

SSEN Distribution

ANNUAL ENVIRONMENTAL REPORT

2023/24



Scottish & Southern
Electricity Networks

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1. INTRODUCTION

1. EXECUTIVE SUMMARY

2023/24 is the first year of the five-year price control and has been primarily focused on the detailed planning for delivery throughout the remaining RIIO-ED2 period. This approach was intentional and critical in allowing us to be confident in delivering an extremely positive outcome to our customers during this price control period and beyond.

Following the success of being the first Distribution Network Operator (DNO) to have our 1.5°C science-based targets accredited by the Science Based Targets Initiative (SBTi) in 2021, this year we continue to lead by example having exceeded our SBTi absolute reduction target by achieving a 22% reduction in Scopes 1 and 2 from our baseline year.

We've had a successful year across many elements of our Business Carbon Footprint (BCF) profile, and we're continuing to make good progress, with further electrification of our vehicle fleet and increasing the use of fossil-fuel alternatives in our operations.

Our bank of SF₆ assets has increased due to the expansion of our network, and will continue to do so. With that in mind, we're ramping up the type-testing of alternatives in our asset policy to secure options for this delivery, as our network will continue to grow.

During 2023/24, we refreshed our losses strategy with a revised structure and added in the latest data and information to improve the clarity of the actions we're taking to reduce electrical losses for our stakeholders. We focused on updating and embedding our design standards for cable and overhead line sizing and improving the energy efficiency of our substations to reduce actual losses. As a result of our targeted interventions, we've achieved a calculated losses saving of 7,513MWh for 2023/24.

Embodied carbon - which is the carbon "spent" during the production, delivery and installation of new assets - is a new area of reporting for Ofgem, which we're required to start in Year 2. To this end, we've developed a reporting tool that is currently undergoing trials, and which we're confident will be ready on schedule. Our aim is to have typical embodied carbon levels for all material assets, then we will target reductions from this baseline.

In May 2023, we launched our Sustainable Supplier Code, and at the end of 2023/24 we had 37.5% of our supply chain (by spend) signed up. Throughout the year we've carried out extensive supplier engagement through webinars, in-person events and numerous direct supplier engagements. The demand for this engagement from suppliers continues to be high.

Our Sustainable Supplier Code included Invitation to Tender (ITT) questions in all one-off and framework tenders, launched our sustainability supplier awards and carried out numerous supplier engagement sessions.

Since April 2023 we've been working hard to ensure climate action is integrated into all our operations. We understand that strong engagement with our suppliers is crucial for the achievement of our sustainability ambitions, and so we've been taking a leadership approach to collaborate with our supply chain to facilitate full understanding of our sustainability values and ambitions, as well as engagement with all suppliers to further develop their own sustainability values to support and, where appropriate, drive ours.

We've made strides in the nature space, investigating options for the delivery of our ambitious Nature-based Solutions and Consumer Value Proposition. We became a founding business partner of Projects for Nature, a pioneering platform that connects businesses with on-the-ground nature projects in England. Through this platform, we're currently in discussions with projects within our SEPD licence area to identify where we can direct our allowances towards suitable habitat creation and restoration efforts. We've played an active role in steering the direction of the nascent nature markets through responding to consultations and attending roundtables in this space, setting out both our own and the sector's requirements and challenges.

The area where we were behind in 2023/24 was the delivery of our Polychlorinated biphenyls (PCB) transformer replacement programme. This was mainly down to the delivery challenges, which had driven the need to innovate to do things differently, and we're now really pleased to share some improvements on the delivery front. As predicted, we're seeing a significant ramp up across all of our PCB activities and whilst the programme is challenging, we're confident that with the additional planning work around delivery and the innovations deployed, we can recover in line with legislative requirements.

During 2023/24 we completed 11,357 interventions. Our efforts have included the development of a novel technique to retrieve oil samples for testing, and an award-winning collaboration with other DNOs on a statistical model, which can determine the likelihood of PCB contamination in pole mounted transformers (PMTs).

This is living proof that environment and sustainability is beginning to feel embedded across our operations. Our RIIO-ED2 Environmental Action Plan (EAP), supported by our Climate Resilience Strategy and Sustainability Strategy, will propel continuous improvement in our Environment and Sustainability ambitions as we progress through RIIO-ED2 and beyond.

For further details, please see section 4 onwards; further information on how we are progressing against our Climate Resilience Strategy and Sustainability Strategy can be found in the appendices.

For more information, see ssen.co.uk/sustainability.

“Our ED2 EAP enables a required step change in environmental performance from SSEN. In year one we have taken the time to plan our outputs and commitments in an efficient way, which will aid delivery in subsequent years and ensure we stay committed to doing the right thing for our customer. PCB programme is a challenge but already we're seeing recovery to plan in early stages of year 2. We have achieved our ambitious carbon targets and have made revolutionary change in our approach to nature. This is all reinforced with strong Climate Resilience thinking that feeds directly into our Asset Management and Investment decision making, ensuring sustainability issues are embedded in all that we do, and the way we do it.”

Shirley Robertson
SSEN's Head of Strategic Planning
and Sustainability





OUR EAP COMMITMENTS

The table below details our business plan outputs and further Environmental Action Plan commitments, with the latter being denoted by a leaf.

COMMITMENTS	TARGET	CONSUMER BENEFIT	STATUS	COMMENTARY
S1. Environmental Action Plan	Produce and report annually on an Environmental Action Plan (EAP).	Decarbonisation and improved environmental performance of our network and the wider community. Improved air quality, reduced carbon emissions and net zero.	🌿	
S2. Set Science-based Targets, accredited with the SBTi	Set an ambitious 1.5°C SBT (including losses) requiring at least a 35% reduction in our carbon footprint by 2028.	Reduced carbon emissions. Targeting embodied carbon through supply chain.		
S2.1. Reduce travel-related emissions	Electrify 80% of our core vehicle fleet by 2028, reduce our average road mileage by 15% (from pre-covid levels) and limit air travel where possible.	£1.9m societal benefits delivered by reduction in carbon emissions.	🟡	At the end of 2023/24 we had 29% of our vehicles under the EV100 commitment that had transitioned to an EV. This percentage is a mixture of company cars and operational vans. Transitioning is limited by lease dates and the availability of electric commercial vehicles. We have trialled other vehicle types such as hydrogen fuelled but these are still not available on a large scale and are currently investigating using Hydrotreated Vegetable Oil (HVO) as a transitional fuel to minimise greenhouse gas emissions until we have the EV alternatives available.
S3. Reduce emissions from mobile diesel generation during interruptions	Reduce emissions by replacing mobile generators wherever possible with lower carbon alternatives or by using alternative lower carbon fuel types by 2028.	£1.4m financial benefits delivered by reduced fuel costs. £1.5m societal benefits delivered by a reduction in carbon emissions and improved air quality.	🌿	HVO has been used as fuel for mobile diesel generation instead of diesel as a way of reducing carbon emissions. A total of 1537 tonnes of 'Scope 1' CO2e have been avoided by using the alternative fuel.
S4. Reduce reliance on back up embedded diesel generation on our islands	Reduce reliance on diesel back-up generation, exploring local solutions and flexibility opportunities from the start of RIIO-ED2.	£0.4m financial benefits from reduced fuel costs. £0.2m societal benefits from reduced carbon emissions.		KPI to be agreed.
S5. Manage losses on our network	Implement a strategy to efficiently manage losses on our network in the long-term: Re-classify losses as a Scope 2 emission and act to reduce actual losses.	Reduced transformer losses by up to 30% through our TASS project. Substation Energy Efficiency improvements. Manage significant losses incrementally across our network by applying loss reduction tech first. £36m societal benefits delivered by energy savings and lower carbon emissions as a result of reduced losses.	🌿	



COMMITMENTS	TARGET	CONSUMER BENEFIT	STATUS	COMMENTARY
S6. Reduce SF₆ emissions from our assets	Reduce emissions from our assets by a minimum of 35%, report on and begin reducing our holdings.	Reduction in the amount of toxic gas emitted by our assets, in line with our 1.5°C SBT. £2.5m societal benefits delivered by reduction in carbon emissions.		
S7. Nature-based solutions for carbon removal	Plant 258 hectares of native woodland and restore 522 hectares of peatland in our licence areas, which are expected to remove up to 65,000 tCO ₂ e by 2045.	Biodiversity baselining. A transformational and longer-term approach for net zero, that provides a legitimate and transparent record of carbon abatement. Improved air quality and local habitats.		
S8. Reduce leakage from fluid-filled cables	Replace 72km of fluid-filled cable and reduce oil leakage by 20% relative to 2019/20.	£15m societal benefit delivered by reducing oil leakage.		
S9. Undergrounding in Areas of Outstanding Natural Beauty and National Parks	Complete undergrounding of up to 83km of lines.	Improved visual amenity of lines in National Parks and Areas of Outstanding Natural Beauty.		
S10. Complete flood-related activities in compliance with obligations	Complete works at c.73 sites across our network in line with ETR138.	Reduced impact of flooding on our network leading to improved resilience to climate change.		
S11. Sustainable Supplier Code	Sign up 80% of our supply chain (by value) by 2028 to our Sustainable Supplier Code.	Contribution to lower emissions across multiple companies in our supply chain.		
S11.1 Environmental reporting	Create environmental reporting to include Embodied Carbon and Biodiversity.	Reduce lifecycle emissions and embed circular economy principles to reduce waste. Create biodiversity baseline. Take efficient actions to reduce noise pollution and report on these actions.		
S12. Protecting marine biodiversity: Life below water	Explore opportunities to improve our marine environment.	Restoring ancient seagrass beds that have been destroyed by seabed activity provides carbon sequestration rates three times higher than on-land planting. Improved natural habitats and protection against coastal erosion. £3.3m net benefit to the environment.		
S13 Resource use and waste	Commit to Zero Waste to Landfill (excluding compliance waste) by 2028.	Reduced waste from operations. Resource Use Standards in place by 2023.		


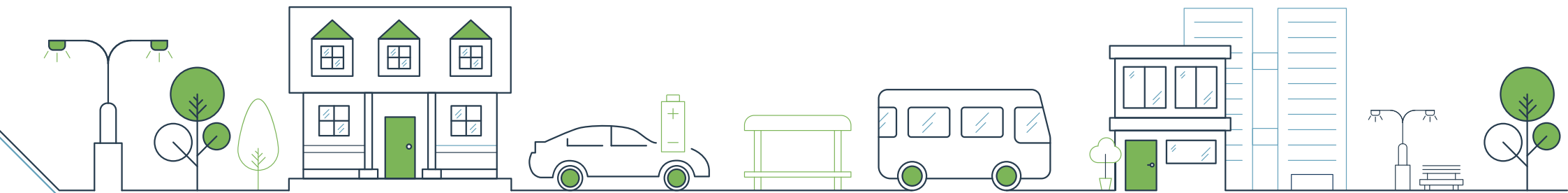
COMMITMENTS	TARGET	CONSUMER BENEFIT	STATUS	COMMENTARY
S14. Polychlorinated Biphenyl (PCB) compounds	Removal of all PCB-contaminated assets from our network by 31 December 2025.	Compliance with new legislative requirement to remove PCB across all DNOs. Transparency on the volume of PCB-contaminated equipment on the network (through our Annual Environmental Report).		By the end of 2023/24 we had delivered oil sampling and PCB testing for most of our ground mounted transformers (GMTs), with accessible sample points. We've developed a novel procedure to sample GMTs that don't have accessible sample points, without interrupting customer supplies, and expect to complete the remainder by early 2025. Fewer than 4% of our GMTs are contaminated with PCBs, and successful trials have proven they can be decontaminated with oil changes. GMT decontamination will be rolled out as a standard procedure during 2024/25 and we're on track to complete this by the end of December 2025. We delivered almost 1,500 pole mounted transformer (PMT) replacements during 2023/24, and work is ramping up to deliver outstanding replacements by the end of December 2025. The required volume of PMT replacements is determined by a statistical model fed with test results from PMTs from all GB DNOs, and is updated on a regular basis. As the deadline approaches a risk remains that the required volume may increase, depending on test results returned. Together with our PMT replacements, the statistical model output enabled us to remove almost 4,700 PMTs from our PCB registers held with environmental regulators.
S15. Bunding	We will construct bunding to bring assets in line with current Oil Storage Regulations with particular focus on assets that are in environmentally sensitive areas.	Reduce the risk of pollution from un-bunded equipment in environmentally sensitive areas.		

Table 1: Our EAP Commitments

For more information on our Environmental Action Plan and business plan commitments, please visit:

ssenfuture.co.uk/wp-content/uploads/2022/03/A_13.1_EAP_CLEANOFGEM.pdf





2. WHO WE ARE

Scottish and Southern Electricity Networks (SSEN) is the trading name of the two Distribution and one Transmission businesses that form part of the FTSE-100 energy company, SSE.

This report focuses on the two Distribution businesses, Scottish Hydro Electric Power Distribution plc (SHEPD), that operates to the north of the central belt of Scotland, and Southern Electric Power Distribution plc (SEPD) that operates in central southern England, as shown in Figure 1.

OUR DISTRIBUTION NETWORK AT A GLANCE

Over **3.9million** homes and businesses

More than **987,500** customers on our Priority Services Register

Over **128,000km** of overhead lines and underground cables

Over **460km** of subsea cables powering our island communities

Over **4,400** employees across the country

Figures as of October 2024

North of Scotland
SHEPD LICENCE AREA



Central Southern England
SEPD LICENCE AREA

Figure 1: Summary of SSEN Distribution



3. PURPOSE OF THIS REPORT

The purpose of this report is to provide stakeholders with a transparent and public account of our commitment to addressing environmental matters in RIIO-ED2. This includes, but is not limited to, our role in the low carbon transition. It's intended to provide a holistic overview and clear rationale for our actions and details of actual benefits to customers. It also provides an important update on our continuing progress to meet our environmental targets and demonstrates how stakeholders shape this going forward e.g. through continued engagement on our strategies and focus areas, as well as their role in specific environmental initiatives such as our visual amenity projects.

We have a duty to efficiently supply electricity to our customers as well as also protect, and maintain, the environment we operate in whilst doing so through our regulatory licence.

Therefore, we continually seek to:

- Evaluate and mitigate environmental and sustainability risks during the design and construction phases of our projects.
- Reduce the amount of overhead line in designated areas.
- Reduce our business carbon footprint.
- Reduce the amount of oil leakage caused by our assets.
- Reduce SF₆ emissions from our assets.
- Keep distribution losses as low as reasonably practicable.
- Continuously innovate to reduce our environmental impact.





4. MANAGING OUR ENVIRONMENTAL IMPACT

We're committed to managing our environmental impact and avoiding any damage to the communities in which we operate. We've got dedicated workstreams to address this.

This section details the various activities we have been engaging in to meet our RIIO-ED2 environmental commitments and covers the following environmental considerations:



Business carbon footprint - We're committed to reducing our business carbon footprint by reducing emissions associated with diesel consumption, energy usage in our buildings and by keeping electrical losses as low as reasonably practicable. We're also committed to minimising the amount of SF₆ that leaks from our assets, amongst other emissions reduction efforts.



Visual amenity – The act of undergrounding overhead lines in designated areas including Area's of Outstanding Natural Beauty (AONB), Natural Scenic Areas and National Parks. Projects to remove overhead lines are initiated by our stakeholders to ensure areas are targeted to provide the best value for the consumer and return the locations to a more natural state.



Oil leakage - Many of our assets contain oil which is essential for insulation and providing electrical safety. However, oil leakage from these assets can cause environmental harm. As a result, we're tactically reducing oil leakage by replacing specific high-risk assets to minimise and mitigate environmental harm.



Additional environmental activities - We engage in a host of environmental activities across our licence areas. The implementation of flood protection defenses, contaminated land clean-up efforts and further innovations providing environmental benefits, as well as community fund raising and improving employee awareness, are just some of the projects we participate in to help maintain and protect our local environment.





5. BUSINESS CARBON FOOTPRINT (BCF)

5.1. SUMMARY

SSEN Distribution operates over a wide geographical area across central southern England and the north of Scotland, employing thousands of people to maintain and operate the network. We're committed to reducing our BCF by reducing our GHG emissions across the board, including those associated with diesel consumption, energy usage in our buildings and network losses. We are also committed to minimising the amount of SF₆ that leaks from our assets.

This section provides a transparent account of the impact that our business activities have on the environment and our progress against our emissions reduction target for RIIO-ED2. It details the total GHG emissions produced in both SHEPD and SEPD licence areas from our base year, 2019/20, to the 2023/24 reporting year. Our BCF is published as part of our company reporting obligations and reported annually to Ofgem as part of our distribution licence requirements.

We saw an increase in emissions from last year of 5.5%. This is due to the emissions factor change for losses in the year due to a greater national reliance on fossil fuel generation. We've still exceeded our 2023/24 ED2 reduction target from Baseline of our Scope 1 and 2 achieving a 22% reduction of emissions against a 15% target. Excluding network losses, we've seen a reduction of 29% in SEPD and an increase of 27.6% in SHEPD – this translates as an actual reduction of 5,511 tCO₂e from the previous year.

We continue to make good progress with further electrification of our vehicle fleet and increasing the use of fossil-fuel alternatives in our operations (for e.g. hybrid generators, battery powered vegetation management tools, and diesel alternatives, such as HVO) and an increase in energy efficiency measures throughout our buildings.

In 2023/24, the combined total Scopes 1 and 2 GHG emissions, including network losses, were calculated at 457,950 tCO₂e – a 24,065 tCO₂e increase over the previous reporting period. The national electricity emission factor increase impacted our footprint due to the losses' significance. When including Business Transport and Contractor Transport emissions, our 2023/24 total is 460,057 tCO₂e – a 24,796 tCO₂e increase from 2022/23. Figures 2 and 3, show our total GHG emissions by source for the 2023/24 reporting period, with and without losses.

For further details on losses, please see [AER KPI Tables and worksheet E3 – BCF Snapshot linked to the Appendix of this report.](#)

2023/24 Greenhouse gas emissions by source

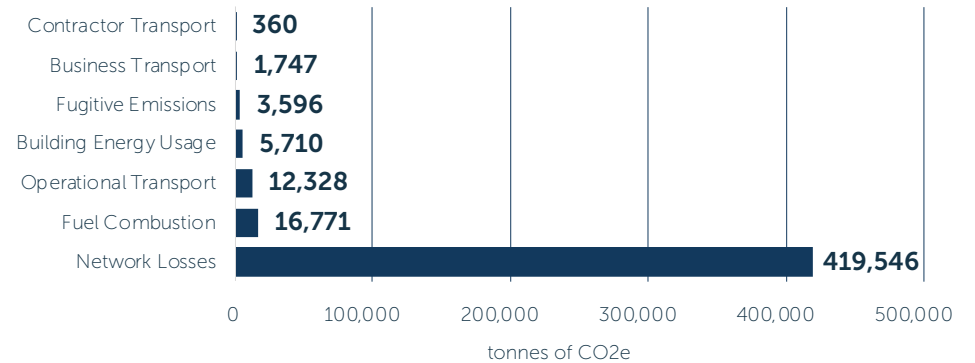


Figure 2. 2023/24 Greenhouse gas emissions by emissions Source

2023/24 Greenhouse gas emissions by source excluding losses

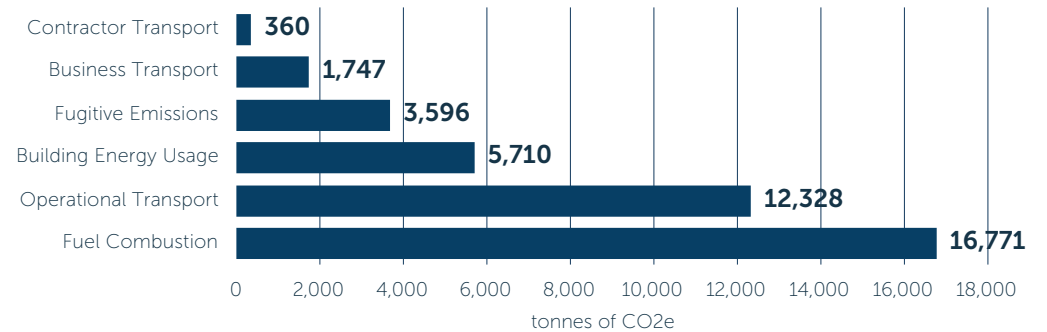


Figure 3. 2023/24 Greenhouse gas emissions by emissions source, excluding losses.



5.1.1. METHODOLOGY

In the following sections, we document our energy usage from offices and substations, distribution losses, transport emissions (both operational and business), fuel combustion, and fugitive emissions from SF₆. The reported data for some emissions sources also takes account of several of our larger contractor emissions as required in Ofgem’s Environment and Innovation Regulatory Reporting Pack.

We collate the data from across our business using the methodology described within international GHG emissions accounting standards, the GHG Protocol and ISO14064-1. We convert our data to equivalent tonnes of carbon dioxide (tCO₂e) using conversion factors as provided by the Department for Business, Energy, and Industrial Strategy (BEIS) for annual reporting to Ofgem.

5.1.2. BUSINESS CARBON FOOTPRINT CALCULATIONS AND RESULTS

In 2023/24, our combined total GHG emissions across the SHEPD and SEPD licence areas, including network losses, was calculated at 460,057 tCO₂e – a 24,796 tCO₂e (5.7%) increase over the previous reporting period 2022/23.

The increase in our emissions was driven by the increase of the electricity emission factor intensity between years. In 2022/23 the emission factor was 0.1934kg CO₂e/kWh, and it increased by 7% for 2023/24, reaching 0.2071kg CO₂e/kWh. Network losses are a significant part of our BCF and any changes to its factor impacts our results.

Several of our Scottish islands are supplied by a single circuit. In fault and maintenance conditions we rely on embedded generation to maintain security of supply. Due to an increase in storm activity and coverage for transmission outages, we’ve seen an increase in running times, resulting in an increase in the associated emissions by 137% in the year.

We now expect the reliance on these stations to increase compared to ED1 as a result of the amount of work planned in both the SSEN Transmission and SSEN Distribution networks to enable net zero. Therefore, during RIIO-ED2, we have proposed more environmentally-friendly solutions to continue to reduce the reliance on diesel power stations, including the deployment of innovative technological solutions, the utilisation of fossil fuel alternatives, and strengthening our resilience in the north of Scotland by exploring local solutions and flexibility services.

Our total operational emissions for the RIIO-ED1 period, against our absolute reduction target, are shown in Figure 4, For RIIO-ED2, through our SBT, we’re committed to reducing our emissions by 35% by 2028, from our 2019/20 baseline.

Annual BCF (tCO₂e) excluding network losses

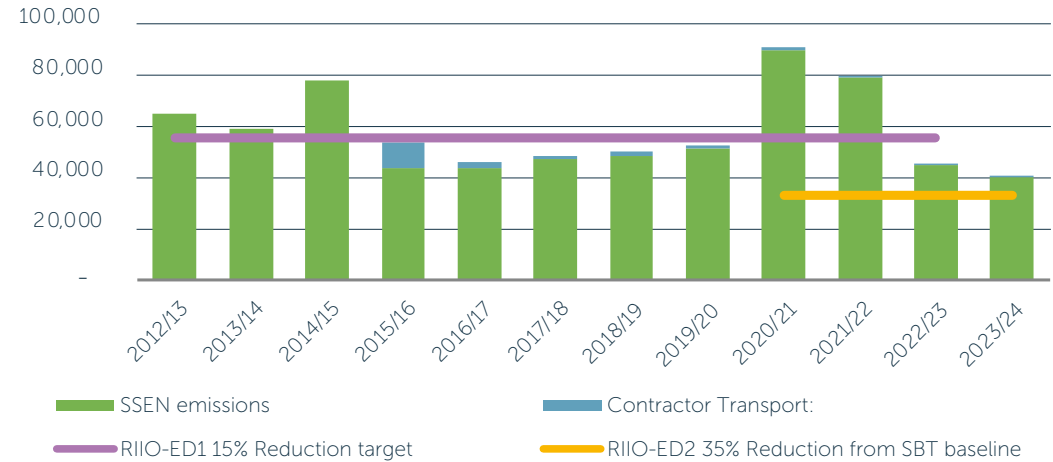


Figure 4: SHEPD and SEPD Historical GHG Emissions (tCO₂e) by Emissions Source (Excluding Losses)





As shown in Figure 4, our BCF, excluding losses, has decreased by 37.6% from 2012/13, highlighting the positive action undertaken in our operations to reduce our environmental impact whilst ensuring security of supply to our 3.9m customers throughout our SHEPD and SEPD licence areas.

Figure 5, shows the contribution that our network losses make to our overall BCF in relation to our operational emissions and contractor emissions across both SHEPD and SEPD licence areas over the past 12 years. As shown, network losses make up the largest proportion of our total BCF.

In 2023/24, network losses across both licence areas made up 91.2% of our total GHG emissions. Therefore, we continually strive to keep network losses as low as is practically possible.

Figure 5 shows how our emission trajectory associated with losses has dropped significantly over the RIIO-ED1 period, but had an increase due to the emission factor intensity during this first year of ED2. The emission factor is updated every year following the latest published figures by DESNZ (formally BEIS). Through our Losses Strategy, we adopt more pro-active measures to reduce network losses e.g. increasing minimum cable size and reducing energy theft.

For further details on losses, please see AER KPI Tables and worksheet E3 – BCF Snapshot linked to the Appendix of this report.

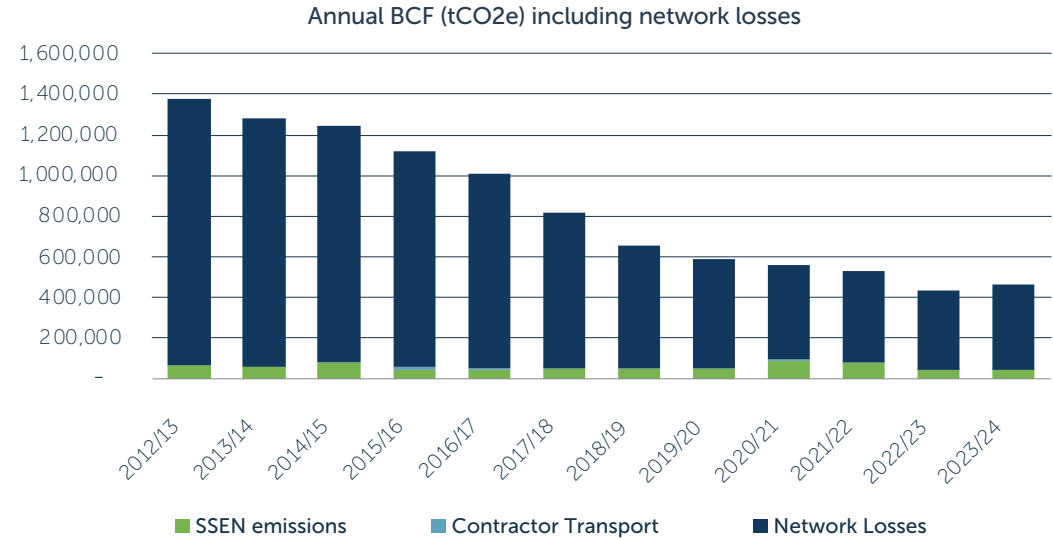


Figure 5: SHEPD and SEPD Historical (tCO2e) by Emissions Source (Including Losses)

5.1.3. REDUCING OUR TRAVEL-RELATED EMISSIONS

Figure 6, shows the emissions associated with our total transport (business and operational), which significantly reduced over the RIIO-ED1 period. 2023/24 has been a year with the highest Business Transport emissions since the Covid-19 pandemic started, with increased emissions from flights and operational transport.

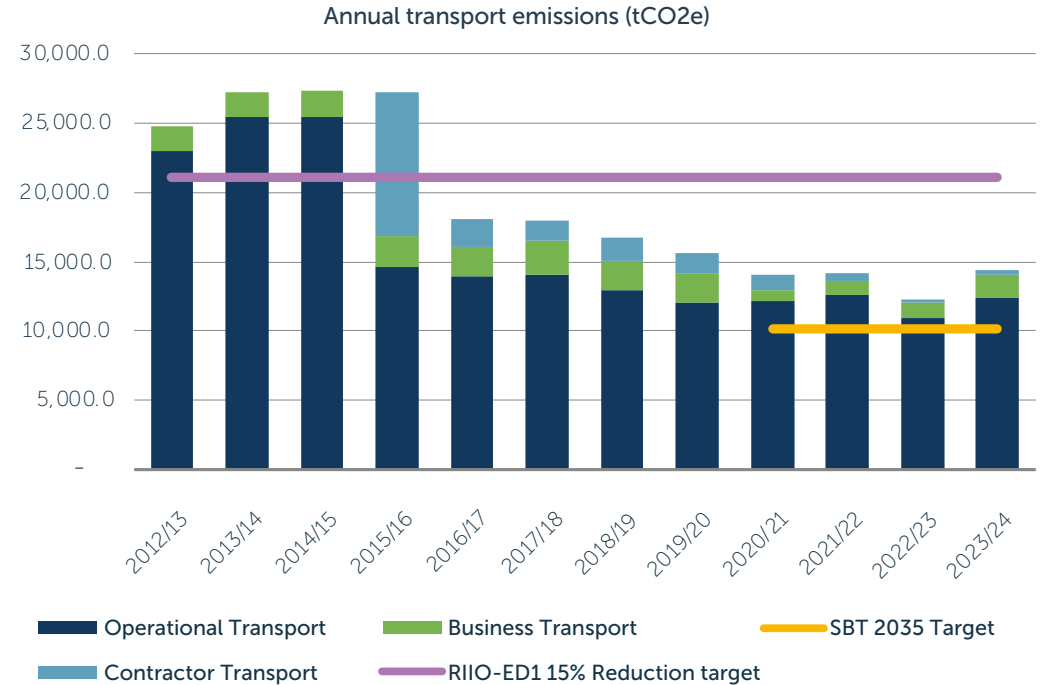


Figure 6: Annual Transport Emissions (tCO2e)





OPERATIONAL TRANSPORT

Operational transport emissions are those coming from vehicles owned or controlled by the reporting company. For us, this refers to our large fleet of commercial vehicles (generally vans and lorries) that allow engineers to service our network, and which are either owned, leased or hired. Helicopter fuel consumption is also considered an operational transport under our reporting. Although leased or hired vehicles are technically a Scope 3 GHG emission under the GHG Protocol, our lease/hires are long-term and controlled by us, therefore, we classify them as a Scope 1 GHG emission (for vehicles that consume fuel) and Scope 2 (for vehicles that consume electricity). In our RIIO-ED2 EAP we committed to at least a 35% reduction in Scope 1 and 2 emissions by 2028 and to electrify 80% of our core vehicle fleet where supply allows. We also made a commitment to transition our <3.5t fleet to 80% EV and our 3.5-7t fleet to 40% EV by the end of ED2 as part of our EV100 commitment.

SSE has made a commitment to transition as much of its fleet that is operationally practicable to zero emissions by 2030, with a strategic commitment alongside over 100 global companies in joining the Climate Change Groups' EV100 programme. Currently we have 1,707 vehicles that fall under the EV100 commitment with 495 (29%) of these having been swapped across to an EV.

Unfortunately, there is still limited choice of MDV and HDV electric commercial vehicles being manufactured and available for fleet operators especially utility companies. While we have trialled a limited choice of commercial vehicles of other energy vector types such as hydrogen (fuel cell) manufacturing over the past twelve months, these vehicles are not yet manufactured on a large scale and available for fleets.

Our SSE Group fleet team is currently investigating using HVO as a transitional fuel until we have the EV alternatives available.

BUSINESS TRANSPORT

Business Transport emissions are from the transportation of employees for business-related activities in vehicles owned or operated by third parties, and are a Scope 3 emission. In our RIIO-ED2 EAP we committed to a reduction in business road mileage and to limit air travel where possible from pre-Covid levels.

In 2023/24 our average business road mileage equated to 3,491, equating to a 26% reduction from our 2019/20 base year, which means we are on track to meet our RIIO-ED2 business plan commitment to reduce our average business road mileage by 15%. We continued to utilise flexible working arrangements, conduct engagements virtually using digital technologies and challenged the necessity of road travel to help meet this target. Figure 7, outlines our progress against our business road mileage target for RIIO-ED2.

In 2023/24, the number of return flights undertaken equated to 0.4 per employee which means we are on track to meet our RIIO-ED2 business plan commitment to managing return flights to average 0.4 per employee per year. We continued to use virtual meeting platforms, deliver travel awareness communications, and challenged the necessity of air travel to help meet this target.

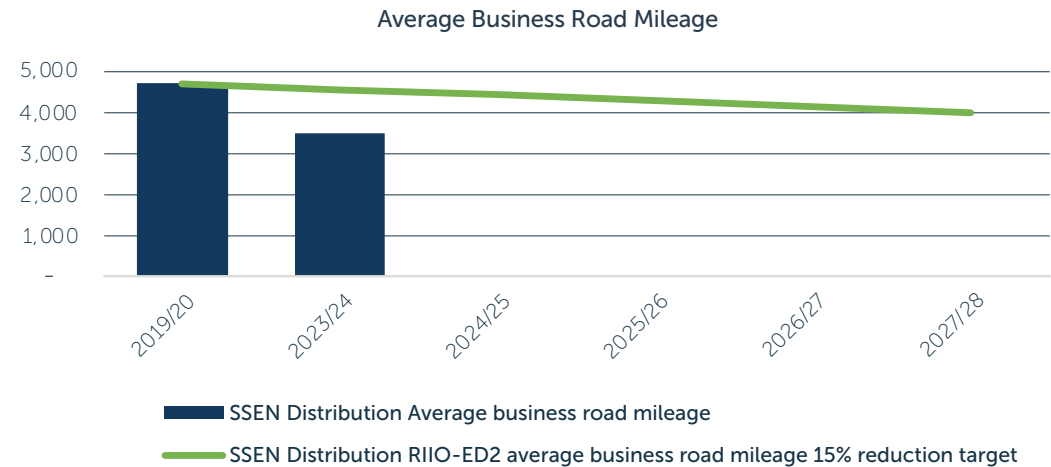


Figure 7: Annual average business road mileage over the RIIO-ED2 period (SHEPD and SEPD)

CONTRACTOR TRANSPORT

As shown in Figure 8, our contractors' transport emissions have exhibited a downward trend from 2015/16. This is because we made a decision to shift away from using 'external' contractors in 2016/17, with several core areas being brought into the Networks business. It should be noted that contractor emissions were recorded as part of operational transport prior to 2015/16. After this point they were recorded separately as shown in Figure 8.

Contractor transport emissions were previously calculated by converting spend values into mileage before multiplying by the road emission factors from DESNZ. Starting in 2023/24 the emissions are calculated using the spend data multiplied by DESNZ Input-Output factors without the mileage conversion.

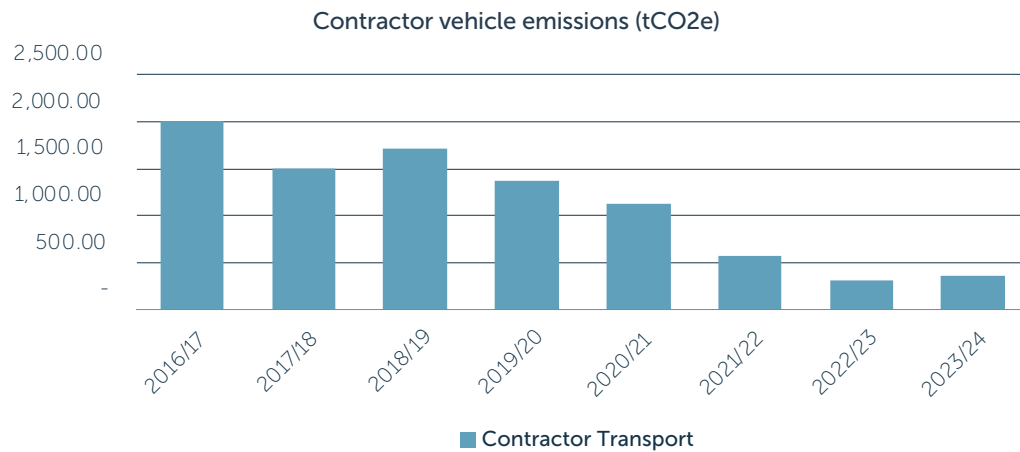
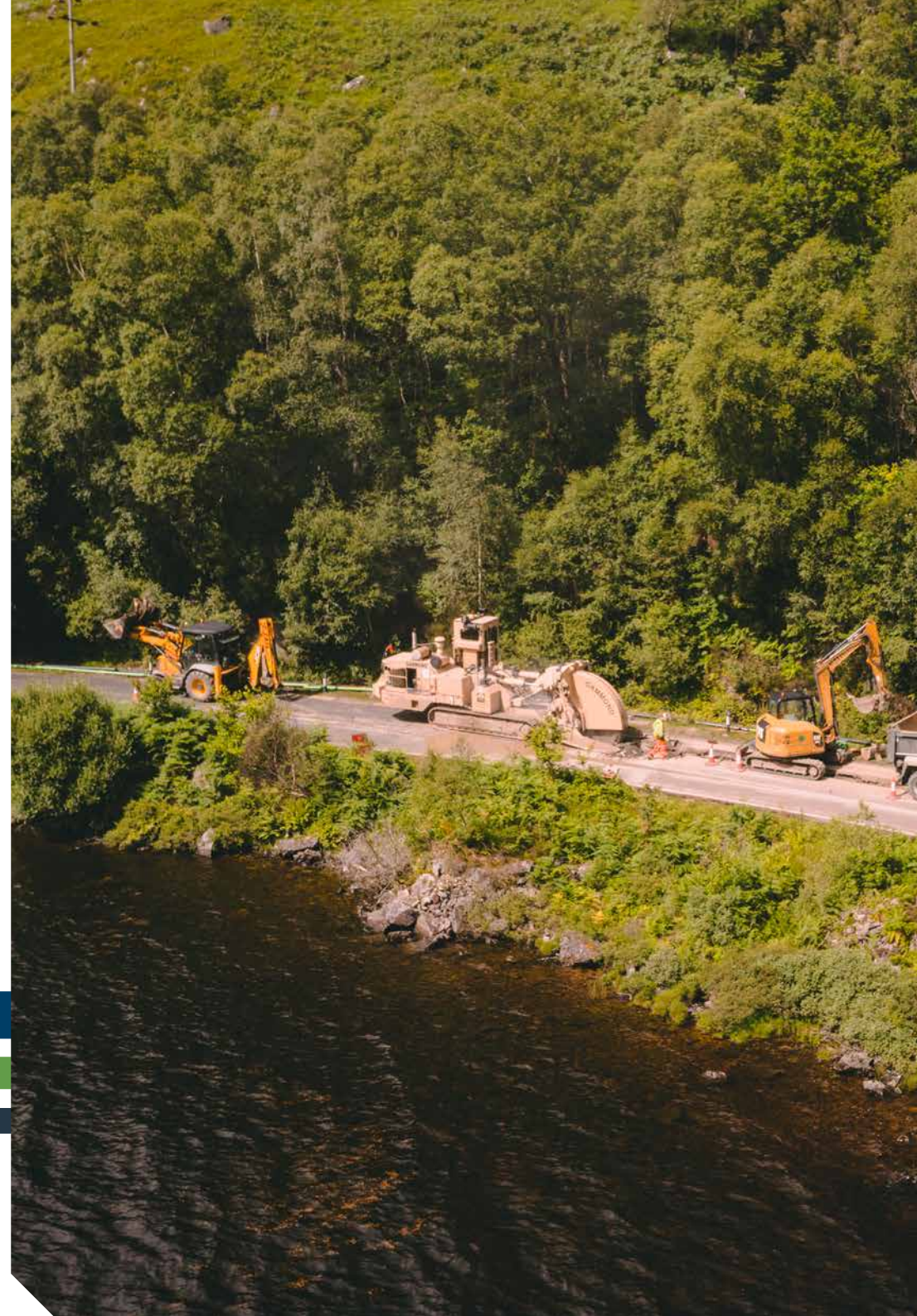


Figure 8: Contractor vehicle emissions (tCO₂e)





5.1.4. REDUCING OUR ENERGY CONSUMPTION

SSEN makes up one part of the wider SSE Group, which is comprised of several other businesses. In 2023/24 SSE Group’s non-operational building carbon footprint has increased in GHG emissions, mainly due to the grid carbon factor. By sharing building space with other SSE businesses, we can reduce costs as well as energy consumption.

To date, investments in a range of energy efficiency projects have been successful in returning financial and GHG emissions savings. Further details of this can be seen in Table 2.

To report our portion of SSE Group’s total energy consumption emissions across SHEPD and SEPD, we adopted a recharge model which is based on number of employees per SSE business. The total building energy usage carbon emissions for SSEN is shown in Figure 9. The figure shows we are reducing our energy-related emissions from our 2019/20 baseline, despite a slight increase for 2023/24 mainly due to the emission factor intensity.

In 2023/24, electricity usage decreased by around 1% whilst gas usage **decreased by around 21%** compared to the previous reporting year. The almost stable numbers in electricity usage are a combination of maintaining an improved data capture methodology and overall stable occupancy of offices.

For further details on losses, please see AER KPI Tables and worksheet E3 – BCF Snapshot linked to the Appendix of this report.

SSE GROUP TARGET

SSE Group has an internal target of 5% GHG emissions reduction per three-year period (up until 2030) based on 2017/18 baseline. However, from the 1 April 2022, a new SSE Group GHG emissions reduction target was reported to align with their ambition of achieving a net zero non-operational buildings estate by 2035.

Performance is measured going forward against a revised annual reduction target of 7.19% against a 2021/22 baseline. SSE Group reports that its non-operational estate net zero target was 2.4% ahead of the target in 2023/24. Latest data confirms that 100% of electricity supplied to SSE’s facility managed offices and depot sites is sourced from renewable generation.

During 2023/24, energy efficient investments included building energy management systems (BEMS) upgrades at five office sites, the installation of LED lighting at facility-managed and depot sites and investments in energy efficient air conditioning including the installation of energy efficient air source heat pumps and new chillers utilising low global warming potential (GWP) and zero ozone depletion potential (ODP) refrigerant gases.

Measures included a £750,000 investment at SSE’s Perth headquarters for upgraded energy efficient LED lighting and air conditioning systems; a £200,00 investment in a new energy efficient chiller at SSE’s Havant site; investment in solar PV generation at Inverness and Isle of Wight office and depot sites; and BEMS upgrades totalling £120,000.

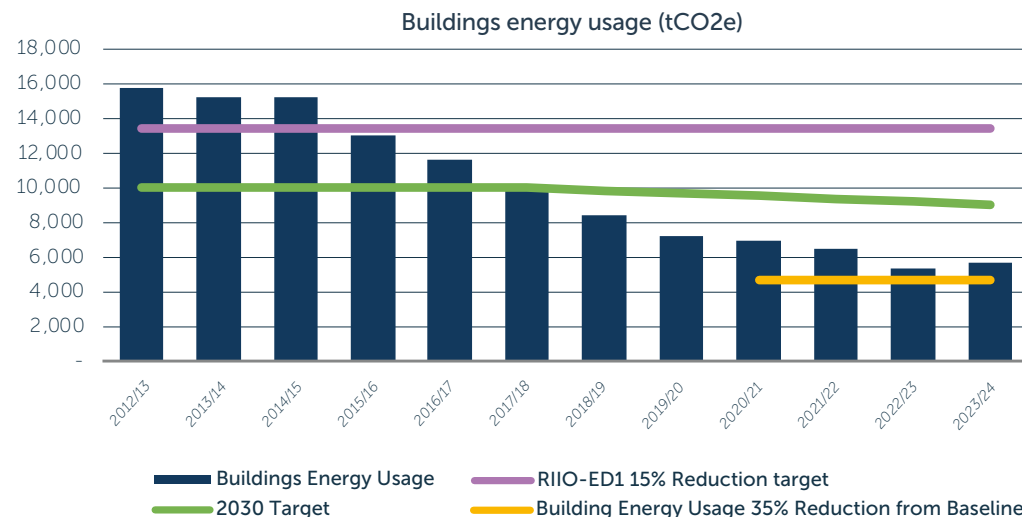


Figure 9: Annual building energy usage over the RIIO-ED1 period (SHEPD and SEPD)

Year	Energy efficiency investment (per annum)	Reported annual carbon reductions	Energy saving (annually recurring)
2012/13	£1,170,000	12,469	£39,740
2013/14	£2,399,000	7,819	£164,492
2014/15	£2,360,000	35,020	£632,540
2015/16	£3,083,000	6,170	£1,134,412
2016/17	£1,568,000	2,203	£229,786
2017/18	£2,237,910	2,314	£107,733
2018/19	£429,244	3,765	£207,228
2019/20	£450,000	5,268	£2,457,580
2020/21	£150,000	2,074	£717,189
2021/22	£150,000	3,066	-
2022/23	£250,000	165	-
2023/24	£ 1,200,000	-	-
Totals	£15,447,154	80,333	£5,375,739

Table 2: SSE Group’s energy efficiency performance 2012/13 to 2023/24¹

¹ Previous reports have included energy savings for SSE Group, monitored by the Property Services Team, however, an increased focus on reducing GHG emissions has led to a shift in data monitoring and availability. Therefore, this data is not available for the last three periods.



5.2. SULPHUR HEXAFLUORIDE EMISSIONS

SUMMARY

Sulphur Hexafluoride (SF₆) is an extremely effective electrical insulator that is used in our circuit breakers, switchgear, and other electrical equipment. It has significant advantages over alternative materials; for example, it's non-flammable - a critical safety requirement in the high-voltage applications, and, because of the excellent insulating properties, it takes up less volume than alternatives. It's also, however, a very potent greenhouse gas - one kilogram of SF₆ is equivalent to approximately 23,500kg of carbon dioxide. SF₆ is consequently a material factor in our business carbon footprint. To meet net zero, we must align with a 1.5°C trajectory and therefore, as a minimum, we need to reduce SF₆ emissions by at least 35% by the end of the ED2 price control in 2028 and by 55% by 2033.

During the 2023/24 reporting period we had a total of 30,057kg of SF₆ installed on our network across our SHEPD and SEPD licence areas. Emissions of SF₆ are recorded in our asset management system and represent the amount of SF₆ used to top up assets during fault repair, routine maintenance or commissioning of assets that use SF₆ as an insulating medium. A total of 153KG of SF₆ was emitted during the 2023/24 reporting period due to natural leakage and subsequently required top-ups as part of the normal maintenance and cold/hot snaps in the weather that exacerbated leaks.

To counter this, improved monitoring and analysis have been developed to track the poorest performing assets on a monthly basis. We're committed to exploring alternatives to SF₆ and will install alternatives where solutions are available. Our ED2 investment plans include the replacement of both severe and poor leakers in the first two years on a like-for-like basis with newer more efficiently sealed SF₆ equipment and are committed to deploying SF₆ alternatives as they become market ready. Over the course of the reporting period a total of 153 SF₆ containing assets were commissioned on our network and 222 SF₆ containing assets were decommissioned.

No other insulation and interruption gases (IIG) were installed on our network during the 2023/24 reporting period. However, we're actively engaging with numerous suppliers to discuss and technically review their alternative gas offerings at lower 11kV and 33kV voltages, and we'll continue this approach throughout RIIO-ED2. Several non-disclosure agreements have been signed with a variety of switchgear suppliers to share their own developments in HV switchgear at voltage levels across the distribution arena, in both primary and secondary equipment. We are actively engaging with our framework partners and encouraging new suppliers to discuss possibilities for trialling their alternative-gas offerings on our network with the aim to accelerate the adoption of SF₆-free equipment and understand some of the potential challenges of managing a multiple gas asset-base. We continue to actively participate in the Energy Networks Association SF₆ working group and ensure that any learning is fed back into our strategy work.

When SF₆ filled equipment reaches the end of its operational life and is decommissioned, we take measures to ensure that SF₆ is recovered from the equipment. We've got a procedure in our document management system that specifies our requirements for the management and handling of SF₆. We utilise a supply chain partner who is fully licenced to remove SF₆ gas and provide full traceability of the volume of SF₆ removed from the asset alongside traceability that the equipment has been decontaminated and managed in accordance with the F-Gas Regulations.

5.2.2. SF₆ PERFORMANCE DURING RIIO-ED2

To meet net zero, we must align with a 1.5°C trajectory. Reducing SF₆ emissions is a key part of that, and our overall target is to reduce our leakage rate (the amount of SF₆ emitted, as a proportion of SF₆ contained in our assets, referred to as the 'bank') by at least 35% by the end of RIIO-ED2, and 55% by 2033.

In 2023/24, SF₆ emissions for SSEN-Distribution totalled 3,596 tCO₂e. The SF₆ leakage rate for 2023/24 was 0.51% (i.e. 0.51% of our total SF₆ holdings were emitted), which is a 21% reduction on our 2019/20 baseline (where the leakage rate was 0.64%). This means we have achieved our target of reducing SF₆ leakage rates by 3% in year 1 of RIIO-ED2.

For further details on SF₆, please see AER KPI Tables linked to the Appendix of this report.

5.3. ELECTRICITY DISTRIBUTION LOSSES

SUMMARY

Electrical losses are an unavoidable consequence of transferring energy across the electricity network, where they have a significant financial and environmental impact. For Distribution Network Operators (DNOs), electrical losses represent the difference between the amount of electricity entering the distribution network, from the transmission system or directly from generators, and the amount of electricity leaving the distribution network to our customers. These losses are classified as either technical (resulting from our assets and the movement of electricity through our network) or non-technical (resulting from electricity accounting issues).

We have obligations to manage distribution losses and to ensure they are as low as is reasonably practical. In our RIIO-ED2 Environmental Action Plan (EAP) we committed to implementing a strategy to efficiently manage losses on our network in the long-term, reclassify losses as a Scope 2 emission and act to reduce actual losses. Through our losses strategy we aim to deliver reductions in losses by:

- Setting asset and network design policies and specifications to minimise losses where this is demonstrably the right approach.
- Strategically installing lower-loss assets, and optimising network configuration where this is demonstrably the right approach.
- Trialling known and new loss-reducing techniques, such as methods to stabilise power factor and improve power quality, to assess suitable applications within our network.
- Tackling electricity theft and calculation anomalies through investigation works and wide-reaching communications highlighting the issue.
- Improving our understanding of network losses through research, innovation and collaboration.

Through our targeted initiatives, we hope to realise a losses avoidance of approximately 466,612MWh by the end of the RIIO-ED2 price control period.

During 2023/24, we refreshed our losses strategy with a revised structure and added in the latest data and information to improve the clarity of the actions we're taking to reduce electrical losses for our stakeholders. We focused on updating and embedding our design standards for cable and overhead line sizing and improving the energy efficiency of our substations to reduce actual losses. As a result of our targeted interventions, we have achieved a calculated losses saving of 7,513MWh for 2023/24.

Full details of our Losses Strategy can be found at: ssen.co.uk/about-ssen/library/losses-strategy.

5.3.2. LOSSES VOLUME

The total volume of distribution electrical losses in 2023/24 was around 2,026 GWh as shown in Table 3. The distribution losses volume is derived from an industry-standard model utilising both percentage of sales and purchases of electricity from the grid. Network Losses are a consequence of energy loss due to materials, temperatures and physical properties of the energy distribution process.

Figure 10 shows the volume of distribution network losses in each reporting period over RIIO-ED1 and the first RIIO-ED2 year. Network losses increased by around 0.5% in 2023/24 compared to 2022/23. The reduced load from the previous year is attributed to the cost-of-living crisis, which saw consumers trying to reduce their electricity consumption and kept the values in a similar position. The increase in carbon emissions, 7.6%, was mostly due to the 7.1% increase of the emission factor carbon intensity, showing that the UK grid was less renewable than previously.

Year 2023/24	Total Distribution Losses GWh	Equivalent tCO2e
SHEPD	493.68	102,229
SEPD	1,532.38	317,317
Total Losses	2,026.06	419,546

Table 3: Total losses in the SSEN Distribution network

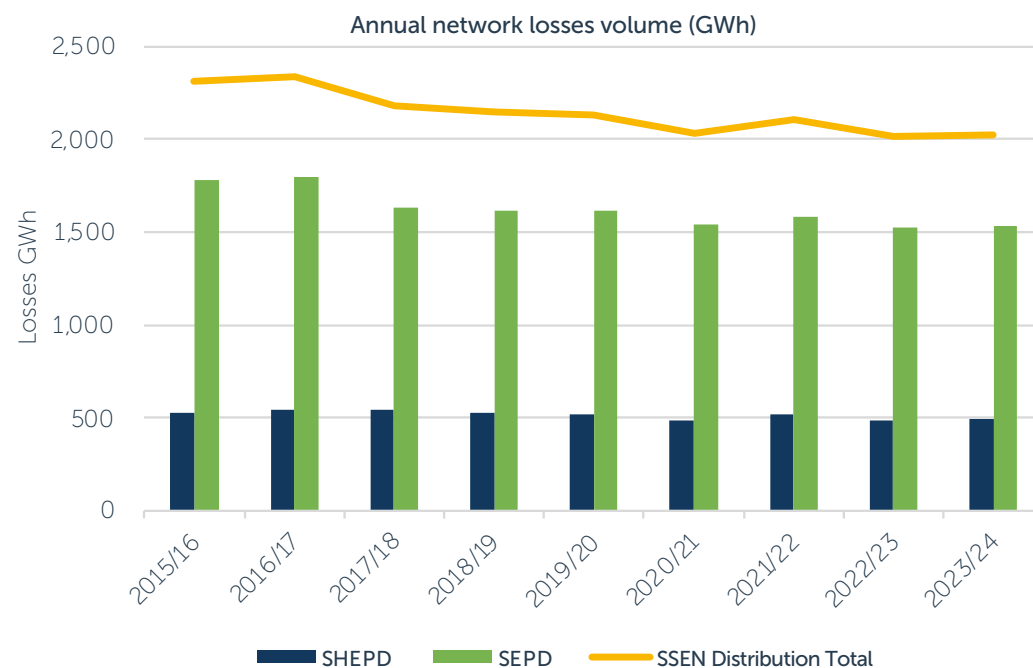
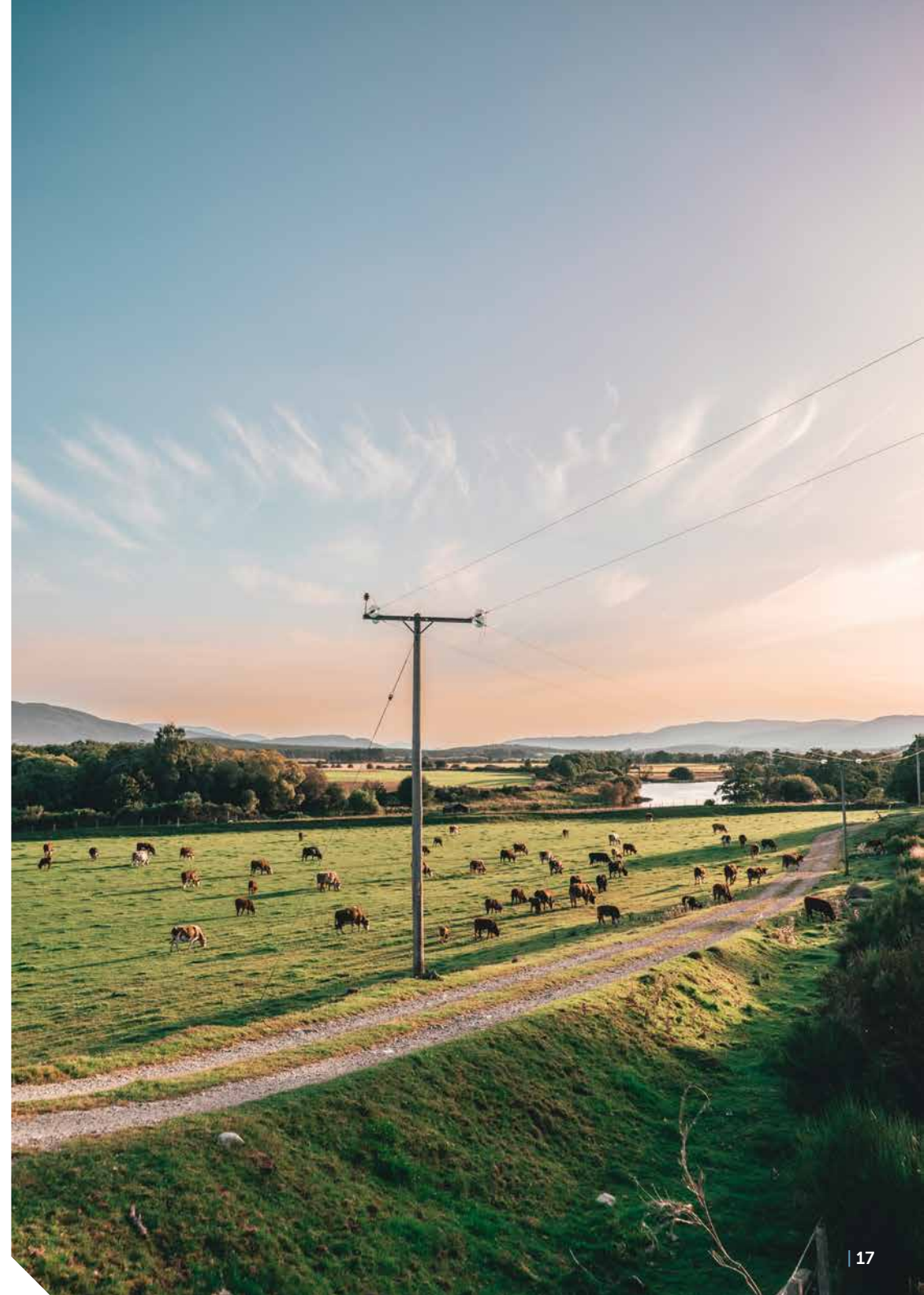


Figure 10: Annual network losses volume (GWh)





5.3.3. LOSSES STRATEGY IN ACTION

To help ensure we meet our commitment to reduce losses and ensure they are as low as reasonably practicable, we've been implementing targeted measures as outlined in our Losses Strategy.



Installing energy efficient transformers

We've been strategically installing plant and equipment that delivers enhanced losses performance and meets the EU Transformer Eco-design Directive Tier 2 specification. This includes replacing inefficient transformers and accelerated replacement of historical high loss secondary transformers, **delivering a calculated losses saving of 1,213MWh to date in RIIO-ED2.**



Upsizing of cables and transformers

In general terms, increasing the diameter of conductors and upsizing the rating of transformers reduces losses. Therefore, we've set asset design policies and specifications to increase the minimum size of new cables and ratings of transformers, **delivering a calculated losses saving of 65MWh to date in RIIO-ED2.**



Upgrading network voltages

As losses are proportional to the square of the current, and current is directly proportional to the power throughput, increasing network voltages can reduce losses for the same power transfer. As part of our network capacity increase and standardisation, **we've been upgrading legacy 6.6kV networks to 11kV in our SEPD licence area** and a number of schemes are in planning for delivery in later years of RIIO-ED2.



Switching off under-utilised plant

Prior to RIIO-ED2, we successfully demonstrated application of Transformer Auto Stop Start (TASS) technology to reduce losses in primary substations. The technology enables us to switch off one of the transformers at a twin or triple transformer site at times of low demand to avoid the fixed iron losses associated with that transformer. **Installation of the technology is currently being planned for 2025/26 onwards to optimise transformer works and minimise disruption to the network.**



Reducing energy usage at substations

Our substations consume energy to maintain secure network operation and this usage is currently unmetered, so estimates are used in our settlements process, contributing to non-technical losses. By improving the energy efficiency of our substations, we can reduce substation electricity consumption and as a result also reduce losses. Through our substation refurbishment works **we have delivered a calculated losses saving of 2,702MWh to date in RIIO-ED2.**



Resolving Metering Point Administration Numbers (MPAN) Discrepancies

Our Network Protection team continues to focus on investigating and resolving MPAN discrepancies, reducing non-technical losses and through **these activities have delivered a calculated losses saving of 3,533MWh to date in RIIO-ED2.**



Improving assessment and reporting of losses

During 2023/24, we refreshed our losses strategy to improve the clarity of our losses monitoring and reporting processes and the actions we're taking to improve our understanding of losses. **We're leading on an innovation project to develop a new losses apportionment model** to ensure the apportionment of losses across network users remains accurate and fair, with the intention that the model will be able to be used by other DNOs.

For further details on losses, please see [AER KPI Tables and worksheet E4 – Losses Snapshot](#) linked to the Appendix of this report.



6. EMBODIED CARBON

6.1. SUMMARY

With the first year of RIIO-ED2 being narrative-based for embodied carbon we have conducted external and internal engagement to understand how best to integrate embodied carbon reporting into day-to-day activities.

To support with our commitment to report embodied-carbon data on all new large construction projects over the course of RIIO-ED2, we've spent the last year working on developing a tool that captures data for the 'in design' and 'as built' stages of a project.

As part of the ENA Carbon Management working group there has been a set of carbon factors provided which covers circa 80% of our assets. Currently these carbon factors are estimates, however, as we increase our supply chain engagement we'll look to replace these factors with a more accurate representation.

All DNOs collectively agreed that we would report on projects over £10m to ensure we were all working to the same threshold.

We're currently engaging with internal teams and our key suppliers who are leading on projects over £10m to ensure the tool is being used at both project stages accurately. We'll use 2024/25 to create an embodied-carbon baseline on large projects and also look to identify any high carbon materials, like concrete, where we can engage with our supply chain to look at alternatives. We'll also endeavour to align our embodied-carbon work to the PAS2080 standard.

Our aim is to have typical embodied carbon levels for all material asset assemblies (like a primary substation) then we will challenge our suppliers to make reductions from there. All GSP contractors have seen this tool and are on board, with concrete the obvious big ticket item to go after.





7. SUPPLY CHAIN MANAGEMENT

7.1. SUSTAINABLE SUPPLIER CODE

In 2023 we launched our Sustainable Supplier Code to our supply chain. The code has eleven metrics that cover the breadth of sustainability and aims to reduce our Scope 3 emissions whilst supporting our supply chain to reduce their Scope 1 and 2 emissions. Our supply chain is instrumental in meeting our RIIO-ED2 net zero ambitions and our code, through the eleven targeted metrics, we will ensure suppliers are helping us on our net zero journey whilst also gaining knowledge and improving sustainability through their own business.

With the launch of the Sustainable Supplier Code, we held a webinar in June 2023 with our supply chain to discuss the code in more detail and our sustainability business RIIO-ED2 ambitions, which enabled our supply chain to fully understand the direction we are heading in and allowed ample time to implement changes within their business. The code in the current format is our first iteration, with a view that we will update it in 2025 to reflect our RIIO-ED2 target commitment to have 80% of suppliers (by spend) signed up to the code by 2028.

After our first webinar to launch the code, we produced a supplier engagement plan for 2023/24. This included another two webinars and an in-person event all aimed at supporting our supply chain on their sustainability journey. In August 2024 we held a GHG emission webinar (53 participants) and in February 2024 a webinar on circular economy (60 participants).

As of 31 March 2024, and based off 2023/24 spend data, we had 37.5% of suppliers (by spend) signed up to our sustainable supplier code. This equates to 30 suppliers.

7.2. SUSTAINABLE PROCUREMENT

In 2023 we launched our first ever set of sustainability invitation-to-tender (ITT) questions that are being included in all 'one-off' and 'framework' tenders. The ITT questions were created to be aligned with our Sustainable Supplier Code and have enabled us to gain valuable sustainability knowledge on suppliers before contract award.

7.3. SUSTAINABILITY AWARDS

In February 2024 we launched our first ever sustainability awards for our supply chain covering five categories:

- Low carbon
- Social value
- Circular economy
- Engineering
- Individual/team

Over the five categories we had an excellent number of submissions and brought together key senior leaders and subject matter experts to become our first ever review panel. The awards enabled us to showcase the amazing work our suppliers are doing in the sustainability space to our wider business and external stakeholders.

7.4. SUPPLY CHAIN SUSTAINABILITY SCHOOL

Launched in 2012, the Supply Chain Sustainability School is a free virtual learning platform around sustainability, with the aim to upskill those working within, or aspiring to work within, the built environment sector. Since 2018 SSE has been partnered with the school and has brought valuable resources to our supply chain to support with offering valuable learning resources.

During our supplier webinars and engagement days we've promoted the free use of the school to all our suppliers and have created specific learning pathways based on particular needs. We have created learning pathways for our internal procurement staff to follow to upskill their sustainability knowledge.

7.5. SOCIAL VALUE

In 2023 we launched our biggest ever procurement framework in SEPD worth over £1bn. Three suppliers were awarded contracts and as part of this have committed to circa £50m worth of social value over the course of the framework. This is the first time a social value commitment has been included as part of a contract and will enable valuable initiatives to be conducted in local communities.



8. SUSTAINABLE RESOURCE USE AND WASTE

8.1. SUMMARY

As part of SSE Plc, we're actively working towards more sustainable patterns of resource consumption; reducing reliance on non-renewable and single-use products, linking to the objectives of UN Sustainable Development Goal 12 (Responsible Consumption and Production).

In 2023/24 we produced a total of 4359 tonnes of waste, of which **80% was recycled and 97% was diverted from landfill**. A large proportion of our recycling tonnage is achieved through adopting circular economy principles, such as regenerating our transformer oil.

During the reporting period we returned **1129 tonnes of transformer oil to our supply chain partner for recycling**. Used transformer oil is a valuable resource because it can be processed to "as new" quality for re-use as insulating fluid. During the 2023-24 reporting period we purchased a total of 831 tonnes of reclaimed oil.

We work closely with our waste contractors to continually improve our waste management performance, and we continue to monitor waste management key performance indicators on a monthly basis via our ISO14001 certified Environmental Management System.

As part of our Sustainable Supplier Code, we're also working closely with suppliers to ensure we look to reduce the amount of waste that is generated in our operations, and we're supporting them to reach our aim of 60% of our supply chain (by spend) with a waste strategy in place by 2025. During the reporting period we hosted a circular economy webinar for our supply chain, where we showcased our ambitions and invited some of our supply chain to present information on examples of their best practice.

In 2023/24 SSE launched its first **Recycling Awards** in partnership with our waste management contractor Biffa, to recognise individuals or teams who have demonstrated excellence in recycling or landfill diversion for their excellent performance. Four of the six awards were presented to SSEN-Distribution staff, showcasing the good work going on across the business to address and embed circular economy principles. SSE and Biffa also launched a £5,000 community fund to promote recycling and circular economy in its communities.





9. VISUAL AMENITY

9.1. SUMMARY

Overhead lines (OHL), especially those at higher voltage running through National Landscapes (NLs), National Scenic Areas (NSAs) and National Parks are considered unsightly by some, with the suggestion that OHL can have an adverse impact on visual amenity, especially in these sensitive environments. There is also the possibility that this adverse impact could affect individual wellbeing and local economies if, for example, the primary local industry is tourism. The communities we serve are key stakeholders for our business, so this is an important issue for us.

Therefore, to improve visual amenity, we committed to undergrounding up to 83km of OHL in designated scenic areas across both of our distribution networks during RIIO-ED2. Visual amenity projects are initiated by expressed interest from our stakeholders, enabling us to ensure areas targeted are best value for the consumer. We're pleased to have exceeded our 2023/24 RIIO-ED2 target. We envisioned 2023/24 being a year of planning, but we have also managed to deliver a visual benefit to the communities that we serve by undergrounding 350m of OHL through visual amenity schemes nominated by our stakeholders. This performance enforces our confidence that we will achieve our overall RIIO-ED2 commitment.

For the remainder of RIIO-ED2, we're continuing to ramp up stakeholder engagement through targeted, local engagement sessions to ensure that all our stakeholders are aware of the options to underground local network where applicable.

9.2. UNDERGROUNDING SCHEMES DURING RIIO-ED2

Both SHEPD and SEPD have dedicated funding by Ofgem for undergrounding of OHL in protected landscapes in RIIO-ED2. Funding is applicable for distribution voltages up to 132kV and is specifically targeted at National Landscapes (NLs), National Scenic Areas (NSAs) and National Parks.

Visual amenity projects are driven by stakeholder requests, using a nomination scheme. Stakeholders have continued to indicate that undergrounding of existing OHL was "important" or "very important" from a visual amenity perspective in RIIO-ED2 and supported our stakeholder-led approach to address concerns in these areas.

Our stakeholders indicated that we should include factors that they considered important to them, such as the historic environment and that these were considered integral to the scheme selection process. This is achieved by using a Visual Amenity Impact scoring model, developed in agreement with the AONB and National Park officials within our licence areas. Schemes are nominated by these stakeholders, and then considered and prioritised to ensure consistency in assessment across all SEPD and SHEPD licence areas and delivery of maximum value for money.

The focus has primarily been on High Voltage (HV) and Extra High Voltage (EHV) OHL that have a high visual impact on the landscape and have a dominant impact for many viewers. We have therefore, targeted our efforts on the most affected areas identified using the scoring mechanism. Schemes are co-ordinated with other network investment and maintenance works where practicable, to minimise disruption for stakeholders and reduce delivery costs, i.e. reducing costs for consumers.

After lower stakeholder engagement in RIIO-ED1 we've committed to increasing our engagement in this space in RIIO-ED2. During 2023/24 we have continued to refresh our approach to engaging with our communities on the visual amenity application process and have seen higher number of applications on our website. This has enabled us to ensure that ongoing and forthcoming projects achieve the best outcomes for the local landscape, biodiversity and communities. These efforts in enhancing our local engagement has had a positive outcome as we have completed five Visual Amenity schemes across our SHEPD and SEPD licence areas so far in RIIO-ED2, removing 0.35km of OHL cable. Details of these schemes are presented in Table 4.

Scheme	Designated area	OHL km removed	Completion date
PH003091 Auchentyre	Loch Lomond and The Trossachs	0.116km	23/11/2023
CH000257 Kingussie (child project of PH002259 Kingussie)	Cairngorms National Park	0.07km	04/12/2023
CH000256 Kingussie (child project of PH002259 Kingussie)	Cairngorms National Park	0.164km	04/12/2023

Table 4: Visual amenity schemes completed across SHEPD

As presented in Tables 5 and 6, there are 25 visual amenity schemes in progress across our SEPD and SHEPD licence areas scheduled for completion during RIIO-ED2, undergrounding a further 51.54km of OHL.

Scheme	Designated Area	Progress	Planned OHL km Removal	Planned Construction Yr
CH000258 Ruthven (child project of PH002259 Kingussie)	Cairngorms National Park	Execution	0.70km	24/25
PH004324 Linn of Dee	Cairngorms National Park	Execution	4.16km	24/25

Table 5: Visual amenity schemes in progress across SHEPD

Scheme	Designated area	Progress	Planned OHL km removal	Planned construction Yr
PS004474 Ridgeway	Cotswolds NL	Execution	0.33km	24/25
PS006723 Ridgeway	Cotswolds NL	Refinement	1.31km	24/25
PS004473 Thames Valley	Chilterns NL	Refinement	0.87km	24/25
PS004269 South East	South Downs National Park	Refinement	0.92km	25/26
PS004543 Ridgeway	North Wessex Downs NL	Refinement	5km	24/25
PS006735 Thames Valley	Chilterns NL	Refinement	1.4km	24/25
PS006750 South East	South Downs National Park	Refinement	1.11km	25/26
PS006789 Wessex	Cranbourne Chase NL	Refinement	1.3km	24/25
PS006799 Wessex	Cranborne Chase NL	Refinement	3.2km	25/26
PS006967 Ridgeway	Cotswolds NL	Refinement	0.3km	25/26
PS006973 Ridgeway	Cotswolds NL	Refinement	0.81km	25/26
PS007780 Ridgeway	Cotswolds NL	Refinement	0.53km	25/26
PS006985 Thames Valley	North Wessex Downs NL	Refinement	0.41km	25/26
PS007018 Thames Valley	North Wessex Downs NL	Refinement	0.75km	25/26
PS007636 Wessex	South Downs National Park	Refinement	5.17km	25/26
PS007754 Wessex	Dorset NL	Refinement	1.08km	25/26
PS007779 Wessex	South Downs National Park	Refinement	0.47km	25/26
PS007856 Thames Valley	North Wessex Downs NL	Refinement	1.85km	26/27
PS007902 Thames Valley	North Wessex Downs NL	Refinement	9.46km	26/27
PS007957 Thames Valley	Chiltern Hills NL	Refinement	3.83km	26/27
PS008374 Ridgeway	Cotswolds NL	Refinement	1.26km	26/27
PS007977 Wessex	Dorest NL	Refinement	2.13km	27/28
PS008107 Wessex	Dorest NL	Refinement	3.19km	27/28

Table 6: Visual amenity schemes in progress across SEPD

For further details on Visual Amenity, please see AER KPI Tables and worksheet E2 - Visual Amenity linked to the Appendix of this report.

The images below show a completed visual amenity scheme in Glen Muick, if you would like to nominate part of our network to be underground, please visit ssen.co.uk/undergrounding



Caption: Before visual amenity scheme, Glen Muick



Caption: After visual amenity scheme, Glen Muick



10. NOISE POLLUTION

10.1. SUMMARY

Noise nuisance issues can arise from the fixed plant and equipment installed on our network such as transformers, the temporary plant and equipment we use during faults on our network such as mobile generators and from carrying out our operational activities to develop and maintain the network. We've got a dedicated Customer Relations team that deals with customer enquiries and complaints and works with customers to try and reach a satisfactory solution.

In our RIIO-ED2 EAP, we committed to take efficient actions to reduce noise pollution where necessary and report on these actions. As part of our commitment, we also committed to creating a noise strategy, complete a trend analysis of complaints by 2024 and monitor throughout RIIO-ED2. Figure 11 details the annual trend of noise complaints.

In 2023/24, there were 34 noise complaints in total with six in our SHEPD licence area and 28 in our SEPD licence area. These included complaints regarding noise from street works, fixed plant including transformers and substations and temporary plant including mobile generators with 28 followed up and resolved within 48 hours of the complaint being logged. There were six complaints that took longer to resolve and required further intervention which included noise monitoring, removal of temporary plant and equipment, replacement of a transformer and research into less noisy equipment for digging. The significant increase in the number of noise complaints within our SEPD licence area in 2023/24 compared to previous years is due to an improvement to our monitoring processes where we now report on all noise complaints related to our operations not just those related to fixed plant. In 2023/24, only seven of the noise complaints in SEPD were related to fixed plant, similar to previous years.

Our Environmental Management System (EMS) provides the strategy and framework for managing our environmental impact and through our Environment Policy, we commit to protecting the environment, preventing pollution and operating in a sustainable way. As part of our EMS, we've defined our Key Performance Indicators (KPIs), and noise complaints is one of those KPIs, with monitoring undertaken monthly and further action taken if required. We are trending the source of the noise so we can solve the problem at source and we will continue to mitigate noise pollution from our operations as much as possible and to address any complaints in a timely manner throughout RIIO-ED2.

For the breakdown of noise complaints please see the AER KPI tables linked to the Appendix of this report.

Annual number of noise complaints

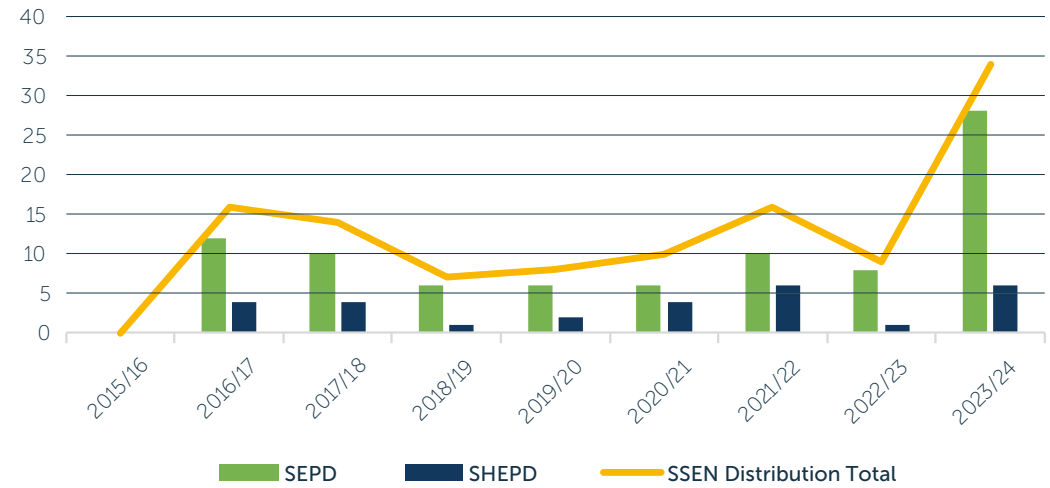


Figure 11: Trend analysis of annual noise complaints





11. POLYCHLORINATED BIPHENYLS

11.1. SUMMARY

Polychlorinated biphenyls (PCBs) are persistent organic pollutants known to be harmful to human health and the environment. Their manufacture was banned in the UK in 1986, and internationally by the Stockholm Convention on Persistent Organic Pollutants in 2001. Successive changes to legislation have been enacted to drive the elimination of legacy PCBs that were manufactured and used prior to bans.

Historically PCBs were introduced via the supply chain into electrical insulating oil and some electrical equipment (mainly transformers) due to their low flammability and high dielectric performance. SSEN Distribution and its predecessors never specified PCBs in the insulating oil used in its equipment, but cross-contamination in the supply chain for mineral oil has resulted in some equipment, manufactured before 1987, containing low concentrations of PCBs.

Before 2020, transformers containing oil with up to 500 parts per million (ppm) of PCBs could remain in service until the end of their useful lives. Subsequent changes to legislation reduced that threshold and required that all transformers with more than 50ppm of PCB be decontaminated or removed from service by 31 December 2025.

We have a programme of testing, decontamination and asset replacement under way to meet these requirements. We hold registers with regulators the Environment Agency (EA) and the Scottish Environment Protection Agency (SEPA), where any assets that are or may be PCB-contaminated are listed. We complete annual updates to the registers to report our progress on removing PCB-contaminated assets. Assets can be removed from the registers for one of the following reasons:

- An oil test has confirmed the PCB concentration is no greater than 50ppm (a negative test result).
- The asset has been decommissioned, and the oil safely destroyed if the PCB concentration is over 50ppm (a positive test result).
- The asset has been decontaminated to reduce the PCB concentration to no more than 50ppm, by changing the oil, and the waste oil safely destroyed.
- The asset has been classified as unlikely to be PCB-contaminated, by a statistical model approved by the EA and the SEPA.
- During 2023/24 we completed 11,357 interventions enabling the removal of 11,989 assets from registers held with regulators.

For further details on PCBs, please see [AER KPI Tables linked to the Appendix of this report](#).

GROUND MOUNTED TRANSFORMERS

During 2023/24 we took oil samples from 9,881 ground-mounted transformers (GMTs) to test them for PCB levels. Results have confirmed fewer than 4% of our GMTs (manufactured before 1987) have PCB concentrations greater than 50ppm, requiring further intervention to remove or reduce PCBs to acceptable levels.

Most GMTs have accessible drain valves installed, enabling us to take an oil sample whilst the GMT remains in service and without interrupting customer supplies. Some of our GMTs don't have accessible sample points and would usually need to be de-energised before an oil sample can be taken. With support from other DNOs, we've developed a technique to retrieve oil samples from these GMTs without de-energising them. This involves drilling a small hole in one of the transformer's cooling radiator fins to retrieve some oil and plugging it with a marine-grade sealing screw. We've rolled out training to our teams and sampling our remaining GMTs which don't have sample points has begun, all without interruption to customer supplies.

Where GMTs remain in good health, but their PCB contamination is greater than 50ppm, our plan is to decontaminate the assets with oil changes. During 2023/24 we developed a procedure and equipment required to complete this, successfully trialing it on seven GMTs. Follow up tests, carried out three months after the oil change, have confirmed PCB levels drop significantly below 50ppm in most cases. Where initial PCB concentrations are near 500ppm, two oil changes may be necessary to bring the concentration down to an acceptable level, but these will be rare. Test results from contaminated GMTs average 137ppm, so most will be successfully decontaminated with a single oil change.





POLE MOUNTED TRANSFORMERS (PMTs)

Pole-mounted transformers (PMTs) are not as accessible as GMTs, rarely have valves or sample points installed, and are connected by exposed live overhead wires. These factors make it difficult to retrieve oil samples for determining PCB levels.

Through the Energy Networks Association (ENA) PCB Strategy Group, we worked with other DNOs and environmental regulators to develop a statistical model to determine likely PCB contamination in PMTs. Environmental regulators have approved the use of this model to identify and remove or remediate contaminated PMTs from our networks.

Populations of PMTs across all DNOs have been grouped into cohorts, or families, of manufacture and year of manufacture. Sample PMTs from each cohort are removed and tested to determine the likely contamination status of all PMTs in that cohort. Generally, a larger proportion of negative test results is required to classify a cohort as GREEN - likely uncontaminated. A significantly lower proportion of positive test results will classify a cohort as RED - likely contaminated. Until enough samples have been tested to determine a cohort's contamination status, it is classified AMBER - unknown.

All DNOs have been gathering samples and test results to contribute to and determine classifications for all cohorts. During 2023/24, we removed and tested 1,466 PMTs. Together with inputs from other DNOs, the results enabled us to remove 4,690 PMTs from SSEN Distribution's registers held with the EA and the SEPA.

PMTs in GREEN cohorts can remain in service until the end of their useful lives. PMTs in RED cohorts must be removed, decontaminated, or proven not contaminated by an individual test, by the end of 2025. We are pursuing a programme of replacements to remove all PMTs in RED cohorts by the deadline.

To date, the outputs from this statistical model have resulted in an estimated saving of £1.3 billion, which would otherwise have been spent on early asset replacement across GB. In December 2023 the ENA PCB Strategy Group was nominated for, and won, the Collaborative Excellence category in the Utility Week Awards, in recognition of this work.

DNOs continue to gather samples and input test results to the statistical model, prompting changes in the output volumes of RED and GREEN PMTs. During the first three years there have been consistent trends of increasing volumes of GREEN PMTs and reducing volumes of RED PMTs. For many GREEN cohorts, one PCB positive test result can be enough to re-classify the cohort to RED, changing the target. We're recently seen an overall increase in the volume of RED PMTs on our network requiring further intervention, compared to previous forecasts. Fluctuations like this present an additional challenge to a busy replacement programme and we are closely monitoring progress and necessary adjustments to meet the deadline.

In most cases, replacement of RED PMTs is the best decision, with the available resources and tools and considering overall impact on our network. Ideally, we'd prefer to retrieve an oil sample from a PMT whilst it remained live and in service, and only return to replace it if the oil test returned a positive result. However, considering the overall impact on our network, along with the available resources and tools, the replacement of RED PMTs is the best decision in most cases.

Together with two other DNOs, we've funded a first phase innovation project to develop concepts for achieving this objective. A couple of ideas have been selected for detailed design, development and testing in a second phase, which we continue to support and fund.





12. BIODIVERSITY AND NATURAL CAPITAL

CASE STUDY

12.1. SUMMARY

SSEN Distribution is subject to legal duties to further the conservation of biodiversity in Scotland, and to conserve and enhance biodiversity in England when delivering its responsibilities. These duties sit alongside compliance requirements for protected sites and species, and to deliver best practice. As such, we assess our capital projects to identify potential ecological impacts that might arise, and to ensure that adverse effects to sensitive species and habitats are avoided, minimised and compensated for in line with the mitigation hierarchy.

Our natural capital work extends across the SHEPD and SEPD licence areas, seeking to realise benefits for nature and people, while tackling the ecological and climate crises. Our RIIO-ED2 Nature-based Solutions commitments seek to achieve woodland creation and peatland restoration to deliver carbon removals as well as other ecosystem benefits. Our Consumer Value Proposition: Life Below Water will deliver seagrass restoration in the seas around our licence areas, boosting biodiversity and benefitting local communities.

12.1.1. BIODIVERSITY

Our distribution network runs through some of the country's most biodiverse environments that support a wide variety of habitats, flora, and fauna. Sometimes our work has the potential to harm sensitive biodiversity or sites, including those that are legally protected. We have a legal duty to conserve and enhance biodiversity, and to mitigate any adverse effects that our projects may have on priority habitats and species.

We assess our projects to identify potential ecological impacts that might arise, and to ensure that adverse effects to sensitive species and habitats are avoided, minimised and compensated for in line with the mitigation hierarchy. Our engineering design teams work closely with our in-house, and supply chain, ecological specialists to ensure that our infrastructure projects are designed sympathetically and with the aim of avoiding and minimising biodiversity impact as well as compensating for any residual impacts.

To inform our projects, we undertake ecological assessments including surveys for protected species such as great crested newt, otter, badger, water vole and bats. We liaise and work closely with Natural England, NatureScot, the Environment Agency, and the Scottish Environmental Protection Agency, and other environmental stakeholders.

12.1.2. NATURAL CAPITAL

Section 8.5 of our Environmental Action Plan (EAP) details the ED2 price control commitments we have made on biodiversity and natural capital. In line with our Final Determination (FD) and subsequent FD Questions agreement, this includes a requirement to:

Part 1: Develop a tool to baseline and monitor our biodiversity and enable cultural change required to enhance biodiversity.

Part 2: Deliver 258ha of woodland restoration and 522ha of peatland restoration, which is expected to remove over 65,000 tCO₂e by 2045.

CHARMINSTER 33KV OIL-FILLED CABLE REPLACEMENT



Caption: Pictures of the bat roost found in a wooden pole and left in situ.

This project involved the installation of approximately 4.5km of new underground 33kV electricity cable between Charminster Substation and the existing overhead network near Charminster, Dorset. The aim was to replace an existing 33kV oil-filled cable at the end of its operational life and which was becoming an environmental risk. To safeguard the security of the local electricity supply, and to remove the environmental risk, a replacement cable was required. 24 spans of existing overhead line and associated poles were also dismantled as the new cable removed the need for these assets.

The cable route was predominantly rural and cross-country, passing through fields used for pasture and the cultivation of crops. A section of the route passed through the historic village centre of Charminster, designated as a Conservation Area known for historic and architectural importance. The River Cerne chalk stream was also crossed by the cable route.

Ecological surveys were undertaken, as is standard practice for projects of this nature. Two badger setts were identified close to the cable route and a licence was obtained from Natural England to ensure that the works complied with the legislation that protects this species – mitigation was then implemented to reduce the effects of construction disturbance to the setts, and to protect badgers from harm. Bat surveys found a roost used by three species of bat within one of the poles to be removed – to protect the bats and to safeguard the roost, the overhead line was dismantled but the pole was retained and left in-situ with the agreement of the landowner. Other measures to reduce impacts to sensitive features included the narrowing of the construction corridor at hedgerow crossings, and the use of horizontal directional drilling below the River Cerne chalk stream; consents were also obtained prior to hedgerow and watercourse crossings from the Local Planning Authority (LPA) and Environment Agency respectively, and good practice methodologies implemented to reduce adverse impacts to these habitats of principal importance.

An archaeological assessment identified that the cable route passed through a landscape of archaeological importance, with high potential for prehistoric, Romano-British and medieval remains and artefacts. Following consultation with the LPA, high-risk areas were excavated in advance of construction commencing, with all other groundworks in areas of archaeological potential being monitored by an archaeologist during construction. No significant archaeology was recorded during construction, indicating that the project's design phase successfully accounted for known archaeological risks.

PART 1:

PROGRESS AND DELIVERY DURING PERFORMANCE YEAR 2023/24

SSEN Distribution is currently partway through an IT tender exercise to, firstly, develop a natural capital baseline of our networks and land estate and, secondly, procure a tool to host the baseline and track changes to biodiversity and ecosystem services resulting from our projects and other interventions.

This will be completed using remote sensing and other credible datasets, for example the Environment Agency's Natural Capital Resister and Account Tool (NCRAT) and in line with established natural capital accounting approaches, such as Defra's Enabling a Natural Capital Approach (ENCA).

Our expectation is that this tool will be operational by the end of the financial year 2024/25. As an interim measure a Biodiversity Net Gain (BNG) Performance Log has been created. This has been shared with internal project teams to track delivery against our corporate commitment to No Net Loss (NNL). It will also support our new statutory requirements through planning to deliver Policy 3 of the National Planning Policy Framework (NPPF) 4 in Scotland to achieve ecological enhancement (as of February 2023) and the Environment Act 2021. This has a requirement to deliver 10% BNG in England (as of 12th February 2024 and 2nd April 2024 for small sites). These are legislative changes requiring achievement of BNG or ecological enhancement that have come into force since ED2 Final Business Plan submission.

SSEN Distribution, alongside partners Frontier Economics and GHD, has also been successful in securing funding for the Discovery Phase of Ofgem's Strategic Innovation Fund (SIF) for its Nature for Networks project that seeks to:

- Identify where there are issues faced by networks which could be addressed by a Nature-based Solutions (NbS) approach.
- Assess whether these NbS are likely to provide value over and above the business-as-usual (BAU) approaches adopted by DNOs.
- Determine whether any barriers exist to the adoption of NbS and how these may be overcome.

And ultimately, if NbS are considered to provide value, develop and trial the processes to enable DNOs to integrate them into their operations.

Outputs from the project will be delivered in May 2024 and, where NbS can be shown to deliver business, environmental and social value, may form part of investment considerations and contribute to the delivery of future net gains in biodiversity. We're seeking to progress this project through an Alpha Phase funding application.

IMPLEMENTATION TIMELINE

ACTION	PERFORMANCE MEASURES / REPORTING COMMITMENTS	TIMELINE
<p>Minimum Requirement - Appropriate tool adopted to assess net changes in natural capital from different options for new connections and network projects.</p> <p>Appropriate tool adopted to monitor the provision of ecosystem services from network sites and commit to reporting annually</p>	<p>Targets against actions to increase environmental value</p>	<p>Annually from 2024</p>
<p>Aim to achieve a Biodiversity Net Gain (BNG) approach</p>	<p>Ofgem Annual Submission</p>	<p>Annually from 2024</p>

PART 2:

PROGRESS AND DELIVERY DURING PERFORMANCE YEAR 2023/24

As outlined above, SSEN Distribution is currently part-way through an IT tender exercise to, firstly, develop a natural capital baseline of our networks and land estate and, secondly, procure a tool to host the baseline and track changes to biodiversity and ecosystem services resulting from our projects and other interventions. This will allow us to understand the natural capital value of habitats across our networks and land estate and the ecosystem service benefits they provide, enabling us to track changes in these as a result of SSEN Distribution's activities.

The nature space is developing at pace, including developments in the ways in which businesses can invest in halting and reversing the decline in biodiversity, and the nascent nature markets are a critical part of this. SSEN Distribution has responded to consultations and attended roundtables on this theme, playing a key role in setting out both our own and the sector's requirements and challenges. The developing nature markets are where opportunities for the delivery of our woodland creation and peatland restoration commitments lie, and we must ensure that we're investing in robust and credible projects and, in some cases, these opportunities are not quite ready yet. However, we have made progress in supporting some specific projects during the 2023/24 performance year.

To contribute towards the delivery of its woodland creation and peatland restoration targets, SSEN Distribution has signed a contract with Projects for Nature (Projects for Nature, Nature recovery and business). Created through a partnership between the Council for Sustainable Business, Defra, the Environment Agency, Natural England, Accenture and Crowdfunder, Projects for Nature is a pioneering platform that connects businesses with on-the-ground nature projects in England to close the finance gap and recover the health of our planet. Through this platform, we're currently in discussions with projects within our SEPD licence area to identify where we can direct our funding towards suitable habitat creation and restoration efforts.

Our Consumer Value Proposition (CVP) aims to achieve 17 hectares of seagrass planting in the seas around our SHEPD and SEPD licence areas and, given the respective coastline extents of these, we are aiming to achieve 14 hectares in Scotland and 3 hectares in England.

To achieve the delivery of 14 hectares of seagrass planting in Scotland, we've signed a contract with the statutory nature conservation authority for Scotland, NatureScot, to administer our funding through the Scottish Government's Scottish Marine Environmental Enhancement Fund (SMEEF) (Largest-ever Scottish seagrass planting programme launched by unique partnership - Scottish Marine Environmental Enhancement Fund (smeeef.scot)). This ensures that funding is joined-up and targeted towards credible and evidence-based delivery projects with access to seagrass expertise. The first funding rounds will be run during the 2024/25 performance year.

We're continuing work to investigate delivery options in the seas around our SEPD licence area, where a number of delivery projects are already underway and provide opportunities to bolster the good work in progress.

IMPLEMENTATION TIMELINE

ACTION	PERFORMANCE MEASURES / REPORTING COMMITMENTS	TIMELINE
Minimum Requirement - Appropriate tool adopted to assess net changes in natural capital from different options for new connections and network projects.	Targets against actions to increase environmental value	Annually from 2024
Appropriate tool adopted to monitor the provision of ecosystem services from network sites and commit to reporting annually		
Establishment of Natural Capital Investment	Ofgem Annual Submissions	Annually from 2024



13. FLUID FILLED CABLES

13.1. SUMMARY

We're committed to reducing our environmental impact in the areas where we operate. An important element of this is to ensure that any oil contained in our assets does not cause damage to the surrounding area.

Oil is widely used as an insulating material or cooling medium across a wide variety of electrical equipment, including fluid-filled cables and some types of electrical switchgear and transformers. We've got robust processes in place to maintain and operate these assets, so that we can ensure any potential leakage is minimised. If there is an incident, we're committed to a fast response and to address and resolve any issues, thus ensuring that there are no adverse environmental impacts seen as a result.

A focus of our oil leak monitoring is oil within fluid-filled cables (FFC). FFC can leak due to age, wear, or third-party damage. If untreated, a leak will not only cause potential environmental damage but may result in equipment failure and disruption for our customers.

To mitigate the environmental impact and any associated supply disruption, we employ a pro-active leak location process known as tagging. This process allows the circuit to remain in service while the leak is being located by dosing the cable system with a chemical marker that can be detected by equipment above ground. This method of detection can detect multiple leaks on the circuit at each operation. Once identified, repairs and any necessary remedial works will be carried out using a risk-based approach. This process is built into the routine maintenance process of our FFC assets.

In addition to our pro-active oil leakage strategy, we have a comprehensive range of specialist equipment to ensure that we can provide a robust response to any oil leakage event. We've also established service agreements with specialist contractors for support in the event of an incident.

13.2. FLUID FILLED CABLE PERFORMANCE DURING RIIO-ED2

Oil leakage from fluid-filled cables (legacy assets of electricity transmission and distribution networks) is known to cause negative environmental impacts. We have funding in our EAP to replace 20.9km of fluid filled cables during RIIO-ED2. A further 42.4km of fluid filled cables have been identified as being required to be replaced due to their health score, bringing the overall RIIO-ED2 total to 63.3km.

Figure 12, shows that the total km of FFC on our network decreased from 1,207km in 2015/16 to 1,060km in 2022/23. There has been an increase from 2022/23 – 2023/24 to 1122km due to a data cleanse in our asset management system.

The total amount of fluid used to top up cables across both of our licence areas has decreased over RIIO-ED1 and RIIO-ED2 as shown in Figure 13 with a 14% reduction seen during the 2023/24 reporting period, when compared to the previous years performance.

For further details on oil leakage, please see [AER KPI Tables linked to the Appendix of this report.](#)

Total km of fluid-filled cables

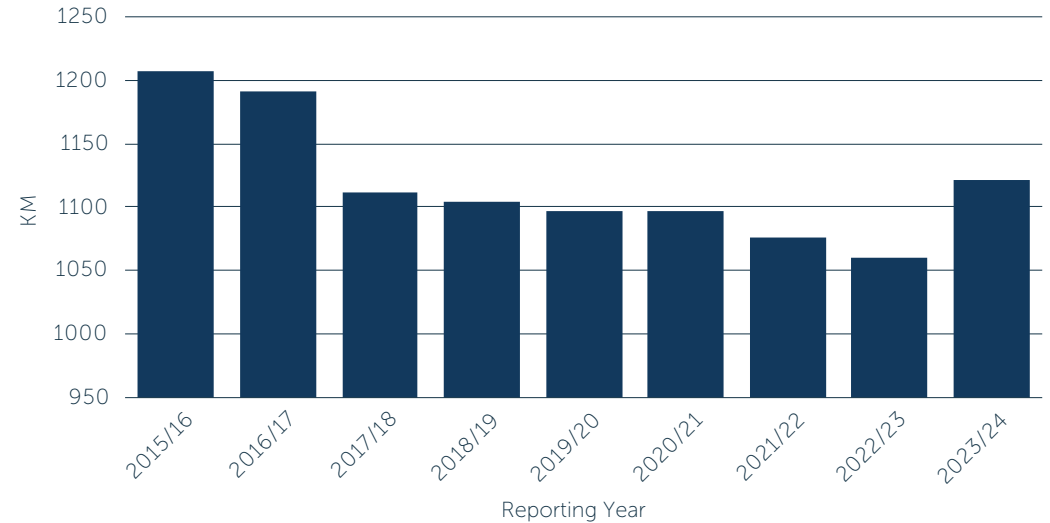


Figure 12: Total km of fluid-filled cables

Fluid in service cables vs fluid used to top up cables

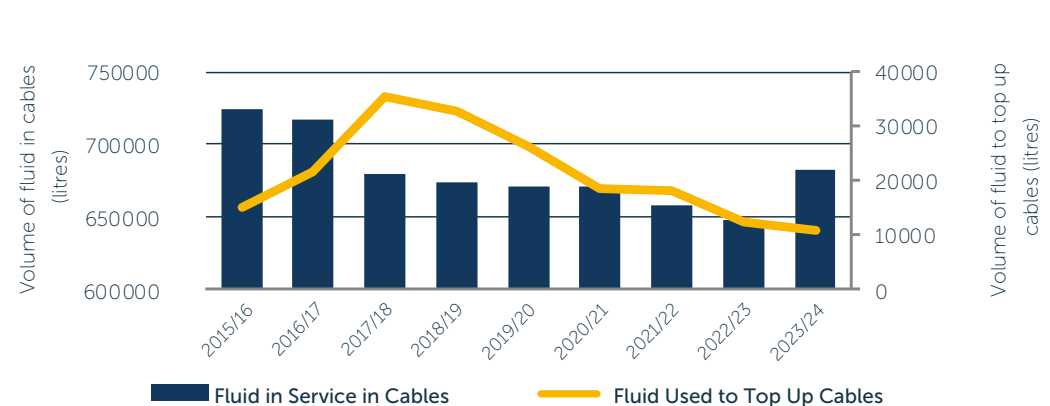


Figure 13: Annual oil in service cables vs fluid used to top up cables

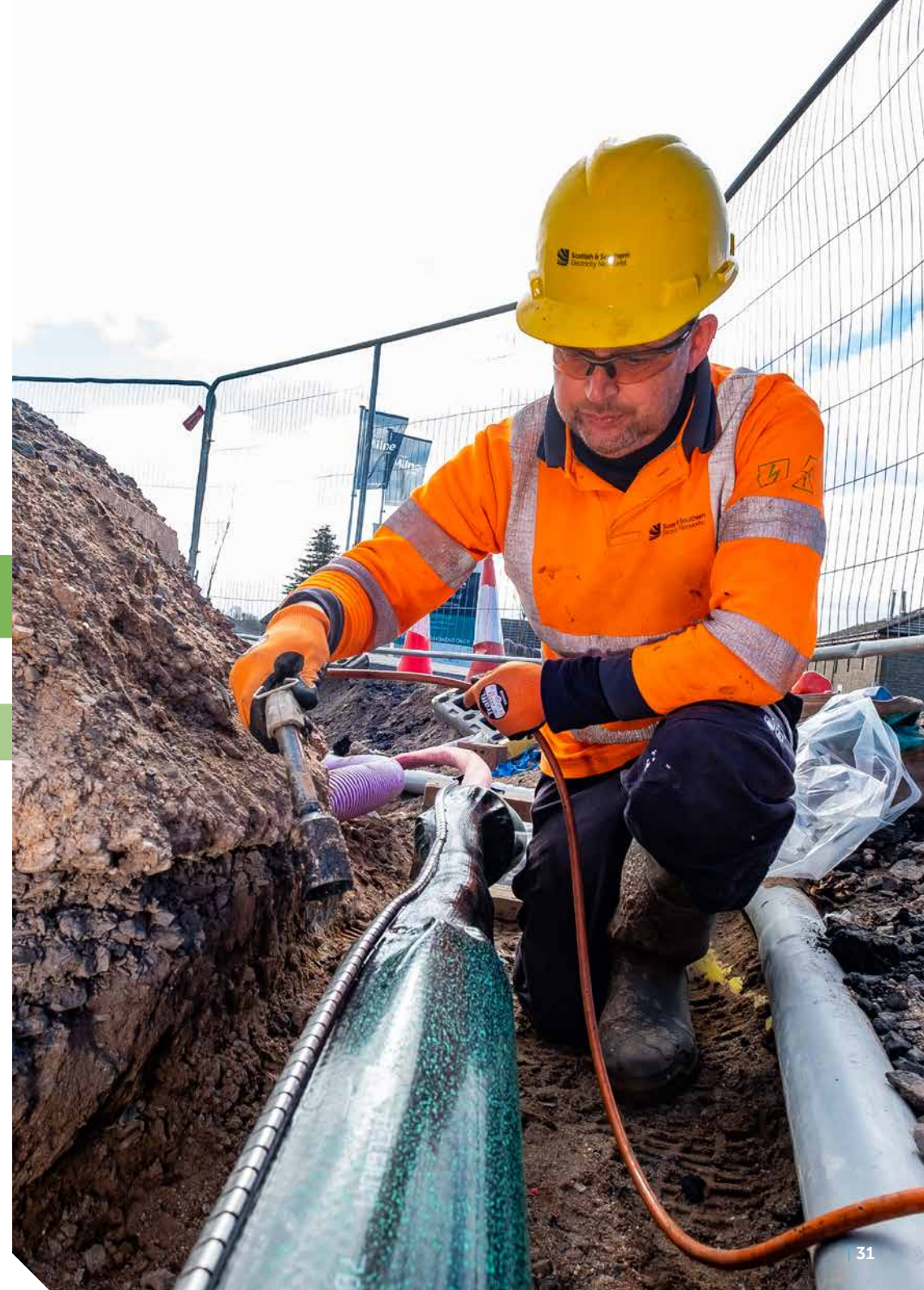
13.3. FLUID-FILLED CABLE INDUSTRY ENGAGEMENT

We continue to engage with other industry stakeholders to share best practices to reduce oil leakage. This involvement includes meetings with other Distribution Network Operators to share best practice learnings and ongoing innovative projects. We hold regular meetings with the Environment Agency and Scottish Environmental Protection Agency to review performance. We will continue this work as we progress through RIIO-ED2.

13.4. OIL MITIGATION SCHEMES

We report the number of oil mitigation schemes affecting cables and substation plant, such as transformers and circuit breakers, and the costs associated with these to Ofgem on an annual basis.

For further details on oil leakage, please see AER KPI Tables linked to the Appendix of this report.





14. WIDER ENVIRONMENT AND OTHER ACTIVITIES

14.1. SUMMARY

We're committed to managing our environmental impact and minimising the potential for any damage to the communities in which we operate.

Following achieving ISO 14001 certification in March 2023 we had our first surveillance audit in April 2024. The three-day audit involved visits to operational depots and sites in the Highland and South Caledonia regions in our SHEPD Licence area. The visit resulted in no non-conformances being raised with continued certification being recommended. The audit report confirmed that a very good level of operational control and engagement was demonstrated throughout audit. This positive outcome reflects our commitment to protecting and enhancing the environment in which we operate. We are committed to retaining ISO 14001 certification and will continue to utilise our Environmental Management System to propel our environmental and sustainability ambitions as we continue to progress through RIIO-ED2 and beyond.

14.2. TESTING SUSTAINABLE SOLUTIONS IN OUR OPERATIONS

14.2.1. LERWICK POWER STATION

Back in 2021 Lerwick Power Station had a new diesel engine with selective catalytic reduction (SCR) abatement fitted. As a more efficient engine, it is used for base load, reducing the CO2 output, and operating with reduced NOx emissions.

More recently in January 2022 a Battery Energy Storage System (BESS) was installed that allows more renewable generation onto the system. It also provides spinning reserve which means that thermal plant providing this service has been reduced.

Now a pipeline between Lerwick Power Station and the District Heating facility SHEAP (Shetland Heat, Energy and Power) has been added to provide them with the waste heat from the operation of the new number 9 engine. This ensures full use of the heat, assisting the environmental performance of a neighboring facility and means we don't need to waste energy cooling before dispersion.

14.2.2. ALLYE MAX – BATTERY GENERATOR TRIAL

The business need was short term generation to allow a Pole Mounted Transformer (PMT) replacement to avoid interruption of supply. Traditionally we would've gone down the diesel route, however, concerned about carbon emission, our local teams wanted to try a different approach and so we deployed Allye Max to support the local substation.

Operating in islanded mode they provide three-phase power for a continuous period of four hours. During this time, it successfully delivered 140kWh of clean energy to approximately 60 SSEN customers. During the trial period we saw a 200kg saving of carbon emissions and at a £90 reduction in cost, based on price of diesel (145p/L).

14.2.3. EV TRIALS

In order to meet our regulatory electric vehicle (EV) commitment, which is 100% of vehicles up to 3.5t by 2030 (80% by end of ED2), we've applied an 'alternative-first' approach to anything vehicle-related, this means that any new vehicle procured must consider an alternative to diesel first and prove that this won't work.

To support this approach, our Transport Standards Working Group is making huge strides in the areas of EV. Over this year we have had a hydrogen vehicle trial in Aberdeen which was a great success, and the first of its kind, solar panel testing for transits in many of our regions – our staff were very curious about this, and infrastructure support at home.



Caption: Hydrogen vehicle trial in Aberdeen

14.2.4. SUBSEA CABLES CLIMATE ADAPTATION

Working on remote islands with often a single connection to the electricity distribution network can mean that, when cables do fault, the community then needs to be supplied through diesel generation. Given that a cable repair or replacement can take months to execute, this can mean a significant environmental impact in terms of emissions. Over the last few years, We've made considerable improvements in our route engineering with the aim to extend the design life of the cable, significantly reducing the risk of failure in service and, therefore, the risk of emissions.

Historically, SHEPD cables were mainly surface-laid, from low-water mark to low-water mark, which was a standard install method of the time. This has made the cables susceptible to movement (instability) abrasion and mechanical damage.

Advancements in subsea cable route survey, analysis and design now allows for more detailed assessments to be conducted when producing a route design. This includes Cable Burial Risk Assessments (CBRA) and on-bottom stability (OBS) analysis.

With improvements in route survey technology, it's now far easier to identify seabed types such as areas of sediment, exposed bedrock, steep gradients, and boulder fields. By collecting high resolution data in a survey campaign, SHEPD can plot an appropriate route that avoid the high-risk areas for cable abrasion and damage, as well as avoiding sensitive habitats. This improved route engineering will alone add to the life expectancy of the cable. Historically, as the majority of subsea cables were replaced reactively following a fault, the replacement would typically adhere to the existing route without much opportunity to source an improved one. More modern installation methods also significantly improve lay accuracy, ensuring the cable is laid closer to the designed route. This significantly reduces the risk of cable-free spans over boulders and steep gradients which would increase the risk of cable damage.

The CBRA will assess risks to the cable from fishing interaction and possible anchor strikes. Where considerable risk is identified, cable burial may be recommended to mitigate the risk and protect the cable. Where burial is not achievable, there may be a recommendation to utilise rock dumping, which overlays the cable protecting it from third party interaction.

OBS will assess if the subsea cable is likely to be stable or unstable in the proposed route position. Should a cable be deemed "unstable" then protection and stabilisation measures will be recommended and utilised to prevent the cable from moving on the seabed, therefore "stabilising" the cable. This prevents possible cable movement and associated damage. These stabilisation methods include rock filter bags, concrete mattresses, cast iron split piping, uraduct, rock dumping or burial.

Usually, the detailed design will recommend a mixture of burial (where achievable) and the various stabilisation methodologies. The resultant design will ensure a prolonged cable life and reduced dependence on diesel generation, minimising emissions.





CONCLUSION

We continuously review our environmental commitments to look for opportunities to reduce our impact on the environment and deliver the environmental expectations of our stakeholders effectively.

Throughout the first year of RIIO-ED2, we've made significant progress in many of our environmental initiatives with the view of fulfilling a year of effective planning in many areas. This approach enables us to ensure delivery on our RIIO-ED2 commitments and pave the way towards a more sustainable grid- crucial to facilitating the energy system transition. We're continuing to drive efficiency, improve customer service and enhance the customer experience.

2023/2024 represented a continued positive trajectory in many of our environmental and wider sustainability considerations, including an increased focus on managing and reducing our BCF. We're delighted to report emissions for 2023/24 were within their Year End target, which was a 15% reduction from the base year (2019/20). The achieved reduction was of 22.2%.

We're also proud to lead by example, having been the first DNO to have our 1.5°C science-based greenhouse gas emissions reduction targets accredited by the Science-Based Targets Initiative (SBTi) last year. This year, through our Sustainable Supplier Code we've provided supplier engagement to encourage SBT sign up, and offer guidance and knowledge to those SME's that are beginning their SBT journey. At the end of 2023/24 we had 32% of our supply chain (by spend) with a verified Science-Based Target.

Additionally, we achieved several of our other 2023/24 targets including visual amenity and sustainable resource use and waste. We've played an active role in steering the direction of the nascent nature markets through responding to consultations and attending roundtables in this space, setting out both our own and the sector's requirements and challenges.

The first year of RIIO-ED2 has been a positive year for delivery but it has also been an enabling year. The hard work that we have completed this year will enable stronger delivery in subsequent years to come.

The advancement reported for the first year of RIIO-ED2 provides a clear message to our stakeholders that we have a successful established programme to deliver environmental benefits, and that we are aware of our responsibilities to both the environment and our customers.

Supporting Documents

- AER KPI Tables 2023-24
- Environment and Innovation Regulatory Reporting Pack 2023-24 Worksheets E1, E3 and E4

More information can be found here: [SSEN Environment reports document library](https://ssen.co.uk/about-ssen/library/environment-reports-document-library)
ssen.co.uk/about-ssen/library/environment-reports-document-library





APPENDIX 1: CLIMATE RESILIENCE

Progress Update on our Climate Resilience Strategy Implementation and Improvement Plan

Area	Action	Progress to date
Assessing Climate Change Risks	Investigate the effects of climate change across our seven different regions	Through the Energy Networks Association Climate Change Resilience Working Group (ENA CCRWG), we've collaborated with governments, industry and academia to further investigate the effects of climate change across our regions through the DESNZ 'Climate Services for a Net Zero Resilient World' (CS-NOW) research programme, running from 2021 to 2025. A report has been produced on future weather and climate risks to energy network infrastructure with further work planned. We've also completed climate change adaptation risk assessments for our 13 SEPD permitted sites, and we're developing our regional climate resilience plans.
	Identify the critical thresholds that will cause our distribution systems to suffer an intolerable shift in performance and undertake threshold analysis. Monitor the proximity and likelihood of exceeding defined climate thresholds	Through our climate change risk assessment and continued collaboration with the ENA CCRWG, we've identified the critical thresholds/ climate hazards we need to monitor and implemented an adaptation response through our adaptation risk actions which aim to reduce the likelihood of crossing these thresholds.
	Further investigate and analyse our interdependencies to develop a better understanding of the impacts of climate change on our business	We've further developed our understanding of interdependencies and cascading risk through collaborative events with the government, other infrastructure operators and our customers. And we'll be embedding our learnings into our regional climate resilience plans.
	Investigate additional scenarios and timeframes, which could include an assessment of our risks to climate change at the end of the century and to different climate model scenarios	We've extended our climate change risk assessment to consider a future climate scenario of 4°C rise by 2100 across our 15 direct adaptation risks (AR1 – AR15). The output will be reported under ARP4, the fourth round of climate adaptation reporting coordinated by Defra to feed into the UK National Adaptation Programme and Climate Change Committee Risk Assessment due at the end of the year.
	Review and update our climate risk and resilience assessment in conjunction with the ENA CCRWG, including any additional direct climate impacts and risks identified through historical learnings and further research e.g. wind	We've extended our climate change risk assessment to consider a future climate scenario of 4°C rise by 2100 across our 15 direct adaptation risks (AR1 – AR15). The output will be reported during ARP4, the fourth round of climate adaptation reporting coordinated by Defra to feed into the UK National Adaptation Programme and Climate Change Committee Risk Assessment.
	Identify the climate risks associated with our low-income and vulnerable customers/ communities, and work together to manage these risks	Through our refreshed consumer vulnerability strategy, we're continuing with our commitment to protect and support our customers and communities. We've successfully delivered Vulnerability Future Energy Scenarios (VFES), an innovation project which accurately predicts where communities are less resilient, less affluent, and more seriously affected by prolonged or frequent power cuts. As a result, we're now incorporating VFES into our business-as-usual processes to help target our services. We're also working with our Priority Services Register (PSR) customers, piloting tailored Personal Resilience Plans to help them know what to do- and hopefully cope better- during power cuts, providing battery packs to those who depend on electricity for medical reasons and preparing power cut resilience packs. We've also launched our 'Powering Communities to Net Zero' £3m fund with half available to support community-led physical and environmental resilience schemes.



Area	Action	Progress to date
Adaptation Planning	Collaborate with stakeholders to develop an adaptation plan for the indirect and interdependent climate risks assessed, as well as other risks associated with climate change.	Through the ENA CCRWG, we've collaborated with governments, industry and academia to further investigate indirect, interdependent and cascading climate risks. We've also participated in national and city-level climate resilience workshops to help define our approach, and will be embedding our learnings into our regional climate resilience plans.
	Further develop our Adaptation Pathways approach to prioritise our climate change adaptation actions utilising threshold analysis and based upon a multi-criteria 6 capitals approach.	Through our climate change risk assessment and continued collaboration with the ENA CCRWG, we've identified the critical thresholds/ climate hazards we need to monitor, and have implemented an adaptation response through our adaption risk actions. We'll continue to develop our approach in this area and test the multi-criteria six capitals approach. We are currently involved in an innovation project, Nature for Networks to investigate how nature-based solutions may provide a more efficient and collaborative approach to providing climate resilience to assets, and we're seeking further funding to expand the project to specific use cases.
	Continue to embed climate risk and resilience into business -as-usual operations - strategic tactical, operational decision-making and investment governance-by establishing clear roles, responsibilities, and leadership within SSEN.	Our Strategic Planning and Sustainability team continues to drive our climate resilience strategy forward to ensure that our network is fit for purpose into RIIO-ED2 and beyond. Our Environment, Social and Governance subcommittee oversees the strategic direction and performance.
Monitoring and Evaluation	Update policy documents, codes of practice and progress reports to consider the impact of climate change. Develop a specific Climate Resilience Policy.	We are part of SSE plc and adhere to the Group Climate Change Policy which outlines SSE's approach to mitigate and adapt to the impacts of climate change and ensure that climate-related risks and opportunities are integrated into both strategic and operational decision making. We continue to monitor whether our policies and procedures need updating in response to climate change and have recently integrated climate change planning into the management system for our SEPD permitted sites.
	Review and update our Adaptation Action Plan and our Implementation and Improvement Plan, including any updates from our climate risk and resilience assessment.	Our climate change risk assessment is currently being reviewed as part of ARP4 and we are developing our regional climate resilience plans. Any updates to our adaptation action plan and implementation and improvement plan will be reported on completion of these activities.
Reporting and Communication	Update customers and the wider public on action taken to improve our resilience to climate change via our website and newsletter.	Our Climate Resilience Strategy and annual progress reports are available on our website, with our second progress report being included in our 2023/24 Annual Environmental Report. We also regularly update stakeholders on other initiatives undertaken via our website and social media platforms, such as the launch of our 'Powering Communities to Net Zero' fund.
	Actively participate in the ENA Climate Change Resilience Group with other DNOs, collaborating with industry and experts (e.g. supporting the DESNZ CS-NOW programme and any other relevant academic projects or partnerships).	We actively participate in the ENA CCRWG with the current focus of the group on the CS-NOW research programme, ARP4 reporting and Climate Resilience metrics. Under CS-NOW, a report has been produced on future weather and climate risks to energy network infrastructure with further work planned.
	Deliver climate resilience-related reporting including: an Annual Progress Report to Ofgem, highlighting the progress we have made against our Adaptation Plan and Implementation and Improvement Plan; government reporting such as Adaptation Reporting Power and National Adaptation Programme for the 4th round; contributing to SSE Plc- level reporting including TCFD.	Our Climate Resilience Strategy and Annual Progress reports are available on our website, with our second progress report being included in our 2023/24 Annual Environmental Report. Through the ENA CCRWG, we are preparing our sectorial ARP4 submission which is due by the end of the year and will also be producing a SSEN-Distribution specific climate change adaptation report to provide more detail. We continue to provide information for SSE Plc-level climate-related disclosures and input into Group climate risk and resilience reviews.

Table 6: Progress Update on our Climate Resilience Strategy Implementation and Improvement Plan

This is a progress update on our Climate Resilience Strategy launched alongside our RIIO-ED2 Business Plan and Climate Resilience Strategy Implementation and Improvement Plan published in October 2023, to read the original documents please visit:

- ssenfutur.co.uk/wp-content/uploads/2021/12/A_7.3_ClimateResilienceStrategy_CLEANFINAL_REDACTED.pdf
- ssen.co.uk/globalassets/about-us/sustainability/documents/ssen-climate-resilience-strategy-progress-report-2023.pdf





APPENDIX 2: CLIMATE RESILIENCE ADAPTATION PLAN

Progress update on our Climate Resilience Adaptation Plan

Adaptation risk	Action(s)	Progress to date
(AR1) Overhead line conductors affected by temperature rise, reducing rating and ground clearance	<p>Review and update design standards for overhead lines, where necessary, to specify the upsizing of capacity to meet future load demands and projected higher temperatures.</p> <p>Progress the internal weather-related fault forecasting model workstream and utilise learnings to drive network planning and investment decisions.</p>	<p>Considering the impact on ratings and ground clearance of our overhead lines from increased average temperatures due to climate change, we've increased our minimum design standards for overhead lines, for both low and high voltage applications, in line with our Environmental Action Plan. We've continued work on our internal weather-related fault forecasting model to support improved resource planning and drive network improvements.</p>
(AR2) Overhead line structures affected by summer drought and consequent ground movement	<p>Undertake a technical review of the impact of summer droughts on ground shrinkage and the destabilisation of the foundations of single structures and towers to ascertain the real risk of this occurring and any mitigation required.</p> <p>Progress the internal weather-related fault forecasting model workstream and utilise learnings to drive network planning and investment decisions.</p>	<p>Droughts experienced to date have not impacted overhead line foundations. However, we will continue to monitor the impact on our structures and modify our standards and policies as necessary. We've continued work on our internal weather-related fault forecasting model to support improved resource planning and drive network improvements.</p>
(AR3) Overhead lines affected by interference from vegetation due to prolonged growing season	<p>Explore the use of LiDAR to aid in the management of trees, allowing a better understanding of circuit resilience.</p> <p>Increase the tree-cutting cycle frequency from four to three years in SEPD to account for more favourable weather conditions for vegetation growth.</p> <p>Commence project to determine if a tree-resilient overhead line can be achieved, to ensure that a line can remain live and safe despite falling trees, using covered conductor and 'Smart' technology to detect when a tree has fallen on the line.</p> <p>Progress the internal weather-related fault forecasting model workstream and utilise learnings to drive network planning and investment decisions.</p>	<p>We're a statutory duty to identify and address vegetation intrusions to our overhead lines to keep them within safe limits. To build greater efficiency into managing these works, we're investigating new data management and modelling solutions to target vegetation management requirements through a risk-based approach, instead of relying on cyclical survey requirements. We've amended our cyclical tree cutting policy in SEPD to aim for a 3-year cycle and are monitoring performance. Investigations are continuing into improved fault detection and automation systems to determine if a tree resilient overhead line can be achieved. And we have continued work on our internal weather-related fault forecasting model to support improved resource planning and drive network improvements.</p>
(AR4) Underground cable systems affected by increase in ground temperature, reducing ratings	<p>Investigate and determine the effects of increase in ground temperature on our underground cable systems.</p> <p>Verify the thermal models currently being used for distribution cables.</p> <p>Consider the effects of the changes to cyclic loading to low voltage levels.</p> <p>Progress the internal weather-related fault forecasting model workstream and utilise learnings to drive network planning and investment decisions.</p>	<p>Considering the impact on ratings of our underground cables from increased average temperatures due to climate change, we've increased our minimum design standards for underground cables in line with our Environmental Action Plan. This increase in cable sizing has mitigated the current projected increase in ground temperature in our licence areas, however, we'll continue to monitor this and develop mitigation and management policies as necessary. We've also continued work on our internal weather-related fault forecasting model to support improved resource planning and drive network improvements.</p>
(AR5) Underground cable systems affected by summer drought and consequent ground movement, leading to mechanical damage	<p>Review and update design standards for the use of ducted systems and joints at high voltage in urban environments, where required, to mitigate the impacts of ground movement.</p> <p>Progress the internal weather-related fault forecasting model workstream and utilise learnings to drive network planning and investment decisions.</p>	<p>Our internal investigations have concluded that this would primarily be a risk to areas with clay soil where the ducts fill with soil during periods of ground movement. We're continuing to investigate this to determine a mitigation and management process. Design standards will be updated as necessary. And we've continued work on our internal weather-related fault forecasting model to support improved resource planning and drive network improvements.</p>



Adaptation risk	Action(s)	Progress to date
(AR6) Substation and network earthing systems adversely affected by summer drought conditions, reducing the effectiveness of the earthing systems	Investigate a risk-based approach to inspect and monitor changes in the conditions of network earthing systems.	Our internal investigations have concluded that current global earthing system specifications mitigate the current projected impacts of increases in earthing resistance. We're continuing to investigate this, particularly in relation to islanded systems, and will continue to apply a risk-based approach to the inspection routine.
(AR7) Transformers affected by temperature rise, reducing rating	Where transformers have radiators, investigate the need for increasing the size of the radiators or the use of water cooling to comply with excess heat and to reduce temperature. Explore the installation of temperature monitors for monitoring conditions in our substations and current primary substations where applicable.	Preliminary findings of our internal investigations have suggested that this impact is seen most significantly in secondary substations as opposed to primary or grid substations. We've been piloting load verification at a few of our secondary substations, and we'll look to commence further investigations into temperature monitoring in the future.
(AR8) Transformers affected by urban heat islands and coincident air conditioning demand leading to overloading in summer months	Where transformers have radiators, investigate the need for increasing the size of the radiators or the use of water cooling to comply with excess heat and to reduce temperature. Explore the installation of temperature monitors for monitoring conditions in our substations and current primary substations where applicable.	Preliminary findings of our internal investigations have suggested that this impact is seen most significantly in secondary substations as opposed to primary or grid substations. We've been piloting load verification at a few of our secondary substations. We will look to commence further investigations into temperature monitoring in the future.
(AR9) Switchgear affected by temperature rise, reducing rating	Embed new design standard with the provision for suitable environmental conditions (e.g. increased ventilation, air-con and dehumidification) that will function in line with projected changes to the climate in our regions. Consider the provision for ventilation/air-conditioning in current substations.	Our current primary and grid substation switchgear are rated to run at 40°C. Our current policies reflect the need for ventilation, air conditioning and dehumidification where containerised solutions are employed. We plan to undertake a literature review to determine whether this issue is being researched within the academic and industrial communities, and whether there are any projects being undertaken or are being planned so that we can consider any outputs and learnings.
(AR10) Substations affected by river flooding due to increased winter rainfall	Assess the risk and resilience of critical substations affected by river flooding and, where required, develop a local flood mitigation plan. Build and invest in flood mitigation measures for critical Substations affected by river flooding (e.g. raising individual sites above the flood level or the installation of temporary barriers). Continue to develop substations in line with the ENA Engineering Technical Report 138 which applies to Grid and Primary sites. Investigate automating the management of flooding data and review the Environment Agency and Scottish Environment Protection Agency flood maps as and when they are updated.	We've continued to develop our flood risk assessment process, and have completed further surveys and assessments across our licence areas to inform our decision making, for where flood mitigation investment is needed the most, as well as effective planning for the rest of RIIO-ED2. We've also delivered flood mitigation works to one site for our communities in SHEPD. Additionally, we've progressed our Nature for Networks innovation project to investigate how nature-based solutions may provide a more efficient and collaborative approach to providing flood resilience to assets, and we're seeking further funding to expand the project to specific use cases.
(AR11) Substations affected by pluvial (flash) flooding due to increased rainstorms in summer and winter	Assess the risk and resilience of critical substations affected by pluvial flooding and, where required, develop a local flood mitigation plan. Build and invest in flood mitigation measures for critical Substations affected by pluvial flooding (e.g. raising individual sites above the flood level or the installation of temporary barriers). Continue to develop substations in line with the ENA Engineering Technical Report 138 which applies to Grid and Primary sites. Investigate automating the management of flooding data and review the Environment Agency and Scottish Environment Protection Agency flood maps as and when they are updated.	We've continued to develop our flood risk assessment process, and have completed further surveys and assessments across our licence areas to inform our decision making for where flood mitigation investment is needed the most, as well as effective planning for the rest of RIIO-ED2. We've also delivered flood mitigation works to one site for our communities in SHEPD. Additionally, we've progressed our Nature for Networks innovation project to investigate how nature-based solutions may provide a more efficient and collaborative approach to providing flood resilience to assets, and we're seeking further funding to expand the project to specific use cases.



Adaptation risk	Action(s)	Progress to date
(AR12) Substations affected by sea flooding due to increased sea levels and/or tidal surges	<p>Assess the risk and resilience of critical substations affected by sea flooding and, where required, develop a local flood mitigation plan.</p> <p>Build and invest in flood mitigation measures for critical substations affected by sea flooding (e.g. raising individual sites above the flood level or the installation of temporary barriers). Continue to develop substations in line with the ENA Engineering Technical Report 138 which applies to Grid and Primary sites.</p> <p>Investigate automating the management of flooding data and review the Environment Agency and Scottish Environment Protection Agency flood maps as and when they are updated.</p>	<p>We've continued to develop our flood risk assessment process, and have completed further surveys and assessments across our licence areas to inform our decision making for where flood mitigation investment is needed the most, as well as effective planning for the rest of RIIO-ED2. We've also delivered flood mitigation works to one site for our communities in SHEPD. Additionally, we've progressed our Nature for Networks innovation project to investigate how nature-based solutions may provide a more efficient and collaborative approach to providing flood resilience to assets, and we're seeking further funding to expand the project to specific use cases.</p>
(AR13) Substations affected by water flood wave from dam burst	<p>Continue to monitor the current position regarding dam burst and develop and implement a mitigation plan where necessary.</p>	<p>We're looking to investigate this work in the future to inform any immediate risks to our substations.</p>
(AR14) Overhead lines and transformers affected by increasing lightning activity	<p>Continue with the current strategy to use class 2 surge arresters and investigate the latest technology and research where applicable.</p> <p>Progress the internal weather-related fault forecasting model workstream and utilise learnings to drive network planning and investment decisions.</p>	<p>During RIIO-ED1, we installed 450 surge arresters across both of our licence areas and will continue to monitor and assess future changes in technology and research. We've also continued work on our internal weather-related fault forecasting model to support improved resource planning and drive network improvements.</p>
(AR15) Overhead lines and underground cables affected by extreme heat and fire smoke damage	<p>Explore wildfire risk areas and develop and implement a mitigation plan where necessary.</p> <p>Progress the internal weather-related fault forecasting model workstream and utilise learnings to drive network planning and investment decisions.</p>	<p>We'll look to commence our investigations into future potential impacts on our overhead lines and underground cables from extreme heat and fire/smoke damage. Also we've continued work on our internal weather-related fault forecasting model to support improved resource planning and drive network improvements.</p>

Table 7: Progress update on our Climate Resilience Adaptation Plan





APPENDIX 3: SUSTAINABILITY PROGRESS 2023/24

Following the launch of our first Sustainability Strategy at the start of 2021, we completed a strategic update in 2023 to show key sustainability ambitions during the RIIO-ED2 price control.

Following on from this strategic update, we committed to including a report on progress made against sustainability commitments in our Annual Environmental Report.

The following sections contain the key updates for 2023/24 against each of the five Ambitions in our Sustainability Strategy.

To read our original Sustainability Strategy and October 2023 Strategic Update, please visit:

- ssenfuture.co.uk/wp-content/uploads/2021/12/A_13.2_SSEN_Sustainability_Strategy_CLEANOFGEM.pdf
- ssen.co.uk/globalassets/about-us/sustainability/documents/ssen-sustainability-strategy-2023--final-.pdf



Caption: SSEN Distribution Sustainability Ambitions - these ambitions are at the heart of our sustainability work and drive the agenda for the net zero pathway.

1. RELIABLE NETWORK



We will work collaboratively to build trust and ensure legitimacy in everything that we do, for the greater good of our local communities and GB.

1.2 DECENT WORK AND ECONOMIC GROWTH

Over 2023/24, SSEN Distribution contributed £1.03bn to UK GDP and supported 9,720 jobs.

1.3 A CLIMATE-RESILIENT DECARBONISED NETWORK

During 2023/24, we continued to make progress against our adaptation actions and additionally completed Climate Change Adaptation Risk Assessments for our SEPD permitted sites.

1.6 MAINTAINING A SAFE, RELIABLE AND RESILIENT NETWORK

This year our Asset Management System was assessed by an external auditor, and we were awarded a renewed certification to the ISO 55001 International Standard, valid for three years.

TOPICS:

- 1.1 Business-as-usual reliable network
- 1.2 Decent work and economic growth
- 1.3 A climate-resilient decarbonised network
- 1.4 Asset management
- 1.5 Asset strategy
- 1.6 Maintaining a safe, reliable and resilient network

Secondary linked
UN SDGs



**SUSTAINABLE
DEVELOPMENT
GOALS**

2. ENABLING NET ZERO



We will support the global drive to net zero by committing to a climate science backed net zero goal, which is also considerate of wider societal impact

2.1 WHOLE SYSTEM APPROACH TO THE ENERGY TRANSITION

Throughout 2023/24, we have been developing whole system proposals for Scottish Islands to meet their energy needs whilst reducing our carbon emissions on the islands through the use of diesel embedded generation (DEG). Additionally, we've been working with local authorities through use of the LENZA tool to develop Local Area Energy Plans (LAEPs) which will form local decarbonisation strategies across both our licence areas.

2.2 DISTRIBUTION FUTURE ENERGY SCENARIOS (DFES)

In the last year, we've been working with Regen to understand how vulnerability and socio-demographics can inform our DFES projections. This will allow us to develop long term plans that facilitate a just transition. We've also published a bespoke guide to our DFES ensuring local authorities and other stakeholders can develop plans for the future.

2.4 DECARBONISATION OF TRANSPORT AND HEAT

We've collaborated with the ENA and other DNOs to develop a single platform to handle domestic LCT applications. The platform, ENA Connect Direct, aims to accelerate the installation process, providing a host of benefits and a more seamless experience.

By removing the need for installers to email the Word or Excel application documents to our Connections team, it is now a fully digital process, which removes processes which are time-consuming and prone to error. In addition, because of the combination of embedded decision logic and the use of property-level DNO data, installers can now get either instant approval or instant escalation of applications, removing the often days-long wait for a response.

The platform also features an image recognition tool which helps to identify any DNO assets which might require replacing due to age or damage, boosting safety as well as installation efficiency.

With the ability to connect via a web portal or API, the platform is enabling third parties to embrace the fully digital domestic LCT application process, and also supports LCT manufacturers by including a digitalised Type Test Register and LCT database, which further boosts the decarbonisation of heat and transport by making it easier for third parties to easily view/upload/assess LCTs.

We've worked with Regen to understand how bespoke transport decarbonisations such as ferries and light aircraft will impact future demands on Scottish Islands.

2.6 INNOVATION FOR THE NET ZERO TRANSITION

Nature4Networks (N4N):

The Nature4Networks (N4N) project explores the potential of using nature-based solutions (NbS) to address challenges faced by energy networks, such as flooding, overheating, and visual impact. NbS not only supports faster and more resilient transformation towards net-zero goals but also offer social and environmental benefits. Monetising these benefits through schemes in Great Britain would help offset costs, providing better value to consumers. During the discovery phase, the N4N project catalogued various NbS approaches tailored to energy network needs, offering theoretical and conceptual solutions that address specific challenges.

TOPICS:

- 2.1 Whole system approach
- 2.2 DFES
- 2.3 Smart and flexible networks
- 2.4 Decarbonisation of transport and heat
- 2.5 Future Connections and LCT Supply
- 2.6 Innovation for the net zero transition

Secondary linked
UN SDGs

SUSTAINABLE
DEVELOPMENT
GOALS



3. CLIMATE ACTION



We will ensure a net positive impact on environments we disrupt and commit to no further degradation to our local environments

3.1 ISO 14001

We had a successful surveillance audit with our external auditor, NQA, with zero non-conformances identified. We're committed to retaining ISO 14001 certification and will continue to utilise our Environmental Management System to propel our environmental and sustainability ambitions as we continue to progress through RIIO ED2 and beyond.

3.3 REDUCING ELECTRICITY LOSSES

During 2023/24, we refreshed our losses strategy with a revised structure and added in the latest data and information to improve the clarity of the actions we are taking to reduce electrical losses for our stakeholders. We focused on updating and embedding our design standards for cable and overhead line sizing and improving the energy efficiency of our substations to reduce actual losses. As a result of our targeted interventions, we have achieved a calculated losses saving of 7,513MWh for 2023/24.

3.4 EFFICIENTLY MANAGE SULPHUR HEXAFLUORIDE (SF₆)

In 2023/24, we reduced our overall SF₆ leakage rate by 21% across both licence areas, beating the 3% reduction target for year 1 of RIIO-ED2. We have improved our monitoring and analysis to track the poorest performing assets, and begun targeting investment to replace these where repair is not suitable.

3.5 REDUCING EMBODIED CARBON

As part of our RIIO-ED2 sustainability requirements we'll be reporting on embodied carbon for all projects over £10m from April 2024. We've developed a tool that captures carbon figures for 'In Design' and 'As Built' stages for each of these projects, and we're currently engaging with internal teams and our contractors to ensure the data is captured correctly.

3.6 SUSTAINABLE SUPPLY CHAIN

Since the launch of our Sustainable Supplier Code in May 2023 we've seen a huge increase in supplier engagement in the sustainability space, and we now have 37.5% of our supply chain (by spend) signed up to our code.

In addition, since January 2024 we've also hosted two webinars; one covering circular economy, and the other discussing the challenges we face with biodiversity net gain requirements.

3.7 REDUCING RESOURCE CONSUMPTION

During the 2023/24 reporting period we produced a total of 4,359 tonnes of waste, of which 80% was recycled and 97% was diverted from landfill, exceeding our targets.

TOPICS:

- 3.1 ISO 14001
- 3.2 Reducing our business carbon footprint
- 3.3 Reducing electricity losses
- 3.4 Efficiently manage sulphur hexafluoride (SF₆)
- 3.5 Reducing embodied carbon
- 3.6 Sustainable supply chain
- 3.7 Reducing resource consumption
- 3.8 Enhancing biodiversity and natural capital
- 3.9 Efficiently manage fluid-filled cables
- 3.10 Minimising noise pollution
- 3.11 Efficiently manage PCB
- 3.12 Additional sustainability initiatives

Secondary linked UN SDGs

SUSTAINABLE DEVELOPMENT GOALS



3. CLIMATE ACTION (CONTINUED)



3.9 EFFICIENTLY MANAGE FFC

In 2023/24, we reduced our oil leakage from fluid-filled cables (FFC) by 13%. We remain committed to addressing, managing, and reducing FFC leakage and targeting the gradual removal of FFC from our network.

3.10 MINIMISING NOISE POLLUTION

We're now reviewing our noise complaints monthly to monitor trends and ensure we're taking appropriate action to minimise noise pollution.

3.11 EFFICIENTLY MANAGE PCBs

Polychlorinated biphenyls (PCBs) were banned in 1987, and successive changes to legislation have been enacted to safely remove and disposal of legacy volumes. Less than 4% of our transformers installed before 1987 have low concentrations of PCBs in their insulating oil, and we are committed to addressing these by the end of 2025. During the last year we've developed and deployed a novel technique for taking oil samples from our remaining transformers without interrupting customer supplies to complete our testing programme. We've also proven and begun rolling out a procedure for decontaminating ground-mounted transformers with oil changes.

3.12 ADDITIONAL SUSTAINABILITY INITIATIVES

Work is ongoing to develop and implement the Sustainability Assessment and Action Plan (SAAP) through creating a SAAP Lite, which is a 'lighter/shortened' version of the original SAAP and is to be used for all projects over £10m (backdated to October 2023). The aim of this document is to support our suppliers, mitigating risks whilst identifying sustainability opportunities and enabling action.

TOPICS:

- 3.1 ISO 14001
- 3.2 Reducing our business carbon footprint
- 3.3 Reducing electricity losses
- 3.4 Efficiently manage sulphur hexafluoride (SF₆)
- 3.5 Reducing embodied carbon
- 3.6 Sustainable supply chain
- 3.7 Reducing resource consumption
- 3.8 Enhancing biodiversity and natural capital
- 3.9 Efficiently manage fluid-filled cables
- 3.10 Minimising noise pollution
- 3.11 Efficiently manage PCB
- 3.12 Additional sustainability initiatives



Secondary linked UN SDGs

SUSTAINABLE DEVELOPMENT GOALS



4. SERVING OUR CUSTOMERS



Our five sustainability ambitions are at the heart of all our work and are essential to drive a net zero Just Transition for our customers

4.3 SUPPORT CUSTOMERS IN A VULNERABLE SITUATION

We've made progress against all our commitments to supporting customers in vulnerable situations. In 2023/24, we increased the number of households registered on our Priority Service Register (PSR), taking the total number registered to 987,831. Working with the Centre for Sustainable energy, we have enhanced the data used to target PSR promotion to help us reach 1m PSR customers by March 2025.

We've supported over 6,000 households in fuel poverty; this support includes energy efficiency advice, income maximisation and benefits checks. Whilst this is slightly below our 2023/24 target, we're on track to reach 50,000 households supported by March 2028.

Our 'Powering Communities to Net Zero' fund launched in July 2024, supporting communities with resilience, environment and low carbon technology initiatives. Applications for funding remained open until August, with the funding being awarded from October onwards. The fund will run annually throughout R10-ED2.

Our PSR satisfaction score has improved to 8.83 but is slightly below target; improvements across planned supply interruptions and our customer messaging are under way to help increase this score.

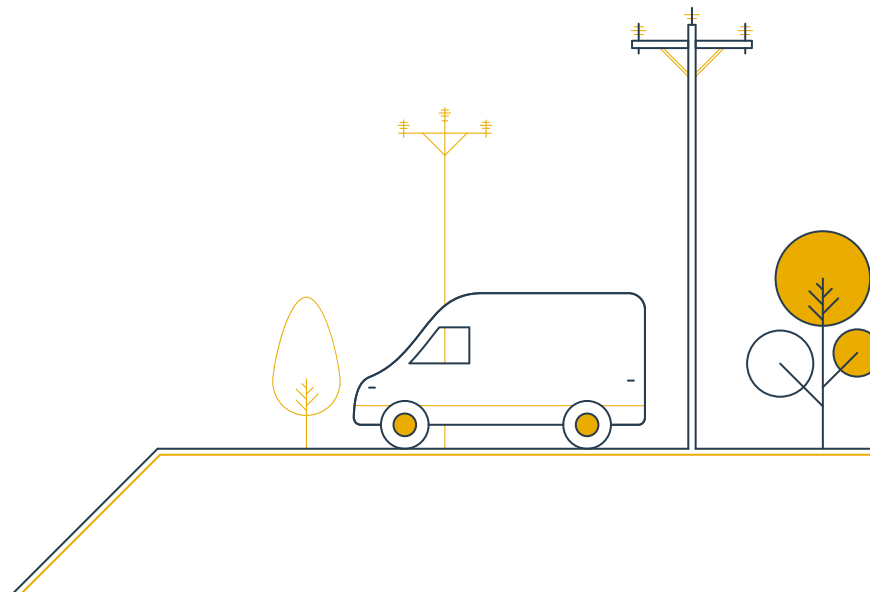
We launched our Vulnerability Allies Community (Vulnerability champions) in March 2024 and this has grown to over 40 members. In addition, Maxine Frek from SSE Plc has joined the SSEN Distribution Executive Committee, championing customer experience and vulnerability.

TOPICS:

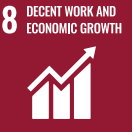
- 4.1 Develop a stakeholder engagement strategy
- 4.2 Customers at the heart of service offerings
- 4.3 Support customers in a vulnerable situation
- 4.4 Maintain strong and strategy partnerships
- 4.5 Ensure a Just Transition for all

Secondary linked UN SDGs

SUSTAINABLE DEVELOPMENT GOALS



5. OUR PEOPLE



We'll build a more inclusive and diverse workplace where people can thrive, be themselves, contribute to SSEN Distribution being a great place to work and make a positive impact on society

5.1 INVESTING IN WORKFORCE RESILIENCE

Further investment in our future talent with early careers pipelines securing an additional 100 new colleagues for September 2024 and hiring 90 adults for upskill/reskill programmes for critical craft skills, many from high carbon or declining sectors.

We've conducted further engagement with social mobility and STEM-related providers, which has been integrated with our My Way In attraction campaign. We've also struck up new partnerships with the Princes Trust and Movement to Work, and seen continued success with Career Ready, enabling young people with a disadvantaged start in life to enter the world of work or gain work experience.

TOPICS:

- 5.1 Investing in workforce resilience
- 5.2 Enabling inclusive and accessible workplaces
- 5.3 Enabling inclusive and accessible products and services

5.2 ENABLING INCLUSIVE AND ACCESSIBLE WORKPLACES

We've launched an internal and informal all-colleague network called the "EDI collective", to generate conversation on Equity, Diversity and Inclusion topics and encourage greater awareness of, and increased understanding of, perspectives and enabling ownership at local levels.

We're also promoting cultural development through a simple co-created behavioural framework, encouraging amongst other elements, teamwork and collaboration. This seeks to build on our SSE values and develop momentum of how we work together as one team.

Secondary linked
UN SDGs



SUSTAINABLE
DEVELOPMENT
GOALS



GLOSSARY

Business carbon footprint (BCF)

A measure of the total Greenhouse Gas Emissions (in tonnes of carbon dioxide equivalent, tCO₂e) resulting from operations on which the DNO has full authority to introduce and implement their operating policy, as well as contractors' emissions.

Common distribution charging methodology

Used to calculate charges to users who are connected to the LV and HV levels of the network.

Demand-side response

Demand side response is a scheme where customers are incentivised financially to lower or shift their electricity use at peak times. This helps manage load and voltage profiles on the electricity network.

Designated area

Areas in which Visual Amenity Projects may be undertaken, according to the relevant definitions in CRC 3J (allowed expenditure on Visual Amenity Projects).

Distributed generation (DG)

Plant or equipment for the production of electricity that is directly connected to the distribution network

Distribution losses

Units lost while being transported through the licensee's distribution system, either as electricity turns to heat as it is transported through the network or non-technical losses, such as theft or measurement errors.

Distribution losses' strategy

The DNO's strategy for designing, building, and operating the distribution system in a manner that can reasonably be expected to ensure that distribution losses are as low as reasonably practicable.

Environmental Report

SpC 9.1 (Environment Reporting) sets out requirements for the licensee to publish an annual Environmental Report about activities that it has undertaken in relation to environmental matters.

Fluid-filled cables

Pressurised fluid-filled underground cables, high voltage cables in which the insulating medium is liquid oil as opposed to a solid insulator such as oil impregnated paper or PVC.

Fluid recovered

Fluid associated with pressurised fluid-filled underground cables that has leaked from a cable and is subsequently recovered and includes:

- Fluid captured in a container whilst jointing works are being undertaken.
- Spoil removed from site because it has become saturated with fluid during a cable leak.
- In order to avoid double counting, the volume of fluid used to top up a cable to prevent pressure reaching the Pressure emergency (PE) level prior to jointing or repair should be excluded.

Fluid used to top up cables

Fluid pumped into pressurised fluid-filled underground cables and includes fluid used to:

- Bring a circuit back up to the appropriate pressure from a lower pressure level.
- Sustain a circuit fluid pressure from reaching Pressure emergency level prior to jointing or repair of a leak.

Greenhouse gas (GHG) emission

The release of greenhouse gases into the atmosphere, including carbon emissions. Within the BCF, greenhouse gas emissions, e.g. SF₆, are calculated as equivalent carbon dioxide emissions.

Low carbon technologies (LCTs)

LCTs is the collective term for technologies that are being introduced to the market with the aim of reducing carbon emissions through the more efficient use of energy, the storage of energy in a flexible way or a move from another energy vector such as oil to electricity. Examples include:

- Heat pumps
- Electric vehicles
- Domestic batteries

Noise pollution

The activity of investigating reports of noise pollution, and consequential remedial works (if necessary). In this context, noise pollution is defined as levels of noise associated with the normal operational characteristics of electrical distribution assets that may be deemed to be a nuisance and subject to Part III of the Environmental Protection Act 1990 (EPA).

Non-technical losses

Electricity units lost for reasons such as theft and measurement inaccuracy.

Oil leakage

The discharging of insulating oil into the environment because of a DNO's equipment and activities.

Network innovation allowance (NIA)

A set allowance per network licensee to fund smaller technical, commercial, or operational projects directly related to the licensee network that have the potential to deliver financial benefits, and / or to fund the preparation of submissions to the Network Innovation Competition (NIC)

Regulatory instructions and guidance (RIGs)

The term RIGs refer to a collection of documents issued by Ofgem to the DNOs to enable them to complete the reporting requirements associated with the RIIO-ED1 price control arrangements. It includes Excel reporting packs, instructions and guidance, commentaries, and the glossary.

RIIO-ED2 Business Plan

For SHEPD and SEPD, the document submitted to Ofgem and published by the licensee in December 2021. This business plan covered the period 1st April 2023 to 31st March 2028.

RIIO-ED2 Cost Benefit Analysis (CBA) Tool

The CBA tool DNOs used when completing their RIIO-ED2 Business Plans.

SSEH/SHEPD

This stands for Scottish and Southern Electricity Hydro. It is the acronym provided to our Scottish network.

SSES/SEPD

This stands for Scottish and Southern Electricity South. It is the acronym provided to our Southern network.

Sulphur hexafluoride / SF₆

The chemical symbol for sulphur hexafluoride, a gas that is used as both an insulating and arc extinction medium in electrical plant. The reporting requirement is in respect of fugitive BCF emissions attributed to SF₆ lost from electrical plant.

SF₆ bank

The total mass (in kg) of sulphur hexafluoride held by the DNO for both assets installed on the network and those held in inventory. Each DNO's SF₆ bank should be calculated according to the methods set out in ENA Engineering Recommendation S38.

SF₆ emitted

The total mass (in kg) of sulphur hexafluoride emitted during asset installation (only if gassed by the DNO), service life and decommissioning. Service-life emissions include those due to leakage (measured through top-ups); those measured during service activity requiring gassing and degassing; and those due to equipment failure resulting in the loss of all gas contained by the asset. The SF₆ emitted value should account for gas recovered.

Each DNO's SF₆ emitted should be calculated according to the methods set out in ENA Engineering Recommendation S38. DNOs should not assume a percentage leakage rate to determine any element of SF₆ emitted and if a DNO does not have measured records of SF₆ emitted, this should be highlighted in the accompanying commentary.

Tagging

Tagging is the process where the worst-performing cables are targeted and injected with radioactive isotopes, which helps to identify leaks, monitor the cables and track their performance over time.

tCO₂e

Carbon dioxide (CO₂) equivalent, measured in tonnes. This is a measure for describing how much global warming a given type and amount of greenhouse gas may cause, using the functionally equivalent amount or concentration of carbon dioxide (CO₂) as the reference.

Technical losses

Electricity units lost owing to the physical properties of the network. This also includes the way the network is configured and operated.

Visual amenity inside designated areas

Activity undertaken as part of a Visual Amenity Project funded under the Visual Amenity Allowance funding mechanism described in Special Licence Condition CRC 3J (Allowed expenditure on Visual Amenity Projects) of the electricity distribution licence which relates to overhead distribution assets located within a Designated Area.

Visual amenity outside designated areas

Activity undertaken as part of a Visual Amenity Project, funded under the Visual Amenity Allowance funding mechanism. This is described in CRC 3J (Allowed expenditure on Visual Amenity Projects) of the electricity distribution licence, and relates to overhead distribution assets which form part of an overhead line that spans the boundary of a Designated Area, and is located outside the boundaries of the DNO's Designated Area; In these scenarios, up to 10% of the Visual Amenity Allowance funding mechanism described in CRC 3J (Allowed expenditure on Visual Amenity Projects) of the electricity distribution licence may be used.



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