.

As a first stage in this transition, we are working with our Procurement Team to tender for suitable at-home and on-site EV charging point installation partners to increase our existing workplace charging infrastructure. Renewable energy sources, such as solar panels, and battery energy storage systems may support this charging infrastructure, reducing grid-based energy consumption and peak demands on the distribution network. Although we are committed to increasing the number of our own charging points, we will still have some reliance on the public charging network. The availability of an effective charging network across our regions is an important enabler for the use of low emission vehicles, and is critical for their successful implementation. In conjunction with this activity, we continue to work with vehicle manufacturers to identify viable options for our operational needs.

CO_2e intensity of an operational km travelled

We are also exploring additional ways of reducing vehicle emissions by examining technologies such as hydrogen fuel cells and using alternative, renewable fuels as a replacement for diesel within the existing fleet during the transition to ZEVs. Hydrotreated Vegetable Oil (HVO) is considered a low-carbon renewable fuel, delivering a CO_2e reduction of approximately 90 per cent when compared to diesel. HVO is fully substitutable for diesel in any quantity, can be interchanged without modification and without the need to drain tanks.

Use of HVO is particularly relevant to larger or more specialist vehicles where there is currently no ULEV or ZEV alternative. However, it can also be utilised within any existing diesel vehicle in the fleet to achieve a significant reduction in GHG emissions.

Business carbon footprint (BCF)

Scope 3 emissions

Scope 3 emissions are all indirect emissions that occur in the upstream and downstream activities of our organisation. Addressing scope 3 emissions as part of our transition to net zero is a significant undertaking and requires collaboration and close working between Northern Powergrid and our supply chain. We understand and are acting on the requirement to improve our scope 3 emissions data reporting through ED2 – to develop a methodology for reporting emissions, and to develop and report on a reduction strategy and actions to reduce our scope 3 emissions over time – as well as our efforts to work collaboratively across industry. To this end, in 2023/24 we have taken the following actions:

- Introduced a Responsible Procurement Charter, details of which can be found in the Supply Chain Management section of this report.
- Identified scope 3 emissions categories as a first step in a comprehensive data gathering methodology.
- Measured our scope 3 emissions associated with supply chain fuel usage and Northern Powergrid business mileage.
- Worked in partnership with the Supply Chain Sustainability School to enable learning and collaboration, and adopted its carbon calculator as our supply chain scope 3 measurement tool.

Partnering with the supply chain sustainability school

We are working in partnership with the Supply Chain Sustainablity School and have adopted the school's carbon calculator to help enable us to accurately measure the scope 3 emissions in our supply chain. This is a software application which supports our suppliers with calculating their GHG and provides Northern Powergrid with a view of emissions embedded in our supply chain. The calculator was developed in collaboration with industry and so is a standardised and consistent way of recording scope 3 emissions. We also continue to work with other DNO to ensure we share expertise and learnings and utilise a consistent methodology. Over the course of ED2, as more suppliers provide more detailed information, we will gain a more informed understanding of our scope 3 emisions which will help us target improvements.

As an important element of this, we have contacted our highest spend suppliers and have requested that they sign up to the Supply Chain Sustainability School to enable collection of annual emissions data returns, allowing us to provide a more detailed account of our scope 3 emissions in next year's Annual Environmental Report. The data that we will gather from our supply chain is split into the following categories:

Category	Data Sources
Company transport	Mileage data from trackers, mileage claims for expenses
Fossil fuels	Fuel bills, fuel expense claims
Fugitive emissions	Incident reports for any fugitive emissions leaks. These will be stored company records
Electricity	Electricity bill or electric meter reads
Materials	Records of materials purchased to process into manufactured materials
Third party transport	Expenses claims for fuel, rail & air travel, employee transport survey
Waste	Waste management company report and waste disposal invoices
Water	Water bill or water meter readings

Business carbon footprint (BCF)

Measuring our scope 3 emissions

To date, our scope 3 emissions data is associated with supply chain fuel usage and Northern Powergrid business mileage.

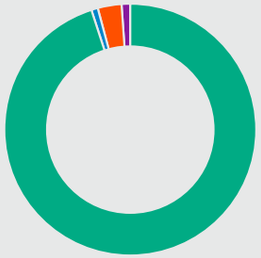
Our key suppliers provide fuel use data which can be broken down as shown. To note, this data is based on the most recent information provided to us at the time of publication.

As shown, operational fleet diesel use makes up 95 per cent of the overall fuel used in our supply chain and represents over 18,000 tCO_2e. Including all fuel types and uses, our supply chain consumed approximately 7.5 million litres of fuel during 2023/24.

95%

Operational fleet diesel use makes up 95% of the overall fuel used in our supply chain

Supply chain fuel use – litres



- Operational transport fleet – diesel
- Operational transport fleet – petrol
- Plant
- Aviation fuel
- Mobile generators

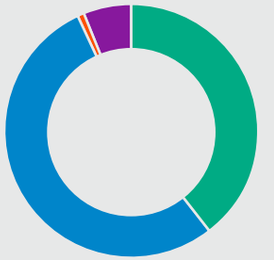
Northern powergrid business travel

Our business travel scope 3 emissions are broken down as shown.

Overall, this equates to just over 2,100 tCO_2e. Our approach to hybrid working supports the reduction of business miles and where possible travelling by rail is encouraged.

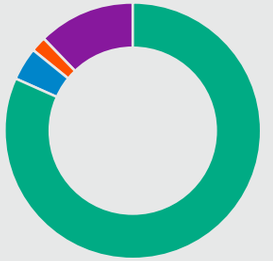
To summarise, this is an area of continued focus and, throughout the remainder of ED2, our reporting of scope 3 emissions will only increase based on working in collaboration with our supply chain partners.

Business car use – tCO_2e



- Petrol
- Diesel
- Electric
- Hybrid

Business air and train – tCO_2e



- Air (Long Haul)
- Air (Short Haul)
- Air (Domestic)
- Rail

Sulphur hexafluoride (SF_6) and other insulation and interruption gases (IIGs)

Sulphur hexafluoride (SF_6) gas has been used in several industries across the world for many years. In the energy industry, it is a commonly used insulator in high voltage electrical equipment. It is also a potent greenhouse gas – one tonne of SF_6 gas is equivalent to 23,500 tonnes of CO_2.

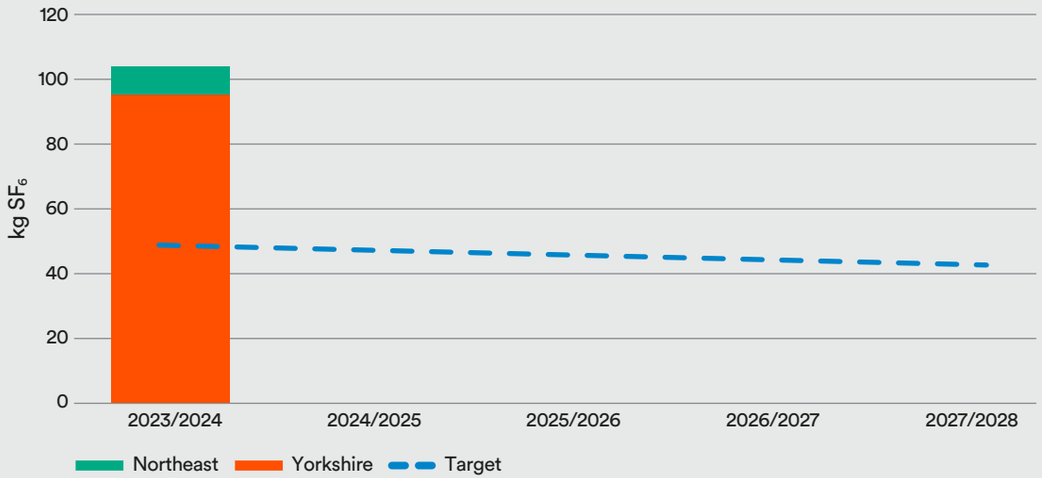
Industry and equipment manufacturers are already taking action to avoid the release of SF_6 to the atmosphere. At Northern Powergrid, we have a strong record of deploying innovative technology and are proactively supporting manufacturers to develop effective and reliable alternatives to SF_6, including conducting trials of alternative gas technologies. However, at present, there are few economically and technically viable substitutes for SF_6, so we expect to continue to use it until equipment manufacturers develop suitable alternatives.

The nature of SF_6 means it's essential we keep the amount that leaks out of our equipment to an absolute minimum. We monitor all SF_6 losses on a daily basis by measuring how much we have injected back into the equipment to replace gas which has leaked into the atmosphere. We report our SF_6 gas losses as one of our environmental key performance indicators.

The total amount of SF_6 on our network is 16,439kg. In 2023/24, 103kg of SF_6 was emitted, 95kg of which was within the Yorkshire and north Lincolnshire licence operating region. Whilst the overall loss volume represents a significant reduction on the previous year, it is still higher than we would like. We are targetting five assets in the Yorkshire region that between them were responsible for 68 per cent of all SF_6 losses and these are all scheduled for repair by the end of Q3 2024.

We have also improved our operational routines and response to leaks. If we discover, either via a remote pressure alarm or on-site inspection, that some gas has leaked, then we schedule maintenance and repair work. If a leak is persistent and is not fixed by the maintenance and repair option, we invest in replacing the equipment. We have also invested in infra-red cameras which can detect SF_6 leaks, enabling rapid pinpointing of the leak.

Sulphur hexafluoride (SF_6) actual by licence area vs overall target



KG

16,439 kg

Total amount of SF_6 on our network

Sulphur hexafluoride (SF_6) and other insulation and interruption gases (IIGs)

Supply chain interventions

We are working closely with the equipment manufacturer to improve the speed of response, ensuring that parts are made available quickly and that they can be installed in a timely manner to resolve the leak. This is especially important where there is a persistent low level leak.

When our supply chain partners decommision equipment which contains SF_6, they must follow a detailed work instruction and method statement. This instruction covers all equipment required, health and safety considerations and a step by step sequence to follow for decontamination. In essence, the pressure within the switchgear is recorded and the gas is extracted until a negative or constantly low pressure is achieved, ensuring that no SF_6 is lost to the atmosphere.

Industry collaboration

We also take a collaborative approach, working with other DNO's and the Energy Networks Association (ENA) on SF_6 losses. It is a top priority of the ENA Environment and Sustainability Committee and has an associated working group focusing on this issue. We play an active role in both groups and will continue to contribute and share intel around our approach and innovative trials. We also liaise with National Grid to understand the solutions that they have implemented to manage and resolve leaks. These measures range from preventative measures (coatings and seals) to reactive measures (leak sealing, e.g. molton metal manipulation technique and alternative gasket materials). We assess the suitability and benefits of these measures and adopt them where appropriate for use on our network.

Northern Powergrid championing innovation

As well as ensuring that our current operational interventions on legacy SF_6 assets are safe and robust, we continue to work with equipment manufacturers and other DNOs through the ENA to trial and embrace innovative new SF_6-free technologies.

Some great examples include:

Switchgear replacement at Kirkstall B 132 kilovolt grid supply point substation

In 2023, we replaced two of our worst performing SF_6 high voltage circuit breakers in Kirkstall, West Yorkshire with 'clean air' insulated switchgear. The new switchgear utilise a vacuum interrupter unit to extinguish the arc, and electrical insulation is achieved with a high-pressure mixture of nitrogen (80 per cent) and oxygen (20 per cent). The replacement of just two units has effectively removed the equivalent of over 400,000 kg of CO_2 from our network.

Replacement of Keadby 132 kilovolt grid supply point substation

In 2023 we tendered for a new 21 bay indoor 132 kilovolt Gas Insulated Switchgear (GIS) substation at Keadby, North Lincolnshire. Following successful SF_6-free product assessments, which we supported through ENA, we were able to update our tender specification to stipulate that GIS switchgear be SF_6-free.

400,000 kg

Amount of CO_2 we removed from our network at Kirkstall

Sulphur hexafluoride (SF_6) and other insulation and interruption gases (IIGs)

Molton metal manipulation technique
In 2023, we trialled a new, innovative solution for sealing a leak using a molten metal manipulation technique. Initial testing of the seal showed no obvious enduring leak but the trial will continue until the 'repaired' metal work has at least one cycle of seasonal temperature variations. If successful, this innovation will provide a rapidly deployable solution to seal or mitigate SF_6 leaks.

Another example of Northern Powergrid championing innovation is the use of SF_6 capture technology. This has been funded through the RIIO-2 Network Innovation Allowance (NIA) Project.

To maintain the security of supply to our customers, it is sometimes necessary to keep plants affected by a loss of SF_6 pressure in service for longer than we would like. To minimise SF_6 loss to the atmosphere while we await delivery of new components or a new circuit breaker, we are collaborating with other network operators and the product developer to explore the potential of an innovative solution utilising nano materials to visually identify leaks and prevent SF_6 escaping into the atmosphere.

To date, nano-porous cage material has been manufactured and trialled in a laboratory environment, where it demonstrated that SF_6 can be effectively adsorbed and desorbed by the crystalline cage material. The analytical techniques, such as thermogravimetric analysis used to date, utilise only a few milligrams of cage material, but initial results suggest it may be scalable. There are challenges to overcome, including controlling the rate of desorption and manufacturing larger quantities of the cage material but we will continue to pursue this opportunity.

Overall, SF_6 emissions remain a significant contributor to our carbon footprint and we are committed to a trajectory to drive a further reduction of 15 per cent between 2023-2028. To achieve this goal, we will continue to closely monitor SF_6 leaks, drive operational improvements and interventions and, crucially, collaborate and pursue innovative solutions to drive us towards an SF_6-free network.

15%
We are committed to reduce SF_6 emissions by 15 per cent between 2023-2028

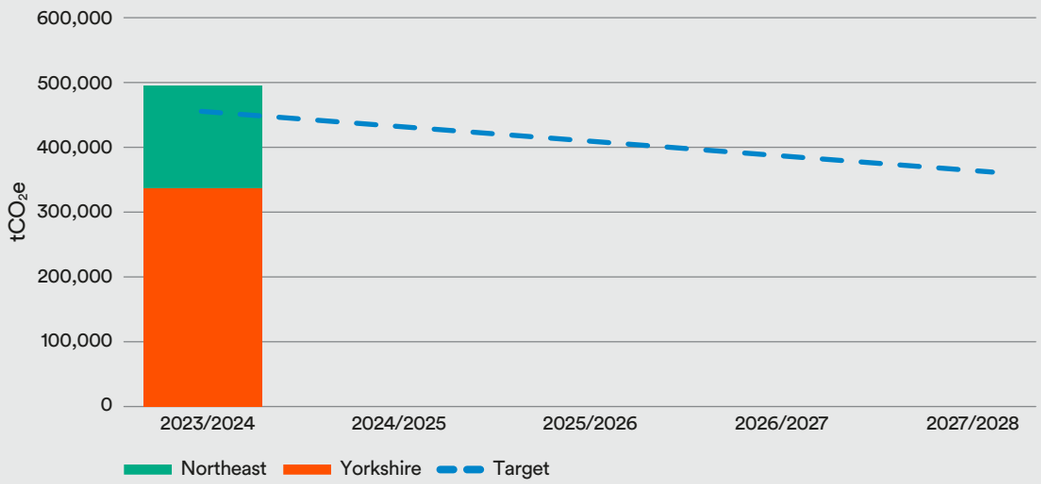
Electricity distribution losses

Electricity distribution losses are the difference between the amount of energy entering the network from the National Grid and the amount of energy drawn out of it by our customers. No system can be 100 per cent efficient and losses are unavoidable in distributing electricity. The two main types of losses are:

- **technical losses,** the natural effect of network equipment heating up while transferring electricity, and
- **non-technical losses,** generally resulting from metering errors and theft.

For Northern Powergrid, the magnitude of losses for 2023/24 equates to roughly four terawatt-hours (TWh), and the associated carbon emissions equate to roughly 97.5 per cent of current scope 1 and 2 emissions. When expressed as a percentage of the total energy entering the network, losses are approximately six per cent. This energy that is 'lost' must first be generated, and therefore has a financial and carbon impact. Although losses cannot be completely eliminated, we must ensure they are as low as reasonably practicable.

Distribution losses (tCO_2e)



We estimate that losses on our network in 2023/24 amounted to 4,320GWh, equivalent to 494,422 tCO_2e which is slightly adverse to our target, as shown below.

How electrical losses are linked to decarbonisation

Our Losses Strategy details how there are some aspects of losses management that we can fully control and other aspects that we can only influence.

Volume of losses is dictated primarily by the loading of electricity placed upon network equipment and, to a lesser extent, by the characteristics of the network, meaning that losses are mainly determined by the energy requirements of our customers. In general, the higher the electricity loading, the higher the electrical losses.

Decarbonisation will result in a significant increase in network loading as customers switch from fossil fuels to electricity and low-carbon technologies. Given that the majority of our existing network will continue to operate well into the future, we anticipate that electrical losses will generally increase in line with demand. We will have the ability to directly control or influence only a small percentage of these losses, primarily when we make changes to our network and install new equipment.

The most economic and efficient manner of facilitating net zero will generally be to increase network utilisation which will create an increase in electrical losses. Network losses are therefore not something that we seek to minimise, but to better manage as part of a holistic asset management approach which will generally see losses increase in the coming decades, whilst emissions will ultimately tend to zero.

As the key driver of losses is our customers' energy needs, which are subject to significant uncertainty and can vary year-on-year in line with economic activity and weather, forecasting of losses is challenging. As a result, we do not forecast losses.

As the primary driver of any future change to the overall level of network losses is the changing energy needs of our customers, we have a significant opportunity to reduce losses by influencing customers to reduce their energy usage. We will work closely with our customers and stakeholders as part of our commitment to support communities to become more energy efficient. The actions we are taking to educate and inform customers about energy efficiency are detailed in the 'Consumers and Network – Customer Service' section of our 2023-28 business plan.

Electricity distribution losses

Our electrical losses interventions strategy

Our low-loss interventions come under two main categories: low-loss cable installation; and replacement of pre-1958 distribution transformers. The benefit of these interventions has not been accounted for in the first year of ED2 but will appear in the 2024/25 data and Annual Environmental Report.

Low-loss cables

We have embedded a low-loss policy in designing and operating our network. One of the key considerations is the size of the cable installed. The incremental cost of higher capacity (larger) cables was compared with the benefits of having bigger capacity, lower resistance cables – i.e. low-loss cables – to create the extra network capacity required to facilitate net zero and improve network performance while minimising associated losses.

To note, we have reported 270 km of low-loss cable installation in 2023/24. The cable volumes (additions) were obtained from our Asset Register. The volumes reported represent an estimate based on actual year-to-date volumes, along with an uplift to account for completed schemes where asset records have not been recorded on to our asset systems. The estimate represents 50 per cent of the total reported volumes and the outturn is in line with figures provided in previous years.

Replacement of pre-1958 distribution transformers

Our analysis shows that the costs associated with replacing a pre-1958 transformer with a more efficient modern transformer would be offset by future losses cost savings within ten years of its replacement. As a result, we are prioritising replacement of pre-1958 distribution transformers as part of our existing asset replacement work programmes. This supports our ongoing drive to reduce technical losses on the network and an approach to the targeted replacement of pre-1958 distribution transformers identified by other DNOs within their business plans.

270 km

Length of low-loss cable installation in 2023/24

Embodied carbon

Embodied carbon is the term used for all carbon emissions associated with the production and transport of building materials and the construction of the built environment. Embodied carbon is accounted for as a scope 3 emission and is linked with our Responsible Procurement Charter, which is discussed in the Supply Chain Management section of this report.

During 2023/24 we have developed a model to assess and report on embodied carbon used in the construction of new major projects. The method has been developed based on industry best-practice and takes into account the limitations regarding availability and data collection. We are now in the process of adopting and embedding this model into the business; while we do not yet have results to report, we will be in a position to update further on this in our 2024/25 Annual Enviromental Report.

Reducing embodied carbon in our non-operational buildings:

Dunnington storage and distribution facility

We are currently in the process of applying for planning permission for a new storage facility at Dunnington, North Yorkshire. As part of the application process, we have considered several environmentally sustainable design aspects to reduce the embodied carbon of the building.

These include:

Energy: A fabric-first approach has been taken to ensure that the new building achieves the best possible energy efficiency. The building will benefit from a highly efficient air source heat pump to heat and cool the main building, and local electric water heaters will provide the building with hot water. This will deliver a 68 per cent reduction in carbon emissions with a 564 per cent increase in energy generation.

Water: Efficient sanitary fittings have been chosen for the site, improving the building's baseline water consumption by over a third.

Waste: One way to reduce the waste a building produces is to future-proof it. This will give the building a longer lifespan, eliminating the need for interventions in the future. Future-proof technologies such as photovoltaic (PV) or solar cell and air source heat pumps (ASHPs) have been incorporated into the design to reduce annual energy consumption, and comfort cooling has been incorporated to help mitigate the effects of global warming.

Health and Wellbeing: The comfort cooling incorporated into the design will achieve optimum indoor thermal comfort for employees. In addition, the site is in close proximity to local amenities, residential areas and safe outdoor spaces, accessible via cycle routes and footpaths, enhancing the wellbeing of building users.

Transport: A travel plan has been developed to promote and enhance sustainable travel to and from the site. The development is well served by public transport, and car, cycle, and electric vehicle parking will be provided.

Pollution: The site will use a suitable refrigerant (R-32) which has many sustainable advantages over comparable options. These include low global warming potential, zero ozone depleting potential and high efficiency. A flood risk report concluded that the site is at low risk of flooding, increasing site resilience and minimising the release of waterborne pollutants. Finally, the site presents minimal risk of nighttime light pollution.

Land use and ecology: We have conducted an Ecological Impact Assessment to identify and address potential nature impacts with mitigation strategies. These include landscape planting, creation of habitat piles and additional bird and bat boxes. The assessment summarised that if its recommendations are implemented, there will be no significant adverse effect on protected or notable habitats and species.

Embodied carbon

Riverside House office

Embodied carbon was considered in the material choices at our new Riverside House offices. The carpet tiles installed in the building are 100 per cent nylon. They are made up of recycled content and also have a backing on them which is a non-vinyl, non-bitumen composite material containing bio-based and recycled fillers. When measured on a standalone basis they are net carbon negative.

The new vinyl planks installed in the reception area at Riverside House contain up to 40 per cent recycled content and are “BRE (Building Research Establishment) Green Guide” A+ rated and “GreenTag LCA (Life Cycle Analysis) rated gold plus”. The BRE Green Guide specification provides guidance on how to make environmental choices when selecting construction materials and components. Materials are assessed in terms of their environmental impacts, within comparable specifications, across their entire life cycles.

The new ceiling tiles at Riverside House are made with 46 per cent recycled content and are E1 rated (they meet the European standard) for formaldehyde emissions and A rated for low VOC emissions. Also of note, the emulsion paint used is water based and is 99.9 per cent VOC free.

Supply chain management

89%

Percentage of suppliers that have signed up to Northern Powergrid's Responsible Procurement Charter

Our supply chain is key to helping us deliver our business objectives. We see our suppliers as an extension of Northern Powergrid and collaborate to help them meet the standards to which we hold ourselves. To this end, we have asked our suppliers to sign up to the Northern Powergrid Responsible Procurement Charter. To date, approximately 89 per cent of our suppliers have done so, against our target of 90 per cent. We also encourage our suppliers to hold ISO14001 certification or operate an appropriate environmental management system, and more than 90 per cent now have one of these in place.

As part of our Responsible procurement charter, we expect our suppliers to share our commitment to the environment by abiding by the letter and spirit of all environmental laws and regulations, as well as our policies and procedures related to pollution, waste disposal, emissions, and wildlife and habitat protection. Our suppliers are required to obtain and maintain all permits and registrations necessary to conduct their work. Suppliers are also expected to perform all work and maintain their equipment in a manner that avoids spills and releases to the environment and, if a spill or release does occur, to report those incidents in accordance with our policies.

We have set out a requirement for our suppliers to provide the following environmental metrics on an annual basis and will continue to work with them to help them provide the best available information under these categories:

- Emission reduction in the last three years
- Percentage of fleet vehicles that are ULEV/ZEV
- Percentage of office energy offset by low-carbon technologies
- Percentage of 'green' office supplies
- Waste reduction in last three years
- All applicable scope 3 emissions.

For any new developments designed with environmental considerations in mind, suppliers are required to provide monthly environmental metrics for the period of the contract, including fuel use, resource management data and information on any environmental incidents.

A new portal has recently been launched to enable our suppliers to report data directly to us in the format we require. This will enable us to provide more detailed information in the next annual report.

Supply chain scope 3 emissions

As described in the Business Carbon Footprint section, we are working in partnership with the Supply Chain Sustainablity School and have adopted the school's carbon calculator. This is a software application which supports our suppliers to calculate their GHG and provide Northern Powergrid with a view of emissions embedded in the supply chain. We are currently working with our highest spend suppliers to get them signed up to the Supply Chain Sustainability School to enable collection of annual data returns and will therefore be able to give a more detailed account of scope 3 emissions in next year's annual report.

Part 3 Environmental protection

Our long-term objective is to improve the natural habitats in the regions we serve, to increase the variety and variability of species and ecosystems.

Sustainable resource use and waste

Our stakeholders have told us they want to see a reduction in our waste and for us to better manage waste generated by our suppliers. In order to operate a circular economy model (the production and consumption of waste which involves sharing, leasing, reusing, repairing, refurbishing and recycling existing materials for as long as possible), we must continually improve our resource management processes in ED2 and beyond.

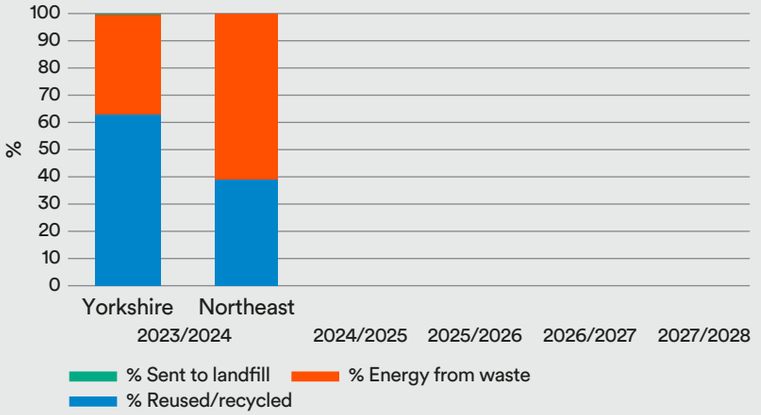
The waste data presented in Annex A is a summary of our EA waste returns, representing the waste produced directly by Northern Powergrid. The information comprises the disposal of the following waste types from our non-operational sites:

Waste type	Waste classification code*
Oil + PCBs	130301
Mineral oil	130306
Waste oil	130307
Insulating oils	130310
Packaging containing residues	150106
Oily rags	150202
Eqt + PCB oil	160209
Eqt + oil	160213
Eqt + SF_6	160214
Mixed metal	160216
Fire extinguishers/aerosols	160504
Fire extinguishers	160505
Lead batteries	160601
Batteries (Ni Cd)	160602
Wood	170204
Steel & joints	170405
Cables + waste	170411
Asbestos	170601
Construction materials containing asbestos	170605
C+D waste (cont mercury)	170901
Flammable wastes	170903
Construction & demolition waste (non haz)	170904
Fluorescent tubes	200121
Eqt + CFCs	200123
Adhesives, paints & resins	200127
Batteries	200133
WEEE	200135
WEEE	200136
Wood	200138
General waste, office and C+D	200301

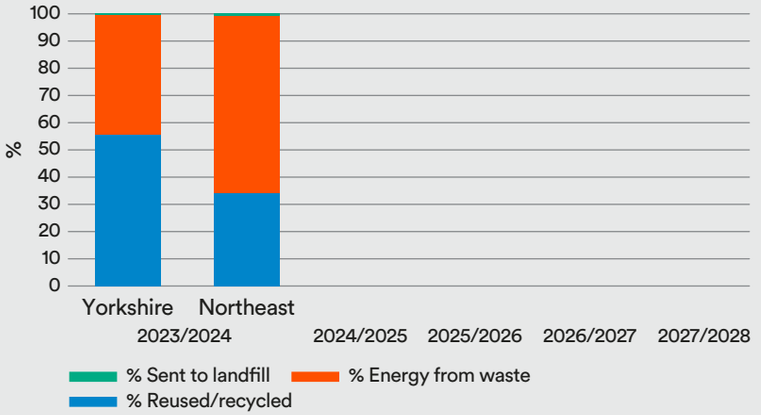
*code as per technical guidance WM3

The destination of the waste produced is shown below for both non-hazardous and hazardous waste:

Hazardous/special waste destination



Non-hazardous/special waste destination



Sustainable resource use and waste

Operational waste and our supply chain partners

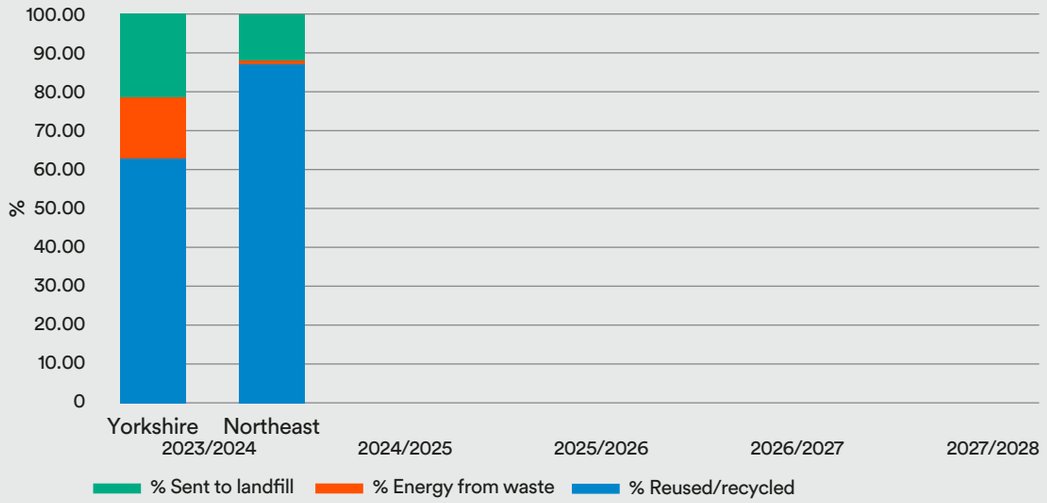
Our network operations are our largest source of waste generation; the production of waste arising from excavations and other network operations represents over 97 per cent of our total waste generated in 2023/24. The total operational waste produced in 2023/24 was 63,033 tonnes, with the destination of this waste represented below:

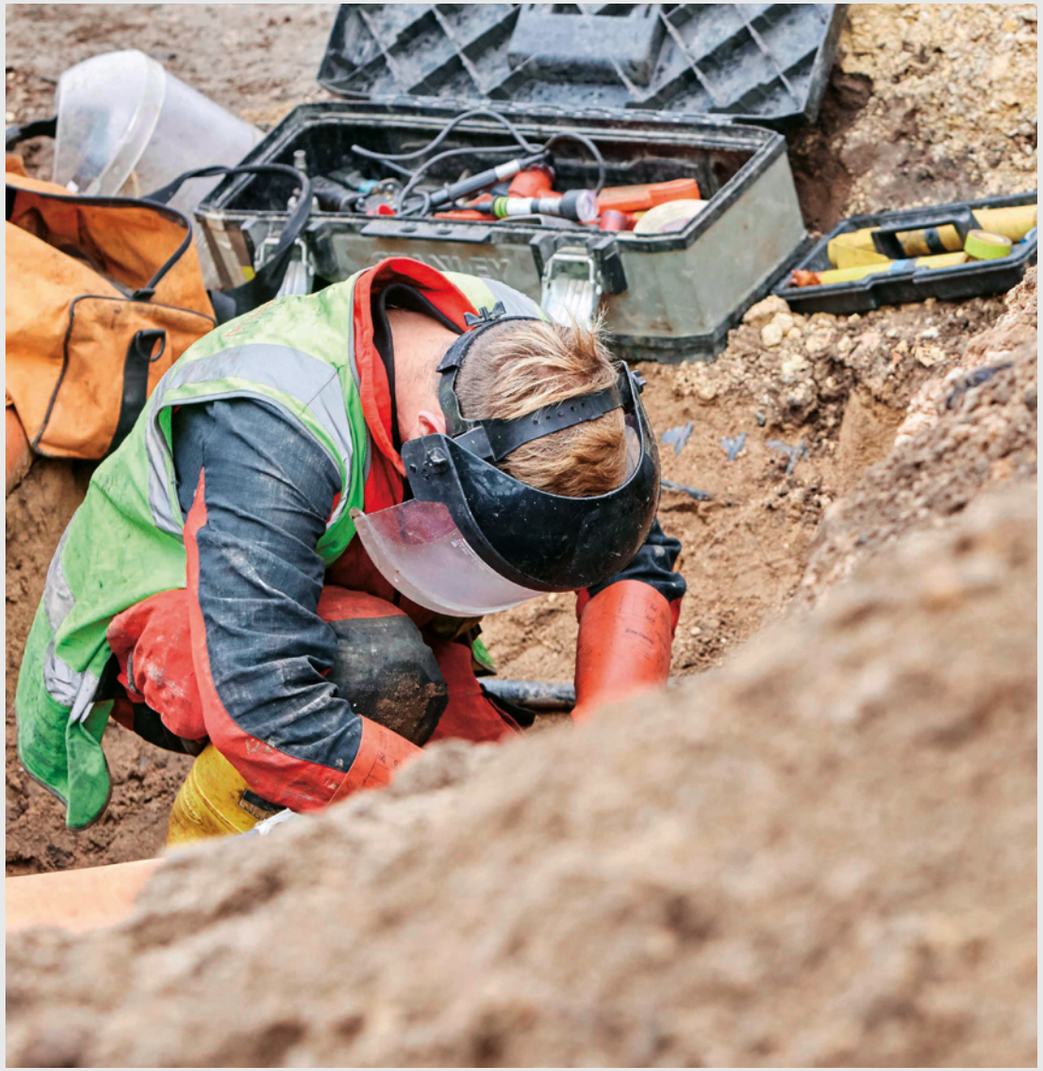
Overall, 82.2 per cent of operational waste was diverted from landfill. This is just above our target of 82 per cent.

We will continue to work with our supply chain to reduce packaging and ensure we use sustainable alternatives where possible, and will utilise our embodied carbon model, as described in the Embodied Carbon section, to support our investment decisions, which include the sourcing of raw materials.

We will also ensure that our supply chain partners comply with the Environment Agency's regulatory position statements on streetworks when handling waste produced on behalf of Northern Powergrid. Specifically, RPS 298 – Classify excavated waste from street and utility works, and RPS 299 – Storing and managing excavated waste from streetworks.

Operational waste destination

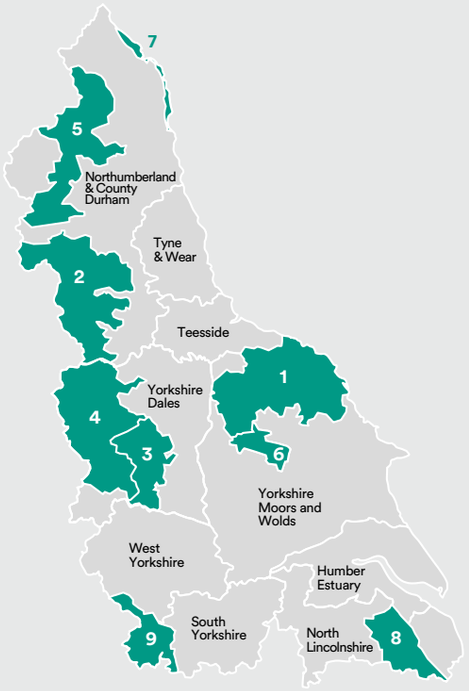




Visual amenity

Approximately a third of the total length of our cables and lines is overhead, and we work with our stakeholders to minimise the visual impact of these assets in National Parks and National Landscapes (formally known as Areas of Outstanding Natural Beauty).

Overhead electricity lines can negatively impact the appearance of the landscape and affect local wildlife, and we have a statutory duty to consider the purpose of National Parks and National Landscapes (collectively known as 'designated areas') and conserve the biodiversity within them.



Four National Parks and five National Landscapes fall either partly or entirely in our two licence areas. Reflecting stakeholder feedback, we have a special programme of work dedicated to removing overhead lines and replacing them with underground cables in these designated areas.

In 2023/24, we spent £1.9 m (£1.7 m in Yorkshire and £0.15 m in the Northeast) to remove 5.7 km of overhead line and installed 10.8 km of underground cable. Totalling 16.4 km, this outperformed our target in the Environmental Action Plan by 4.2 km.

The lengths of overhead line within each area as of March 2024 are shown below:

Our stakeholder engagement and support

We work closely with stakeholders from each of the National Parks and National Landscapes so that together we can improve visual amenity for people who live in and travel to these beautiful areas. Our programme steering group, made up of stakeholder representatives and members of our design, wayleaves and delivery engineer teams, meets twice a year to identify and prioritise projects and discuss other issues, including policy development and publicity. We maintain day-to-day control over this work and provide regular feedback to stakeholders.

Our strategy for project assessment and delivery, including analysis of costs and benefits

Our undergrounding programme is designed to meet the needs of representatives from the designated areas. We're aiming to make it easy for them to access the information and expertise they need to make an informed choice. We invite representatives from the designated areas to state their preference for underground schemes, in line with the jointly agreed Assessment and Stakeholder Participation Policy. The stakeholders draw up a priority list of potential projects, considering the characteristics of each site and the visual and environmental impact of the overhead line.

	Designated area	Length of overhead line (km) – March 2024	Visual amenity inside designated areas: Overhead line removed during year (km)	Visual amenity inside designated areas: Underground cables installed during year (km)	Visual amenity inside designated areas: Visual amenity expenditure (£m) on visual amenity inside designated areas
1	North Yorks Moors	1,105.13	0.51	0.69	0.148
2	North Pennines	696.51			
3	Nidderdale	559.70			0.058
4	Yorkshire Dales	580.16	2.60	4.50	1.019
5	Northumberland	308.57			0.004
6	Howardian Hills	248.97			0.002
7	Northumberland Coast	78.08			
8	Lincolnshire Wolds	410.73	2.59	5.56	0.633
9	Peak District	204.75			0.007
	Total	**4,192.60**	**5.69**	**10.75**	**1.875**

Figure 1: Designated areas in our regions (National Parks and National Landscapes)

Visual amenity

The visual amenity schemes and their progression status are given here. This shows that six schemes have been completed in 2023/24, with many more in progress.

Designated Area	Location	Length of line (km) for undergrounding	Stage in the process
Howardian Hills	York – Oswaldkirk	1.9	4 – Construction in progress
	Welburn	0.7	1 – Proposed for design and feasibility
	Howardian Hills Total	**2.5**	
Lincolnshire Wolds	Louth, Hallington Station	0.0	1 – Proposed for design and feasibility
	Market Rasen, Claxby Village	5.2	2 – Proposed and awaiting land consents
	Market Rasen, Benniworth Donnington Road	4.8	4 – Construction in progress
	Louth, Donnington Station	2.6	4 – Construction in progress
	Louth, Goulceby Top	2.7	1 – Proposed for design and feasibility
	Market Rasen, Tealby Thorpe, Sixhills School	4.6	3 – Confirmed by stakeholder and ready to deliver
	Lincolnshire Wolds Total	**19.9**	
Nidderdale AONB (NE)	Wath, Harrogate, Pie Gill Green Cottage	0.5	3 – Confirmed by stakeholder and ready to deliver
	Nidderdale AONB (NE) Total	**0.5**	
Nidderdale AONB (YE)	Nidderdale, Timble	1.4	5 – Complete
	Ilkley – Langbar – Beech House Spur	3.0	2 – Proposed and awaiting land consents
	Harrogate – Fewston Institute	1.3	4 – Construction in progress
	Skipton – Barden Reservoir	1.4	3 – Confirmed by stakeholder and ready to deliver
	Nidderdale AONB (YE) Total	**7.1**	
North Pennines AONB	Rookhope Head	3.8	5 – Complete
	Allenheads South – Greenfield Quarry	2.5	1 – Proposed for design and feasibility
	North Pennines AONB Total	**6.2**	
North York Moors National Park	Nether Silton	0.7	5 – Complete
	Whitby, Kettleness	0.5	3 – Confirmed by stakeholder and ready to deliver
	Whitby, Goldsborough	0.3	3 – Confirmed by stakeholder and ready to deliver
	Scarborough, Staintondale & Staintondale North	1.0	2 – Proposed and awaiting land consents
	Thirsk, Hambleton Spring – Old Byland North	0.6	3 – Confirmed by stakeholder and ready to deliver
	North York Moors National Park Total	**3.0**	
Northumberland Coast National Landscape	Beadnell, Beadnell Harbour & Beadnell Chalets	0.6	1 – Proposed for design and feasibility
	Northumberland Coast National Landscape Total	**0.6**	
Northumberland National Park	Carvoran – Thirlwell Castle	1.8	4 – Construction in progress
	Rochester	1.2	4 – Construction in progress
	Linhope	0.5	3 – Confirmed by stakeholder and ready to deliver
	Tower Tie – Greencarts	1.4	3 – Confirmed by stakeholder and ready to deliver
	Greenwood	0.6	3 – Confirmed by stakeholder and ready to deliver
	Beggar Bog – Moss Kennels	0.8	3 – Confirmed by stakeholder and ready to deliver
	Shield Vallum – Milestone House	0.5	3 – Confirmed by stakeholder and ready to deliver
	Hareshaw Head – Hareshaw Cottages	3.3	3 – Confirmed by stakeholder and ready to deliver
	Northumberland NP Total	**10.1**	
Peak District National Park	Peak District, Sheffield, Redmires Road	1.5	4 – Construction in progress
	Sheffield, Bolsterstone	0.6	1 – Proposed for design and feasibility
	Sheffield, Dunford Bridge	1.8	5 – Complete
	Peak District NP Total	**4.0**	
Yorkshire Dales National Park	Hawes, Widdale Head – Widdale Head	2.4	1 – Proposed for design and feasibility
	Yorkshire Dales National Park Total	**2.4**	
Yorkshire Dales National Park (NE)	Reeth North	0.8	2 – Proposed and awaiting land consents
	Gunnerside Radio & Gunnerside Dyke	0.8	3 – Confirmed by stakeholder and ready to deliver
	Leyburn, Thornton Rust	0.4	2 – Proposed and awaiting land consents
	Yorkshire Dales, Kilnsey Crag	2.6	5 – Complete
	Yorskhire Dales, Dribbles Bridge House	2.3	5 – Complete
	Yorkshire Dales, Hebden, Garnshaw Tee	1.9	4 – Construction in progress
	Skipton – Halton Gill to Foxup	1.0	3 – Confirmed by stakeholder and ready to deliver
	Yorkshire Dales NP (NE) Total	**9.8**	
	GRAND TOTAL	**66.1**	

Noise pollution

Sometimes overhead lines and substation equipment can generate noise. This can be detected by the human ear and creates noise pollution. We continue to ensure that we comply with noise and statutory nuisance legislation and respond swiftly to all complaints to reduce, minimise or eliminate noise from our equipment. We receive a small number of noise complaints each year, with investigation often showing that the cause is driven by other sources such as lower levels of traffic and other ambient background noise.

In 2023/24, we received 45 noise complaints from our customers, of which five led to Northern Powergrid taking action to resolve the issue for the customer. This is favourable to target as shown.

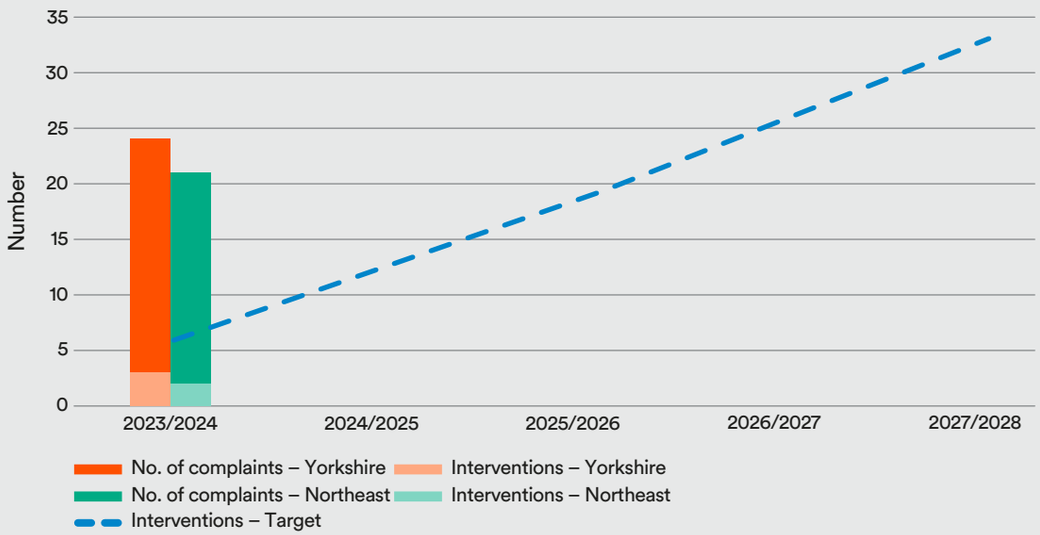
This is an ongoing process, with several noise complaints from 2023/24 still under review to determine the cause. The information provided for 2023/24 is a snapshot taken at the time of publication. Throughout ED2, noise complaint information will be updated on an annual basis via this report.

Of the five substantiated complaints from 2023/24, three were in the Yorkshire licence area and two in the Northeast area.

Two of the cases in Bridlington, East Yorkshire, were repeat complaints and were resolved when we brought forward planned work to replace all the equipment at the distribution substation. The third substantiated case in Yorkshire was resolved when we replaced a faulty intruder alarm at a primary substation. The two complaints in the Northeast were also both resolved for the customer. One involved a transformer being lifted and placed on anti-vibration pads, and the substation building and doors being treated to reduce sound transmission. The second complaint in the Northeast measured borderline noise levels; however, to ensure that the customer was completely satisfied, we fitted vent treatments to the substation doors.

As well as responding to all customer noise complaints, we work with local councils to complete noise impact assessments to ensure that our new developments meet legal requirements. We also complete noise at work risk assessments to keep our colleagues safe.

Noise complaints and interventions



Polychlorinated biphenyls (PCBs)

Polychlorinated biphenyls (PCBs) are organic chemicals that were manufactured for use in various industrial and commercial applications from 1929 to the late 1970s. Attributes of PCBs include fire resistance, low electrical conductivity, high resistance to thermal breakdown and high degree of chemical stability. It is the thermal and chemical stability that made PCBs useful in industrial applications, however these attributes can potentially lead to negative impacts to the environment and to human health.

PCBs are occasionally found in electrical transformers, important components in many different types of electrical circuits, from small-signal electronic circuits to the high-voltage power systems on our network.

For most large transformers, the entire unit is filled with a dielectric fluid to increase the insulation between and to cool the electric coils. The fluid most often used for this purpose is mineral oil and although the transformers do not intentionally contain PCBs, they occasionally became contaminated by the use of common filling equipment or maintenance filling with used or recycled oil. Any damage to the transformer's outer casing therefore could potentially result in PCB-fluid leakage.

1,671

Number of pole mounted transformers replaced as of March 2024

We have an obligation under the latest PCB regulations to identify and remove or remediate non-compliant equipment by 31 December 2025.

The main assets that fall within the scope of the legislation are all pole mounted (PM) and ground mounted (GM) transformers that have been manufactured prior to 1987.

Removal of PCB contaminated equipment

Ground mounted transformers

The insulating oil in ground mounted transformers is sampled and tested to determine the presence and concentration of PCBs. Each make and model "cohort" of ground mounted transfer is tested to determine if the cohort is compliant (green), i.e. there are no PCBs present, or non-compliant (red), i.e PCBs are present. All our ground mounted transformers have been tested in previous years and are all categorised as compliant or non-compliant. As a result, in Annex A for 2023/24, we have reported a nil return for the number of assets tested in the year.

To address the non-compliant ground mounted transformers we can either replace the oil or replace the asset.

Pole mounted transformers

Pole mounted transformers are not designed to be internally inspected and do not have valves from which an oil sample can be taken. In Annex A, this is therefore reported as N/A for the number of assets tested in the year. PCB content can only be sampled when a pole mounted transformer is decommissioned as part of the disposal process.

To address this limitation, a statistical model has been developed in collaboration with the Environment Agency and the Energy Networks Association. Each Distribution Network Operator feeds decommissioning data into the model to determine which cohorts of pole mounted transformer are compliant and which are not. This is an ongoing process whilst the "amber" cohort is sorted into the red (non-compliant) or green (compliant) groups. Non-compliance is being addressed through our asset replacement programme.

PCB compliance programme

Overall, as of March 2024, we have replaced 1,671 units of the 16,742 declared as in scope in our ED2 submission (1,325 in ED1 and 346 in ED2). We estimate that more than 4,000 units will need to be replaced in ED2 – this assumes all non-compliant (red) units are replaced as well as 22 per cent of "undetermined" (amber) units. This could increase to over 6,000 replacements depending on the outcome of oil sampling on the "undetermined" (amber) units, which, as described above, will occur during the course of replacement and disposal works.

The data provided in Annex A is the best available information at the time of publishing and is a snapshot in time from March 2024. This is in line with our registration of PCB contaminated equipment with the Environment Agency. The number of units in the red and green cohorts is revised on a frequent basis as the industry statistical model is updated with PCB results. Also to note, since March 2024, asset replacement numbers have been updated and so this will be reported in the 2024/25 data.

Biodiversity and natural capital

Our long-term objective is to "improve the natural habitats in the regions we serve, to increase the variety and variability of species and ecosystems". By doing this, we will increase natural capital (the stock of natural resources) and improve ecosystem services (the way ecosystems provide for human wellbeing and quality of life). In this section, we provide details on some of the initiatives we have undertaken in 2023/24. Please also see the Visual Amenity section of this report, which outlines how removal of overhead lines has a positive impact on ecosystems.

Conservation mowing

In 2023/24 we identified 20 sites where we have implemented conservation mowing. Conservation mowing on our operational sites means only removing grass around pathways and borders, leaving the main areas free for insects and birds to thrive. We will continue to adopt conservation mowing in 2024/25 on sites where it is possible and safe to take this approach.

Major development – Seaham primary substation

We have identified that there is an urgent need for a new substation in Seaham, County Durham, to support future demand. This scheme is strategic investment funded by the Green Recovery Scheme. The provision of the new substation will increase network capacity to enable the safe and reliable operation of infrastructure for homes and businesses across Seaham. It will also support decarbonisation by accommodating increased adoption of low-carbon technology such as EV charging and powering low-carbon homes.

The site at Seaham has been identified jointly by Northern Powergrid and the council's Climate Change Strategy And Emergency Response Plan for County Durham (2022-24).

The Preliminary Ecological Appraisal conducted by specialist consultancy, OS Ecology, demonstrates that the proposed development will result in the following impacts on the site as existing:

- The loss of areas of grassland of at least local value for their diversity.
- The loss of habitats used by bat species for foraging and commuting.
- Potential harm to mammals during construction work, including badgers and hedgehogs. This can be managed via mitigation.
- Loss of habitat with the potential to be used by hedgehogs.
- Harm to nesting birds and their dependant young during site clearance, unless managed via mitigation and timing.
- The loss of habitats with the potential to support priority butterfly species.

In order to avoid and mitigate the adverse effects listed above, the following measures are proposed as part of design and a Construction and Environmental Management Plan:

- External lighting that could affect the site's suitability for bats will be avoided. If required, this will be limited to low level, avoiding use of high intensity security lighting.
- Works will not be undertaken during the nesting bird season (March to August inclusive) unless the site is checked by an appropriately experienced ecologist and nests are confirmed to be absent.

- Any excavations left open overnight will have a means of escape for mammals that may become trapped in the form of a ramp at least 300 mm in width and angled no greater than 45°.
- Retained trees will be protected from damage in line with the recommendations in BS5837:2012.
- Site design will minimise impacts to grassland areas where they are to be retained and will protect them from disturbance.
- Retained trees and hedgerows around the site boundaries will be protected from damage in line with the recommendations in BS5837:2012.

In addition to the above, and in order to completely mitigate and deliver ecosystem enhancement, the possibility of proportionate off-site contributions or delivery of off-site habitat enhancement will be discussed with Durham County Council as part of the wider strategy.

Biodiversity and natural capital

Wildflower planting

Native wildflower species can provide a host of benefits to the local ecosystem, providing bees, butterflies and other pollinators and insects with food, shelter and a place to breed. Biodiversity and wildflower planting is a primary focus for our social impact programme, which will deliver social impact projects in the areas around 50 per cent of our major works schemes in ED2.

This example, at one of our operational sites, also shows how beautiful wildflowers are increasing ecosystem services (the impact that nature has on our wellbeing).

Volunteering

We are in the process of implementing a new volunteering app to help facilitate and encourage employee volunteering across Northern Powergrid. One of the key target activities covered is environmental impact and increasing biodiversity in our operational regions. All Northern Powergrid employees have the opportunity to take part in volunteering activities and we will be promoting and encouraging this into 2024/25.

We will also continue to work with the Energy Networks Association to develop a natural capital tool to enable Northern Powergrid and the other DNOs to measure the effect we are having across all our operational activities.

Fluid-filled cables

Fluid-filled cables are part of our underground network of cables. They are managed and operated in line with the National Operating Code, which was published by the Environment Agency and the Energy Networks Association.

Fluid-filled cables have been in operation since the 1960s and were installed because the cable fluid acts as an excellent electrical insulator. However, no new fluid-filled cables are installed today because of the potential environmental impact of fluid losses from the cables.

Our management of fluid-filled cables compares well with other electricity DNOs in the country, although our exposure remains high because we have the third longest fluid-filled cable network and the second highest volume of fluid in our network compared with the other DNOs. We're addressing this through our fluid-filled cable replacement programme and by adopting innovative technologies to enable rapid detection and pinpointing of losses.
In our Environmental Action Plan, we committed to "Reduce fluid lost to ground and replace fluid-filled cable assets to remove leakage risk exposure".

15.5 km

Length of fluid-filled cable replaced in 2023/24

Managing fluid lost to the ground

Fluid lost to ground is one of the top concerns for stakeholders, particularly the Environment Agency, with the potential for fluid losses to result in contamination of water supplies and negative impacts to the wider environment. Losses can also lead to cable failure which could result in power cuts.

In 2023/24, the total amount of fluid loss from our network was 20,955 litres, which was significantly favourable to our target of 26,500 litres. In order to continue to minimise losses, we are committed to the following activities:

Fluid-filled cable replacement programme

In 2023/24, we have replaced 15.5 km of cable (5.7 km in Yorkshire and 9.8 km in the Northeast). This is significantly above the 8 km target for 2023/24 set out in our plan and equates to the removal of almost 41,000 litres of oil from our cable network. We will continue to replace high risk cables to further reduce environmental risk.

Perfluorocarbon tracer (PFT)

Perfluorocarbon tracer is a non-hazardous chemical which is injected into fluid-filled cables. When it leaks from the cable, this is easily detected from above the ground. This technique helps us to pinpoint the source of the leak quickly and therefore stop the oil from having a serious detrimental effect on the environment. While our plan was to inject 53.4 km of cable in 2023/24, we only achieved 7.1 km. We are currently reviewing our strategic plans in this area and are putting new contracts in place for this work.

Self healing technology

In collaboration with UKPN (United Kingdom Power Networks), Northern Powergrid is sponsoring the development of self-healing fluid. This is a product that exists in liquid form but reacts and hardens when exposed to oxygen. The joint innovation project is exploring the introduction of self-healing technology in fluid-filled cables.

The trial aims to demonstrate that this technology will assist in the containment of lower-level leaks when they occur. Results from tests conducted so far have been positive, and we will continue with this project and report further in next year's Annual Environmental Report.

Annex A

Key performance indicators (KPI) table

The data provided in this section is the best available information at the time of publication.

Business carbon footprint

Yorkshire

BCF scope 1 and 2	Category	Sub-category	Total baseline reduction target tCO_2e RIIO-ED2 2028	Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
	Operational transport	**Total**		tCO_2e	**1,976.98**	-	-	-	-
		Road		tCO_2e	1,976.98				
		Marine		tCO_2e	-				
		Air		tCO_2e	-				
	Building energy usage	**Total**		tCO_2e	**3,293.20**	-	-	-	-
		Electricity		tCO_2e	795.59				
		Other fuels		tCO_2e	-				
		Substation electricity		tCO_2e	2,475.07				
		Gas		tCO_2e	22.55				
	Fuel combustion	**Total**		tCO_2e	-	-	-	-	-
		Diesel (excluding transport)		tCO_2e	-				
		Diesel (embedded stations)		tCO_2e	-				
		Other		tCO_2e	-				
	Fugitive emissions	**Total**		tCO_2e	**2,233.44**	-	-	-	-
		SF_6		tCO_2e	2,233.44				
		Other IIG		tCO_2e	-				
	Total scope 1 and 2 emissions (excluding losses)		See total for NPg	tCO_2e	**7,503.62**	-	-	-	-
	Electricity distribution losses			tCO_2e	336,501.44				
	Total scope 1 and 2 Emissions (including losses)		**See total for NPg**	tCO_2e	**344,005.06**	-	-	-	-

Carbon offsets	Category			Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
	Total carbon offsets			tCO_2e	-				

Annex A

Key performance indicators (KPI) table

The data provided in this section is the best available information at the time of publication.

Business carbon footprint (continued)

Northeast

BCF scope 1 and 2	Category	Sub-category	Total baseline reduction target tCO_2e RIIO-ED2 2028	Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
	Operational transport	**Total**		tCO_2e	**1,938.94**	-	-	-	-
		Road		tCO_2e	1,938.94				
		Marine		tCO_2e	-				
		Air		tCO_2e	-				
	Building energy usage	**Total**		tCO_2e	**2,659.82**	-	-	-	-
		Electricity		tCO_2e	753.51				
		Other fuels		tCO_2e	-				
		Substation electricity		tCO_2e	1,732.82				
		Gas		tCO_2e	173.49				
	Fuel combustion	**Total**		tCO_2e	-	-	-	-	-
		Diesel (excluding transport)		tCO_2e	-				
		Diesel (embedded stations)		tCO_2e	-				
		Other		tCO_2e	-				
	Fugitive emissions	**Total**		tCO_2e	**204.45**	-	-	-	-
		SF_6		tCO_2e	204.45				
		Other IIG		tCO_2e	-				
	Total scope 1 and 2 emissions (excluding losses)		See total for NPg	tCO_2e	**4,803.21**	-	-	-	-
	Electricity distribution losses			tCO_2e	157,920.36				
	Total scope 1 and 2 emissions (including losses)		**See total for NPg**	tCO_2e	**162,723.57**	-	-	-	-

Carbon offsets	Category			Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
	Total carbon offsets			tCO_2e	-				

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Key performance indicators (KPI) table

The data provided in this section is the best available information at the time of publication.

Business carbon footprint (continued)

Total

BCF scope 1 and 2	Category	Sub-category	Total baseline reduction target tCO_2e RIIO-ED2 2028	Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
	Operational transport	**Total**		tCO_2e	**3,915.9**	-	-	-	-
		Road		tCO_2e	3,915.9				
		Marine		tCO_2e	-				
		Air		tCO_2e	-				
	Building energy usage	**Total**		tCO_2e	**5,953.0**	-	-	-	-
		Electricity		tCO_2e	1,549.1				
		Other fuels		tCO_2e	-				
		Substation electricity		tCO_2e	4,207.9				
		Gas		tCO_2e	196.0				
	Fuel combustion	**Total**		tCO_2e	-	-	-	-	-
		Diesel (excluding transport)		tCO_2e	-				
		Diesel (embedded stations)		tCO_2e	-				
		Other		tCO_2e	-				
	Fugitive emissions	**Total**		tCO_2e	**2,437.9**	-	-	-	-
		Sf_6		tCO_2e	2,437.9				
		Other iig		tCO_2e	-				
	Total scope 1 and 2 emissions (excluding losses)		8,920.0	tCO_2e	**12,306.8**	-	-	-	-
	Electricity distribution losses			tCO_2e	494,421.8				
	Total scope 1 and 2 emissions (including losses)		**374,130.0**	tCO_2e	**506,728.6**	-	-	-	-

Carbon offsets	Category			Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
	Total carbon offsets			tCO_2e	-				

Annex A

Key performance indicators (KPI) table

The data provided in this section is the best available information at the time of publication.

Sulphur hexafluoride (SF_6) and other insulation and interruption gases (IIGs)

Yorkshire

Category	Voltage	Sub-category (where applicable)	Decarbonisation target & metric to end of RIIO-ED2 (2028)	Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
SF_6 Bank	**LV**	Total no. of assets containing SF_6	**Sulphur hexafluoride (SF_6) and other insulation and interruption gases (IIGs)**	No. of assets	-				
		Total amount of SF_6 on network		kg	-				
		No. of SF_6 assets replaced (per annum)		No. of assets	-				
		No. of SF_6 alternative assets (per annum)		No. of assets	-				
		% of assets containing SF_6 (% of bank)		%	-				
		No. of SF_6 assets installed (per annum)		No. of assets	-				
SF_6 Emissions	**LV**	Leakage (per annum)		kg	-				
		Leakage rate (% of bank)	15% across all assets by 2028	%	-				
		Interventions (per annum)		#	-				
		Impact of Interventions		kg	-				

Category	Voltage	Sub-category (where applicable)	Decarbonisation target & metric to end of RIIO-ED2 (2028)	Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
SF_6 Bank	**HV**	Total no. of assets containing SF_6		No. of assets	11819				
		Total amount of SF_6 on network		kg	6537				
		No. of SF_6 assets replaced (per annum)		No. of assets	280				
		No. of SF_6 alternative assets (per annum)		No. of assets	-				
		% of assets containing SF_6 (% of bank)		%	31%				
		No. of SF_6 assets installed (per annum)		No. of assets	279				
SF_6 Emissions	**HV**	Leakage (per annum)		kg	2.1				
		Leakage rate (% of bank)	15% across all assets by 2028	%	0.03%				
		Interventions (per annum)		#	0				
		Impact of interventions		kg	0				

Annex A

Key performance indicators (KPI) table

The data provided in this section is the best available information at the time of publication.

Sulphur hexafluoride (SF_6) and other insulation and interruption gases (IIGs) (continued)

Yorkshire

Category	Voltage	Sub-category (where applicable)	Decarbonisation target & metric to end of RIIO-ED2 (2028)	Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
SF_6 Bank	**EHV**	Total no. of assets containing SF_6		No. of assets	613				
		Total amount of SF_6 on network		kg	6341				
		No. of SF_6 assets replaced (per annum)		No. of assets	6				
		No. of SF_6 alternative assets (per annum)		No. of assets	-				
		% of assets containing SF_6 (% of bank)		%	24%				
		No. of SF_6 assets installed (per annum)		No. of assets	5				
SF_6 Emissions	**EHV**	Leakage (per annum)		kg	66.5				
		Leakage rate (% of bank)	15% across all assets by 2028	%	1.05%				
		No. of SF_6 assets replaced (per annum)		#	-				
		Interventions (per annum)		#	1				
		Impact of interventions		kg	1.55				

Category	Voltage	Sub-category (where applicable)	Decarbonisation target & metric to end of RIIO-ED2 (2028)	Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
SF_6 Bank	**132kV**	Total no. of assets containing SF_6		No. of assets	385				
		Total amount of SF_6 on network		kg	7508				
		No. of SF_6 assets replaced (per annum)		No. of assets	-				
		No. of SF_6 alternative assets (per annum)		No. of assets	-				
		% of assets containing SF_6 (% of bank)		%	28%				
		No. of SF_6 assets installed (per annum)		No. of assets	2				
SF_6 Emissions	**132kV**	Leakage (per annum)		kg	26.4				
		Leakage rate (% of bank)	15% across all assets by 2028	%	0.35%				
		No. of SF_6 assets replaced (per annum)		#	-				
		Interventions (per annum)		#	1				
		Impact of interventions		kg	2.1				

Annex A

Key performance indicators (KPI) table

The data provided in this section is the best available information at the time of publication.

Sulphur hexafluoride (SF_6) and other insulation and interruption gases (IIGs) (continued)

Yorkshire

Category	Voltage	Sub-category (where applicable)	Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
IIG Name	**LV**	No. of assets with IIG	#	-				
		Amount of IIG	kg	-				
		Global warming potential of IIG	CO_2 comparison constant	-				
		Leakage	kg	-				
IIG Name	**HV**	No. of assets with IIG	#	-				
		Amount of IIG	kg	-				
		Global warming potential of IIG	CO_2 comparison constant	-				
		Leakage	kg	-				
IIG Name	**EHV**	No. of assets with IIG	#	-				
		Amount of IIG	kg	-				
		Global warming potential of IIG	CO_2 comparison constant	-				
		Leakage	kg	-				
IIG Name	**132kV**	No. of assets with IIG	#	-				
		Amount of IIG	kg	-				
		Global warming potential of IIG	CO_2 comparison constant	-				
		Leakage	kg	-				

Annex A

Key performance indicators (KPI) table

The data provided in this section is the best available information at the time of publication.

Sulphur hexafluoride (SF_6) and other insulation and interruption gases (IIGs) (continued)

Northeast

Category	Voltage	Sub-category (where applicable)	Decarbonisation target & metric to end of RIIO-ED2 (2028)	Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
SF_6 Bank	**LV**	Total no. of assets containing SF_6		No. of assets	-				
		Total amount of SF_6 on network		kg	-				
		No. of SF_6 assets replaced (per annum)		No. of assets	-				
		No. of SF_6 alternative assets (per annum)		No. of assets	-				
		% of assets containing SF_6 (% of bank)		%	-				
		No. of SF_6 assets installed (per annum)		No. of assets	-				
SF_6 Emissions	**LV**	Leakage (per annum)		kg	-				
		Leakage rate (% of bank)	15% across all assets by 2028	%	-				
		Interventions (per annum)		#	-				
		Impact of interventions		kg	-				

Category	Voltage	Sub-category (where applicable)	Decarbonisation target & metric to end of RIIO-ED2 (2028)	Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
SF_6 Bank	**HV**	Total no. of assets containing SF_6		No. of assets	2393				
		Total amount of SF_6 on network		kg	1842				
		No. of SF_6 assets replaced (per annum)		No. of assets	11				
		No. of SF_6 alternative assets (per annum)		No. of assets	-				
		% of assets containing SF_6 (% of bank)		%	11%				
		No. of SF_6 assets installed (per annum)		No. of assets	35				
SF_6 Emissions	**HV**	Leakage (per annum)		kg	-				
		Leakage rate (% of bank)	15% across all assets by 2028	%	-				
		Interventions (per annum)		#	0				
		Impact of interventions		kg	0				

Annex A

Key performance indicators (KPI) table

The data provided in this section is the best available information at the time of publication.

Sulphur hexafluoride (SF_6) and other insulation and interruption gases (IIGs) (continued)

Northeast

Category	Voltage	Sub-category (where applicable)	Decarbonisation target & metric to end of RIIO-ED2 (2028)	Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
SF_6 Bank	**EHV**	Total no. of assets containing SF_6		No. of assets	329				
		Total amount of SF_6 on network		kg	6471				
		No. of SF_6 assets replaced (per annum)		No. of assets	39				
		No. of SF_6 alternative assets (per annum)		No. of assets	-				
		% of assets containing SF_6 (% of bank)		%	14%				
		No. of SF_6 assets installed (per annum)		No. of assets	14				
SF_6 Emissions	**EHV**	Leakage (per annum)		kg	6.4				
		Leakage rate (% of bank)	15% across all assets by 2028	%	0.10%				
		No. of SF_6 assets replaced (per annum)		#	-				
		Interventions (per annum)		#	0				
		Impact of interventions		kg	0				

Category	Voltage	Sub-category (where applicable)	Decarbonisation target & metric to end of RIIO-ED2 (2028)	Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
SF_6 Bank	**132kV**	Total no. of assets containing SF_6		No. of assets	214				
		Total amount of SF_6 on network		kg	8931				
		No. of SF_6 assets replaced (per annum)		No. of assets	-				
		No. of SF_6 alternative assets (per annum)		No. of assets	-				
		% of assets containing SF_6 (% of bank)		%	34%				
		No. of SF_6 assets installed (per annum)		No. of assets	2				
SF_6 Emissions	**132kV**	Leakage (per annum)		kg	2.3				
		Leakage rate (% of bank)	15% across all assets by 2028	%	0.03%				
		No. of SF_6 assets replaced (per annum)		#	-				
		Interventions (per annum)		#	0				
		Impact of interventions		kg	0				

Annex A

Key performance indicators (KPI) table

The data provided in this section is the best available information at the time of publication.

Sulphur hexafluoride (SF_6) and other insulation and interruption gases (IIGs) (continued)

Northeast

Category	Voltage	Sub-category (where applicable)	Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
IIG Name	**LV**	No. of assets with IIG	#	-				
		Amount of IIG	kg	-				
		Global warming potential of IIG	CO_2 comparison constant	-				
		Leakage	kg	-				
IIG Name	**HV**	No. of assets with IIG	#	-				
		Amount of IIG	kg	-				
		Global warming potential of IIG	CO_2 comparison constant	-				
		Leakage	kg	-				
IIG Name	**EHV**	No. of assets with IIG	#	-				
		Amount of IIG	kg	-				
		Global warming potential of IIG	CO_2 comparison constant	-				
		Leakage	kg	-				
IIG Name	**132kV**	No. of assets with IIG	#	-				
		Amount of IIG	kg	-				
		Global warming potential of IIG	CO_2 comparison constant	-				
		Leakage	kg	-				

Annex A

Key performance indicators (KPI) table

The data provided in this section is the best available information at the time of publication.

Sulphur hexafluoride (SF_6) and other insulation and interruption gases (IIGs) (continued)

Total

Category	Voltage	Sub-category (where applicable)	Decarbonisation target & metric to end of RIIO-ED2 (2028)	Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
SF_6 Bank	**LV**	Total no. of assets containing SF_6		No. of assets	-				
		Total amount of SF_6 on network		kg	-				
		No. of SF_6 assets replaced (per annum)		No. of assets	-				
		No. of SF_6 alternative assets (per annum)		No. of assets	-				
		% of assets containing SF_6 (% of bank)		%	-				
		No. of SF_6 assets installed (per annum)		No. of assets	-				
SF_6 Emissions	**LV**	Leakage (per annum)		kg	-				
		Leakage rate (% of bank)	15% across all assets by 2028	%	-				
		Interventions (per annum)		#	-				
		Impact of interventions		kg	-				

Category	Voltage	Sub-category (where applicable)	Decarbonisation target & metric to end of RIIO-ED2 (2028)	Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
SF_6 Bank	**HV**	Total no. of assets containing SF_6		No. of assets	14212				
		Total amount of SF_6 on network		kg	8379				
		No. of SF_6 assets replaced (per annum)		No. of assets	291				
		No. of SF_6 alternative assets (per annum)		No. of assets	-				
		% of assets containing SF_6 (% of bank)		%	23%				
		No. of SF_6 assets installed (per annum)		No. of assets	314				
SF_6 Emissions	**HV**	Leakage (per annum)		kg	2.1				
		Leakage rate (% of bank)	15% across all assets by 2028	%	0.03%				
		Interventions (per annum)		#	-				
		Impact of interventions		kg	-				

Annex A

Key performance indicators (KPI) table

The data provided in this section is the best available information at the time of publication.

Sulphur hexafluoride (SF_6) and other insulation and interruption gases (IIGs) (continued)

Total

Category	Voltage	Sub-category (where applicable)	Decarbonisation target & metric to end of RIIO-ED2 (2028)	Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
SF_6 Bank	**EHV**	Total no. of assets containing SF_6		No. of assets	942				
		Total amount of SF_6 on network		kg	12812				
		No. of SF_6 assets replaced (per annum)		No. of assets	45				
		No. of SF_6 alternative assets (per annum)		No. of assets	-				
		% of assets containing SF_6 (% of bank)		%	19%				
		No. of SF_6 assets installed (per annum)		No. of assets	19				
SF_6 Emissions	**EHV**	Leakage (per annum)		kg	72.9				
		Leakage rate (% of bank)	15% across all assets by 2028	%	0.57%				
		No. of SF_6 assets replaced (per annum)		#	-				
		Interventions (per annum)		#	1				
		Impact of interventions		kg	1.55				

Category	Voltage	Sub-category (where applicable)	Decarbonisation Target & Metric to End of RIIO-ED2 (2028)	Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
SF_6 Bank	**132kV**	Total no. of assets containing SF_6		No. of assets	599				
		Total amount of SF_6 on network		kg	16439				
		No. of SF_6 assets replaced (per annum)		No. of assets	-				
		No. of SF_6 alternative assets (per annum)		No. of assets	-				
		% of assets containing SF_6 (% of bank)		%	30%				
		No. of SF_6 assets installed (per annum)		No. of assets	4				
SF_6 Emissions	**132kV**	Leakage (per annum)		kg	28.7				
		Leakage rate (% of bank)	15% across all assets by 2028	%	0.17%				
		No. of SF_6 assets replaced (per annum)		#	-				
		Interventions (per annum)		#	1				
		Impact of interventions		kg	2.1				

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Key performance indicators (KPI) table

The data provided in this section is the best available information at the time of publication.

Sulphur hexafluoride (SF_6) and other insulation and interruption gases (IIGs) (continued)

Total

Category	Voltage	Sub-category (where applicable)	Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
IIG Name	**LV**	No. of assets with IIG	#	-				
		Amount of IIG	kg	-				
		Global warming potential of IIG	CO_2 comparison constant	-				
		Leakage	kg	-				
IIG Name	**HV**	No. of assets with IIG	#	-				
		Amount of IIG	kg	-				
		Global warming potential of IIG	CO_2 comparison constant	-				
		Leakage	kg	-				
IIG Name	**EHV**	No. of assets with IIG	#	-				
		Amount of IIG	kg	-				
		Global warming potential of IIG	CO_2 comparison constant	-				
		Leakage	kg	-				
IIG Name	**132kV**	No. of assets with IIG	#	-				
		Amount of IIG	kg	-				
		Global warming potential of IIG	CO_2 comparison constant	-				
		Leakage	kg	-				

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Key performance indicators (KPI) table

The data provided in this section is the best available information at the time of publication.

Electricity distribution losses

Yorkshire

	Target RIIO2-ED2 2028	Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
Annual losses		GWh	1625.09				
Share of total electricity distributed		%	8.36				
Carbon equivalent		tCO_2e	336,501				
Annual interventions completed		#	147				
Impact of interventions (per annum)		MWh	-				
Impact of interventions (per annum)		tCO_2e	-				

Interventions – Description		Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
OPPORTUNISTIC: NPgY low-loss HV cable		#	75				
OPPORTUNISTIC: NPgY low-loss LV cable		#	70				
PROACIVE: NPgY Pre-1958 ground-mounted transformer replacement		#	1				

Interventions – Description		Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
OPPORTUNISTIC: NPgY low-loss HV cable		MWh	-				
OPPORTUNISTIC: NPgY low-loss LV cable		MWh	-				
PROACIVE: NPgY Pre-1958 ground-mounted transformer replacement		MWh	-				

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Key performance indicators (KPI) table

The data provided in this section is the best available information at the time of publication.

Electricity distribution losses (continued)

Northeast

	Target RIIO2-ED2 2028	Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
Annual losses		GWh	2695.12				
Share of total electricity distributed		%	6.15				
Carbon equivalent		tCO_2e	157,920				
Annual interventions completed		#	125				
Impact of interventions (per annum)		MWh	-				
Impact of interventions (per annum)		tCO_2e	-				

Interventions – Description		Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
OPPORTUNISTIC: NPgY low-loss HV cable		#	77				
OPPORTUNISTIC: NPgY low-loss LV cable		#	48				
PROACIVE: NPgY Pre-1958 ground-mounted transformer replacement		#	0				

Interventions – Description		Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
OPPORTUNISTIC: NPgY low-loss HV cable		MWh	-				
OPPORTUNISTIC: NPgY low-loss LV cable		MWh	-				
PROACIVE: NPgY Pre-1958 ground-mounted transformer replacement		MWh	-				

Total

	Target RIIO2-ED2 2028	Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
Annual losses	-	GWh	4,320.21				
Share of total electricity distributed	-	%	7.26				
Carbon equivalent	457,610	tCO_2e	494,422				
Annual interventions completed	-	#	271				
Impact of interventions (per annum)	-	MWh	-				
Impact of interventions (per annum)	-	tCO_2e	-				

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Key performance indicators (KPI) table

Please note, at present we are not able to provide a split of this data by licence area, we will provide the split in next year's annual report.

Supply chain management

Yorkshire

	Units	Target RIIO2-ED2 2028	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
Percentage of suppliers meeting licensee's supplier code	Cumulative % by annual spend	90	-				

Northeast

	Units	Target RIIO2-ED2 2028	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
Percentage of suppliers meeting licensee's supplier code	Cumulative % by annual spend	90	-				

Total

	Units	Target RIIO2-ED2 2028	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
Percentage of suppliers meeting licensee's supplier code	Cumulative % by annual spend	90	89				

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Key performance indicators (KPI) table

The data provided in this section is the best available information at the time of publication.

Sustainable resource use and waste

Yorkshire

Waste destination – Non hazardous/non special category	Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
Total waste produced directly by licensee	Tonnes	361.83				
Reused/recycled	%	55.52				
Energy from waste	%	43.77				
Sent to landfill	%	0.72				
Other	%	-				
Waste diverted from landfill (excluding compliance waste)	%	-				

Waste destination – Hazardous/special	Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
Total waste produced directly by licensee	Tonnes	707.90				
Reused/recycled	%	62.96				
Energy from waste	%	36.86				
Sent to landfill	%	0.19				
Other	%	-				
Waste diverted from landfill (excluding compliance waste)	%	-				

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Key performance indicators (KPI) table

The data provided in this section is the best available information at the time of publication.

Sustainable resource use and waste (continued)

Northeast

Waste destination – Non hazardous/non special category	Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
Total waste produced directly by licensee	Tonnes	202.93				
Reused/recycled	%	33.97				
Energy from waste	%	64.92				
Sent to landfill	%	2.24				
Other	%	-				
Waste diverted from landfill (excluding compliance waste)	%	-				

Waste destination – Hazardous/special	Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
Total waste produced directly by licensee	Tonnes	375.86				
Reused/recycled	%	39.18				
Energy from waste	%	60.81				
Sent to landfill	%	0.01				
Other	%	-				
Waste diverted from landfill (excluding compliance waste)	%	-				

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Key performance indicators (KPI) table

The data provided in this section is the best available information at the time of publication.

Sustainable resource use and waste (continued)

Total

Waste destination – Non hazardous/non special category	Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
Total waste produced directly by licensee	Tonnes	564.77				
Reused/recycled	%	47.78				
Energy from waste	%	51.37				
Sent to landfill	%	0.86				
Other	%	-				
Waste diverted from landfill (excluding compliance waste)	%	-				

Waste destination – Hazardous/special	Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
Total waste produced directly by licensee	Tonnes	1083.76				
Reused/recycled	%	54.71				
Energy from waste	%	45.16				
Sent to landfill	%	0.13				
Other	%	-				
Waste diverted from landfill (excluding compliance waste)	%	-				

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Key performance indicators (KPI) table

The data provided in this section is the best available information at the time of publication.

Visual amenity

Yorkshire

Visual amenity scheme	Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
Removal of overhead lines (due to a visual amenity scheme)	km	15.24				
No. of amenity schemes	#	2				
Other (if applicable)		-				

Northeast

Visual amenity scheme	Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
Removal of overhead lines (due to a visual amenity scheme)	km	1.20				
No. of amenity schemes	#	4				
Other (if applicable)		-				

Total

Visual amenity scheme	Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
Removal of overhead lines (due to a visual amenity scheme)	km	16.44				
No. of amenity schemes	#	6				
Other (if applicable)		-				

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Key performance indicators (KPI) table

The data provided in this section is the best available information at the time of publication.

Noise pollution

Yorkshire

Noise	Units	2023/2024
No. of complaints received	#	24
No. of complaints leading to intervention	#	3

Northeast

Noise	Units	2023/2024
No. of complaints received	#	21
No. of complaints leading to intervention	#	2

Total

Noise	Units	2023/2024
No. of complaints received	#	45
No. of complaints leading to intervention	#	5

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Key performance indicators (KPI) table

The data provided in this section is the best available information at the time of publication.

Polychlorinated biphenyls (PCBs)

Yorkshire

PCBs – Pole mounted transformers	Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
No. of assets PCB contaminated or statistically likely to be contaminated (i.e. no. remaining on PCB register held with environmental regulator)	#	2,888				
No. of assets PCB negative or statistically likely to be negative (i.e. no. that can be removed from PCB register held with environmental regulator)	#	5,235				
No. of asset replacements due to known or statistically likely PCB contamination	#	947				
No. of assets tested to confirm levels of PCB contamination	#	N/A				

PCBs – Ground mounted transformers	Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
No. of assets PCB contaminated or statistically likely to be contaminated (i.e. no. remaining on PCB register held with environmental regulator)	#	419				
No. of assets PCB negative or statistically likely to be negative (i.e. no. that can be removed from PCB register held with environmental regulator)	#	-				
No. of asset replacements due to known or statistically likely PCB contamination	#	-				
No. of assets remediated due to known or suspected PCB contamination	#	-				
No. of assets tested to confirm levels of PCB contamination	#	-				

PCBs – Other assets	Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
No. of assets PCB contaminated or statistically likely to be contaminated (i.e. no. remaining on PCB register held with environmental regulator)	#	-				
No. of assets PCB negative or statistically likely to be negative (i.e. no. that can be removed from PCB register held with environmental regulator)	#	-				
No. of asset replacements due to known or statistically likely PCB contamination	#	-				
No. of assets remediated due to known or suspected PCB contamination	#	-				
No. of assets tested to confirm levels of PCB contamination	#	-				

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Key performance indicators (KPI) table

The data provided in this section is the best available information at the time of publication.

Polychlorinated biphenyls (PCBs) (continued)

Northeast

PCBs – Pole mounted transformers	Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
No. of assets PCB contaminated or statistically likely to be contaminated (i.e. no. remaining on PCB register held with environmental regulator)	#	3,524				
No. of assets PCB negative or statistically likely to be negative (i.e. no. that can be removed from PCB register held with environmental regulator)	#	2,819				
No. of asset replacements due to known or statistically likely PCB contamination	#	1,329				
No. of assets tested to confirm levels of PCB contamination	#	N/A				

PCBs – Ground mounted transformers	Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
No. of assets PCB contaminated or statistically likely to be contaminated (i.e. no. remaining on PCB register held with environmental regulator)	#	10				
No. of assets PCB negative or statistically likely to be negative (i.e. no. that can be removed from PCB register held with environmental regulator)	#	-				
No. of asset replacements due to known or statistically likely PCB contamination	#	-				
No. of assets remediated due to known or suspected PCB contamination	#	-				
No. of assets tested to confirm levels of PCB contamination	#	-				

PCBs – Other assets	Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
No. of assets PCB contaminated or statistically likely to be contaminated (i.e. no. remaining on PCB register held with environmental regulator)	#	12				
No. of assets PCB negative or statistically likely to be negative (i.e. no. that can be removed from PCB register held with environmental regulator)	#	-				
No. of asset replacements due to known or statistically likely PCB contamination	#	-				
No. of assets remediated due to known or suspected PCB contamination	#	-				
No. of assets tested to confirm levels of PCB contamination	#	-				

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Key performance indicators (KPI) table

The data provided in this section is the best available information at the time of publication.

Polychlorinated biphenyls (PCBs) (continued)

Total

PCBs – Pole mounted transformers	Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
No. of assets PCB contaminated or statistically likely to be contaminated (i.e. no. remaining on PCB register held with environmental regulator)	#	6,412				
No. of assets PCB negative or statistically likely to be negative (i.e. no. that can be removed from PCB register held with environmental regulator)	#	8,054				
No. of asset replacements due to known or statistically likely PCB contamination	#	2,276				
No. of assets tested to confirm levels of PCB contamination	#	N/A				

PCBs – Ground mounted transformers	Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
No. of assets PCB contaminated or statistically likely to be contaminated (i.e. no. remaining on PCB register held with environmental regulator)	#	429				
No. of assets PCB negative or statistically likely to be negative (i.e. no. that can be removed from PCB register held with environmental regulator)	#	-				
No. of asset replacements due to known or statistically likely PCB contamination	#	-				
No. of assets remediated due to known or suspected PCB contamination	#	-				
No. of assets tested to confirm levels of PCB contamination	#	-				

PCBs – Other assets	Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
No. of assets PCB contaminated or statistically likely to be contaminated (i.e. no. remaining on PCB register held with environmental regulator)	#	12				
No. of assets PCB negative or statistically likely to be negative (i.e. no. that can be removed from PCB register held with environmental regulator)	#	-				
No. of asset replacements due to known or statistically likely PCB contamination	#	-				
No. of assets remediated due to known or suspected PCB contamination	#	-				
No. of assets tested to confirm levels of PCB contamination	#	-				

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Key performance indicators (KPI) table

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Fliud-filled cables

Yorkshire

Fluid-Filled cables oil loss	Sub category	Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
	FFC in service	km	318.9				
	Oil in Service	Litres	790,536.5				
	Cable oil top up litres	Litres	18,375.0				
	Fluid used to top up cables as a percentage of volume in service	%	2%				
	Removal of FFC	km	5.7				
	Leak reduction	Litres	14,130.0				
	Oil recovered	Litres	5,867.0				

Northeast

Fluid-filled cables oil loss	Sub category	Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
	FFC in service	km	431.1				
	Oil in Service	Litres	1,170,566.3				
	Cable oil top up litres	Litres	9,183.0				
	Fluid used to top up cables as a percentage of volume in service	%	1%				
	Removal of FFC	km	9.8				
	Leak reduction	Litres	26,611.5				
	Oil recovered	Litres	785.0				

Total

Fluid-filled cables oil loss	Sub category	Units	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028
	FFC in service	km	750.0				
	Oil in service	Litres	1,961,102.9				
	Cable oil top up litres	Litres	27,558.0				
	Fluid used to top up cables as a percentage of volume in service	%	3%				
	Removal of FFC	km	15.5				
	Leak reduction	Litres	40,497.1				
	Oil recovered	Litres	6,652.0				