Annual Sustainability Statement 2015–16

SP ENERGY NETWORKS

Contents

Welcome to the SP Energy Networks Transmission Annual Sustainability Statement 2015–16

SP Energy Networks (SPEN) is the owner of the Transmission network (TO) in central and southern Scotland. We are responsible for operating and maintaining the network, and for investing in our network to maintain the highest levels of reliability and availability. Through adopting a more sustainable approach, we believe we can deliver this more effectively for customers and the environment, year on year.

In short, we are responsible for:

- Providing a safe, reliable and economic transmission system for current and future network users; and
- Delivering a sustainable, low carbon energy system.

In this, the third of our annual sustainability statements, we outline the initiatives we have undertaken during 2015 and 2016 towards our aim of achieving high standards of environmental management. These are central in enabling us to move closer to the low carbon energy system required to limit temperature rises to 2°C by 2100 as agreed at the 2015 United Nations Climate Change Conference.

We are a forward-looking company that recognises the potential impact of climate change. We also recognise the key role the electricity transmission sector can play by developing our network sustainably and boosting the connection of low carbon technologies. Our stakeholders are already playing a vital part in the drive towards the decarbonisation critical to meeting both the UK and Scottish Government targets by 2020. We are working with them to facilitate the low carbon generation connections they need more quickly and cheaply by leading advances in technology and enshrining successful business innovations in our 'business as usual' approach.

As sponsors and co-hosts of the 2015 Low Carbon Networks Innovation conference and through our wider stakeholder engagement strategy, we collaborated with stakeholders to identify improvements to our processes and approach to low carbon generation, strengthening our focus on ease and speed of connection. In consultation with our stakeholders we continue to develop strategic initiatives for the future that drive changes within our business to give greater focus to the low carbon transition over the coming years.
We are upgrading networks with novel systems to enable connections, avoiding expensive reinforcements and shortening connection timescales. We are working in tandem with other transmission operators to develop new grid network monitoring systems to ensure the security of electricity supply that is particularly critical for vulnerable customers.

We are working to reduce environmental impacts throughout the supply chain by engaging with suppliers and delivering training workshops on waste and carbon reporting. We are also developing a process to review supplier environmental performance and are actively encouraging improvements and innovation.

In our 2013–14 Annual Statement we announced our eight Sustainability Drivers. We reported on key initiatives that delivered against these in our 2014–2015 Annual Statement.

In this Annual Statement we provide examples of initiatives that highlight our main area of focus for 2015–16 as part of our longer term strategic plan. The initiatives presented this year explain the work we are undertaking to enable the connection of low carbon technologies, deliver network improvement projects and manage the network and its impacts, and how this work is driven by our eight Sustainability Drivers.

We welcome feedback on the content of the report and hope that it provides you with valuable information on our activities.

Frank Mitchell
CEO

Scope

The Environmental Discretionary Reward (EDR) Scheme is a key incentive under the Ofgem Price Control Process for Electricity Transmission 2013 to 2021 (RIIO-T1).

We fully support the objectives of the EDR Scheme and have chosen to make a submission for the 2015 to 2016 period. We welcome the opportunity to demonstrate the progress we are making towards delivering a low carbon energy system and the high standards of environmental management we are seeking to achieve.

This report is the SPEN annual executive statement for the EDR Scheme and is intended to be suitable for a non-technical reader. More detailed information will be presented within the EDR submission to Ofgem in June 2016.

The scope of this document is to update on our sustainability strategy, explore some of the initiatives we are leading on, and explain how they are being shaped by our Sustainability Drivers.

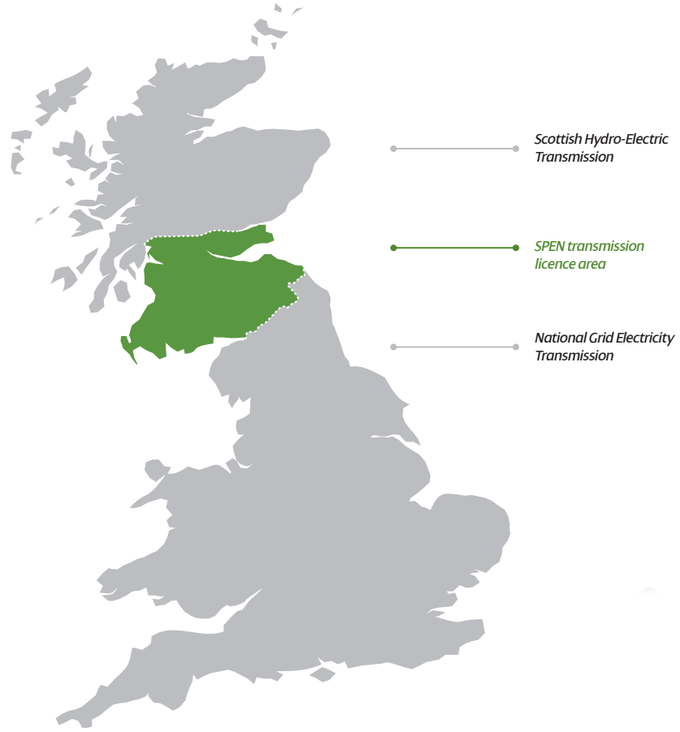
Who we are

SP Energy Networks is responsible for the transmission of electricity in central and southern Scotland. SPEN is part of the Iberdrola Group – a Dow Jones Sustainability Index and Global 100 listed company. Our role is to maintain, operate and invest in our transmission network to secure a safe, reliable and economic service for current and future users.

The SPEN transmission network comprises 4,093 circuit kilometres of overhead line and underground cable and 125 substations operating at 400, 275 and 132kV supplying approximately 1.99million customers and covering and area of approximately 22,950 square kilometres. It is connected to Scottish Hydro Electric Transmission plc (SHE Transmission) system to the north, to the National Grid Electricity Transmission (NGET) system to the south, and to the Northern Ireland Transmission system via a subsea HVDC interconnector.

The SPEN transmission area is crucial to the delivery of the Government's renewable energy objectives due to its location in an area of outstanding renewables resource and its position between the SHE Transmission and NGET areas. We therefore have a unique role in connecting renewable generation and bulk transfer of renewable energy from the SHE Transmission and SPEN areas into England and Wales. Our activities therefore benefit stakeholders well beyond our licence area.

SPEN also own and operate the distribution network in Central and Southern Scotland, and the distribution network in Merseyside, Cheshire, North Wales and North Shropshire. These operations are not considered in this document.



Our Sustainability Strategy

Our eight Sustainability Drivers were developed following consultation with a broad range of stakeholders including, Ofgem, customers, Statutory Authorities, our own staff and interested parties.

The Sustainability Drivers enable us to consider the effects on low carbon generation connections and our own environmental impacts during business planning. They encourage the removal of time barriers to ensure quicker connections. This strengthens existing stakeholder networks to better predict where future upgrading works will be required, and enables development of new mitigation options where conflicts with stakeholders may arise. As well as removing the time barriers, cost barriers are also reduced, thereby helping renewable energy generators to reduce and stabilise the levelised cost of energy.

The Drivers encourage SPEN to lead technical innovation and collaboration to promote solutions that avoid or minimise negative environmental effects and outages, without negatively affecting performance. As a result, innovative projects are already using cheaper and safer alternatives, and in cases, greatly reduced quantities of materials to mitigate future waste disposal and accidental releases to the environment. Within the report we have highlighted nine initiatives either initiated over the past year or are further developed from our 2014–15 Annual Sustainability Statement. We have identified which Drivers have influenced each of these initiatives. Each year we develop scorecard key metrics for the individual Sustainability Drivers which we use to track our progress towards becoming a more sustainable business. Some of these are shown here.

SPEN has identified a number of performance indicators and objectives against each of the Sustainability Drivers. These are business wide sustainability goals, covering our distribution as well as transmission operations. Examples relevant to our Transmission business include:

1 Carbon and Energy Reduction

Reduce our carbon footprint (excluding network losses) by 15% by 2023 and deliver suppliers training workshops to improve monitoring and reporting.

2 Land and Biodiversity Improvement

Improve biodiversity in the areas in which we operate by establishing a process to manage non-native and invasive species.

3 Stakeholder Engagement

Reduce supply chain environmental impacts by establishing a process to review supplier environmental performance and encourage improvement.

4 Climate Change Resilience

Increase resilience to flood risk and develop flood response action plans for highest risk sites.

5 Waste Minimisation

Development of waste minimisation plans for operations and major construction activities.

6 Water Efficiency and Protection

Reduce water consumption at depots and investigate grey water opportunities.

7 Oil Leakage and SF6 Losses Reduction

Investigate options for use of alternatives to SF6.

8 Raw Materials Optimisation

Introduce life cycle analysis to SPEN processes.

Beneath these objectives, we have identified targets and actions for delivery during 2016 and will be identifying actions for 2017 onwards as we develop our strategy over the coming year.

Although this document is primarily focussed on environmental sustainability, with a ‘sustainable network’ as the goal, our strategy considers social and economic impacts. Our ambition is to assist the UK in its transition to a low carbon future whilst delivering our regulatory, legal and business plan commitments.

SPEN has recently formed a new Sustainability team whose responsibility is to develop the Sustainability Strategy from now until 2030 and beyond. The Strategy is being developed through consultation with external stakeholders. The team will also analyse the data that has been collected over many years and track the improvements that result from initiatives to reduce environmental impact and improve sustainability, some of which are described in this document. We plan to report relevant data in future Statements, where appropriate.

Enabling the connection of low carbon technologies

Scotland as a whole has experienced a dramatic change in the power generation landscape in the last decade through the construction of onshore windfarms.

There is currently approximately 5.2GW of installed capacity in Scotland, up from 2.4GW in Q4 of 2010. Much of this generating capacity has been constructed in the SPEN area. Within the RIIO-T1 business plan it was anticipated that 1GW of new onshore wind generation would require connecting in the south-west of Scotland. However, this figure has doubled and further renewable projects are likely to require connecting in the near future.

SPEN has progressed three initiatives directly related to enabling the connection of low carbon technologies over the past year. The initiatives have the Sustainability Drivers at their core and aim to strengthen the network, enable existing renewable generating capacity to get power to the market without constraint during high wind periods, and enable new generation capacity to connect in reasonable timeframes:

– Series Compensation

– VISOR

– Novel Conductor Materials

These projects have seen SPEN lead and collaborate with the other GB transmission owners and engage proactively with low carbon generation developers in our transmission area.

Series Compensation

1. Carbon and Energy Reduction
2. Land and Biodiversity Improvement
4. Climate Change Resilience
8. Raw Materials Optimisation

Project Background

The Series Compensation project is the upgrading of the onshore transmission network between Scotland and England to facilitate a 4.4GW export capability, an increase of 1.1GW.

The works have involved the installation of four series capacitors on the 400kV lines at Gretna, Moffat and Eccles and associated overhead line, switchgear and protection control modifications, to increase the east-west circuits to 400kV through the central belt of Scotland. The Series Compensation project was taken forward due to the relatively short time period to complete when compared to alternatives. The project benefitted our stakeholders by being less costly than the alternative of upgrading of east-west circuits or the construction of new overhead lines.

Sustainability Drivers

Carbon and Energy

This project is critical in supporting the target of producing 15% of the UK's energy from renewable sources by 2020. By increasing capacity of the transmission network it will enable a greater amount of electricity generated by wind in Scotland to be exported south during high wind periods. This improves both the security of supply and reduces the periods of constraint on low-carbon generation, the associated costs which are borne by the consumer to a value of around £150million annually.

The project also contributes to the reduction and stabilisation of the levelised cost of energy (the average cost of the lifetime of the plant per MWh of electricity generated reflecting the cost of building, operating and decommissioning) by reducing the connection costs for renewable generators.

The Series Compensation project is a component of the wider Gone Green initiative which aims to connect a further 2.5GW of wind generation in the SPEN area, supporting the requirement to generate low carbon energy and combatting climate change. This has the potential to displace approximately 1.5 million tonnes of CO_2 compared to generation from a traditional mix of generation methods[1].

Raw Materials, Land & Biodiversity

By upgrading existing assets and constructing three new Series Compensation compounds at Gretna, Moffat and Eccles, the constraints in the transmission network can be significantly relieved without new overhead line build, thereby maximising the benefit and reducing use of concrete, steel, aluminium, copper and plastics, visual intrusion and construction impacts.

Current Status

Moffat and Gretna infrastructure upgrades were completed and available for operation in December 2015.

Timescales for Completion

Eccles upgrades are due for completion in Q2 of 2016 due to outage restrictions.

[1] assuming capacity factor of 26.6% for Scottish windfarm sites https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/463060/Regional_spreadsheets__2003-2014__-_Std_LFs_-_September_2015.xls

and grid emissions costs from generating electricity in Scotland of 271gCO2e/kWH http://www.gov.scot/Resource/0046/00469235.pdf

VISOR

1. Carbon and Energy Reduction

3. Stakeholder Engagement

8. Raw Materials Optimisation

2. Land and Biodiversity Improvement

Project Background

As environmental, economic and government focus has resulted in an increased reliance on renewable generation to meet 2020 carbon targets, the transmission system in GB is facing many new challenges relating to the closure of major power stations. This is leading SPEN to examine new ways of monitoring and managing the network.

VISOR (Visualisation of Real Time System Dynamics using Enhanced Monitoring) is a flagship collaborative Network Innovation Competition (NIC) project between system designers, operators, developers and researchers. The project demonstrates the first Wide Area Monitoring System (WAMS): a nationwide IT infrastructure combining synchronised measurements from all three GB Transmission Owners (TOs). The aim is to improve visibility of dynamic system behaviour and enhance network resilience, increase network capacity and deliver savings to customers. The VISOR trial will demonstrate the potential for avoided investment benefit compared to the business as usual approach. It will also guard against the possibility of large scale blackouts which is crucial in ensuring the continuity of electricity supply for vulnerable customers in the SPEN transmission area and beyond.

Sustainability Drivers

Carbon and Energy

The mapping of energy use hotspots was a key consideration for SPEN in 2015. VISOR sought to address the issues by revolutionising the real-time monitoring of the GB system to highlight the opportunities to reduce both operational and capital expenditure and increase the resilience of the power system against high-impact, low-probability events that can cause plant damage or even blackouts as we move toward a low carbon future.

Stakeholders

This collaboration between three GB TOs (SPEN, National Grid, and SHE Transmission) sets a precedent for cross-company coordination by developing infrastructure and applications to meet the needs of the future GB network. The key aspect of the WAMS infrastructure is that it allows new real-time visibility of the system dynamics across "power transmission boundaries" between SPEN-NGET and SPEN-SHE Transmission.

Raw Materials and Land & Biodiversity

The project is underpinned by a ground-breaking data acquisition infrastructure consisting of new monitoring units, data centres and dedicated servers, communicating via a new high-performance communication link between the three TOs. One of the key outcomes from VISOR will be getting the most out of existing assets, avoiding the cost, visual impact, land use and large quantities of concrete, steel, aluminium, copper and plastics that would otherwise result from new transmission lines.

Current Status

The WAMS infrastructure has been deployed successfully and its monitoring and analysis capabilities are already in use.

Timescales for Completion

The 3-year project completes in 2017 and can be broadly separated into two stages, which overlap to a degree:

- The first involves delivery of the monitoring, communication and computing infrastructure – including a suite of WAMS analysis & visualisation applications.
- A second 18-month period involves the staged deployment, demonstration and evaluation of additional new WAMS applications. This has a focus on leveraging data from the new WAMS to provide tangible improvements in the reliability and efficiency of the GB network and related benefits to GB customers.

Novel conductor materials

1. Carbon and Energy Reduction

2. Land an Biodiversity Improvement

8. Raw Materials Optimisation

Project Background

SPEN is currently re-conductoring two 400kV routes in the south-west of Scotland using a new all-aluminium High-Temperature Low-Sag (HTLS) conductor system.

The system is designed to operate at higher temperatures than conventional conductors, therefore offering greater transfer capacity. The HTLS technology will directly replace 'Zebra' and 'Rubus' conductors without the need for tower reinforcement. The two routes are the Kilmarnock South to Coylton 15.5km double-circuit (known as the XY Route), and the Coylton to Mark Hill 49.5km single-circuit (known as the YY Route). Coupled with the over-arching 'South West Scotland' project, the proposed work will increase the total export capability from Coylton to the wider 400kV network and contribute 1.7GW by 2021 (and 2.1GW by 2023) of additional renewable generation to the GB system, representing 40% of SPEN's onshore wind in Scotland. Both the YY and XY routes will be uprated for a reduced cost, and at least 8 years earlier than the business as usual alternative of developing new routes and constructing new towers and lines.

Sustainability Drivers

Carbon and Energy

The South-West of Scotland has witnessed a remarkable rise in onshore wind development that requires upgrade of the existing transmission network to connect double the generating capacity that the RIIO-T1 baseline plan forecast. The upgrades will deliver network reinforcement more effectively and efficiently through utilising the HTLS technology to deliver necessary reinforcement. This enables more cost effective grid connections for renewable generators and avoids constraints during high wind periods.

Land and Biodiversity

Traditional reinforcement would require the installation of new towers along existing or new routes with associated environmental effects through disturbance of land and the habitats and activities that occupy it. Using HTLS avoids these effects.

Raw Materials

By using new conductors on existing towers no new overhead line routes, towers or foundations are required, thereby avoiding the greenhouse gas and other emissions from mining, processing and transport of steel or concrete. Existing access roads can also be utilised and additional low carbon connections are made possible at a more affordable price for windfarm developers. To put into perspective the savings in raw materials, there is an estimated reduction of over 4,000 tonnes of steelwork and over 8,500 tonnes of concrete by avoiding construction of 44 single circuit towers and 150 double circuit towers.

Current Status

The re-stringing of the XY Route began in 2015.

Timescales for Completion

Both the XY route and the YY Route will be completed by close of 2016.

Delivering network improvement projects

SPEN is leading two key initiatives which will deliver significant network improvements to stakeholders. The initiatives have been developed through consultation and collaboration with relevant network operators, equipment suppliers, centres of academic excellence, government agencies and NGOs and are underpinned by the Sustainability Drivers.

- FITNESS, which seeks to demonstrate that innovative substation design and construction can result in cost savings for connections, materials savings through use of alternative methods, and improved network control through digitisation. SPEN consider that future substation design must be more responsive to modern operating conditions to avoid costly and lengthy outages. This, in conjunction with initiatives to enable low-carbon connections, must allow new connections to be made more quickly and at lower cost.
- VIEW, where we're seeking to demonstrate the benefits of a more stakeholder-focussed approach to routeing decisions and mitigation with regards to effects on important landscapes. We took the lead in the formation of a participation-focussed forum comprising national and regional stakeholders. The aim of the forum is to focus on removing barriers to the enjoyment and use of some of Scotland's most important landscapes.

FITNESS

1. Carbon and Energy Reduction
2. Land an Biodiversity Improvement
8. Raw Materials Optimisation
5. Waste Minimisation

Project Background

'Project Fitness' (Future Intelligent Transmission Network Substation) aims to deliver a globally innovative state-of-the-art digital substation design.

This will use digitised measurement for protection, control and monitoring instead of traditional copper wiring and conventional measurement equipment. Successful delivery of this project will reduce environmental impact and land requirements and future costs associated with new and replacement substations. £8.3m of funding has been awarded by Ofgem for the project, which is being delivered in partnership with GE Grid Solutions, ABB, Synaptec and the University of Manchester. If the pilot is successful and adopted across the industry, by end of RIIO T2, FITNESS would result in a 10% reduction of substation new-build and replacement costs resulting in a saving of between £71m and £107m. The projected system availability improvements translate into a carbon saving of between 40.5 and 129.5 thousand tonnes of CO_2 per year by 2030, depending on level of uptake, and based on increased amount of wind generated.

Sustainability Drivers

Carbon and Energy

A positive indirect benefit of project FITNESS is the reduction in need for system outages which are often required to be planned up to seven years in advance. Limitations on outages commonly force constraints on wind generation in Scotland in the form of connection delays to new projects of months or even years. Project FITNESS will enable new connections to be provided more quickly and at a reduced cost to meet the UK 2020 renewable energy targets.

Land and Biodiversity

The FITNESS infrastructure is 10% smaller than traditional substation design, resulting in a clear reduction in land take. In conjunction with the smaller footprint there is also a reduction in construction duration resulting in reduced effects to environmental and social receptors.

Raw Materials and Waste

Replacing the use of analogue based measurement and control with digital optical-fibre based measurement and control reduces the footprint and cost of substations. In conjunction with the substitution or reduction in quantity of raw materials used, reducing the time spent onsite during construction and maintenance can mitigate environmental and social effects. The end of life decommissioning is also less intrusive, with fewer materials to treat and dispose. FITNESS will deploy smaller, lighter, safer equipment, with greatly reduced reliance upon raw materials compared to conventional 275kV substations:

- For transformers, a 25% of reduction of steel and the removal of dielectric oil
- For relays, a reduction of 90% of the use of low voltage transformers and a reduction of 50-60% in most components
- For civil works, a 50% reduction in Polypropylene, Fibreboard, PVC and Gravel
- For wiring, a reduction of 70% of copper wiring (Copper, Aluminium and Propylene)

Current Status

Project FITNESS is preparing to start in Q2 of 2016.

Timescales for Completion

The project is funded under Network Innovation Competition and scheduled to run for four years, from 2016 to 2020, with the first digital bays installed in 2018.

VIEW

2. Land and Biodiversity Improvement

3. Stakeholder Engagement

Project Background

SPEN is sensitive to the concerns of stakeholders in respect of historical route selection undertaken before guidance on environmental and landscape effects was developed, or where infrastructure is located in areas since identified as important landscapes.

We are committed to improving the visual impact of such lines in areas where this will make the most difference.

The Visual Impact of Existing Wirescape (VIEW) Project represents an opportunity to contribute to the success of Scotland's National Parks and National Scenic Areas. This is made possible by accessing a share of a £500 million Ofgem fund, for the positive enhancement of existing transmission infrastructure in National Parks and National Scenic Areas, our most protected locations.

This fund is intended to positively influence the visual impact of transmission infrastructure, including overhead lines and substations, which currently exist within the UK's most highly valued landscapes.

It is important to consider that while the undergrounding option removes the visual impact during the operational lifetime, it has a far greater cost than traditional line construction and introduces different environmental impacts during the construction period. The mitigation options identified have been challenged robustly to ensure a balance between the minimisation of cost and environmental effects.

Sustainability Drivers

Land and Biodiversity

The first part of the project is to identify the locations where pre-existing transmission infrastructure has a direct environmental impact on nationally designated, protected landscapes. The second part of the project is to identify where there is greatest opportunity for successful mitigation through hard engineering amendments such as route realignment or undergrounding to softer methods such as tree screening or landscape enhancement. By identifying where the greatest opportunities to conserve and enhance natural beauty, wildlife and cultural heritage exist, whilst considering the aim of minimising unacceptable environmental impacts, it is possible to improve opportunities for recreational, educational or social initiatives associated with the use and visual experience of the land.

Stakeholders

A Stakeholder Partnership Group (SPG) was formed comprising senior representatives of twelve groups and organisations with a national or regional interest in the protection, enhancement and use of the designated landscapes being considered. Members include the Scottish Government, National Park Authority, NGO's and SHE Transmission. The SPG first met in May 2015, and has since participated in the Scoping of the project, provided valued input on key improvement areas based on local knowledge and collaborated in the review of the environmental assessment and mitigation options.

Current Status

The environmental assessment has been completed by the landscape consultants commissioned by SPEN and a series of mitigation options drafted. In December 2015 the SPG met to discuss eight areas identified as benefitting from the VIEW project together with mitigation proposed. In Spring 2016 the mitigation options will be refined and a formal proposal submitted by SPEN to Ofgem.

Timescales for Completion

- Finalisation of mitigation options: Winter 2015/2016
- Submission of proposal to Ofgem: Spring 2016
- Ofgem decision (anticipated): Early 2017
- Project implementation: Early 2017

Managing the network and its impacts

In managing the day-to-day operation of the transmission network, SPEN has progressed several initiatives to improve upon the business as usual approach.

These have been developed as a direct result of our Sustainability Drivers: to facilitate the switch to a low-carbon economy, to reduce the direct environmental effects of our infrastructure locally, and of our activities globally through avoidance of greenhouse gas and other emissions.

Examples of these initiatives include:

- Network Loss Reduction
- Promoting Biodiversity
- Leakage and Waste Reduction
- Peat Management

We employed sustainable procurement methods to consider the lifetime impacts when replacing infrastructure that would cut electrical losses and reduce the electricity demand. We are continuing our focus on reducing landscape and visual effects and enhancing local biodiversity in tandem with one another. We are replacing oil filled equipment throughout our network and we are seeking to minimise our usage, and leakages of, SF6.

Network Loss Reduction

1. Carbon and Energy Reduction

Project Background

During the transmission of electricity some losses to the environment occur before it can be used, most often these losses are in the form of heat.

Based on metered data, the total losses on our transmission network, i.e. the difference between energy flowing into and out of our network, for the period between 1 April 2014 and 31 March 2015 were 420 GWh[1], representing an operational cost of approximately £25m[2]. This could power approximately 135,000 family homes per year.

We are committed to reducing losses on our network wherever and however it is economic and efficient to do so, through improving the overall performance of our network by employing technological advances. As we continue to connect more renewable generation in Scotland network losses become a key factor, especially when considering the relative distance between generation locations and the towns and cities using the electricity. We are working towards getting the most out of our existing assets and increasing the capacity of our network to accommodate this generation. By reducing our losses, we can reduce the associated environmental impact and the cost burden to customers from electricity that is generated and lost before it can be utilised.

Sustainability Drivers

Carbon and Energy

One way to reduce network losses is to upgrade transformers. Although reducing network losses alone would not fulfil an economic case for renewal, SPEN capitalises the cost of network losses when considering whole life costs of a planned upgrade. This incentivises suppliers to design more efficient systems, and enables SPEN to consider sustainability during the procurement process. On top of the obvious environmental benefits, the newly replaced Portobello 275/33kV transformer is estimated to achieve an annual saving of around £26,000 in operational costs due to avoided losses. This sustainable approach of comparing lifetime costs has also been adopted in the planned re-conductoring of overhead lines to identify replacement equipment which reduce network losses.

Our substations use some electricity to power protection and control equipment, battery chargers, cooling systems, lighting and heating, but presently this energy use is not metered. Therefore we don't know how much of our overall losses can be attributed to substation demand. We are planning a pilot project to install energy metering at a small number of test sites so we can take ownership of this contribution to the losses figure, and improve that position sustainably by carrying out an audit of possible on-site energy-saving measures. This would indicate whether the cost of installing energy metering at all our transmission substations would justify the cost savings and environmental benefits that could be obtained by monitoring the energy consumption of each site more carefully.

Current Status

Transformer replacement and overhead line re-conductoring is ongoing across the SPEN transmission licence area and the sustainable procurement aspects highlighted are embedded in these activities. At the time of writing, SPEN has replaced a total of four transformers that benefitted from this approach since April 2015.

We are currently discussing the substation power supplies pilot project with a number of potential contractors and are planning to start this work in Q2 of 2016.

Timescales for Completion

The results of the pilot study on substation energy use will be available in 2017 and the re-conductoring will continue throughout the RIIO-T1 period.

[1] The level of Transmission Losses from the licensee's Transmission System, measured as the difference between the units of electricity metered on entry to the licensee's Transmission System and the units of electricity metered on leaving that system as per licence condition 2K.4 (a).

[2] In assessing the financial value of losses we have assumed £60/MWh, which is the value generally used in our cost benefit analyses.

Promoting Biodiversity

2. Land and Biodiversity Improvement

3. Stakeholder Engagement

Project Background

After approval was granted for the major new Beauly Denny transmission overhead line in central Scotland, we undertook studies to look at how we could further mitigate the landscape and visual effects of the overhead line in the sensitive Ochil Hills and Glenside areas.

We developed a range of mitigation measures collectively known as Green Networks. These were set up to implement, replace and reinforce features in the landscape with a dual aim. Firstly to mitigate landscape and visual effects and secondly to consider the creation of new wildlife habitats. These dual aims were intended to improve access and enjoyment of the landscape for local communities.

We are considering the use of Green Networks on other major transmission projects, crucially looking at how we can introduce the idea much earlier in the planning process.

Sustainability Drivers

Land and Biodiversity

The schemes, promoted by the affected communities, range from small localised planting works aimed at addressing impact on a single property right up to new improved sections of National Cycle Route or biodiversity schemes with large scale landscape design proposals. Where vegetation is planted, it involves native species rich in food production or shelter for wildlife such as oak, rowan, crab apple and hazel. The mitigation proposals will in time aid in improving landscape quality, biodiversity and access in the local and wider area. This reduces the impact of the overhead line and also leaves an enduring legacy of landscape, habitat and wider biodiversity benefits to the surrounding area.

Stakeholders

During the planning of transmission infrastructure developments it is not always possible to gain the support of local communities and landowners. Following the decision to approve the line, it was clear that there was a willingness to work with us and develop something beyond the business as usual form of mitigation. Traditionally, mitigation of this nature has been difficult to deliver due to the works requiring access to land which we do not control, or that is in some cases distant to the overhead line. We have therefore formed a Partnerships Group with Stirling Council, Scottish Government and Central Scotland Green Networks to assist us in the delivery of the Green Network initiatives.

In order to deliver schemes that are both effective and meaningful for the long-term, we have worked closely with local community stakeholders in the identification of opportunities and then provided project funding, management structures and mechanisms to deliver the benefits for local communities. The bottom-up approach led to changes in the locations to be mitigated and the planting options chosen to deliver the optimum results.

Current Status

During 2015, a campaign of community meetings and open days was undertaken where SPEN was able to engage positively with communities and groups representing all of the areas along the overhead line route. Plans are now in place to deliver the first phase of Green Networks mitigation in early 2016.

Timescales for Completion

An initial phase will be delivered early in 2016, with the remaining planned work being completed in the next two to three years.

Leakage and Waste Reduction

1. Carbon and Energy Reduction
2. Land and Biodiversity Improvement
5. Waste Minimisation
6. Water Efficiency and Protection
7. Leakage and Losses Reduction
8. Raw Materials Optimisation

Project Background

Transmission assets traditionally used oil as an insulator for equipment. Advances in technology have identified Sulphur Hexafluoride (SF6) as a safer and more cost efficient electrical insulator, whilst also helping to minimise the size and therefore footprint of equipment when compared to oil filled alternatives.

However SF6 is a greenhouse gas and accidental leaks, or leaks caused by maintenance activities contribute to the carbon footprint of power transmission activities. With more SF6-filled equipment being fitted onsite as upgrading across our network proceeds, the onus is on SPEN to minimise the likelihood of leakages and to develop alternatives to SF6 by working closely with suppliers.

Sustainability Drivers

Carbon and Energy, Leakage and Losses

As part of the Iberdrola Group, SPEN shares the commitment to becoming Carbon Neutral by 2050, and we are committed to reducing our carbon footprint by 15% by 2023 (not including networks losses). We therefore must manage releases of SF6 to the environment. To achieve this, we look at the whole life cycle of assets to understand leakage and losses risk then procure, measure and monitor assets to optimise the management of SF6 across the network. We take explicit cognisance of the volume of SF6 and likely leakage and electrical loss rates into account in our decisions on the procurement of new and replacement equipment. In our daily operations, we employ a rigorous approach to the measurement and monitoring of leakages of SF6 and close the loop back to our asset management policies to inform replacement priorities.

Waste, Water and Land & Biodiversity

One litre of oil could render one million litres of water undrinkable. The importance of reducing effects on water quality, levels of land contamination and adverse impacts on biodiversity due to oil leakages has influenced the decision to upgrade to SF6. The gradual renewal of the network to remove oil filled equipment will remove these risks.

Raw Materials

This ongoing work focuses primarily upon the reduction in the use of oil and leakage rates of SF6 in transmission assets. SPEN removed equipment containing approximately 19,620 litres of oil and replaced with non-oil alternatives between April 2015 and December 2015. The SF6 leakage rate between April 2015 and December 2015 is estimated to be 0.36% (estimated to be 245.9kg in total for this period).

The use of the life cycle approach in our procurement activities for new equipment is couched, wherever possible, in terms of a monetised value of leakages and losses, with options ranked best to worst in terms of the total capacity of SF6 within the asset, the anticipated SF6 loss rates, overall electrical losses, and in terms of cost. The selection made is based on the best possible balance between these four factors. For example in a recent contracting exercise the anticipated penalty for SF6 leakage was used to balance the relative prices of alternatives offered by tenderers and was sufficient to change the relative attractiveness of the options.

With this tender nearing completion two equipment options have been identified: a low SF6 version and a no SF6 version using a novel gas known as g3. When compared to SF6 g3 has a 98% lower global warming potential however it is an unproven alternative and may not be suitable at present. It does show though, that SPEN is leading innovation through the procurement process and that suppliers are engaged in the drive for environmental sustainability led innovation to meet our climate change ambitions.

Current Status

This end-to-end approach has now been embedded and some tangible improvements can already be measured as a result of these. As stated above, SPEN removed 19,620 litres of oil contained in equipment last year. The overall SF6 leakage rate has been estimated at 0.36%, on track to be well below the industry limit of 0.5%.

Timescales for Completion

Ongoing benefits will be delivered by using the whole life cycle approach. For example, we expect to see improvements in our oil leakage rates and impacts following recent business decisions including: accelerated replacement of oil filled cables, review of bund provision and condition around substations and updates to drainage plans at substation locations so leaks can be detected quicker and environmental effects can be avoided.

Peat Management

2. Land and Biodiversity Improvement
3. Stakeholder Engagement
4. Climate Change Resilience
5. Waste Minimisation
6. Water Efficiency and Protection

Project Background

The South West Scotland Scheme involves the construction of five new substations in remote rural upland agricultural or forestry locations to enable the connection of low-carbon generation from windfarms.

During the construction of the substations, an estimated 200,000m^3 of peat, the same volume as 80 Olympic size swimming pools, needs to be excavated and replaced with suitable engineering material. It is anticipated that onsite investigations may indicate a larger volume of peat than estimated to be excavated. An innovative project, developed in collaboration with the Scottish Mines Restoration Trust will see this peat diverted from landfill to be used in the restoration of abandoned opencast coal mines.

Sustainability Drivers

Land and Biodiversity

The abandonment of the opencast coal sites caused a legacy of a scarred landscape unable to be enjoyed or used by the public, and offering limited biodiversity potential. Through the restoration of the mines, bog habitat can be recreated, adding to the percentage of this internationally important habitat located in Scotland, and benefiting moorland birds and plant life.

Stakeholders

The diversion of a large volume of peat from landfill disposal to be used in a landscape and biodiversity restoration of a stalled space is a success of sustainable development. It shows the benefits in engaging stakeholders and informing stakeholders of our long-term plans, which then enables stakeholders to suggest viable alternatives. The Scottish Mines Restoration Trust is an independent non-profit-making organisation established to help facilitate the process by which communities and other stakeholders can develop viable restoration plans for abandoned open-cast coal sites across Scotland. The trust actively engages with community groups, landowners, the public and private sectors, voluntary bodies and Government, bringing a fresh and constructive approach to restoring the sites of old opencast sites, bringing them back into community use. SPEN offer advice, expertise and staff time to facilitate the plans for restoration of derelict and abandoned sites, to the benefit of the communities in which we operate.

Climate Change Resilience and Water

Peat and peaty soils in Scotland store the equivalent quantity of carbon of 180 years of Scottish greenhouse gas emissions at current emission rates. Healthy peat bogs continue to act as carbon sinks whilst degraded bogs release carbon. By providing the peat resource to the mine restoration scheme, bog habitat can be recreated, ensuring the peat removed from the substations continues to act as a carbon store. Peat bogs absorb atmospheric pollutants and water, acting to improve water quality downstream and slow down watershed in upland areas, reducing instances of flooding.

Waste

During construction, peat would typically be classed as waste and as such would have to be disposed of to landfill. SPEN contracted delivery partner Iberdrola Engineering and Construction to undertake an assessment of alternatives to mitigate the environmental impact of sending the peat to landfill. Through engaging with the Scottish Mines Restoration Trust and working with the Scottish Environment Protection Agency and the local council, a positive plan to avoid landfilling was developed, thereby saving at least 200,000m^3 of carbon rich peat from entering the waste stream.

Current Status

The planning of the restoration works is well underway. Methodologies for transporting the peat and storage before its use have been put in place and the eventual profiling of the restored sites has been agreed. Site investigations are due to begin shortly to determine the peat resource present.

Timescales for Completion

The main works will be undertaken from Summer 2016 until Summer 2017.

Consultation and feedback

We would be delighted to receive any comments, suggestions or questions on the content of this Annual Sustainability Statement, in particular:

How useful did you find the content of the Annual Sustainability Statement?

What was the most useful part of the statement to you?

Is there anything you would like SP Energy Networks to focus on more within the Annual Sustainability Statement?

Do you think SP Energy Networks is doing enough to facilitate the transition to a low carbon future?

Do you think SP Energy Networks is doing enough to manage its impact on the environment?

Please email us at:
stakeholderengagement@spenergynetworks.com

Or write to us at:
SP Energy Networks
Ochil House Technology Drive
Hamilton International Park
Blantyre, G72 0HT

Following consultation with stakeholders on the content of the Annual Sustainability Statement we:

- Amended our Sustainability Drivers diagram and explained more clearly how the drivers are interlinked and applied to our initiatives
- Highlighted where initiatives will enable greater grid availability and stability
- Stated where initiatives result in cost savings or avoid increases in costs
- Improved the flow of the report by reducing reliance on acronyms and technical language
- Provided a clearer and easier to access list of all acronyms used within the document

Further information

If you would like further information on SP Energy Networks please visit our website: www.spenergynetworks.co.uk

Information on our key initiatives can be found here:

FITNESS: www.spenergynetworks.co.uk/news/pages/sp_energy_networks_successful_in_ofgem_innovation_competition.asp

VIEW: www.spenergynetworks.co.uk/pages/view_project.asp

VISOR: www.spenergynetworks.co.uk/pages/visor.asp

Information on RIIO-TD1 can be found on the Ofgem website here: www.ofgem.gov.uk/network-regulation-riio-model/network-performance-under-riio

SP ENERGY NETWORKS

List of Acronyms

EDR Environmental Discretionary Reward

FITNESS Future Intelligent Transmission Network Substation

g3 Green Gas for Grid

GB Great Britain

GW Gigawatt

GWh Gigawatt Hour

HTLS High Temperature Low Sag

HVDC High Voltage Direct Current

IT Information Technology

kV Kilovolt

MVA Megavolt Ampere

MW Megawatt

MWh Megawatt Hour

NGET National Grid Electricity Transmission

NGO Non-Governmental Organisation

NIC Network Innovation Competition

Ofgem The Office of Gas and Electricity Markets

PVC Poly Vinyl Chloride

RIIO-T1 Revenue = Incentives + Innovation + Outputs (Transmission period 1)

SF6 Sulphur Hexafluoride

SHE Transmission Scottish Hydro Electric Transmission

SPEN ScottishPower Energy Networks

SPG Stakeholder Partnership Group

TO Transmission Operator

VIEW Visual Impact of Existing Wirescape

VISOR Visualisation of Real Time System Dynamics using Enhanced Monitoring

WAMS Wide Area Monitoring System