

SP Energy Networks 2015–2023 Business Plan

Updated March 2014

Annex

Legal and Safety Strategy

SP Energy Networks

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1.	Scope	3
2.	Table of linkages	3
3.	Introduction	3
4.	Overhead Line Safety Defects	3
4.1.	ESQCR Statutory Obligations	3
4.2.	ABSD Remedial Works Programme	4
5.	Site Security and Metal Theft	4
6.	Mural Wiring	4
7.	Safety Around Recreational Sites	5
8.	Provision of Earthing - Rise of Earth Potential (RoEP)	5
9.	Fire Mitigation	6
10.	Asbestos management	6

1. Scope

This Annex covers our strategy for the replacement and refurbishment of 11kV substation plant assets through the ED1 period.

2. Table of linkages

This strategy supports our ED1 Business Plan. For ease of navigation, the following table links this strategy to other relevant parts of our plan.

Document	Chapter / Section
SP Energy Networks Business Plan 2015-2023	Chapter C6 – Expenditure e. Non Load Related Investment
SP Energy Networks Business Plan 2015-2023 Annexes	Annex C6 – Expenditure Supplementary Annex – SPEN

3. Introduction

This annex covers our ED1 investment plans relating to legal and safety issues, including:

- *Overhead line defects relating to safety.*
- *Site security and metal theft across our network,*
- *Mural wiring installations,*
- *Safety around recreational sites,*
- *Earthing of our network,*
- *Fire protection at our sites,*
- *Management of asbestos.*

All expenditure included here is entered at the <CV8 – Legal & Safety> ED1 Business Plan spreadsheet and summarised here:

In SPD we plan to spend £24.8M during ED1.

In SPM we plan to spend £36M during ED1. This includes £11M on remedying mural wiring issues.

4. Overhead Line Safety Defects

4.1. ESQCR Statutory Obligations

Under ESQCR, SPEN is required to deal with safety related defects on their overhead line network. This includes the repair of stays, signage, insulators and anti-climbing guards.

Please note that this is separate from our ESQCR investment to remedy ground and proximity clearances which is reported at the <CV2 – ESQCR> ED1 Business Plan spreadsheet

Our continuing statutory obligations under ESQCR include:

- *Stay wires - all stay wires (except for stays on earthed metal structures) must be fitted with insulators where there are bare phase conductors.*



- *Safety notices, - there is a statutory requirement to ensure safety notices are clearly visible on all poles & towers carrying uninsulated live electrical plant and equipment.*
- *Insulators – an overhead line must be supported on insulators so as to prevent leakage to earth, so any defective insulators pose a risk and must be replaced or repaired.*
- *anti-climbing guards – requirement to have fit for purpose anti-climbing equipment on wood poles and steel towers.*

4.2. ABSD Remedial Works Programme

The programme to modify or renew air break switches to allow them to operate with a hookstick continues. This follows a fatality associated with this type of switchgear on another DNO's network. This applies to all pole mounted Air Break Switch Disconnectors (ABSDs) which have earthing systems fitted on the same pole as the switching location on both the 11kV & 33kV networks. We plan to have completed our works on 11kV ABSDs during DR5 and we plan to modify those ABSDs on the 33kV network during ED1.

5. Site Security and Metal Theft

Site security is key to the safety of the public and to the continued safe operation of our network.

Metal theft has increased over the last few years from virtually zero to a peak of 509 incidents in a year, so that securing our substations is ever more critical. When metal theft or vandalism occurs, there is a requirement to replace or repair the stolen or damaged assets. This can include replacement doors, fences and padlocks or replacement electrical equipment. In some cases this also requires a substantial environmental clean-up, due to oil being emptied from equipment in order to access the copper components inside.

We are currently investing in a range of security solutions to target “high risk” geographical areas and combat metal theft and interference. We are increasing the protection of sites with an “Abloy” key suite, supplementing this with enhanced security measures such as security doors in place of traditional substation doors. Further to this we are fitting security alarm systems to all our primary substations.

We work with local police forces following incidents and this has led to a number of arrests and prosecutions. We are also working proactively to prevent further incidents occurring, using a range of innovative surveillance and asset identification techniques. We map the location of thefts to spot local/regional trends when a theft occurs. We undertake public information campaigns on the dangers of entering and interfering with electrical equipment. We also maintain regular liaison with regional and national cross-industry taskforces which ensures that we are abreast of the current trends and issues relating to metal theft and the legislative actions of Government to tackle the problem.

6. Mural Wiring

Urban mural wiring is a system of wiring which was used in SPM where cables are fixed to the external fabric of customer's properties in towns and cities. The nature of the original installation of these particular systems has resulted in significant public safety issues and as a consequence, a programme to replace Mural Wiring is underway. Most of the mural wiring projects are individually designed and have involved installing new LV mains

and individual underground services to affected properties. This continues to require considerable pre-planning and customer engagement to facilitate the works and minimise disruption to customers and the local community.

In November 2012 we contracted with five contractors so as to gain some diversity of resources and encourage competition in delivery. Customer service initiatives introduced include the introduction of 48 hour appointment times and rapid response teams. Further initiatives have been introduced in this area and these have received excellent feedback from customers, local housing authorities and private landlords alike. We continue to seek opportunities to improve the aesthetic impact of new installations as this is valued by our customers.

SPEN undertook an independent audit of mural wiring condition, and subsequently extrapolated this audit across the SPD and SPM networks, disaggregated using postcode and housing type. All end of life (HI5) mural wiring will be modernised in RIIO-ED1.

7. Safety Around Recreational Sites

Protecting the public from the dangers of inadvertent contact with overhead lines at fishing sites, caravan parks and recreational areas is also priority key public safety concern. The solutions range from providing adequate warning signs to removing the hazard altogether through deviating the line out of the site to undergrounding the overhead line through the site. We do, however, recognise that excavating in these areas causes temporary disruption to the activities of members of the public and also to wildlife in the vicinity. Where it is appropriate to do so, we will deviate the overhead line out of the recreational area, thereby minimising the disruption caused by our work.

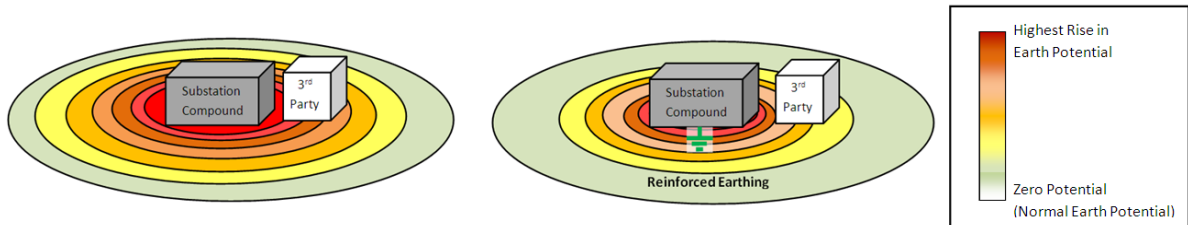


8. Provision of Earthing - Rise of Earth Potential (RoEP)

Electricity Industry and Telecommunications Operators have legal obligations (set out in Schedule 4 of the Electricity Act 1989) to avoid interference between electrical plant and telecommunications apparatus. When electricity network faults such as the grounding of overhead line conductors occur, the ground (Earth) potential at the substation supplying the energy to the line will rise until such time as the fault is cleared / disconnected from the system. At substation sites with good ground conditions and adequate earthing, the ground potential rises decline rapidly as the distance from the site increases.

The Earth potential rise and the range of its effect depends on network conditions and the conductivity of land in the geographic area where the substation is located. These conditions can be measured and fault conditions can be modelled. Where our models or calculations show that the Earth potential at network sites can rise beyond defined thresholds (dependant on protection speed of operation) in the event of a fault, these sites are classified as "hot sites". There are special precautions that must be taken to avoid danger to personnel or damage to 3rd party equipment within a hot site boundary.

Figure 1: Diagram showing a Substation with RoEP Issues during fault conditions and potential resolution by Earthing Reinforcement



At network, Grid and Primary sites, the Rise of Earth Potential (RoEP) is modelled when these substations are constructed or altered significantly and the sites are classified accordingly. We keep our register of hot sites as up to date as reasonably possible through reviews after any network construction or re-configuration which may change associated substations RoEP.

Some “hot sites” in resistivity geographic areas can be subject to very high RoEP levels and we need to take risks to third parties into account. We plan to target these sites during ED1.

We plan to retest and remodel the earth systems at selected "Hot Sites" to determine if upgrades to the earthing systems are required. We project that only a small percentage of substations will require alterations to Earthing systems. It has also been assumed that this work programme will commence during ED1 at our highest risk sites and continue into ED2.

9. Fire Mitigation

Our fire protection policy SUB 01 12 and embedded substation policy SUB 01 013 defines the mitigation measures necessary to ensure compliance with our legal obligations to minimise public safety risk. One of the key areas of risk is basement and embedded substations where transformers and switchgear are housed below or adjacent to occupied offices or public buildings. Our proposals to mitigate risk include installing fire doors, provision of adequate ventilation, installation of low smoke zero halogen (LSZH) cables and replacing transformer oil with a less flammable insulating medium.

We have conducted surveys to establish the risk primarily associated with basement type substations and quantified the risk and prioritised plan based on our scoring methodology. Our methodology and approach has been vetted by industry experts.

10. Asbestos management

Our obligations relating to asbestos in our buildings is included in the Control of Asbestos Regulations 2012. We have mapped all our substations containing asbestos and signage has been erected. We will continue to deal appropriately with any exposed asbestos or any requirement to deal with it during our network investment programme.

It is the policy of SPEN to comply with the requirements of ScottishPower's Framework Policy SP/H&S/2007-01 for Management of Asbestos Containing Materials and in doing so it's statutory legal duties.