SP Energy Networks 2015–2023 Business Plan

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Annex

Rising Mains and Laterals Strategy

SP Energy Networks

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SP ENERGY NETWORKS

Rising and Lateral Mains Strategy

March 2014

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1. Scope

This Annex covers our strategy for the management of rising and lateral mains 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
SP Energy Networks Business Plan 2015-2023 Annexes	Annex C6 – Asset Health and Criticality Strategy – SPEN
SP Energy Networks Business Plan 2015-2023 Annexes	Annex C6 – Cost Benefit Analysis – SPEN

3. Executive Summary

The Rising and Lateral Mains (RLM) modernisation programme has been developed within the DPCR5 period and is specifically targeted at an ageing legacy asset installed within multi-occupied properties in both licensed areas. During DPCR5 discussions with OFGEM, questions relating to the legal ownership and responsibility to maintain were addressed, with funding being agreed to target the highest risk property types. Rising and Lateral Mains systems form part of the distribution system and the operation and use of Internal Mains by SPD and SPM constitute activities undertaken by these companies which is subject to obligations under the Electricity Act 1989 (the 1989 Act), the Distribution Licence and the Electricity, Safety, Quality and Continuity Regulations (ESQCR).

Our ED1 submission facilitates the continuation of our established programme, reducing the public safety risk associated with equipment situated in all areas of the customer's property. Expenditure on Rising and Lateral Mains is summarised in Table 1. During the RIIO-ED1 period, we will maintain expenditure at around DPCR5 levels in order to deliver our long-term strategy of prioritised asset modernisation work.

Table 1 – Planned expenditure for Rising and Lateral Mains

RLM Property Type	SPM		SPD	
	Volume	£m	Volume	£m
Houses	-	-	23,408	8.1
Flats	10,189	36.7	19,333	68.6
Multi-storey	22	2.4	41	4.3
Total	**10,211**	**39.0**	**42,782**	**81.1**

The creation of the DPCR5 programme was subject to completion of a detailed assessment in 2012, in which OFGEM recognised that many rising and lateral electricity mains in multi occupied premises were reaching the end of their lifespan. It has now been established that DNOs are responsible for operating and maintaining these systems regardless of legal ownership. RLMs are now deemed part of the distribution system and are subject to the same requirements as any other part of the network with respect to the Electricity Safety Quality and Continuity Regulations (2002).

As a result of this confirmation of responsibility we have now commenced a RLM modernisation programme in the SPM and SPD network areas. Table 1 shows that the relative size of these programmes differs significantly due to the higher proportion of properties in the SPD network area served by RLMs.

The risks associated with internal mains are measured in terms of the potential hazard resulting from asset failure, principally public safety risks due to fire and smoke within high occupancy buildings with constrained points of access and egress. We have actively engaged with relevant stakeholders during the DPCR5 regulatory period, including Local Authorities, Industry Forums (SELECT) and the Health and Safety Executive (HSE), receiving considerable support.

Modernised RLMs will simplify the Smart Meter roll out by improving the first call success rate for meter installers through provision of safe working equipment and local points of isolation included as part of our design criteria.

Furthermore, the RLM programme is essential to delivering our primary outputs, particularly public safety, employee safety (including third party meter operators) and providing a reliable network for our customers. The programme also allows us to improve our understanding of asset health of the overall RLM population.

Towards the end of the DPCR5 period, moving into RIIO-ED1, the focus of the modernisation programme will move from multi-storey tower blocks to tenements, flats and houses as the next highest risk property groups. Programme delivery in terms of customer numbers is expected to increase as the cable lengths associated with flats decrease. Similarly we expect the level of engineering works and labour requirements per property to reduce during RIIO-ED1. Our expectation is to complete all Tower block modernisation works by the end of DPCR5[1].

During DPCR5 we have been actively working to address uncertainties regarding asset volumes and asset condition, by creating a method of collecting and recording actual asset volumes, locations and condition via an electronic tablet. The new application is being trialled early in 2014 and is already available to our Network Partners. This asset data innovation will improve customer safety and forecast accuracy for the RLM modernisation programme during RIIO-ED1.

1 Subject to building owner confirmation of long-term building life expectancy

Prior to DPCR5, RLM systems have fallen outside the scope of building owner maintenance, or DNO investment, with a fix on failure approach being adopted by both parties. In future, as part of a managed 50 year lifecycle, the RLM systems will be subject to regular 10 yearly electrical testing and inspection. We believe the approach we have taken in DPCR5, and will continue into RIIO-ED1, is in the best interests of customers. We also believe that our approach to future RLM ownership once modernisation works are complete, will allow a controlled and supervised lifecycle of 50 years to be assigned to this asset class, with a focussed approach to inspection towards end of life.

4. Introduction

In order to achieve our primary outputs we have developed a prioritised, fully justified and efficient plan for Rising and Lateral Mains assets. To ensure we prioritise investments on the highest risk sites, we have used Condition Based sample surveys to assign an asset health index taking into account the number of customers residing in each building type, access and egress restrictions, and the location of equipment.

The assignment of risk is illustrated in the following example; two metered service positions with equipment of a similar age, one located on the ground floor of a semi-detached property and the other on the 22nd floor of a high rise tower block. Clearly the failure of equipment in the upper floor poses a much higher risk to the occupier who's ability to escape may be compromised, and for this reason our programme primarily targeted this property type, and will continue to target the highest risk properties in the ED1 period.

5. Network Strategy

During the RIIO-ED1 period, we are planning to maintain annual RLM modernisation expenditure at a level consistent with the DPCR5 period. During RIIO-ED1, our modernisation programme will increasingly focus on flats following completion of works within tower blocks. Consequently, we are planning to significantly increase the number of properties modernised during RIIO-ED1 without increasing annual levels of expenditure.

As part of our DPCR5 submission, SPEN undertook an independent audit, of a statistically robust circa 1.2% [2] sample, and subsequently extrapolated this audit across the SPD and SPM networks. The audit was disaggregated using postcode and housing type, based on publicly available census information taken from the Scotland Census Results Online [3] website for SPD and the General Household Survey, Office for National Statistics[4] for SPM.

Analysing the census information it was apparent that the housing mix across the UK differs from one area to another. Figure 1 shows that within SPD there are significantly more properties comprising Tenement flats and maisonettes than the typical UK profile. Within SPM, the housing stock broadly aligns with the typical UK profile as shown in Figure 2, deviating with more semi-detached and less properties comprising flats than the SPD area.

The assessment of Internal Mains within publicly occupied buildings is analogous with the guidance detailed within BS7671 (5), in particular guidance note 3, Inspection and Testing. Guidance note 3 provides details of inspection and testing for LV electrical systems installed within buildings, and forms the basis of our condition based approach. The guidance recommends the replacement of assets which we would classify as Health Index 4 & 5. Our condition-based audits have placed the assets into five categories aligned with our policy for asset health indices.

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2 1.2% of customer properties surveyed equates to circa 14% equivalent, based on asset commonality within a given locality. (1:12 ratio of same age & type properties was identified from our survey work)

3 Scrol: http://www.scrol.gov.uk/scrol/common/home.jsp

4 Office for National Statistics: http://www.statistics.gov.uk/ssd/surveys/general_household_survey.asp

5 BS7671: The IEE Wiring Regulations, Requirements for Electrical Installations

- *Cat 1: Newly installed or equivalent assets using modern cabling, containment and switchgear types, installed broadly in accordance with BS7671.*
- *Cat 2: Cable, containment and switchgear in good condition, using mixed insulation types including Poly Vinal Chloride - polymeric cable (PVC) & Mineral Insulated Copper Clad cable (PYRO), typically in the region of 10-20 years old.*
- *Cat 3: Cable, containment and switchgear in acceptable condition, using mixed insulation types including PVC, PYRO & VIR, typically in the region of 20-30 years old.*
- *Cat 4: Detailed in Figure 3, Cable containment and switchgear in poor condition degraded Vulcanised India Rubber (VIR) insulation cables.*
- *Cat 5: Detailed in Figure 4, Cable, containment and switchgear in poor condition, Cables undersized, VIR insulation degraded and showing early signs of potential failure.*

Figure 1 – Comparison of SPD housing stock with UK average

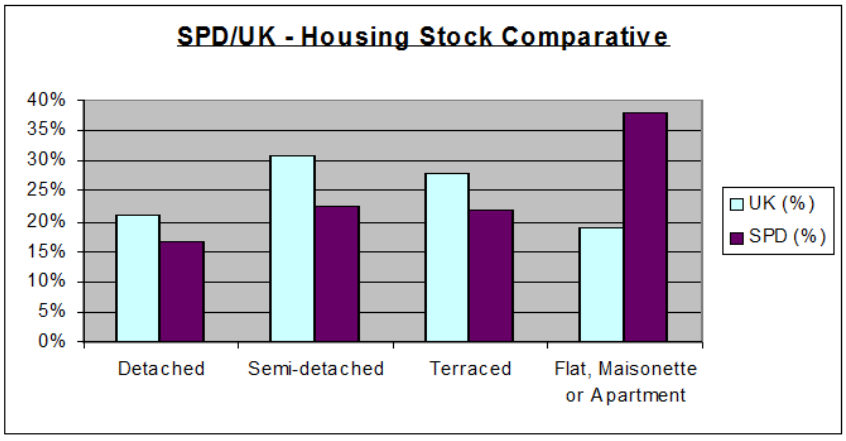
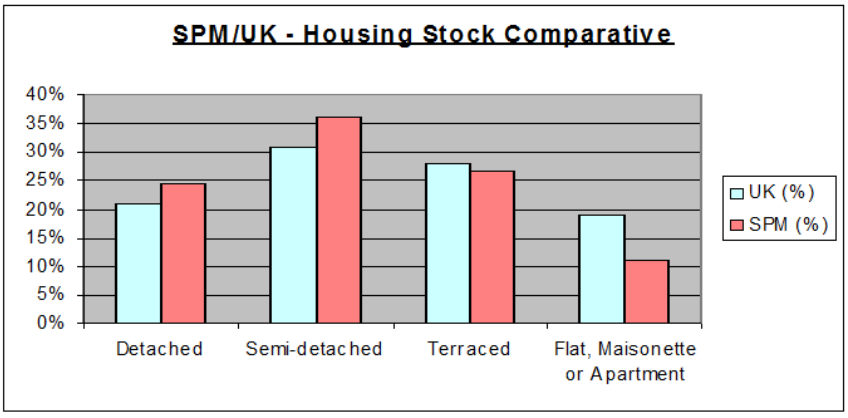


Figure 2 – Comparison of SPM housing stock with UK average



Typical examples of Health Index 4 / 5 RLM Systems are provided in Figure 4 and Figure 5 which show significant deterioration in the asset equipment and VIR cables. Without appropriate and controlled intervention, there is a real risk that the end of life equipment shown in figure 3 will continue to deteriorate until it becomes hazardous as shown in figure 4. As such equipment is often located in a publicly accessible area, the risk posed is not only to security of supply and the operational staff, but also to members of the public should the equipment become unsecured.

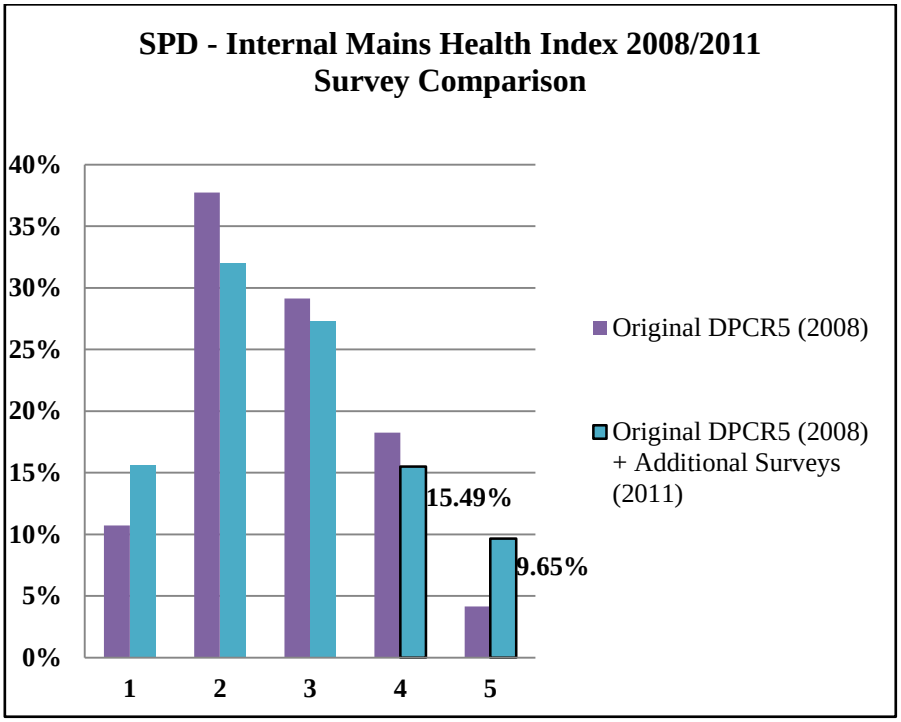
Figure 3 - Example of a typical HI4 RLM system

Figure 4 - Example of a typical HI5 RLM system

Figure 5 – Example of modernised RLM system

During the first two years of the DPCR5 period, we undertook further randomised surveys within SPD, which has refined and validated the Health Index as shown in Figure 6.

Figure 6 – HI profile survey results for RLM systems in SP Energy Networks licensed areas



Within SPD we surveyed 19,242 customer properties, and within SPM we surveyed 15,414 customer properties, as detailed below. The survey findings have been disaggregated by:

- *Geographical area*
- *Housing Mix*
- *Cable Type*
- *Cable length per house type*
- *Cable condition*

Based on our original DPCR5 surveys, we have estimated that approximately 72% of the total number of customers metered service positions in SPD and 66% of the total number of customers metered service positions in SPM are connected via an internal mains service cable supplied either directly from an Underground Service Cable, or a Rising Main.

In line with OFGEM definition of “Services associated with a Rising and Lateral main”, we estimate 26% of properties in SPD and 9% of properties in SPM are supplied via RLM Systems with the total number of LV services associated with RLMs in each area equating to:

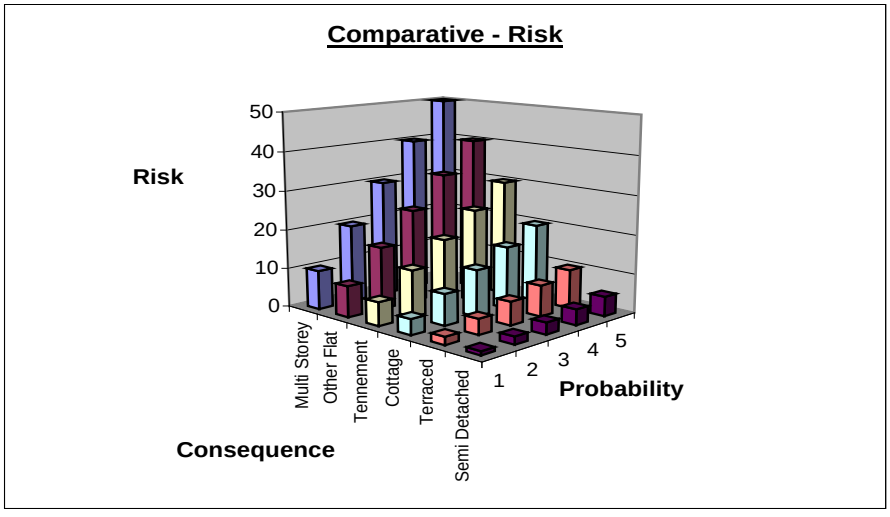
- SPD: 511,284 services
- SPM: 136,282 services

These estimates of the number of Services associated with a Rising and Lateral Mains have been based on Ordnance Survey Topographic Identifiers (TOID), census data and information from our Geographic Information System (GIS). Further refinements will be made annually using feedback from our RLM modernisation programme.

It should be noted that due to building access restrictions and installation criteria stipulated in BS7671 and G87, it is often not possible to replace existing cabling on a like for like basis as dedicated internal service cables are typically installed. Consequently, the installed cable asset volume may increase as modernisation works progress.

We have developed our geographically (by postcode) disaggregated investment plans on a risk-based approach, determined by the condition of the assets and the occupancy of the affected building. Details of our modernisation prioritisation process are shown in Figure 7.

Figure 7- Prioritisation of RLM modernisation programme by risk



We will continue to undertake this investment programme by targeting the highest risk sites as a priority - condition assessed categories 4 and 5 in combination with high occupancy buildings (Flats), consisting typically

of ‘VIR’ cable. In simple terms, the greater the number of people affected by a failure of a specified RLM system, attracts a higher associated risk (consequence is affected by restrictions on access and egress or equipment location in fire escape routes)

SPEN addressed the legal ownership and responsibility question raised in regards to these systems during the DPCR5 submissions and we will continue our current approach in ED1, spending £ 120.1m to further address this risk for circa 204,000 of our customers.

Our policy in RIIO-ED1 is to:

- *Maintain equipment safety, integrity and performance.*
- *Meet statutory legal and licence obligations.*
- *Intervene prior to asset failure and replace on failure.*
- *Reduce risk of third party direct contact.*
- *Install low smoke emitting equipment.*
- *Support smart meter roll out.*

We will continue to actively engage with relevant stakeholders throughout the ED1 settlement period, including Local Authorities, Industry Forums (SELECT) and the Health and Safety Executive (HSE).

6. Deliverability & Efficiency

The Rising and Lateral Mains modernisation programme is delivered in full using external Network Partners. The works associated with the programme are subject to a full tendering process with the tender respondents selected via the Achilles Utility Vendour Database.

We have also during the first two years of the programme, engaged with an external independent specialist consultant who was tasked with benchmarking the successful Network Partners financial and safety performance against each party, the tender submissions were also benchmarked against the wider industry norms.

Our outputs and volumes in the DPCR5 period have remained in line with expectation and forecast, and we expect this to remain the same during the ED1 Period.

7. Reference Documentation

- *Asset 01 019 Asset management Strategy and Plans*
- *Asset 01 021 Asset Inspection and Condition assessment Policy*
- *Cab-03-032 Specification for the Installation of Internal Mains*
- *DPCR5 Re-opener submission.*