

# UK Power Networks Revised RIIO-ED1 Business Plan What's changed and why Summary for Stakeholders

March 2014

“ A reliable... an innovative...  
and the lowest price electricity  
distribution group. ”



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# 1

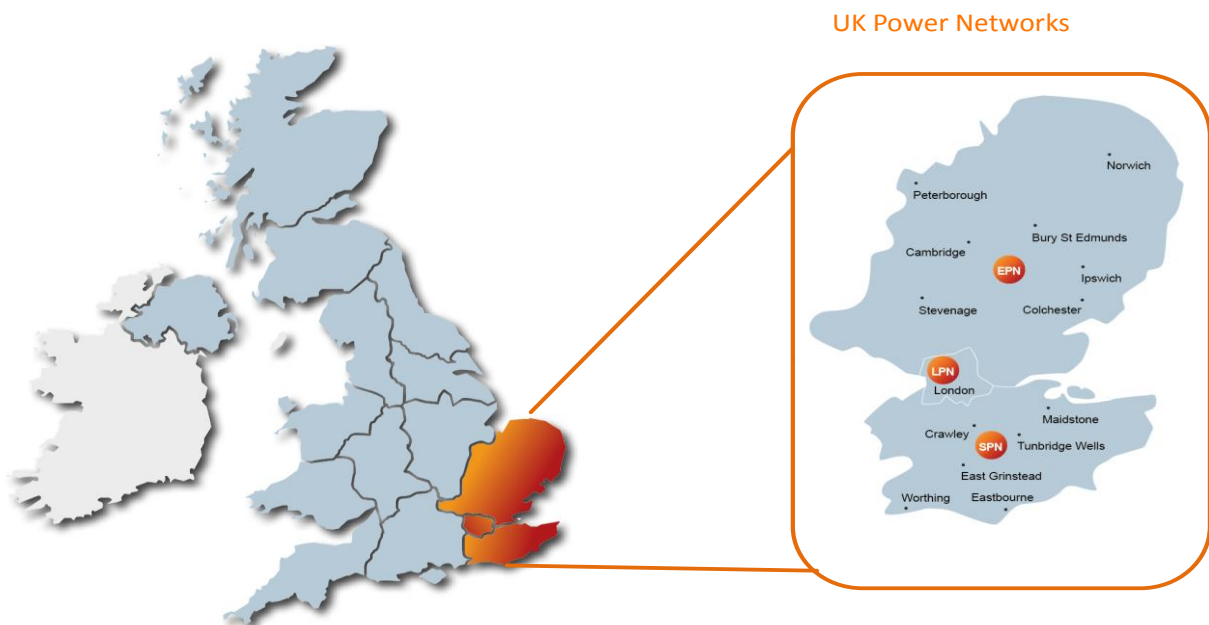
## Executive Summary

### 1.1 Introduction

On 1 July 2013, UK Power Networks published its business plans for the regulatory period 2015/16 to 2022/23. The business plans provided detailed accounts of how our three networks will be developed. The three networks that we manage are Eastern Power Networks (EPN), London Power Networks (LPN) and South Eastern Power Networks (SPN).

Figure 1 shows our area of operation. Please refer to Chapter 2 'Who we are and what we do' of [the UK Power Networks' Executive summary](#) for further detail.

Figure 1 Where we operate



In November 2013, Ofgem assessed us for 'fast-track' eligibility of our July 2013 business plans and announced that none of our three DNO groups would be fast-tracked, and requested that we submit revised business plans by March 2014 for approval.

The principal outcome of Ofgem's assessment is that whilst UK Power Networks' plans were strong in three of the five assessed areas: process, financing and uncertainty and risk, and in all primary outputs for customers, there remained scope for improvement, particularly in regard to providing better evidence for the need to spend. Ofgem also commented that there was some inconsistency in our secondary network outputs, specifically relating to our load and health indices. (Load indices collate information on the utilisation of individual substations or groups of interconnected substations and for tracking changes in their utilisation over time; and health indices collate information on the health (or condition) of distribution assets and for tracking changes in their condition over time).

Figure 2 summarises Ofgem's assessment of our July submission. Ofgem considers the amber and the red areas as not ready for fast-track.

Figure 2 Ofgem's summary of assessment of UK Power Networks' business plans

	Process	Outputs	Resources – efficient costs	Resources – efficient finance	Uncertainty and risk
EPN	Green	Green	Red	Green	Green
LPN	Green	Yellow	Red	Green	Green
SPN	Green	Yellow	Yellow	Green	Green

This document summarises what has changed since our original plan in July 2013.

## 1.2 UK Power Networks' business plan delivers better service at lower cost for our customers

We are pleased to re-submit our business plan to Ofgem for further assessment. We believe that this revised plan represents good value for customers as

- We have reduced the level of proposed totex by 1.9% from the July 2013 plan
- We have further assessed, and provided improved justification, for our business plan volume forecasts and concluded that they are efficient when compared to other UK DNOs
- Our load related volumes of work are efficient given our operational areas of work and we are providing all of the requested justification including individual scheme papers
- We have further enhanced our regional cost justification where Ofgem felt this was inadequate
- We have improved the scope and depth of our cost benefit analysis so that it now covers more than 60% of our capital expenditure programme
- We have provided alternative cost benefit analysis using other DNO and asset industry condition strategies that show that UK Power Networks' ED1 and ED2 asset replacement volumes are efficient
- We have reviewed the data quality of the business plan tables and provided external assessment by KPMG
- We have improved our forecasts for civil works in ED1 and ED1 indirect cost forecasts
- We further increased our initial price reduction to 9.3% for UK Power Networks (EPN 5%, LPN 12% and SPN 13%) and UK Power Networks' prices are also forecast to be lower on average (2%) in ED1 than at the end of DPCR5.
- We reduced the cost of equity allowance from 6.7% to 6.0% as proposed by Ofgem (and we expect the cost of equity to be reflected in Ofgem's cost benchmarking as it was at fast-tracking)
- We have kept all our original 77 output commitments and, provided further clarity of our network secondary outputs
- Our network in ED1 will be reliable, low price and the most innovative for our customers

We have consulted with Ofgem following the 'fast-track decision' in November 2013, and conducted an in-depth review of our expenditure and price model. We have provided further justification for our re-submission proposals, and endeavoured to supply clear, supporting evidence and explanatory narrative. The revised business plan has had significant internal and external assurance, including

- **PA Consulting** who provided advice, quality assurance and monitoring of the development of the business plan since 2011. They have reviewed all of the scheme papers (both load and non load) as well as reviewing the Cost Benefit Analyses (CBAs) of the papers
- **Navigant** who reviewed and provided feedback on our revised March 2014 business plan, as well as a sample of the Cost Benefit Analyses (CBAs) of the scheme papers
- **Sinclair Knight Merz (SKM)** who re-assessed the reasonableness of our asset investment and outputs forecasts

- **Oxera** (through the Energy Networks Association) and **First Economics** provided advice on the cost of capital and other financial matters
- **NERA Economic Consulting** reviewed our internally estimated Real Price Effects (RPEs) and Total Factor Productivity (TFP) for the period 2015 to 2023 to ensure that they are economically justified and robust
- **Investment Property Databank** (IPD) provided cost benchmarking analysis to inform our property related expenditure forecasts and to measure the efficiency of the estate
- **ImprovIT** provided benchmarking cost analysis to inform our IT related expenditure forecasts and ensure that they are efficient
- **KPMG** reviewed the business plan data templates for consistency with Ofgem requirements, completeness and accuracy to source IT systems
- **Internal assurance** business plan data was reviewed and signed-off by the responsible internal data owner

In July 2014 Ofgem will publish its Draft Determinations, for RIIO-ED1, which we hope will reflect this revised plan. We will then have a further opportunity to engage with Ofgem ahead of its Final Determinations in November 2014.

### 1.3 Our 77 Output Commitments

In our July 2013 plan UK Power Networks made 77 primary output commitments that we propose to deliver for customers and stakeholders in RIIO-ED1. Our targets are specific, measurable, and time-bounded. This makes them easy for us and our stakeholders to assess, and means that our delivery performance against these targets in the future will be straight forward to measure.

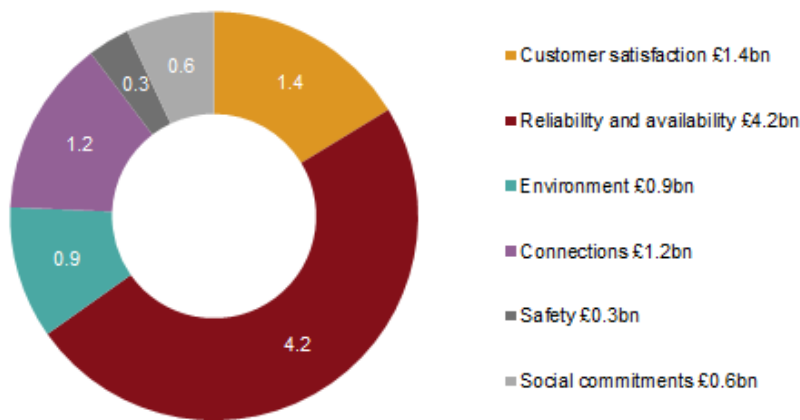
**UK Power Networks is committed to deliver the original 77 primary output commitments stated in July 2013 and there are no changes to this area in this revised business plan.** We will report on our delivery progress each year during RIIO-ED1.

The commitments should maintain UK Power Networks as one of, the lowest priced, most reliable and innovative DNO groups throughout RIIO-ED1.

- Our £6.6 billion of forecast expenditure (excluding pensions) is a 3% increase on our final DPCR5 forecast expenditure but delivers 9% more investment volumes and lower operating costs
- We will maintain the health of our network and reduce network utilisation in RIIO-ED1, optimising work volumes to ensure we only do what we need to do, and applying unit costs that are efficient in the industry
- Our plan has been significantly influenced by feedback from our extensive engagement process with hundreds of stakeholders, including further consultation on our revised plan
- We have built on our innovation track record to fully cater for industry changes such as the move to a low carbon economy and the transition to smart grids – we include £141 million of smart savings (up from £135 million in our July 2013 plan)
- Through our £50 million shareholder funded Business Transformation project for UK Power Networks, we are currently upgrading our systems and processes to further improve our customer service and to be on target to rank in the top third of the ‘Broad Measure of Customer Satisfaction’, an industry benchmarking incentive. Our aim is to improve from an average of 7.6 to 8.2 by the start of RIIO-ED1
- We will build further on our good safety record and continue with innovative internal safety programmes
- We will raise £2.9 billion of debt and £0.6 billion of equity capital to finance our plan, at a cost significantly demanding our cost of capital when compared to DPCR5
- Our plan reflects two years’ detailed work by specialists drawn from across our entire business, challenged by external experts, giving us the confidence we can deliver it for the benefit of our customers.

Where UK Power Networks has changed any secondary network output targets (Load Indices (LI) and Health Indices (HI)) this has been included in this document. UK Power Networks has not changed any secondary output categories in customer satisfaction, environment, safety and social.

**Figure 3 Proportion of forecast Totex associated with our output commitments (£6.6 billion 2012/13)**



## 1.4 Revised Expenditure

### 1.4.1 RIIO-ED1 Business Plan Summary of Ofgem Proposals

In this section, we are presenting a high level summary of the main cost areas from our original July 2013 business plan together with Ofgem’s assessment, and our revised March 2014 plan. The following link leads to Ofgem’s assessment of the RIIO-ED1 business plans

<https://www.ofgem.gov.uk/ofgem-publications/84945/assessmentoftheriio-ed1businessplans.pdf>

#### Cost Reductions

The total expenditure of our July 2013 plan was £6,779.5 million. Ofgem assessed total costs of £813 million of as not yet well justified. We believe 74% represented volume reductions, 17% in indirect costs supporting our core activities and 9% related to reductions in direct core activity unit costs. Most of the unit cost reduction (9%) occurred for our LPN network as Ofgem did not accept all of our regional cost arguments.

Table 1 summarises all of the relevant RIIO-ED1 total expenses grouped by the core expense categories and presented at a UK Power Networks’ group level. This table includes all on going efficiencies and includes Real Price Effects (RPEs), as recorded in the submitted March 2014 business plan templates. The table compares

- UK Power Networks’ July 2013 plan
- Ofgem (original) assessment
- UK Power Networks’ March 2014 revised plan

There is a reduction of 1.9% in Totex between our July 2013 and March 2014 plans, in comparison to Ofgem’s proposed reduction of 14.3% through the bottom up assessment published in November 2013, or 12.0% after applying 25% top down methodologies.

For readability purposes, we have used the summary tables in each sub-section showing the monetary difference between the UK Power Networks’ July 2013 submitted cost versus the Ofgem fast-track assessed cost (for a particular expenditure category on a bottom up basis). The numbers presented in the section below are from the Ofgem bottom up cost assessment model before the application of the top down totex ongoing efficiency adjustment.

**Table 1 High Level Summary of ED1 Total Expenses**

£m	RIIO-ED1 July 2013 Plan	Ofgem Fast-Track assessment	Ofgem Variant	RIIO-ED1 March 2014 Plan	UKPN Variant 2013 vs. 2014	Comment
<b>Load Related Expenditure</b>	1,362.0	1,074.6	-287.4	1,350.8	-11.2	Detailed review of individual LRE scheme papers
<b>Non-Load Related Expenditure</b>	1,366.3	1,021.7	-344.6	1,347.2	-19.1	Small reduction in ESQCR, partially off-set by increase in cable pit replacement
<b>Other Non-Load Expenditure</b>	390.8	312.8	-78.0	314.5	-76.3	Reduction of civil works costs, increase in CNI
<b>Network Operating Costs</b>	1,323.6	1,291.6	-32.1	1,304.5	-19.2	Small reduction in ED1 volumes of work
<b>Indirect costs*</b>	2,153.9	1,955.2	-198.7	2,098.6	-55.5	Reduced call centre costs and reductions due to reduced ED1 volumes of work
<b>Other DNO costs**</b>	182.9	152.5	-30.4	234.3	51.2	Reduction in CAI costs to smart metering. Inclusion of originally omitted expenditure on RTUs.
<b>Total</b>	6,779.5	5,808.5	-971.1	6,649.9	-130.1	
<b>% change</b>		14.3		1.9		
<b>Total (after Ofgem totex adjustment)</b>			-£813.0		-130.1	This is after the same 25% totex scaling factors used in fast-track assessment
<b>% change</b>		12.0		1.9		

\* 'Indirect Costs' includes Business Support and Closely Associated Indirect costs

\*\* Other DNO costs include smart meters, operational IT and telecommunications, worst served customers and Areas of Outstanding Natural Beauty

In the March 2014 submission UK Power Networks has included within the business plan data tables the ongoing cost efficiencies assumed. These have not materially changed from the fast-track submission and when combined with UK Power Networks' real price effect assumptions the net impact in ED1 has reduced to 0.0% per annum (a net increase of £19 million in ED1) from 0.1% per annum.

#### 1.4.1.1 Load related expenditure

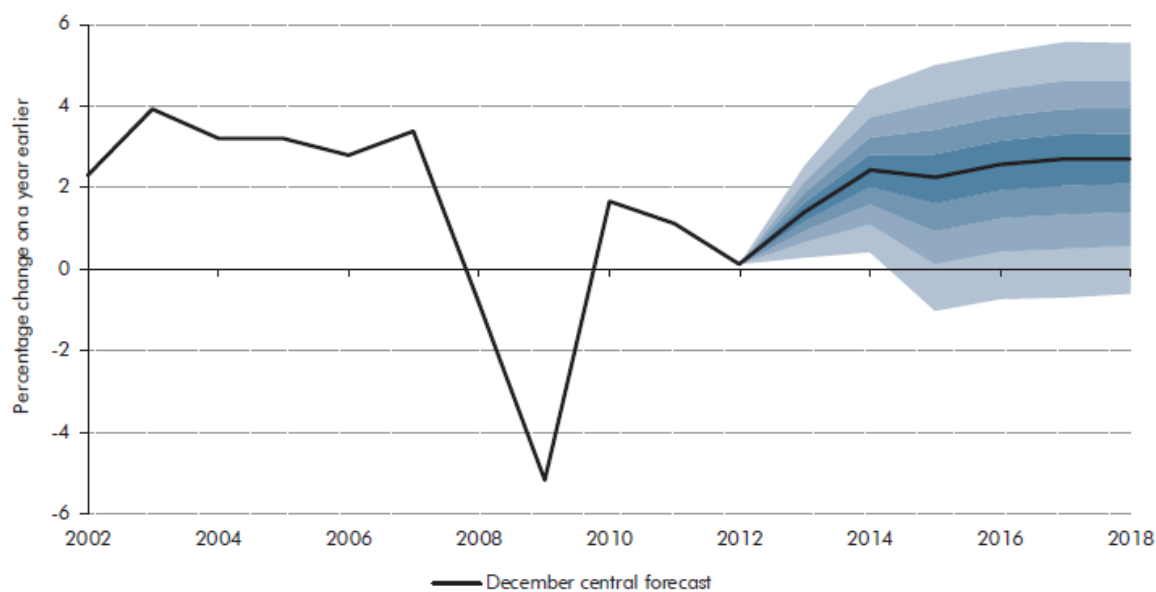
Our revised business plan includes £1,351 million of load related expenditure in ED1, a decrease of £11 million from our July 2013 plan.

- UK Power Networks has conducted an in-depth analysis of our ED1 load related reinforcement proposals increasing expenditure by £5 million from our original July 2013 business plan. All UK Power Networks' ED1 scheme papers have been both internally and externally reviewed (by PA Consulting) and as a result



- 182 individual scheme papers (including 5 High Value Projects (HVPs)) have been submitted with this March 2014 plan
  - 62 smaller schemes have been removed from ED1 reducing ED1 expenditure by £72 million based on a more optimised plan
  - We have revised the scope of another 45 schemes increasing ED1 expenditure by £19 million
  - We have transferred £58 million of Civil Works expenditure in ED1 into load expenditure from non load expenditure as a result of an error in our civil cost classification
- A reduction in Connections' expenditure inside the price control of £7 million as a result of a small reduction in the forecast volume of work in ED1
  - A reduction in Diversions and Wayleves' expenditure of £7 million as a result of a small reduction in forecast volume of work in ED1
  - A reduction in ED1 forecast Transmission Connection Points' expenditure in ED1 of £2 million as a result of the data quality review of the business plan tables
  - We maintain that the volume of load reinforcement work in UK Power Networks' three networks is efficient when the higher regional load growth in our three regions is taken into consideration (it was not in the fast-track assessment)
  - We recognise that our regions are different from the rest of the UK and this may require a UK Power Networks specific adjustment to load related uncertainty mechanisms (materiality thresholds, special project treatment etc.)
  - According to the Treasury, gross domestic product (GDP) growth in the economy in 2015 will be 2.5% (February 2014), which will impact expected maximum system demand. This is an increase of 0.4% on the assumption within the July 2013 plan. This increases the risk that our forecast reinforcement volumes may be too low.

**Figure 4 Office for National Statistics forecast GDP growth December 2013**



Source: ONS, OBR

We have prepared a cost benefit analysis justification for a representative sample of the proposed load related schemes. This sample includes all five High Value Projects and 10 schemes from each DNO. All schemes are shown to be positive under cost benefit analysis with a total benefit to customers of £36 million in ED1.

Table 2 summarises UK Power Networks' load related cost benefit analysis outcomes. Further information regarding our Scheme Justification Papers (Load) is available in Appendix 1. In summary this table shows the whole life net benefit of UK Power Networks' proposed scheme solution against the next best alternative. The table also shows the average annual benefit and the straight line benefit in ED1 (£35.8 million benefit to customers).

**Table 2 UK Power Networks' load related Cost Benefit Analysis outcomes**

£m	Whole Life Benefit				Annual Benefit	ED1 total Benefit
	EPN	LPN	SPN	UKPN	UKPN average	ED1 average
<b>Load related</b>	61.4	26.1	14.4	101.9	2.3	18.1
<b>High Value Projects</b>	11.3	70.8	17.7	99.8	2.2	17.7
<b>Total</b>	72.7	96.9	32.1	201.7	4.5	35.8

### Load related expenditure – Load Index Outputs

UK Power Networks has reduced its ED1 load related expenditure by £11 million, reducing from £1,362 million to £1,351 million. This has been achieved without a material change in the end ED1 forecast secondary load index customer outputs as described Chapter 2 'Load related expenditure and connections output commitments'

#### 1.4.1.2 Non load related expenditure

Our revised business plan includes £1,347 million, a decrease of £19 million from our July 2013 plan. UK Power Networks took the following action in response to this area of the Ofgem assessment:

- We reviewed our initial submission to address volume justification variances between Regulatory Instructions and Guidelines' (RIGs) tables and Asset Stewardship documents identified by Ofgem
- We have developed alternative scenarios based on fast-track companies' asset condition thresholds
- These scenarios show UK Power Networks' proposed volumes to be efficient in comparison
- A review of "Electricity Safety, Quality and Continuity Regulations" expenditure jointly with the HSE

### UK Power Networks forecasts fewer Health Indices 4 and 5 assets than the other DNOs

Of all the DNOs' July 2013 business plans, analysis shows that UK Power Networks is forecasting a lower percentage of assets at health index 4 and 5 at the end of RIIO-ED1 than the other DNO groups, both before investment and as a reduction as a result of our proposed investment. Therefore, our proposed work volumes could look excessive both against the reduction in health indices 4 and 5 delivered as a result of the work, and against the starting position in terms of overall health of the network

### However this is because our thresholds are calculated differently, as we assume 12% longer asset lives

Based on advice we have received from Sinclair Knight Merz ("SKM"), we believe that benchmarking volumes based on this analysis would be inappropriate. The result, a material reduction in volumes proposed, would lead to a material deterioration in the health of the network over RIIO-ED1, both compared to today and compared to the other network groups. This is because, all else being equal, UK Power Networks' classification methodology results in fewer health indices 4 and 5 scores being awarded than is the case for the other network groups.

### Benchmarking should compare our asset replacement volumes with other DNOs, because they are highly efficient

UK Power Networks' proposed asset replacement volumes for RIIO-ED1 are lower both than our volumes for DPCR5, and the volumes proposed by other DNO groups for RIIO-ED1. This is because our sophisticated approach to asset health, as confirmed by SKM, allows us to optimise asset replacement whilst still running an acceptable level of asset risk.

We would also note that EA Technology, with whom we have worked on our Asset Risk and Prioritisation (ARP) models has stated that "UK Power Networks have continued to work with EA Technology **and are taking a global lead in asset deterioration modelling** (our emphasis) including the consideration of a combined load and non-load modelling capability and the impact and optimisation of investment to support a low-carbon SMART future".

### Our expanded cost benefit analysis supports our asset replacement volumes

A cost benefit analysis is a systematic way of calculating and comparing benefits and costs of a project. A cost benefit analysis has two purposes

1. To determine if a project is a sound investment decision
2. To provide a basis for comparing projects or project options considering both the costs and benefits.

For the purposes of assessing our investment plans, and in line with Ofgem's guidance, cost benefit analysis assessments have been used to consider the costs against the benefits of different intervention approaches. Cost benefit analysis has been focused on areas of investment where there is a marked difference in expenditure between DPCR5 and RIIO-ED1. We have carried out cost benefit analysis comparisons of our proposed ED1 non load related investment volumes to the equivalent DPCR5 volume as requested by Ofgem. These comparisons cover 65% of the ED1 non load investment programme.

Table 3 shows that customers are benefitting by more than £11 million in ED1 compared to DPCR5 volumes. This is a function of UK Power Networks' long term innovative asset management strategy as health index outputs are constant through DPCR5, ED1 and ED2 as shown in the Asset Stewardship Reports (ASRs) contained within UK Power Networks' business plan.

UK Power Networks has done further analysis to quantify the benefit of our lower asset replacement volumes to our customers, both relative to DPCR5 and to the other DNOs. We strongly believe that this is the relevant analysis when benchmarking our asset replacement volumes, rather than a simple comparison of health indices 4 and 5 asset numbers as reported by the companies but which are not on a like-for-like basis.

### We have benchmarked our volumes against equivalent industry and fast-track representative volumes

UK Power Networks has also developed two alternate scenarios (industry representative condition and fast-track representative condition) to compare our proposed expenditure in ED1. It was not possible to carry out these comparisons into ED2 as most other DNOs had not publically published ED2 volumes in their July 2013 business plans.

Table 3 indicates (through cost benefit analysis) that customers are benefitting from applying an industry representative condition based volume assessment on UK Power Networks' three networks. A positive value indicates that UK Power Networks has proposed lower volumes in ED1 compared to using representative industry condition to derive UK Power Networks' non load replacement volumes. In summary this shows that customers are benefitting by £330 million in ED1 through UK Power Networks' innovative asset management strategy.

**Table 3 UK Power Networks' cost benefit analysis supporting our asset replacement volumes**

Non load £m benefit in ED1	Vs. UKPN DPCR5 equivalent	Vs. estimated Industry ED1 policy	Vs. estimated WPD ED1 policy
UKPN	+11.6	+329.6	+112.1
EPN	+18.7	+137.1	+34.6
LPN	-10.6	+121.2	+36.3
SPN	+3.6	+71.3	+41.3

Table 3 also indicates the cost benefit analysis to customers of applying a Western Power Distribution (WPD) representative condition based volume assessment on UK Power Networks' three networks. A positive value indicates that UK Power Networks has proposed lower volumes in our ED1 plan than if the WPD representative condition was used to derive UK Power Networks' non load replacement and refurbishment volumes. In summary this shows that customers are benefitting by more than £112 million via UK Power Networks' innovative asset management strategy. **We maintain that our volumes of activity in ED1 (and ED2) are efficient when compared to any other DNOs.**

### Non Load expenditure – Health Index Outputs

UK Power Networks has reduced its ED1 non- load related expenditure by £19 million, this has been achieved without a material change in the secondary Health Index (HI) customer outputs and is detailed further in Chapter 3: Non Load Related Expenditure.

#### 1.4.1.3 Other non load expenditure

Our revised business plan includes £315 million for other non load expenditure, a decrease of £76 million from our July 2013 plan. The changes are as a result of

- Since the submission of the July 2013 business plan UK Power Networks has received new requirements from The Department of Energy and Climate Change (DECC) to enhance our protection of critical national infrastructure assets increasing ED1 expenditure by £24 million. These requirements have been included in the revised business plan
- An improvement in the justification for our BT 21st Century Networks and fluvial flooding expenditure
- Reducing our civil works condition expenditure by £100 million following a detailed review of the data with EC Harris. During this data cleanse we identified that £100 million of civil costs were incorrectly attributed to non load related expenditure and the appropriate costs of £58 million were transferred to load related expenditure.

#### 1.4.1.4 Network Operating Costs

Network Operating Costs amount to 3% of the fast-track variance. This represents a total monetary value of £32 million. Our revised business plan includes £1,305 million, a decrease of £19 million from our July 2013 plan. UK Power Networks took the following actions in response to this area of the Ofgem assessment

- We have carried out a specific cost benefit analysis to better explain why London is different, in particular in reference to the central London strategy. Refer to Enhancements to Regional Costs Justification section for more information in section 8.2.
- Following Ofgem's fast-track assessment, we have enhanced our process on how we assess the quality of our data. This is detailed in Data Quality Improvement section of this document
- UK Power Networks has reviewed the underlying data tables against the expected 2013/14 out-turn and has made small changes to the unit costs and associated volumes, reducing the totex by £32 million in ED1
  - An increase of £44 million in Trouble Call (faults)
  - A decrease of £24 million in Occurrences Not Incentivised (ONIs) - these relate to customer supply restoration for individual premises and public and street furniture
  - A decrease of £48 million in Inspection and Maintenance
  - A decrease of £4 million in Tree Cutting
- The inclusion of appropriate expenditure of £14 million for a 1:20 weather event in two of our three networks
- We have developed a cost benefit analysis for the central London strategy that shows a positive return on the investment in ED1 for our customers

#### 1.4.1.5 Indirect costs (Business Support and Closely Associated Indirect Costs)

Our revised business plan includes £2,099 million for this cost category, a decrease of £56 million from our July 2013 plan

- A reduction of £52 million in Closely Associated Indirect costs through
  - a reduction of £18 million due to reduced work volumes
  - a reduction of £22 million in pension costs
  - a reduction of £12 million in call centre costs
- A reduction of £4 million in non-operation capex as a result of reduced volumes of work in ED1
- Ofgem has confirmed the material technical error in its benchmarking business support. UK Power Networks maintains this has a disproportionate impact to UK Power Networks due to the scale impact of our Connections business. We estimate this reduces the ED1 efficiency gap to the frontier by £55 million
- We are seeking Ofgem to benchmark Closely Associated Indirect Costs at group level and to drop the use of weighted Modern Equivalent Asset Value (MEAV) as a benchmarking driver, as it has no logic as a measure and leads to counter-intuitive results with poor statistical properties. This has a material impact on the benchmark outcome reducing UK Power Networks' inefficiency by £75 million, which eliminates the ED1 efficiency gap



#### 1.4.1.6 Other DNOs costs

The smart metering costs have reduced by £44 million following extensive review of

- The UK Power Networks' resourcing strategy resulting in the hiring of more internal direct labour
- Managerial and clerical overheads
- Work force renewal costs
- Transport and property costs
- There has been a reduction in the volume driven variant costs for smart metering of £12 million due to elimination of an error in our July 2013 business plan

The operational IT and Telecommunications costs in ED1 have increased by £95 million from July 2013. This is as a result of the identification of an omission of expenditure in relation the replacement of Remote Terminal Units (RTU) on an asset condition basis in ED1. RTUs are communication devices that transmit readings and information about the status of the network back to our control centre. We were the first DNO to install RTUs extensively, as part of our business as usual network investment in LPN. As a result, these assets are coming to the end of their natural economic life and require replacement. This has resulted in the increase in expenditure between DPCR5 and ED1 in this category.

UK Power Networks has not changed the forecast variant costs associated with Areas of Outstanding Natural Beauty and worst served customers.

### 1.5 March 2014 revised business plan cost assessment

UK Power Networks has undertaken to benchmark its March 2014 business plan through Ofgem's fast-track assessment model. The following changes have been made to the original fast-track assessment model

- The inclusion of UK Power Networks' revised business plan templates
- The removal of the Business Support double count
- The closely associated indirect assessment methodology has been updated to UK Power Networks' "Option 3"; reflecting economic growth, actual Modern Equivalent Asset Value (MEAV) and delivery of services on a group basis
- We have removed all of the fast-track Ofgem qualitative volume assessment or historic run rate limitations as we have provided significantly improved volume justification and cost benefit analyses
- Elimination of all benchmark modelling errors as shared with Ofgem

Table 4 shows the relative efficiency of UK Power Networks' revised March 2014 business plan following our adjustments to Ofgem's model. In aggregate we estimate the inefficiency gap to be £120 million before the application of any totex (macro) ongoing efficiencies. This breaks down into an efficient cost adjustment (i.e. a positive increase in allowed revenue) of £123 million and an inefficient volume adjustment of £244 million. The volume adjustment is a direct consequence of Ofgem's use of actual historic volume delivery as the efficient frontier. As discussed previously UK Power Networks maintains that its volumes in non load and load capex are efficient relative to the average industry proposed volumes and the assessed efficient fast-track volumes.

**Table 4 Revised benchmarking based on UK Power Networks' adjustments to Ofgem's Model**

Cost category	Expenditure change required to meet efficiency frontier (a positive value denotes a forecast which already benchmarks as efficient)		
	EPN	LPN	SPN
Totex (macro)	+2%	+4%	0%
Totex (sum of below categories)	-1%	-6%	+1%
Load-related capex	+11%	+9%	+12%
Non-load related capex	-12%	-31%	-9%
Other Network Capex	-19%	-15%	+5%
Network Operating Costs (NOC)	+2%	-1%	+5%
Closely Associated Indirect costs (CAI) and Smart Metering	+5%	-4%	+2%
Business support, Operational IT & Telecoms and non-op capex	-5%	-7%	-5%
	NB Business Support benchmarks as efficient, supported by external review		

It is recognised that this assessment will change as other slow-tracked companies revised ED1 business plans and Ofgem improve their benchmark model for slow-track assessment. However, it is useful to identify where the assessment model still shows that UK Power Networks' plan requires additional justification. The main remaining areas of negative variance are

- Non load capex for all three DNOs (-£218 million). UK Power Networks' has included improved volume justification in its asset stewardship reports for all non-load expenditure together with a significant expansion of its cost benefit analysis to cover 65% of its expenditure. Additional justification has also been provided for increased central London capex of our £30 million in our improved regional cost justification
- Other capex for EPN and LPN (-£37 million). UK Power Networks' has provided additional justification for its proposed ED1 BT21CN expenditure, showing that UK Power Networks will be ahead of its original DPCR5 at the end of 2014/2015 plan for both volume delivered and cost efficiency. There is a recognition that there is an increase in costs in this category but this is as a result of the mix of projects to be delivered in ED1. Additional justification for UK Power Networks' civil works' expenditure is also provided in the civil works condition Asset Stewardship Report. This expenditure is also supported by additional positive cost benefit analyses in ED1
- Non-operational capital expenditure (-£55 million). UK Power Networks has provided further justification of the increase in expenditure in ED1 for the replacement of its Remote Terminal Units (RTU) as they come to the end of their useful lives. We believe to be unique to UK Power Networks' DNOs. UK Power Networks has also resubmitted its original external justification for our proposed property and IT capital expenditure in ED1. This justification is also relevant to property and IT business support expenditure

## 1.6 Financing

UK Power Networks has reviewed its financing assumptions included in the business plan with reference to the changing economic climate and the Competition Commission's and Ofgem's cost of capital reviews. UK Power Networks has kept all of its assumptions consistent with the original business plan submission with the exception of the cost of equity, and the split of fast and slow money.

UK Power Networks has decided to adopt Ofgem's new reference cost of equity of 6.0% in our revised business plan.

UK Power Networks does not accept that the long term cost of capital has reduced since the final price controls in gas and transmission. We believe the proposed allowed return by Ofgem is too low. However, UK Power Networks expects that Ofgem will assess companies' business plans using a cost of equity of 6.0% whatever companies propose. Therefore not accepting 6.0% would simply result in a penalty charge under Ofgem's Information Quality Incentive mechanism. Applying a cost of equity allowance of 6.0% results in a significant tightening of forecast credit metrics. As a result of this, UK Power Networks is proposing to alter its fast and slow money split from 70/30% to 68/32% to maintain financeability, in particular PMIC ratios (Post Maintenance Interest Cover ratio).

Our acceptance of the 6.0% cost of equity is conditional on Ofgem accepting our overall business plan package, including our proposed totex and financeability proposals.

## 1.7 Risk and uncertainty

UK Power Networks notes that the economic outlook has improved since the July 2013 business plan submission, with economic growth now likely to be 2.6% in 2014 and 2.5% in 2015. This is an increase from 1.7% in 2014 and 2.1% in 2015 (source February 2013 and February 2014 editions from <https://www.gov.uk/government/collections/data-forecasts>). This faster than expected return to growth is more pronounced in UK Power Networks' operational areas, with growth expected to be more than 0.5% p.a. higher in this region. This increased growth outlook further underlines the need to invest the load related expenditure we have requested.

## 1.8 Revenues and prices

UK Power Networks is proposing to reduce its initial ED1 prices (2015/16), in the first year by 9.3% in real terms. This is a 5% reduction in EPN, 12% reduction in LPN and a 13% reduction in SPN. This is a bigger initial first year reduction than initially proposed in the July 2013 business plan.

Overall UK Power Networks' customers' prices are forecast to decrease by 2% on average for ED1, compared to the end of DPCR5. We expected that our customers will still be receiving amongst the lowest prices in the UK at the end of ED1.

Table 5 summarises the ED1 average price changes for domestic and non-domestic customers between DPCR5 and ED1.

**Table 5 UK Power Networks ED1 average price changes for domestic and non-domestic customers**

£m	End of DPCR5	Average RIIO-ED1	% difference between end of DPCR5 and average RIIO-ED1
<b>EPN</b>			
<b>Domestic</b>	76.5	78.3	2%
<b>Non-Domestic</b>	147.5	151.1	2%
<b>LPN</b>			
<b>Domestic</b>	75.5	70.8	-6%
<b>Non-Domestic</b>	141.3	132.6	-6%
<b>SPN</b>			
<b>Domestic</b>	89.7	85.8	-5%
<b>Non-Domestic</b>	147.5	141.2	-5%
<b>UKPN</b>			
<b>Domestic</b>	80.0	78.3	-2%
<b>Non-Domestic</b>	145.7	143.0	-2%

## 1.9 Document structure

Our revised business plan package is presented in the same structure and format as our July 2013 plan, with the relevant documents updated as appropriate.

This document provides a “what changed and why” single narrative to the revisions made to the business plan and a summary of the further justification provided. As appropriate, we have included dynamic links to the supporting documentation.

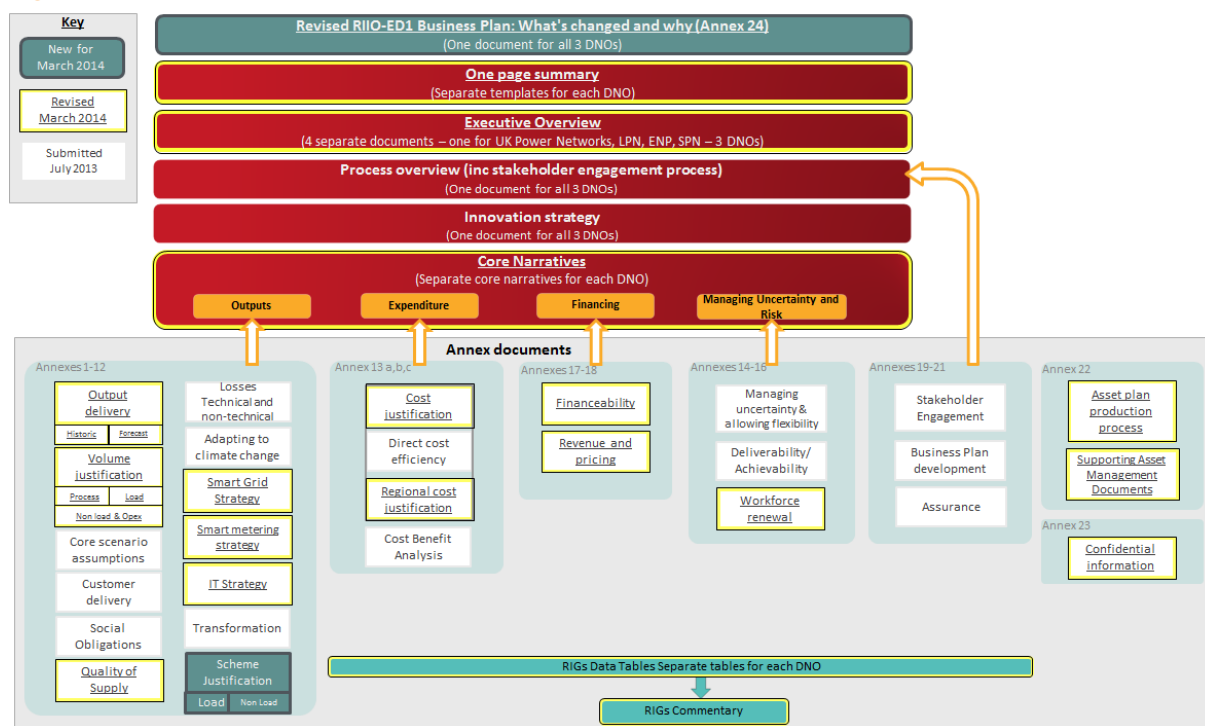
Each expenditure category has a number of investment drivers, where there has been a change, we provide an explanation or further justification the costs and volumes at a UK Power Networks’ group and DNO level.

### Our Business Plan Document Suite - March 2014 Re-submission

This change justification document adds to our suite of business plan documents that were developed for the July 2013 submission. Figure 5 shows the hierarchy of our business plan documentation structure. This is categorised as follows:

- New documents which have been introduced as part of the re-submission plans
- Documents that were submitted in July 2013 and have been revised for the re-submission
- Documents that were submitted in July 2013 and are presented for re-submission as unmodified

Figure 5 UK Power Networks’ RIIO-ED1 Re-Submission Documentation Structure



### 1.9.1 Asset Management Document Structure

Figure 6 provides a structural overview of our Asset Management information and how it relates to our business plan Annex 22. The structure is formed of a main [Annex 22: Asset Plan Production Process](#) and supporting plans and scheme papers.

Our strategy to successfully manage our network is explained in detail in seven core documents:

- [Annex 22: Asset Plan Production Process](#)
- [LOAD Asset Plan EPN](#)
- [LOAD Asset Plan LPN](#)
- [LOAD Asset Plan SPN](#)
- [Non Load Asset Plan EPN: HI Modelling Overview](#)
- [Non Load Asset Plan LPN: HI Modelling Overview](#)



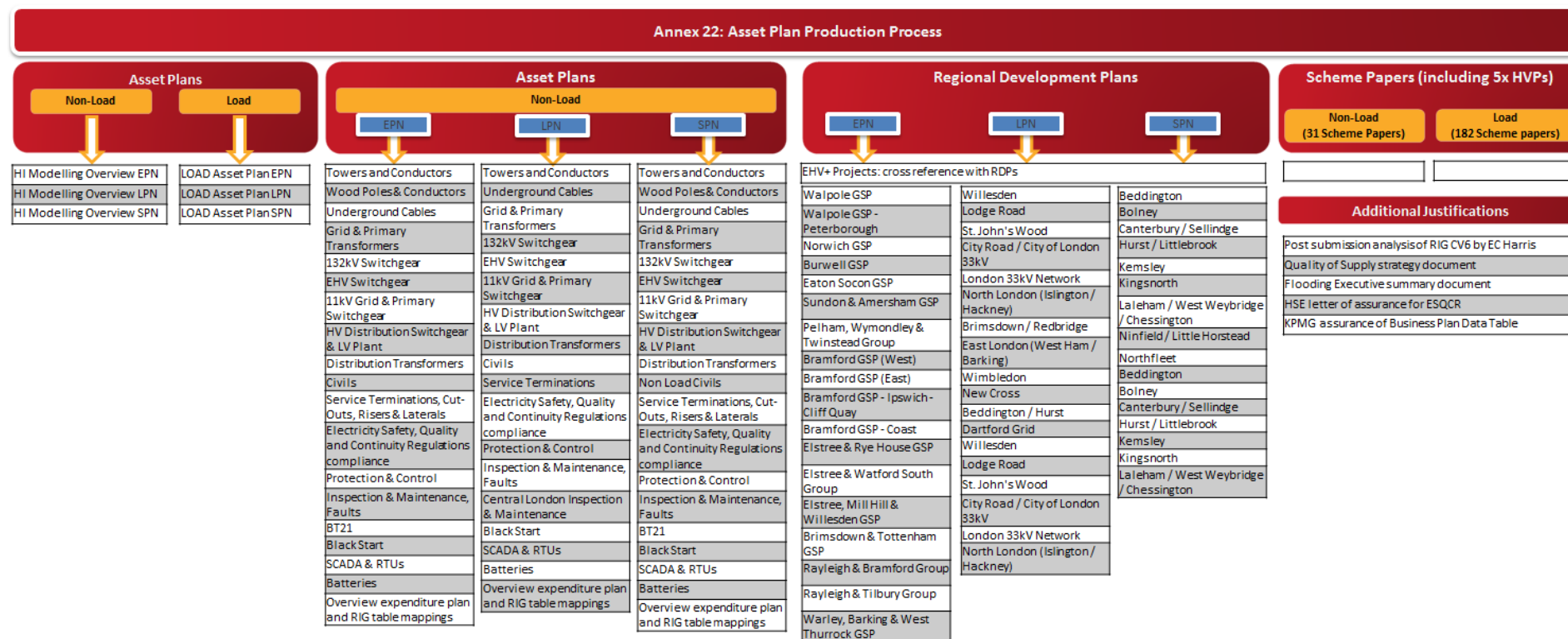
- [Non Load Asset Plan SPN: HI Modelling Overview](#)

These documents combined show that our asset strategy is – we believe - the most innovative and efficient in the UK.

Whilst we are broadly supportive of the fast-track assessment approach for capital expenditure, we have the following observations

- Some models (e.g. asset replacement) assess calculating a volume and unit cost adjustment for every activity at a granular level, whilst others (e.g. Low Carbon Technologies (LCT) reinforcement) roll up diverse activities and calculate overall adjustments. We would recommend a consistent approach unless there is a clear rationale for difference in a particular model
- We would support the application of qualitative adjustments at a line item level for reasons of transparency
- In replacement and Low Carbon Technologies reinforcement, Ofgem creates composite unit costs for groups of asset types based on an industry distribution of volumes. Any DNO whose workload is skewed towards more expensive interventions is penalised – In Low Carbon Technologies reinforcement, LPN gets a cost reduction in spite of all its individual Unit Cost Indicators (UCIs) being better than ED1 and UK Power Networks would be happy to provide alternative modelling which will calculate a DNO-specific composite unit cost

Figure 6 UK Power Networks' RIIO-ED1 Asset Management Document Structure



- Further information regarding our load scheme papers is available in Appendix A.1 Scheme Justification Papers (Load)
- Further information regarding our non load scheme papers is available in Appendix A.2 Scheme Justification Papers (Non-Load)

# 2

## Load Related Capital Expenditure

We have refined and provided further evidence our load related expenditure

### 2.1 Introduction

Load related expenditure is investment in reinforcing our network to cater for growth in electricity demand. It is also required to manage the overall network risk, based on assessment of network utilisation as measured by load indices.

This chapter sets out UK Power Networks' revised business plan adjustment justification for load related capital expenditure which reflects Ofgem's November 2013 assessment report and question and answer process.

In July 2013, UK Power Networks submitted a total load related capital expenditure of £1,362 million. Revised expenditure in RIIO-ED1 is forecast to be £1,350 million. The investment drivers included in load related expenditure are

- Connections
- Diversions and wayleaves
- Reinforcement
- Transmission Connections Points
- High Value Projects

Table 6 summarises UK Power Networks' group and DNO data submitted for fast-track alongside our March 2014 revised plan data.

**Table 6 UK Power Networks' Revised Data Tables (Load Capital Expenditure)**

£m	RIIO-ED1 July 2013 UKPN Plan	Ofgem Fast- Track assessment	Ofgem Variant	RIIO-ED1 March 2014 Plan	UKPN Variant (2013 vs. 2014 )	Comment
<b>Connections</b>	91.3	100.1	8.8	84.2	-7.1	Reduced volume of work
<b>Diversions &amp; Wayleaves</b>	215.6	218.2	2.6	208.3	-7.3	Reduced volume of work
<b>Reinforcement</b>	822.3	598.9	-223.4	830.1	7.8	Revised scheme papers including load related civils expenditure
<b>Transmission Connection Points</b>	83.5	89.2	5.6	81.9	-1.7	Reduced volume of work
<b>High Value Projects</b>	149.3	68.3	-81.0	146.4	-2.9	Reduced volume of work
<b>Total load capex</b>	1,362.0	1,074.6	-287.4	1,350.8	-11.2	

In the July 2013 plan UK Power Networks reviewed all projects that were originally contained within the accepted DPCR5 business plan that were funded through the price control and identified just £6 million of expenditure that has not been completed. UK Power Networks has continued to keep these projects and our associated outputs in the RIIO-ED1 business plan but has removed all of the expenditure from the ED1 period.

This chapter focuses on the investment drivers detailed below and provides a summary of the changes since the July 2013 submission, based on Ofgem's assessed adjustments and UK Power Networks' proposals regarding revisions to the submitted data.

### 2.1.1 Load related expenditure and connections output commitments

UK Power Networks is not proposing to make any changes to our primary network load and connections outputs despite the small reduction in costs. UK Power Networks is proposing to alter the forecast load indices 4 and 5 at the end of ED1 by 5 to 44 as a result of the inclusion of the 2012/13 system maximum demands and the revision to the proposed schemes of work.

Table 7 shows the impact on load indices of the load related reinforcement schemes we plan for RIIO-ED1. These are listed in Appendix A.1 Scheme Justification Papers (Load).

**Table 7 UK Power Networks Load Index outputs in ED1**

Load Indices 4 and 5	July 2013 plan				March 2014 plan			
	DPCR5 Start	End DPCR5 target	End DPCR5 forecast	End ED1 forecast	End DPCR5 forecast	End ED1 With intervention	End ED1 without intervention	Delta intervention
EPN	87	56	21	21	25	18	50	32
LPN	28	21	17	12	17	12	33	21
SPN	59	40	22	16	25	14	29	15
<b>UKPN Total</b>	<b>174</b>	<b>117</b>	<b>60</b>	<b>49</b>	<b>67</b>	<b>44</b>	<b>112</b>	<b>68</b>



The increase in expected load indices 4 and 5s at the end of DPCR5 to 67 (from 60) in the March 2014 business plan is as a result of a small increase in actual system maximum demand (compared to July 2013 plan) and delivering behind programme for eight projects because of a delay in project construction. It should be noted that the costs associated with the slippage have not been included in ED1 forecast costs.

## 2.2 Connections

### 2.2.1 UK Power Networks' Revised Plan

UK Power Networks is committed to making it easier for customers to connect to our networks – this is an important element of achieving its vision of reaching top-third performance amongst the 14 distribution networks in the area of customer service. We are committed to improving our Connections' customer service, facilitating competition in the connections market and making it easier for customers seeking connection.

Following careful consideration from Ofgem's remodelling our data UK Power Networks has reduced the total expenditure that was submitted in July 2013 by £7 million. This was as a result of a small reduction in forecast volumes of work.

Table 8 summarises UK Power Networks' group and DNO data submitted in July 2013 alongside our March 2014 revised plan data.

**Table 8 UK Power Networks' Revised Data Tables (Connections)**

£m	RIO-ED1 July 2013 Plan	Ofgem Fast-Track assessment	Ofgem Variant	RIO-ED1 March 2014 Plan	UKPN Variant (2013 vs. 2014 )
UKPN	91.3	100.1	8.8	84.2	-7.1
EPN	52.5	49.0	-3.5	48.7	-3.9
LPN	14.7	19.8	5.1	13.1	-1.6
SPN	24.1	31.3	7.2	22.4	-1.7

## 2.3 Diversions and Wayleaves

### 2.3.1 UK Power Networks' Revised Plan

Following careful consideration from Ofgem's remodelling our data UK Power Networks has reduced the total expenditure that was submitted in July 2013 by £7 million. This was as a result of a small reduction in forecast volumes of work.

Table 9 summarises UK Power Networks' group and DNO data submitted in July 2013 alongside our March 2014 revised plan data.

**Table 9 UK Power Networks' Revised data tables (Diversions and Wayleaves)**

£m	RIO-ED1 July 2013 Plan	Ofgem Fast-Track assessment	Ofgem Variant	RIO-ED1 March 2014 Plan	UKPN Variant (2013 vs. 2014 )
UKPN	215.6	218.2	2.6	208.3	-7.3
EPN	116.5	117.5	1.0	115.1	-1.4
LPN	32.9	33.4	0.5	32.3	-0.6
SPN	66.1	67.2	1.1	60.9	-5.2

## 2.4 Reinforcement

### 2.4.1 UK Power Networks' Revised Plan

This area has been subject to a number of significant reviews, both in monetary values and also in terms of the volume of required work. Ofgem has requested scheme papers, which were not included in the July 2013 submission as UK Power Networks had submitted 35 Regional Development Plans (RDPs). These RDPs provide a summary of all network expenditure in a geographical region (reinforcement, replacement, refurbishment and other capex). This enables UK Power Networks to optimise the amount of capital expenditure by geographical region, avoiding duplication of expenditure on assets, optimising the type of expenditure carried out and ensuring that operational expenditure is also optimised. This is a unique feature across the UK's DNOs.

We have reviewed all of our load costs and load-related regional development plans. These were included in our original plan. We are including 182 load-related scheme papers broken down as follows (including 5 High Value Projects (HVPs))

- 87 EPN
- 48 LPN
- 47 SPN

These are detailed in the Appendix A.1 (load related capex). We have internally reviewed all our ED1 schemes; these schemes have also been externally reviewed by PA Consulting to verify the content.

We have made the following updates to the scheme papers

- 62 schemes have been removed from ED1
- 2 schemes added
- 4 schemes transferred to non-load related capex.
- This net reduction of 64 scheme papers has reduced ED1 expenditure by £72 million (before RPEs and ongoing efficiencies)
- We have also revised the scope of a further 45 schemes increasing ED1 expenditure by £19 million (before RPEs and ongoing efficiencies)
- 182 scheme papers (including 5 High Value Projects) have been drafted and included in our revised plan
- We have transferred £58 million of load related civil works' expenditure in ED1 from non-load expenditure
- In aggregate there is a total increase of £5 million in ED1 from original July business plan submission (this includes the reduction of £2.8 million in High Value Projects from Table 12)

Table 10 summarises UK Power Networks' group and DNO data submitted in July 2013 alongside our March 2014 revised plan data.

**Table 10 UK Power Networks' Revised data tables (Reinforcement)**

£m	RIO-ED1 July 2013 Plan	Ofgem Fast-Track assessment	Ofgem Variant	RIO-ED1 March 2014 Plan	UKPN Variant (2013 vs. 2014 )
<b>UKPN</b>	822.3	598.9	-223.4	830.1	7.8
<b>EPN</b>	302.9	166.7	-136.3	295.2	7.7
<b>LPN</b>	325.8	266.8	-59.1	350.7	24.9
<b>SPN</b>	193.5	165.5	-28.1	184.2	-9.4

#### UK Power Networks' Group

We have reviewed all of the load schemes, particularly those that do not appear in load indices 4 and 5 at the end of the period. This is presented at a UK Power Networks' summary level and then detailed for each DNO.

Not all load schemes are driven by increase in system maximum demand, as some are also fault level-related or have other drivers or be part of a wider re-development proposal. Some of the schemes that do not appear to have an load indices 4 or 5 driver had been influenced by higher loads previously observed on the sites and we have now also reviewed them against their 2012/13 maximum demands. Where they were not classified as load indices 4 or 5 during the period they have been taken out. In general terms, the 62 schemes that we have removed were neither in load indices 4 or 5 and, additionally there were no other justifiable business drivers for including them.

## 2.5 Transmission Connection Points

### 2.5.1 UK Power Networks' Revised Plan

Transmission Connection Points are the shared costs of any reinforcement or change to National Grid's infrastructure initiated by a DNO.

Following Ofgem's assessment, we have made minor reductions to our expenditure in this category.

Table 11 summarises UK Power Networks' group and DNO data submitted in July 2013 alongside our March 2014 revised plan data.

**Table 11 UK Power Networks' Revised data tables (Transmission Connection Points)**

£m	RIO-ED1 July 2013 Plan	Ofgem Fast-Track assessment	Ofgem Variant	RIO-ED1 March 2014 Plan	UKPN Variant 2013 vs. 2014
UKPN	83.5	89.2	5.6	81.9	-1.7
EPN	15.5	16.6	1.1	15.2	-0.3
LPN	44.2	47.0	2.8	43.4	-0.8
SPN	23.8	25.6	1.7	23.3	-0.5

## 2.6 High Value Projects

### 2.6.1 UK Power Networks' Revised Plan

Following Ofgem's assessment of the five High Value Projects that were submitted in the July 2013 business plan, UK Power Networks believes the total expenditure is broadly correct and we have made a minor reduction to what we submitted in in July 2013. We have also provided further information to each project to justify our rationale.

A High Value Project is over £25 million.

The following five High Value Projects remain the same for the re-submission

#### EPN

- Little Barford and Eaton Socon

#### LPN

- London West End
- Eltham and Sydenham
- Vauxhall – Nine Elms – Battersea

#### SPN

- PO Route (Polegate to Lewis)

Table 12 summarises UK Power Networks' group and DNO data submitted in July 2013 alongside our March 2014 revised plan data.

**Table 12 UK Power Networks' Revised data tables (High Value Projects)**

£m	RIIO-ED1 July 2013 Plan	Ofgem Fast-Track assessment	Ofgem Variant	RIIO-ED1 March 2014 Plan	UKPN Variant (2013 vs. 2014 )
<b>EPN Little Barford and Eaton Socon</b>	22.6	17.0	-5.6	22.2	-0.4
<b>LPN London new West End tunnel and substation</b>	39.1	0	-39.1	38.4	-0.7
<b>LPN Eltham - Sydenham Gas Cables</b>	27.8	28.6	0.8	27.3	-0.5
<b>LPN Vauxhall - Nine Elms - Battersea</b>	27.3	0	-27.3	26.7	-0.5
<b>SPN PO Route (Polegate to Lewes)</b>	32.5	22.7	-9.8	31.8	-0.7
<b>Total</b>	149.3	68.3	-81.0	146.4	-2.8

### UK Power Networks' Group

We have improved the justification of each of the five High Value Projects through the scheme papers and cost benefit analysis.

#### 2.6.2 EPN Revisions to RIIO-ED1 July 2013 Plan (High Value Projects)

##### Little Barford and Eaton Socon

It is proposed to construct a new Gas Insulated Switchboard (GIS) at Eaton Socon on land owned by National Grid to replace the Little Barford 132kV switchboard, the non-standard AIS busbar arrangement at Eaton Socon and facilitate connection of a 3rd Super-Grid Transformer (SGT) at Eaton Socon.

- We have provided a simplified scheme paper for further clarity on the need for investment
- We have provided Heath Index data for the existing Little Barford switchgear showing the need to replace
- We have provided loading and firm capacity data showing the need for an additional transformer at Eaton Socon to meet N-2 security.
- We have provided details of the alternative option of replacing the switchgear at Little Barford showing that the total cost would be higher
- Further details are in the revised scheme paper: [High Value Project 3: Little Barford & Eaton Socon](#)

#### 2.6.3 LPN Revisions to RIIO-ED1 July 2013 Plan (High Value Projects)

##### 132kV Eltham – Sydenham Gas Cables

The aim of this project is to minimise the risk of failure of 132kV gas cables and consequential risks to network security if they were to fail.

The following points provide further justification to support our July 2013 submitted costs

- We have provided a health index data for the Gas-Filled Cables
- We have reviewed the current outage time used in the benefit case and added 2013 fault numbers
- We have clarified the dependencies with Transport for London and explained how their 'Red Routes' (network of major roads that make up 5 per cent of the roads, but carry up to 30 per cent of the City's traffic) has stringent restrictions on the work that can be done on this route
- We have transferred the cost associated with the Eltham-Sydenham project from load capital expenditure (load related expenditure) to non load related expenditure after revised Planning Load Estimate (PLE) forecasts

Further details are in the revised scheme paper: [High Value Project 5: Eltham - Sydenham](#)



## **London West End**

Our assessment of the distribution network in the area suggests that space constraints at existing sites would not deliver the capacity required and would not improve resilience that stakeholders consider is necessary for the central business districts

- We have provided a simplified scheme paper for further clarity on the need for investment
- We have provided further load index information on the substations currently supplying the area
- We have provided further detail on how this fits into the overall strategy showing the need for a new substation in order to provide for long term development of supplies to London's West End and the limits on reinforcing existing sites

Further details are in the revised scheme paper: [High Value Project 2: London West End](#)

## **Vauxhall – Nine Elms – Battersea**

The Vauxhall-Nine Elms-Battersea (VNEB) area has a large number of developments coming forward. These developments are seeking electricity connections which in total add to more than 100MVA.

The following points provide further justification to support our July 2013 submitted costs

- We have demonstrated why the work is not Connections-driven and why it is therefore being funded out of Distribution Use of System (DUoS), which are charges DNOs apply for electricity being distributed on our networks
- We have provided load index tables of all adjacent substation sites to provide additional rational for the expenditure
- We have shown costs of reinforcing existing sites for underlying load growth
- We have provided information and demonstrated why long cables from other substations are not possible
- The other substations will eventually run out of capacity and will also need reinforcing
- Increased losses

Further details are in the revised scheme paper: [High Value Project 1: Vauxhall Nine Elms](#)

## **2.6.4 SPN Revisions to RIIO-ED1 July 2013 Plan (High Value Projects)**

### **PO Route (Polegate to Lewes)**

The Lewes - Eastbourne 132kV single circuit tower line is 22 kilometres in length comprising 86 towers and is routed parallel to the south coast. The preferred approach is to create a new Grid Supply Point to supply Lewes Grid before the single circuit PO route is dismantled.

The following points provide further justification to support our July 2013 submitted costs

- We have added health index tables providing information on how to track the condition and how to improve the project over time
- We have clearly stated that the driver is an N-2 constraint at Lewes/Newhaven
- As this an Area of Outstanding Natural Beauty, we are considering removing a visible tower line from the area

Further details are in the revised scheme paper: [High Value Project 4: PO Route \(Polegate to Lewis\)](#)

# 3 Non Load Related Expenditure

## Our non-load related expenditure is better justified

### 3.1 Introduction

Non load related capital expenditure is the replacement or refurbishment of assets which are either at the end of their useful life due to their age or condition, or need to be replaced on safety or environmental grounds; this also includes health index targets, in line with current levels over the RIIO-ED1 period, and we are committed to further improving our Customer Interruptions and Customer Minutes Lost performance.

This chapter details our justification for all non load related capital expenditure. In July 2013, we submitted a total non load related capital expenditure of £1,366 million (this total excludes all quality of supply costs). Expenditure in RIIO-ED1 in the revised business plan is forecast to decrease to £1,347 million, a decrease of 1.4%. UK Power Networks has an innovative asset management strategy that sets high condition and defect health index definitions, which allow tight controls on assets close to the end of their lives. The success of this strategy is demonstrated as UK Power Networks' DNOs are consistently proposing to replace the lowest proportion of their assets during of all DNOs during the ED1 period.

Table 13 summarises UK Power Networks' group and DNO data submitted for fast-track alongside our March 2014 revised plan data

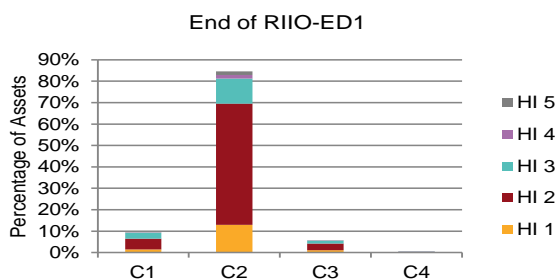
**Table 13 UK Power Networks' Revised Data Tables (Non Load Capital Expenditure)**

£m	RIIO-ED1 July 2013 Plan	Ofgem Fast-Track assessment	Ofgem Variant	RIIO-ED1 March 2014 Plan	UKPN Variant 2013 vs. 2014	Comment
<b>ESQCR</b>	142.7	0.0	-142.7	74.7	-68.0	Reduction in work volumes and transfer of costs to legal & safety
<b>Asset Replacement</b>	975.4	810.7	-164.7	1,045.8	70.5	Revised volumes of work in ED1
<b>Refurbishment</b>	108.5	67.8	-40.7	72.3	-36.2	Transfer of overhead lines expenditure to replacement
<b>Legal &amp; Safety</b>	112.3	110.7	-1.6	127.4	15.1	Increased costs in cable pit expenditure
<b>Quality of Supply</b>	21.2	21.2	0.0	21.2	0.0	To be funded by shareholders
<b>Rising Mains and Laterals</b>	27.4	32.5	5.1	26.8	-0.6	
<b>Total Non-load capex</b>	1,366.3	1,021.7	-344.6	1,347.2	-19.1	This total excludes Quality of Supply as it is shareholder funded

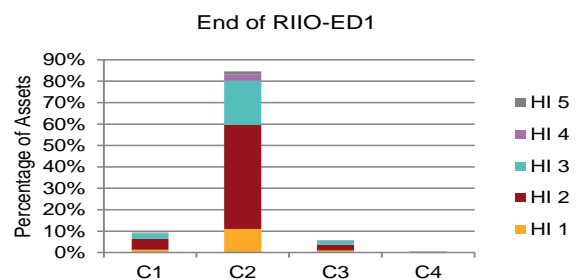
**3.1.1 Non load related output commitments**

UK Power Networks is not proposing to make any changes to its primary network non load outputs other than the small reduction in costs. UK Power Networks is proposing to only make marginal changes to the secondary network output forecast of health indices 4 and 5 at the end of ED1 as a result of the small revisions to the associated volumes of work. This represents no change in risk to customers from the original July 2013 business plan. This is shown in Figure 7 to Figure 12.

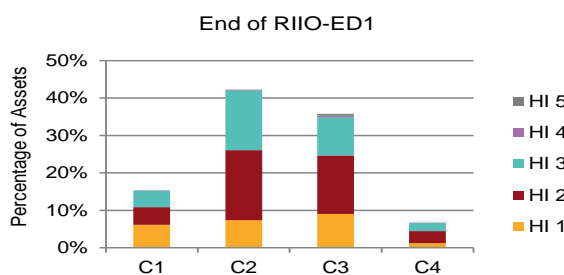
**Figure 7 ED1 EPN HI criticality profile July 2013**



**Figure 8 ED1 EPN HI criticality profile March 2014**



**Figure 9 ED1 LPN HI criticality profile July 2013**



**Figure 10 ED1 LPN HI criticality profile March 2014**

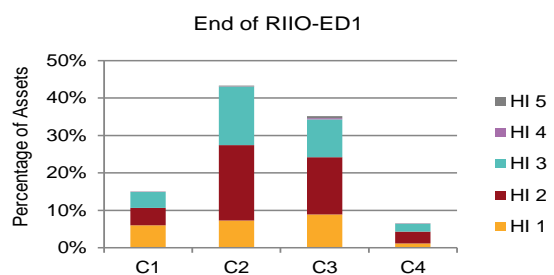


Figure 11 ED1 SPN HI criticality profile July 2013 2014

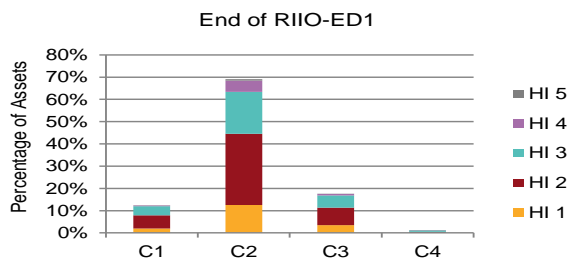
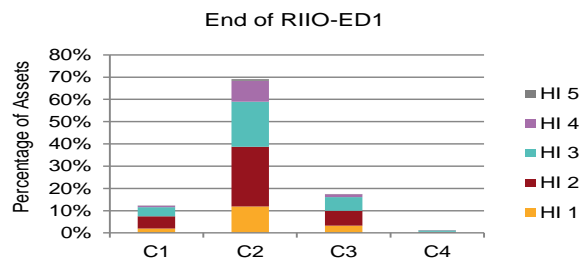


Figure 12 ED1 SPN HI criticality profile March

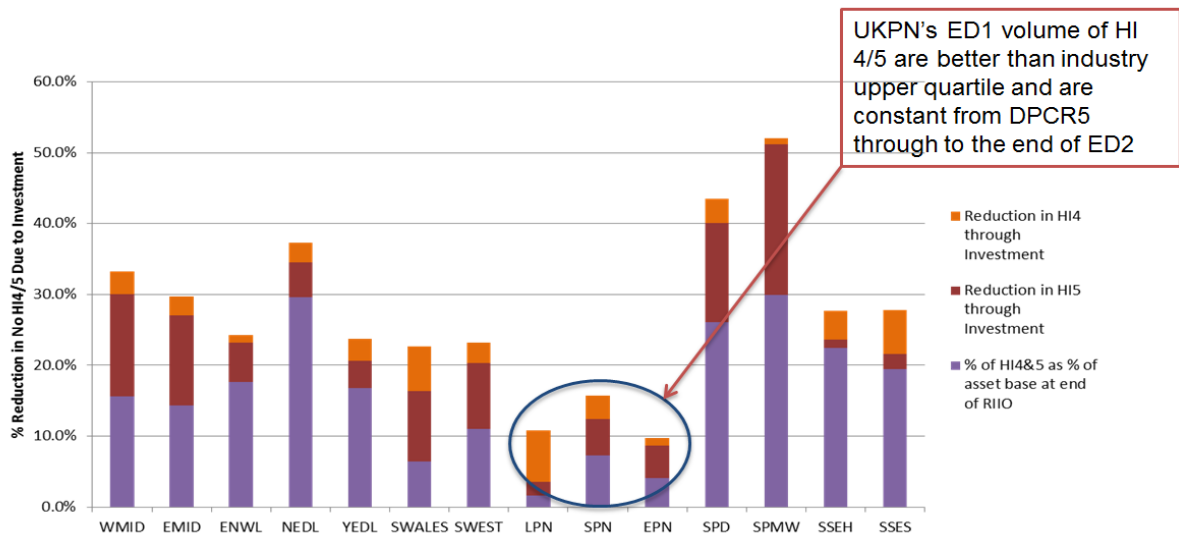


However this is because our thresholds are calculated differently, as we assume 12% longer asset lives

SKM advise “that Electricity North West (ENW), Northern Power Grid (NPG) and Western Power Distribution (WPD) use asset health assessment methodologies that are based on similar principles to that of UK Power Networks”. Other than UK Power Networks, WPD has the clearest disclosure in its July 2013 business plan and SKM is able to identify that both companies use internally a 10 point scale for asset health, and that the “methodology behind the health index scores developed by WPD is very similar to that of UK Power Networks...” There is a slight variation in the health index scores for the health indices 1, 2 and 3 categories but health indices 4 and 5 are identical.” However, whilst the methodologies are very similar, the assumptions used are not. Asset life assumptions are the single most important driver of the health index value assigned to an asset, in the absence of specific condition data for that asset based on an inspection (which is the case for the majority of all DNOs’ assets). SKM advise that “UK Power Networks have adopted in DPCR5 and ED1 a philosophy for ED1 which assumes longer average asset lives than those used by other DNOs in current and previous price control reviews” and that “in comparison to the performance of other DNOs in ED1, this approach will result in UK Power Networks developing both an older asset base with a smaller group of assets identified with a higher probability of failure, and a lower volume of assets being replaced as a proportion of the total asset base”. In SKM’s view “The general increase in average asset lives against other DNOs is considered reasonable considering the use of Asset Risk and Prioritisation (ARP)” (this are UK Power Networks’ advanced ‘Asset Risk and Prioritisation’ asset condition models) and “UK Power Networks is considered to be actively managing a smaller pool of health indices 4 and 5 assets which are closer to service failure than may be the case for other DNOs with different asset replacement methodologies **where assets could potentially be retired too early**” (our emphasis).

Figure 13 shows the differences in health index 4 and 5 observed in the July 2013 business plan. It shows that UK Power Networks consistently assumes longer asset lives than the other groups. We calculate that on average we assume 12% longer asset lives.

Figure 13 Reduction in and residual Health Indices 4 and 5 Assets by DNO



## **3.2 Non load related expenditure Cost Benefit Analysis**

### **3.2.1 UK Power Networks non load related expenditure Cost Benefit Analysis**

UK Power Networks has carried out cost benefit analysis comparisons of our proposed ED1 non load related investment volumes to the equivalent DPCR5 as requested by Ofgem. These comparisons cover 65% of the ED1 non load investment programme. The summary of UK Power Networks' position is provided in the Executive Summary in section 1.3.1.2.

### **3.2.2 EPN non load related expenditure Cost Benefit Analysis**

UK Power Networks has carried out cost benefit analysis comparisons of our proposed EPN ED1 non load related investment volumes to the equivalent DPCR5 volumes as requested by Ofgem. These comparisons cover 60% of the ED1 non load investment programme. Table 14 shows that customers are benefitting by more than £11 million in ED1 compared to DPCR5 volumes. If this is a representative sample of EPN non load related expenditure, customers would be benefitting by more £18 million in ED1. It is recognised in some asset categories that there is a small adverse impact on customers as a result of increased volumes in ED1. However, this is a function of UK Power Networks' long term innovative asset management strategy as EPN health index outputs are constant through DPCR5, ED1 and ED2 as shown in the Asset Stewardship Reports contained within UK Power Networks' business plan.

Table 14 indicates the cost benefit analysis to customers of applying an industry representative condition based volume assessment on EPN. A positive value indicates that UK Power Networks has proposed lower volumes in our EPN ED1 plan than if the representative industry condition was used to derive UK Power Networks' non load replacement and refurbishment volumes. In summary this shows that customers are benefitting by more than £80 million (60% of EPN non load expenditure has had cost benefit analysis carried it) through UK Power Networks' innovative Asset Management strategy. If this cost benefit analysis is representative of UK Power Networks' overall EPN non load investment programme, the total benefits to customers would be £135 million in ED1.

Table 14 also indicates the cost benefit analysis to customers of applying a WPD representative condition based volume assessment on EPN. In summary this shows that customers are benefitting by more than £12 million (32% of non load expenditure has had cost benefit analysis carried out) through UK Power Networks' innovative Asset Management strategy. If this cost benefit analysis benefit is representative of UK Power Networks' overall EPN non load investment programme, the total benefits to customers would be £35 million in ED1.

**Table 14 EPN Cost Benefit Analysis comparisons**

		EPN Condition based to DPCR5	EPN to Industry average condition	EPN condition to fast-track condition
£m	kV	ED1 total	ED1 total	ED1 total
Fluid filled cables	132	-0.3	2.7	N/A
	66	0.0	0.0	N/A
	33	2.6	0.7	N/A
Transformers	132	-2.8	5.9	4.6
	66	0.0	0.0	0.0
	33	-0.2	25.5	8.4
Switchgear	132	1.5	0.8	-2.7
	66	0.0	0.0	0.0
	33	0.2	4.3	0.9
	11	-5.5	12.7	1.3
Link boxes		0.4	0.1	N/A
Distribution switchgear		15.3	29.7	N/A
Steel towers		0.0	0.0	N/A
Total		11.2	82.3	12.5
% of Non-load expenditure		60%	60%	32%
Total (on going efficiencies applied)		18.6	137.1	34.6

### 3.2.3 LPN non load related expenditure Cost Benefit Analysis

UK Power Networks has carried out cost benefit analysis comparisons of our proposed LPN ED1 non load related investment volumes to the equivalent DPCR5 as requested by Ofgem. These comparisons cover 71% of the ED1 non load investment programme.

Table 15 shows that there is a net cost to customers of £8 million in ED1 when compared to DPCR5 volumes. This small adverse impact on customers is a function of UK Power Networks' long term innovative Asset Management strategy as LPN health index outputs are constant through DPCR5, ED1 and ED2 as shown in the Asset Stewardship Reports contained within UK Power Networks' business plan.

Table 15 also indicates the cost benefit analysis to customers of applying an industry representative condition based volume assessment on LPN. A positive value indicates that UK Power Networks has proposed lower volumes in our LPN ED1 plan than if the representative industry condition was used to derive UK Power Networks' non load replacement and refurbishment volumes. In summary this shows that customers are benefitting by more than £85 million (60% of LPN non load expenditure has had cost benefit analysis carried out) through UK Power Networks' innovative Asset Management strategy. If this cost benefit analysis is representative of UK Power Networks' overall LPN non load investment programme, the total benefits to customers would be £121 million in ED1.

Table 15 also indicates the cost benefit analysis to customers of applying a WPD representative condition based volume assessment on LPN. In summary this shows that customers are benefitting by more than £11 million (32% of non load expenditure has had cost benefit analysis carried out) through UK Power Networks' innovative Asset Management strategy. If this cost benefit analysis benefit is representative of UK Power Networks' overall LPN non load investment programme, the total benefits to customers would be £36 million in ED1.



**Table 15 LPN Cost Benefit Analysis comparisons**

		LPN Condition based to DPCR5	LPN condition to Industry average condition	LPN condition to fast track condition
£m	kV	ED1 total	ED1 total	ED1 total
Fluid filled cables	132	-2.7	5.1	0.0
	66	0.1	11.0	0.0
	33	2.9	1.0	0.0
Transformers	132	-1.7	-0.1	1.2
	66	-0.3	3.9	-0.2
	33	-2.4	45.5	9.0
Switchgear	132	-0.7	2.1	0.3
	66	-0.3	0.1	-2.0
	33	0.6	3.3	0.9
	11	-1.1	7.3	2.0
Link boxes		2.2	2.2	0.0
Distribution switchgear		-4.1	4.7	0.0
Steel towers		0.0	0.0	0.0
Total		-7.5	86.1	11.1
% of Non-load expenditure		71%	71%	32%
Total (on going efficiencies applied)		-10.5	121.2	36.3

### 3.2.4 SPN non load related expenditure Cost Benefit Analysis

UK Power Networks has carried out cost benefit analysis comparisons of our proposed SPN ED1 non load related investment volumes to the equivalent DPCR5 volumes as requested by Ofgem. These comparisons cover 67% of the ED1 non load investment programme.

Table 16 shows that customers are benefitting by more than £2 million in ED1 compared to DPCR5 volumes. If this is a representative sample of SPN non load related expenditure, customers would be benefitting by more £4 million in ED1. It is recognised in some asset categories that there is a small adverse impact on customers as a result of increased volumes in ED1. However, this is a function of UK Power Networks' long term innovative Asset Management strategy as SPN health index outputs are constant through DPCR5, ED1 and ED2 as shown in the Asset Stewardship Reports contained within UK Power Networks' business plan.

Table 16 indicates the cost benefit analysis to customers of applying an industry representative condition based volume assessment on SPN. A positive value indicates that UK Power Networks has proposed lower volumes in our SPN ED1 plan than if the representative industry condition was used to derive UK Power Networks' non load replacement and refurbishment volumes. In summary this shows that customers are benefitting by more than £45 million (67% of SPN non load expenditure has had cost benefit analysis carried out) through UK Power Networks' innovative Asset Management strategy. If this cost benefit analysis is representative of UK Power Networks' overall SPN non load investment programme, the total benefits to customers would be £71 million in ED1.

Table 16 indicates the cost benefit analysis to customers of applying a WPD representative condition based volume assessment on SPN. In summary this shows that customers are benefitting by more than £11 million (27% of non load expenditure has had cost benefit analysis carried out) through UK Power Networks' innovative Asset Management strategy. If this cost benefit analysis benefit is representative of UK Power Networks' overall SPN non load investment programme, the total benefits to customers would be £41 million in ED1.

**Table 16 SPN Cost Benefit Analysis comparisons**

		SPN Condition based to DPCR5	SPN condition to Industry average condition	SPN condition to fast track condition
£m	kV	ED1 total	ED1 total	ED1 total
Fluid filled cables	132	-0.6	10.1	0.0
	66	0.0	0.0	0.0
	33	0.8	3.1	0.0
Transformers	132	2.2	2.2	3.8
	66	0.0	0.0	0.0
	33	-0.7	8.3	3.1
Switchgear	132	1.6	1.9	0.9
	66	0.0	0.0	0.0
	33	0.7	5.0	2.1
	11	-2.6	5.8	1.4
Link boxes		1.1	0.3	0.0
Distribution switchgear		-0.2	11.0	0.0
Steel towers		0.0	0.0	0.0
Total		2.4	47.8	11.3
% of Non-load expenditure		67%	67%	27%
Total (on going efficiencies applied)		3.5	71.3	41.3

### 3.3 Electricity, Safety, Quality and Continuity Regulations 2002

#### 3.3.1 UK Power Networks' Revised Plan

The Electricity Safety, Quality and Continuity Regulations 2002 (ESQCR) regulate power quality and supply continuity requirements and specify safety standards. Compliance with ESQCR is a statutory requirement for distribution network operators (DNOs). UK Power Networks has defined our company policies to adhere to ESQCR and minimise risks to members of the public and employees. Table 17 summarises UK Power Networks' group and DNO data submitted in July 2013 alongside our March 2014 revised plan data.

**Table 17 UK Power Networks' Revised data tables (ESQCR)**

£m	RIIO-ED1 July 2013 Plan	Ofgem Fast-Track assessment	Ofgem Variant	RIIO-ED1 March 2014 Plan	UKPN Variant 2013 vs. 2014
UKPN	142.7	0.0	-142.7	74.7	-68.0
EPN	88.5	0.0	-88.5	46.7	-41.7
LPN	0.0	0.0	0.0	0.0	0.0
SPN	54.2	0.0	-54.2	28.0	-26.2

Following a substantial review within this area, we have made the following changes

- £2.6 million of costs (for the Littlehampton ESQCR mitigation project in SPN) have been re-allocated to the investment driver 'Legal and Safety'
- £25.8 million of costs (£12.9 million for undergrounding of overhead lines in each of EPN and SPN) have been re-allocated to the investment driver 'asset replacement'
- £13.7 million of costs (£4.8 million in SPN and £8.9 million in EPN for LV undergrounding projects) have been deleted as they were identified as duplication of other work
- £25.8 million (£5.9 million in SPN and £19.9 million in EPN) has been removed due to a revised ESQCR mitigation strategy

The changes above account for the reduction of expenditure in ESQCR from £143 million (£89 million in EPN, £54 million in SPN) to £75 million (£47 million in EPN and £28 million in SPN).

We believe that the formulation methods used to produce the remaining costs are correct and therefore propose to leave the remaining costs unchanged.

UK Power Networks carried out a benchmarking exercise to reduce the expenditure proposals for ESQCR risk mitigation. The reduction is based on a revised ESQCR (clearances) mitigation strategy and the deletion of some projects.

We have also based our revisions on the assumption that the number of new climbable tree and clearance issues will reduce by 3% each year.

Further details can be found in the Asset Stewardship Reports in the link below

[http://library.ukpowernetworks.co.uk/library/en/RIIO/Asset\\_Management\\_Documents/](http://library.ukpowernetworks.co.uk/library/en/RIIO/Asset_Management_Documents/)

## 3.4 Asset Replacement

### 3.4.1 UK Power Networks' Revised Plan

UK Power Networks replaces or refurbishes assets which are either at the end of their useful life due to their age or condition, or need to be replaced on safety or environmental grounds.

Table 18 summarises UK Power Networks' group and DNO data submitted in July 2013 alongside our March 2014 revised plan data.

**Table 18 Power Networks' Revised data tables (Asset Replacement)**

£m	RIIO-ED1 July 2013 Plan	Ofgem Fast-Track assessment	Ofgem Variant	RIIO-ED1 March 2014 Plan	UKPN Variant 2013 vs. 2014
UKPN	975.4	810.7	-164.7	1,045.8	70.5
EPN	431.4	365.7	-65.7	450.6	19.2
LPN	288.2	191.3	-97.0	303.4	15.1
SPN	255.7	253.7	-2.0	291.8	36.1

### UK Power Networks' Group

We have conducted significant reviews of all major expenditure categories, resulting in minor changes within our asset strategies. Our volumes remain broadly consistent with the July 2013 submitted business plan. There have, however, been some detailed changes in the area of cable pits, as well as some re-classification and replacement. The outcome of the cost benefit analysis and health index reviews indicate that UK Power Networks' non load strategies are efficient. UK Power Networks maintains that it would not be in the interests of consumers, due to the resulting increase in volume of work in ED1 and ED2, if UK Power Networks was to adopt other DNOs' asset replacement strategies.

The age profile of grid and primary transformers show that a high proportion of assets are reaching the end of their life and need replacement. However, these assets are only being replaced based on their condition (following inspection), and not their age. As a result, we are seeing a higher degradation than in DPCR5.

## 3.5 Refurbishment

### 3.5.1 UK Power Networks' Revised Plan

UK Power Networks refurbishes assets which are either at the end of their useful life due to their age or condition, or need to be replaced on safety or environmental grounds when the long-term cost benefit is supportive. Following Ofgem's assessment, we have reduced our costs by £36 million and provided further rationale.

Table 19 summarises UK Power Networks' group and DNO data submitted in July 2013 alongside our March 2014 revised plan data.

**Table 19 UK Power Networks' Revised data tables (Refurbishment)**

£m	RIO-ED1 July 2013 Plan	Ofgem Fast-Track assessment	Ofgem Variant	RIO-ED1 March 2014 Plan	UKPN Variant 2013 vs. 2014
UKPN	108.5	67.8	-40.7	72.3	-36.2
EPN	51.0	31.0	-19.9	31.9	-19.1
LPN	15.7	15.2	-0.5	15.4	-0.3
SPN	41.9	21.5	-20.3	25.1	-16.8

## 3.6 Legal and Safety

### 3.6.1 UK Power Networks' Revised Plan

Legal and Safety relates to the physical, mechanical and electrical safety of network assets that are compliant under legislation.

Table 20 summarises UK Power Networks' group and DNO data submitted in July 2013 alongside our March 2014 revised plan data.

**Table 20 UK Power Networks' Revised data tables (Legal and Safety)**

£m	RIO-ED1 July 2013 Plan	Ofgem Fast-Track assessment	Ofgem Variant	RIO-ED1 March 2014 Plan	UKPN Variant 2013 vs. 2014
UKPN	112.3	110.7	-1.6	127.4	15.1
EPN	54.9	52.8	-2.2	49.9	-5.1
LPN	19.6	21.0	1.4	41.9	22.3
SPN	37.8	36.9	-0.8	35.6	-2.2

### UK Power Networks' Group

We have allocated some additional costs to this area as a result of expenditure transfer from ESQCR. We have also made a change to our cable pit risk mitigation strategy which has increased our costs for LPN. We have also ensured that this does not lead to double-counting.

#### Cable Pits

UK Power Networks considered five scenarios regarding our new revised strategy of addressing the increased risk of cable pit explosions. This revised strategy has been identified through the increased incidents of cable pit asset failure in medium risk assets and the resulting increase in risk to the public. These scenarios are

- Scenario 1: Keep the original submission
- Scenario 2: New assumptions for structural mitigation
- Scenario 3: Original submission (less 5% of ongoing business as usual mitigations)

- Scenario 4: New assumptions for structural mitigation and 5% reduction for ongoing business as usual mitigations
- Scenario 5: New assumptions for structural mitigation and 3% reduction for ongoing business as usual mitigations

After completing cost benefit analysis on all five scenarios, we concluded that Scenario 5 was the preferred option as it provided the best overall safety mitigation. This is despite Scenario 4 being at a lower cost.

### 3.7 Quality of Supply

UK Power Networks has set an overall business objective to improve continuity of supply in all three licence areas so that our Customer Interruptions and Customer Minutes Lost performance from 2013/14 is in the top third compared to other DNOs during ED1. The cost of this improvement in service is zero to customers, as this will be funded directly by shareholders.

### 3.8 Rising Mains and Laterals

#### 3.8.1 UK Power Networks' Revised Plan

Rising Mains and laterals are cables or busbars that form part of the equipment installed within multi-occupancy premises to distribute electricity to more than one dwelling or unit. Following careful consideration, UK Power Networks is not making any significant changes (a reduction of £1 million is proposed) to the totex as submitted in July 2013.

Table 21 summarises UK Power Networks' group and DNO data submitted in July 2013 alongside our March 2014 revised plan data

**Table 21 UK Power Networks' Revised data tables (Rising Mains and Lateral)**

£m	RIO-ED1 July 2013 Plan	Ofgem Fast-Track assessment	Ofgem Variant	RIO-ED1 March 2014 Plan	UKPN Variant 2013 vs. 2014
UKPN	27.4	32.5	5.1	26.8	-0.6
EPN	10.4	7.3	-3.2	10.2	-0.2
LPN	0.0	0.0	0.0	0.0	0.0
SPN	16.9	25.2	8.3	16.6	-0.4

# 4

## Other Non Load Related Capital Expenditure

Our other non load related expenditure has been refined

### 4.1 Introduction

This chapter sets out UK Power Networks' business plan adjustment justification for other non load capital expenditure in response to Ofgem's November 2013 assessment report and question and answer process. In July 2013, UK Power Networks submitted a total other non load related capital expenditure of £391 million. In the revised business plan UK Power Networks has reduced this expenditure by £76 million in ED1 to £314 million. This 18% reduction is as a result of a decrease of £101 million in Civil Works and small increases in critical national infrastructure (£24 million). The main investment drivers are

- Flooding
- BT21st Century Networks (BT21 CN)
- Technical Losses and Other Environment
- Civil Works
- High Impact, Low Probability (HILP)
- Critical National Infrastructure (CNI)
- Black Start

Table 22 summarises UK Power Networks' group data submitted for fast-track alongside our March 2014 data.



**Table 22 UK Power Networks' Revised Data Tables (Other Non-Load Capital Expenditure)**

£m	RIO-ED1 July 2013 Plan	Ofgem Fast-Track assessment	Ofgem Variant	RIO-ED1 March 2014 Plan	UKPN Variant 2013 to 2014	Comment
<b>Flooding</b>	16.0	14.5	-1.5	15.7	-0.3	
<b>BT21CN</b>	44.9	10.5	-34.4	44.0	-0.9	
<b>Technical Losses &amp; Other</b>	17.2	18.2	1.1	17.4	0.2	
<b>Civil Works</b>	303.6	247.6	-56.0	203.4	-100.2	Removal of load related civil works
<b>High Impact Low Probability</b>	0.0	0.0	0.0	0.0	0.0	
<b>Critical National Infrastructure</b>	0.0	0.0	0.0	23.9	23.9	Additional DECC requirements
<b>Black Start</b>	9.1	21.9	12.8	10.1	1.0	
<b>Total Other capex</b>	390.8	312.8	-78.0	314.5	-76.3	

#### 4.1.1 Other non load related output commitments

UK Power Networks is not proposing to make any changes to our primary other non load related network outputs despite the £77 million reduction in costs. This represents no change in risk to customers from the original July 2013 business plan submission.

## 4.2 Flooding

### 4.2.1 UK Power Networks' Revised Plan

UK Power Networks' flood mitigation strategy includes for protection against fluvial and tidal flood events as well as protection against surface water flooding (pluvial). Main sources of guidance to the UK Power Networks' strategy are

- Energy Networks Association (ENA) document Engineering Technical Report 138 (ETR138)
- The Department of Energy and Climate Change (DECC)
- Environment Agency
- Local Authorities
- Specialist Consultants

Flooding was a major concern from the Christmas 2013 storm. Over a 24 hour period, we saw the highest recorded rainfall for the same period was experienced in Wych Cross (SPN – East Sussex), Goudhurst (SPN - Kent) and Frittenden (SPN - Kent) with between 30.8-38.6mm of rain. This resulted in saturated ground, and combined with the higher rainfall resulted in localised flooding across the south east with an Environment Agency spokesman stating it was the worst flooding to hit the South East region since the autumn of 2000.

Although flooded areas and waterlogged ground impeded access at many locations around SPN, particularly in the Maidstone and Tunbridge areas, no electrical supplies were lost due to flooding of UK Power Networks' infrastructure as our mitigation strategies both permanent and mobile proved to be effective.

Table 23 summarises UK Power Networks' group and DNO data submitted for fast-track alongside our March 2014 revised plan data. There are only minor changes to the data due to cleansing and we have provided further justification to clarify the submitted totex.

**Table 23 UK Power Networks' Revised data tables (Flooding)**

£m	RIIO-ED1 July 2013 Plan	Ofgem Fast-Track assessment	Ofgem Variant	RIIO-ED1 March 2014 Plan	UKPN Variant 2013 vs. 2014
UKPN	16.0	14.5	-1.5	15.7	-0.3
EPN	8.0	7.6	-0.4	7.8	-0.2
LPN	4.0	1.1	-2.8	3.9	-0.1
SPN	4.0	5.8	1.8	3.9	-0.1

### LPN

In Ofgem's fast-track assessment LPNs flooding protection was identified as inefficient. UK Power Networks' initial emphasis was on assets at risk of flooding caused by rivers (fluvial) and sea (tidal); following the loss of supply at Kingsway Substation in 2007 and Tooley Street (near London Bridge) in 2008 and 2009 caused by flooding from water main failures; awareness was raised on other sources of flooding that could compromise the network performance.

As a result, the UK Power Networks' Flood Protection Programme was extended to substations at risk of flooding, infrastructure failure and overland flow. The extended scope led to the identification of substations containing critical equipment below street level and in need of flood protection measures. The flood protection works includes protection against 1:100, 1:200 and 1:1000 fluvial and tidal flood events as well as protection against surface water flooding. This additional cost driver was not reflected in our July 2013 business plan.

## 4.3 BT 21st Century Network (BT21CN)

### 4.3.1 UK Power Networks' Revised Plan

BT21CN is a programme to upgrade the UK's telephone network from the AXE/System X Public Switched Telephone Network (PSTN) to an Internet Protocol (IP) system.

We have 138 rented BT private wires in use for 132kV teleprotection. With BT's migration to an IP-based communication protocol by 2018, the electricity network will be at risk due to the non-deterministic nature of IP networks. Malfunction of protection systems, due to teleprotection failure, may result in extended outages to an otherwise healthy network, increased damage at the point of fault, overstressing of other plant and equipment, risk to personnel and members of the public, and potential non-compliance with ESQC regulation.

We have reviewed our BT21CN work against our original DPCR5 Financial Business Plan Questionnaire (FBPQ) submission and have identified we have completed more work than originally forecast at a lower cost. This was reflected in our July 2013 ED1 submission and therefore we are not proposing any revisions. Table 24 summarises UK Power Networks' group and DNO data submitted for fast-track alongside our March 2014 revised plan data.

**Table 24 UK Power Networks' Revised data tables (BT 21st Century Network)**

£m	RIIO-ED1 July 2013 Plan	Ofgem Fast-Track assessment	Ofgem Variant	RIIO-ED1 March 2014 Plan	UKPN Variant 2013 vs. 2014
UKPN	44.9	10.5	-34.4	44.0	-0.9
EPN	26.3	5.7	-20.5	25.8	-0.5
LPN	0.0	0.0	0.0	0.0	0.0
SPN	18.7	4.8	-13.8	18.3	-0.4

A full explanation has been included in the relevant Asset Stewardship Report(s) (ASR). Note there is a separate ASR on BT21CN for each DNO.

## UK Power Networks' Group

We are investing in a communication platform that will replace existing BT private wires by the end of 2017 and which will fully mitigate the risk to the network before BT's withdrawal of service in 2018. There are no known BT private wires in use for 33kV teleprotection in EPN.

Our continued planned strategy is to install fibre in alignment with other asset replacement projects planned beyond 2018. This is designed to increase resilience in the fibre network and gradually reduce reliance on third-party leased fibre. This applies to all our three DNOs.

## 4.4 Technical Losses and Other Environmental

### 4.4.1 UK Power Networks' Revised Plan

Losses represent the difference between the electrical energy metered entering the distribution system from National Grid and that billed to customers. These losses comprise a technical component which is the energy that turns to heat as electricity flows through the distribution system, a proportion that is a result of illegal consumption and inaccuracies in the process of reconciling the energy billed to customers with that entering the distribution system. Table 25 summarises UK Power Networks' group and DNO data submitted in July 2013 alongside our March 2014 revised plan data.

**Table 25 UK Power Networks' Revised data tables (Technical Losses and Other Environmental)**

£m	RIIO-ED1 July 2013 Plan	Ofgem Fast-Track assessment	Ofgem Variant	RIIO-ED1 March 2014 Plan	UKPN Variant 2013 vs. 2014
UKPN	17.2	18.2	1.1	17.4	0.2
EPN	10.5	11.1	0.6	10.3	-0.2
LPN	4.2	4.5	0.3	4.1	-0.1
SPN	2.4	2.6	0.2	2.9	0.5

Network losses are expected to increase as a result of the higher utilisation of networks as load grows and the UK economy decarbonises. Our RIIO-ED1 network losses strategy is to factor in appropriate loss mitigation measures to all categories of existing network investment. This approach, which we describe as 'opportunistic', will give rise to greater and more cost-effective opportunities for losses mitigation since the consideration will be largely a matter of incremental cost over that required to meet a given investment driver.

However, as we noted in our [Losses Strategy \(Annex 7\)](#), it is expected that EU Directive - 2009/125/EC - will mandate the adoption of 'Ecodesign' transformers for distribution networks in two phases, from 2015 and 2020.

It is too early to anticipate the impact these changes will have on transformer procurement prices and installation costs (and therefore on transformer unit costs) when each of the two phases of the mandate comes into effect. This position will be reviewed as and when greater clarity emerges as to the overall cost implications of adopting Ecodesign specifications, and we may seek an adjustment in the Final Determination. This applies to all our three DNOs.

## 4.5 Civil Works

### 4.5.1 UK Power Networks' Revised Plan

Our civil assets represent the investment in replacement of all substation building components and surrounds that have been assessed as 'poor condition' and which, across the London Power Networks (LPN), require

- replacement
- security-related improvements to grid, primary and distribution substation sites in response to increasing levels of trespass and risk based flood protection
- oil containment works required by environmental legislation

- essential cable bridge refurbishment
- cable tunnel refurbishment
- inspection and maintenance

Table 26 summarises UK Power Networks' group and DNO data submitted in July 2013 alongside our March 2014 revised plan data.

**Table 26 UK Power Networks' Revised data tables (Civil Works)**

£m	RIIO-ED1 July 2013 Plan	Ofgem Fast-Track assessment	Ofgem Variant	RIIO-ED1 March 2014 Plan	UKPN Variant 2013 vs. 2014
<b>UKPN</b>	303.6	247.6	-56.0	203.4	-100.2
<b>EPN</b>	115.1	97.4	-17.7	87.7	-27.4
<b>LPN</b>	127.6	81.6	-46.0	70.7	-56.8
<b>SPN</b>	60.9	68.6	7.7	45.0	-16.0

Following Ofgem's assessment of our July 2013 submission, UK Power Networks carried a detailed review of our data in this category. We have cleansed our data and identified that £86 million of civil costs were incorrectly attributed to non load related expenditure; in order verify our new proposed costs, we commissioned EC Harris to support us on an intensive but short review of costs and volumes for key civil activities and to validate the costs reconciled. The report produced by EC Harris has been included as part of our re-submission. The report highlights are

- UK Power Networks has a robust and structured methodology to benchmarking volumes and costs
- UK Power Networks has a complex yet granular approach to managing RIGs requirements
- Benchmarking of some key activities has confirmed that UK Power Networks is not significantly divergent
- Risk that compatible units are based on contractor rates rather than a study on current market rates

We have also reviewed the volume classification against Ofgem's clarifying guidance notes and have updated the volumes of work accordingly.

Following our review and analysis through this engagement, EC Harris believes UK Power Networks

- is now in an improved position to understand the issues that arose during the recent compilation of the RIGs' Civil Works category
- has addressed the issue and volumes are now correct
- has a forward plan to review and correct where necessary, the Unit Cost Indicators for a small subset of civil works activities and re-assess cost benchmarks for future use

## 4.6 High Impact, Low Probability (HILP)

### 4.6.1 UK Power Networks' Revised Plan

High Impact, Low Probability expenditure is designed to increase the security of supply to specific areas of the network that have a level of economic activity over and above a specified threshold. UK Power Networks has not made any changes to the totex as submitted in July 2013 as it is not proposing any investment. This applies for all our DNO groups.

## 4.7 Critical National Infrastructure (CNI)

### 4.7.1 UK Power Networks' Revised Plan

The UK defines its Critical National Infrastructure (CNI) as "certain 'critical' elements of infrastructure, the loss or compromise of which would have a major, detrimental impact on the availability or integrity of essential services, leading to severe economic or social consequences or to loss of life".

We have received additional requirements from DECC since submission of our July 2013 business plan to further clarify their requirements to Ofgem. We received two letters from DECC – the first in November 2013 and the second in January 2014. These letters outlined additional requirements since the business plan submission in July 2013.

We have reflected a conservative view of what these costs will be in ED1 based on four of our sites being upgraded for security reasons. It is likely that further cost will be incurred in ED1 (beyond what we have recorded in this table) and we will therefore want to continue with the re-opener mechanism that is in existence, allowing future re-adjustments of totex due to the level of uncertainty in this category. We have also clarified the costs that we have occurred to date within DPCR5. There has been ongoing dialogue with the Government about sites they consider most critical for security. We received updated confirmation of the current sites that they regard as important and have begun a further dialogue and review of which sites may be important the long term. For that reason we have put in proposal for some new sites which have not been previously confirmed and a small provision for potential sites they may be added during ED1. The sites identified are shared sites with National Grid where our costs will be our contribution to their project costs.

We note that Ofgem has not yet commented on UK Power Networks' application for the Critical National Infrastructure re-opener to be applied in DPCR5. UK Power Networks has included the additional expected forecast costs (for 2013/14 and 2014/15) in the tables on the expectation that they will be included in the DPCR5 legacy cost calculation. We recognise that this requires further discussion with Ofgem before the costs can be finalised in the November 2014 Final Determination.

Table 27 summarises UK Power Networks' group and DNO data submitted in July 2013 alongside our March 2014 revised plan data.

**Table 27 UK Power Networks' Revised data tables (Critical National Infrastructure)**

£m	RIIO-ED1 July 2013 Plan	Ofgem Fast-Track assessment	Ofgem Variant	RIIO-ED1 March 2014 Plan	UKPN Variant 2013 vs. 2014
UKPN	0.0	0.0	0.0	23.9	23.9
EPN	0.0	0.0	0.0	14.6	14.6
LPN	0.0	0.0	0.0	0.0	0.0
SPN	0.0	0.0	0.0	9.3	9.3

## 4.8 Black Start

### 4.8.1 UK Power Networks' Revised Plan

Black Start is the procedure to recover from a total or partial shutdown of the distribution network system which has caused an extensive loss of supplies.

Table 28 summarises UK Power Networks' group and DNO data submitted in July 2013 alongside our March 2014 revised plan data.

**Table 28 UK Power Networks' Revised data tables (Black Start)**

£m	RIIO-ED1 July 2013 Plan	Ofgem Fast-Track assessment	Ofgem Variant	RIIO-ED1 March 2014 Plan	UKPN Variant 2013 vs. 2014
UKPN	9.1	21.9	12.8	10.1	1.0
EPN	4.1	8.9	4.8	4.6	0.5
LPN	1.9	6.7	4.7	2.1	0.2
SPN	3.1	6.4	3.3	3.4	0.3

UK Power Networks has made minor changes to the totex as submitted in July 2013 regarding the volume and cost amendment. This applies to all three of our DNOs. Please note we have transferred costs from IT and Telecommunications to Black Start as this was incorrectly reported in our initial July 2013 submission.



# 5 Network Operating Costs

## 5.1 Introduction

Network operating costs fall into three broad categories of activity that are required to operate the network on an ongoing short term basis. These activities are the restoration of electricity supply as a result of network electrical faults, inspection and maintenance of our assets and tree maintenance.

This chapter sets out UK Power Networks' proposal for business plan adjustment justification for Network Operating Costs (NOCs) in response to Ofgem's November 2013 assessment report and question and answer process.

In July 2013, UK Power Networks submitted a total Network Operating Costs of £1,324 million. Revised expenditure in RIIO-ED1 is forecast to decrease by £19 million due to the impact of reduced unit costs and revised volumes of work. This chapter focuses on the investment drivers detailed below

- Trouble call (faults)
- Occurrences Not Incentivised (ONIs)
- Severe Weather (SW1:20)
- Inspection and Maintenance
- Tree Cutting

Table 29 provides a summary of the changes since the July 2013 submission, based on Ofgem's assessed adjustments and UK Power Networks' proposals regarding revisions to the submitted data.

**Table 29 UK Power Networks' Revised Data Tables (Network Operating Costs)**

£m	RIIO-ED1 July 2013 Plan	Ofgem Fast-Track assessment	Ofgem Variant	RIIO-ED1 March 2014 Plan	UKPN Variant 2013 vs. 2014	Comments
<b>Trouble Call (Faults)</b>	497.1	576.5	79.4	540.7	43.6	Revised unit costs
<b>Fault ONI</b>	177.1	157.9	-19.2	152.9	-24.2	Revised unit costs
<b>Severe Weather 1:20</b>	0.0	0.0	0.0	13.6	13.6	Error corrected
<b>Inspections &amp; Maintenance</b>	361.3	287.5	-73.8	313.4	-47.8	Revised unit costs
<b>Tree Cutting</b>	205.1	192.3	-12.8	201.5	-3.5	Revised unit costs
<b>Other NOCs</b>	83.2	77.5	-5.7	82.4	-0.8	
<b>Total NOCs</b>	1,323.6	1,291.6	-32.1	1,304.5	-19.2	

### 5.1.1 Network Operating Cost Outputs

UK Power Networks is not proposing to make any changes to our primary network operating cost outputs despite the £20 million reduction in expenditure. This represents no change in risk to customers from the original July 2013 business plan submission.

## 5.2 Trouble Call (faults)

### 5.2.1 UK Power Networks' Revised Plan

Table 30 summarises UK Power Networks' group and DNO data submitted in July 2013 alongside our March 2014 revised plan data.

Table 30 UK Power Networks' Revised data tables (Trouble Call)

£m	RIO-ED1 July 2013 Plan	Ofgem Fast-Track assessment	Ofgem Variant	RIO-ED1 March 2014 Plan	UKPN Variant 2013 vs. 2014
UKPN	497.1	576.5	79.4	540.7	43.6
EPN	207.8	257.8	50.0	237.9	30.1
LPN	148.0	154.1	6.1	144.8	-3.2
SPN	141.3	164.6	23.3	157.9	16.6

### 5.2.2 UK Power Networks' proposed total expenses adjustment

We have reviewed our unit costs as a result of 2013/14 nine month actuals, and where appropriate we have made adjustments for the ED1 period. This has resulted in an increase of unit costs of £51.8 million and a decrease of volumes by £8.2 million in UK Power Networks for ED1.

## 5.3 Fault Occurrences Not Incentivised (ONIs)

### 5.3.1 UK Power Networks' Revised Plan

Fault Occurrences Not Incentivised, through the Information Incentive Scheme, relates to customer supply restoration for individual premises and public and street furniture. Table 31 summarises UK Power Networks' group and DNO data submitted in July 2013 alongside our March 2014 revised plan data.

Table 31 UK Power Networks' Revised data tables (Faults Occurrences Not Incentivised)

£m	RIO-ED1 July 2013 Plan	Ofgem Fast-Track assessment	Ofgem Variant	RIO-ED1 March 2014 Plan	UKPN Variant 2013 vs. 2014
UKPN	177.1	157.9	-19.2	152.9	-24.2
EPN	80.3	70.6	-9.6	69.7	-10.6
LPN	47.7	41.7	-6.0	43.4	-4.3
SPN	49.1	45.6	-3.5	39.8	-9.3

We have provided further analysis justifying our costs and we look forward to discussing this methodology with Ofgem and the GEMA board. Following further investigation, the regressions and unit cost analysis give quite different results. In the interest of good practice we would suggest that the results of the two models are combined or averaged. We have made comparable changes and adjusted the unit costs for the ED1 period. This has resulted in £22.6 million being removed from the ED1 for UK Power Networks and there has also been a transfer of some smart metering benefits from Occurrences Not Incentivised back into faults. The forecast for our resubmission for volumes has decreased by £1.6 million.

## 5.4 Severe Weather (SW 1:20)

### 5.4.1 UK Power Networks' Revised Plan

The severe weather 1:20 relates to a severe weather storm occurring once in every twenty years per DNO. In Q4 2013, UK Power Networks was affected by two storms that would fit this category – the St Jude storm at the end of October 2013 and the Christmas storm in December 2013. The [Stakeholder Engagement](#) chapter (chapter 10) provides some further information on how we have engaged with our customers to improve our performance in this area.

Table 32 summarises UK Power Networks' group and DNO data submitted in July 2013 alongside our March 2014 revised plan data.

**Table 32 UK Power Networks' Revised data tables (Severe Weather)**

£m	RIO-ED1 July 2013 Plan	Ofgem Fast-Track assessment	Ofgem Variant	RIO-ED1 March 2014 Plan	UKPN Variant 2013 vs. 2014
UKPN	0.0	0.0	0.0	13.6	13.6
EPN	0.0	0.0	0.0	7.3	7.3
LPN	0.0	0.0	0.0	0.0	0.0
SPN	0.0	0.0	0.0	6.3	6.3

### 5.4.2 UK Power Networks' proposed total expenses adjustment

In our July 2013 submission, we submitted the associated fault volumes with a one in twenty event but did not allocate a unit cost against them.

We have now developed an appropriate unit cost and applied this to the same volumes that were submitted with our July 2013 plan and that has resulted in £13 million in total being added to our plan, these costs are consistent with those incurred in the two events in 2013. The breakdown of the costs is as follows

#### EPN

We are submitting an increase of £7.3 million for EPN, which is equivalent to half an event sometime during ED1.

#### LPN

LPN's network is almost all underground and is therefore not affected by 1 in 20 storm events; therefore no costs have been included for LPN.

#### SPN

We are submitting an increase of £6.3 million for SPN, which is equivalent to half an event sometime during ED1.

## 5.5 Inspection and Maintenance

### 5.5.1 UK Power Networks' Revised Plan

UK Power Networks inspects and maintains our network to minimise the expected whole life cost of an asset. UK Power Networks has developed an inspection and maintenance policy based upon a combination of real time information and studies of asset condition. Inspection and maintenance is used to ensure that the life of an asset is maximised by identifying and fixing asset problems before they occur.

Table 33 summarises UK Power Networks' group and DNO data submitted in July 2013 alongside our March 2014 revised plan data.

**Table 33 UK Power Networks' Revised data tables (Inspection and Maintenance)**

£m	RIO-ED1 July 2013 Plan	Ofgem Fast-Track assessment	Ofgem Variant	RIO-ED1 March 2014 Plan	UKPN Variant 2013 vs. 2014
UKPN	361.3	287.5	-73.8	313.4	-47.8
EPN	129.0	118.6	-10.3	121.5	-7.5
LPN	135.3	88.1	-47.2	117.8	-17.5
SPN	97.0	80.7	-16.3	74.1	-22.9

### 5.5.2 UK Power Networks' proposed total expenses adjustment

Following a comprehensive review of our volumes and allocation to RIGs activity, we have made significant changes to allocations in Inspection and Maintenance. This has resulted in £48 million of reduced costs in the ED1 period for Inspection and Maintenance. We have reduced the unit costs for the ED1 period by £29.1 million by reviewing the 2013/14 actual nine month outturn. The re-forecast for volumes has decreased by a further £18.8 million. In assessing the industry's Inspection and Maintenance costs through regressions, Ofgem concluded that these resulted in very poor statistical properties and we agree with Ofgem's decision not to use them.

#### UK Power Networks' Group

UK Power Networks has reviewed proposals for a number of inspection and maintenance activities and made adjustments to costs and volumes to reflect the latest view of achievements. The changes are summarised as

#### EPN

##### Reductions in volumes

- The biggest reductions in the volumes are in overhead line pole or tower line inspections where the units measured have changed from per km to the number of poles or towers inspected
- A 2557 reduction in civil underground cable inspections in ED1

##### Increases

- The biggest increases (159,357) are in overhead line pole or tower repair and maintenance
- A 2383 increase in HV pole mounted repair and maintenance activities in ED1
- A 2320 increase in HV GM switchgear repair and maintenance activities in ED1
- A 323 extra protection scheme repairs in ED1

##### Neutral

- Approximately 38,000 132kV substation inspections and civil repair and maintenance activities have been moved to 33kV after the correction of a mapping material technical error

#### SPN

##### Reductions in volumes

- The biggest reductions are in overhead line pole or tower line inspections where the units measured have changed from per km to the number of poles or towers inspected
- There are 6,574 fewer tunnel inspections as the unit of measure have changed from per 25m to per tunnel. Costs are unaltered
- An overall reduction of 8,840 substations inspected, repaired or maintained

##### Increases in volumes

- There is an increase of 2160 GM secondary switchgear repair and maintenance
- 533 additional HV pole mounted

- 56 less protection schemes being maintained
- An additional £1.8 million has been allowed for oil top up, pumping and testing and £350,000 for water quality testing following a review of volumes

## 5.6 Tree Cutting

### 5.6.1 UK Power Networks' Revised Plan

Tree maintenance is used to ensure that the amount of network damage as a result of tree growth or network damage during high winds from falling trees is kept to a minimum. UK Power Networks operates a 4-year rolling tree management programme in both SPN and EPN. There are only a few overhead lines in LPN that require tree cutting and therefore a small amount of expenditure has been included. Expenditure in RIIO-ED1 is expected to stay at a constant level when compared to DPCR5.

Table 34 summarises UK Power Networks' group and DNO data submitted in July 2013 alongside our March 2014 revised plan data

**Table 34 UK Power Networks' Revised data tables (Tree Cutting)**

£m	RIIO-ED1 July 2013 Plan	Ofgem Fast-Track assessment	Ofgem Variant	RIIO-ED1 March 2014 Plan	UKPN Variant 2013 vs. 2014
<b>UKPN</b>	205.1	192.3	-12.8	201.5	-3.5
<b>EPN</b>	142.7	115.8	-26.9	132.6	-10.1
<b>LPN</b>	0.2	0.0	-0.2	0.1	0.0
<b>SPN</b>	62.2	76.5	14.3	68.8	6.6

Following an in-depth review of the cost and volumes that were included within our original business plan, we have adjusted costs for both EPN and SPN to reflect the outcomes of the review.

The submission for tree management has been modified to reflect an increased emphasis on Engineering Technical Report 132 (ETR 132) resilience management, and a restatement of costs assuming a saving against current contractual rates.

Since the June 2013 submission, UK Power Networks has reviewed our proposals and, following our experiences in the St Jude's storm and Christmas 2013 storms, we have increased the scope of ETR 132 resilience tree management for the ED1 period to include EHV, although the volumes at HV have reduced. This review has resulted in a revised programme to achieve compliance, and a significant increase in unit costs towards the rates accepted by the Department of Trade and Industry in 2006. This is to reflect additional expected costs resulting from resistance from land-owners, compensation payments, re-planting and increased cutting costs.

#### UK Power Networks' Group

We recognise that there are further spans containing vegetation, with the potential to affect the overhead network, not currently requiring cutting, but following inspection they may fall into that category. The Unit Cost Indicators have been revised in line with current contractual rates, and a reduction of 5% applied going forward into ED1.

#### EPN

In EPN the volumes of network stated for cutting and inspection at the various voltages (LV, HV, EHV and 132kV) have not been changed, and remain in line with network lengths and cyclic policy applicable during DPCR5.

#### LPN

In LPN, volumes have been reduced to better align with network lengths, and unit cost indicators increased to include ancillary costs (previously excluded).

#### SPN

In SPN the volumes of network stated for cutting and inspection at the various voltages (LV, HV, EHV and 132kV) have not been changed, and remain in line with network lengths and cyclic policy applicable during DPCR5.

## **5.7 Other Network Operating costs**

### **5.7.1 UK Power Networks' Revised Plan**

UK Power Networks is not proposing to materially change the proposed expenditure from the July 2013 business plan submission and therefore has included £82 million of expenditure in ED1.



# 6 Indirect Costs

## 6.1 Introduction

Indirect Costs relate to support costs closely associated with our 'direct' capital expenditure and operational expenditure, and general business support costs. This chapter sets out UK Power Networks' proposal for business plan adjustment justification for Indirect Costs in response to Ofgem's November 2013 assessment report and question and answer process.

In DPCR5, UK Power Networks expects to spend a total of £1,770 million in total Indirect Costs (on an 8 year equivalent basis). These costs are below the allowance set by Ofgem by 5%. While we overspent our allowance at the beginning of the price control period, expenditure has significantly decreased as we reduced our headcount by around 600 people through a voluntary severance programme in 2011. Expenditure in RIIO-ED1 will be maintained as further efficiency savings offset the impact of increased work volumes.

In the July 2013 business plan submission UK Power Networks requested £2,154 million. After the Ofgem assessment, this has been revised to £2,099 million. This chapter focuses on the investment drivers detailed below and provides a summary of the changes since the July 2013 submission

- Closely Associated Indirect costs
- Business Support
- Non-operational capital expenditure

Table 35 summarises UK Power Networks' total indirect costs submitted for fast-track alongside our March 2014 revised plan data.

**Table 35 UK Power Networks' Revised Data Tables (Total Indirect Costs)**

£m	RIIO-ED1 July 2013 Plan	Ofgem Fast-Track assessment	Ofgem Variant	RIIO-ED1 March 2014 Plan	UKPN Variant 2013 vs. 2014
<b>Closely Associated Indirect costs</b>	1,330.0	1,254.5	-75.5	1,277.7	-52.4
<b>Business Support</b>	585.8	493.1	-92.7	585.9	0.1
<b>Non-Operational Capex</b>	238.1	207.6	-30.5	235.0	-3.1
<b>Total Indirect Costs</b>	2,153.9	1,955.2	-198.7	2,098.6	-55.5

### 6.1.1 Indirect costs output commitments

UK Power Networks is not proposing to make any changes to its primary outputs despite the small reduction in costs.

## 6.2 Closely Associated Indirect Costs

### 6.2.1 UK Power Networks' Revised Plan

Closely Associated Indirect costs are activities that are required to support the operational activities such as the capital investment and network operating costs of UK Power Networks.

Table 36 summarises UK Power Networks' group and DNO data submitted in July 2013 alongside our March 2014 revised plan data.

**Table 36 UK Power Networks' Revised data tables (Closely Associated Indirect costs)**

£m	RIIO-ED1 July 2013 Plan	Ofgem Fast-Track assessment	Ofgem Variant	RIIO-ED1 March 2014 Plan	UKPN Variant 2013 vs. 2014
UKPN	1,330.0	1,254.5	-75.5	1,277.7	-52.4
EPN	574.6	480.1	-94.5	533.4	-41.3
LPN	346.1	367.2	21.1	348.8	2.7
SPN	409.2	407.1	-2.1	395.4	-13.8

### 6.2.2 UK Power Networks' proposed total expenses adjustment

Ofgem has developed a detailed model to assess the efficiency of Closely Associated Indirect costs. UK Power Networks identified a number of areas where the model does not represent a typical DNOs' operating arrangements. This is primarily through not recognising external load growth drivers, using an incorrect representation of asset value and not recognising the activities that are carried out at a group level.

Following Ofgem's assessment of our July submission, we are planning to remove £52 million from the plan. There are three main drivers for this adjustment

- Reduction of £18.4 million: we have included an automatic workload adjustment mechanism in the plan, which means if our direct costs are adjusted, then our indirect costs will also be adjusted in a pre-determined manner. In this instance, our indirect costs will reduce as our direct costs have reduced
- Reduction of £22 million: we have completed a detailed analysis of our pension costs and transferred £18.4 million to direct costs and £3.6 million to business support
- Reduction of £8.5 million: following a review of our call centre contractor costs, we have removed these and ensure its efficiency via our Business Transformation project. UK Power Networks has also reduced the workforce renewal request in ED1 by £3.5 million

UK Power Networks has been working with our consultants to provide to Ofgem a revised methodology of calculating the efficient Closely Associate Indirect costs frontier. This is described in our [Regional Cost Assessment annex \(13a\)](#).

## 6.3 Business Support

### 6.3.1 UK Power Networks' Revised Plan

Business Support costs are associated with corporate functions of a DNO. The main activities are: HR and non-operational, training, finance and regulation, CEO, IT & telecommunications and property management.

### 6.3.2 Ofgem Fast-Track Assessment

UK Power Networks and other DNOs have identified a material technical error in Ofgem's cost assessment model for business support. The error relates to how revenue from Connection customers is being double-counted in the cost assessment process. Ofgem has acknowledged the material technical error but maintain that this impacts all other DNOs equally. However, this is not the case at UK Power Networks as we have a disproportionately larger volume of Connection customers' revenue. The average impact of this material technical error on all DNOs is 16%, however, for UK Power Networks this is 25%, which is worth an additional £55 million revenue allowance during the ED1 period.

Table 37 summarises UK Power Networks' group and DNO data submitted in July 2013 alongside our March 2014 revised plan data.

**Table 37 UK Power Networks' Revised data tables (Business Support)**

£m	RIIO-ED1 July 2013 Plan	Ofgem Fast-Track assessment	Ofgem Variant	RIIO-ED1 March 2014 Plan	UKPN Variant 2013 vs. 2014
UKPN	585.8	493.1	-92.7	585.9	0.1
EPN	231.4	189.8	-41.6	231.0	-0.4
LPN	173.4	142.0	-31.4	175.3	1.9
SPN	181.0	161.3	-19.7	179.6	-1.4

### 6.3.3 UK Power Networks' proposed total expenses adjustment

Following Ofgem's assessment of Business Support, UK Power Networks has transferred £3.6 million from Closely Associated Indirect Costs to Business Support regarding our pension review.

Following Ofgem's analysis of our July submission, UK Power Networks has made no further changes to its business plan. With the fast-track business plan UK Power Networks included independent reviews of business support costs, the review focussed on property and IT costs. UK Power Networks has resubmitted these assessments for consideration in the slow-track assessment.

## 6.4 Non-Operational Capital Expenditure

### 6.4.1 UK Power Networks' Revised Plan

Non-operational Capital Expenditure covers IT, vehicles and small tools.

Table 38 summarises UK Power Networks' group and DNO data submitted in July 2013 alongside our March 2014 revised plan data.

**Table 38 UK Power Networks' Revised data tables (Non-operational Capital Expenditure)**

£m	RIIO-ED1 July 2013 Plan	Ofgem Fast-Track assessment	Ofgem Variant	RIIO-ED1 March 2014 Plan	UKPN Variant 2013 vs. 2014
UKPN	238.1	207.6	-30.5	235.0	-3.1
EPN	100.1	87.5	-12.6	99.9	-0.1
LPN	65.7	55.6	-10.1	62.3	-3.5
SPN	72.3	64.5	-7.8	72.8	0.5

We have reviewed the level of expenditure in light of the expected 2013/14 outturn as part of a detailed analysis of a wider non-operational expenditure review.

Following Ofgem's analysis of our July submission, UK Power Networks carried out an independent review of Ofgem's benchmarking and as a result we feel the totex that was submitted in July 2013 was correct. The review focussed on property, IT and vehicle costs.

As part of our re-submission, UK Power Networks has provided to Ofgem a more detailed breakdown of our property costs, which justifies the drivers behind each property cost proposal.

## **6.5 Vehicle Expenditure across the cycle**

UK Power Networks has reviewed our vehicle expenditure for RIIO-ED1 (£57 million) as this has been identified as a £8 million inefficiency gap in the fast-track assessment. This explains the total inefficiency for non-operational capex in ED1. We have not amended our vehicle non-operational capex for RIIO-ED1. We have however changed our forecast for the remainder of DPCR5 to reflect both the insourcing of the LPN groundworks contract and the decision to reduce fleet lives from eight to six years. Ofgem's current approach is to benchmark the RIIO-ED1 vehicle non-operational capital expenditure by comparing it to the actual expenditure over the first three years of DPCR5. We are concerned that this is too short a time period, as it will underestimate the cyclical nature of this expenditure.

Expenditure on vehicles is highly cyclical. We carried out analysis over a five year average on our forecast expenditure in all licenced areas which showed to be lower than the historic five year average. We therefore feel that our forecast is efficient.

# 7

## Other Distribution Network Operating Costs

### 7.1 Introduction

This chapter explains other associated DNO costs, which include smart meters, operational IT and telecommunications, variant costs, real price effects and ongoing efficiencies.

Table 39 UK Power Networks' Revised Data Tables (Other DNO costs) summarises UK Power Networks' other DNO costs submitted in July 2013 alongside our March 2014 revised plan data.

**Table 39 UK Power Networks' Revised Data Tables (Other DNO costs)**

£m	RIIO-ED1 July 2013 Plan	Ofgem Fast-Track assessment	Ofgem Variant	RIIO-ED1 March 2014 Plan	UKPN Variant 2013 vs. 2014
Total Smart Meter Costs	108.0	75.5	-32.5	63.9	-44.1
Operational IT and Telecommunications	41.0	43.1	2.1	136.4	95.3
Worst Served Customers	7.1	7.1	0.0	7.1	0.0
Areas of Outstanding Natural Beauty	26.8	26.8	0.0	26.8	0.0
Total	182.9	152.5	-30.4	234.3	51.2

### 7.2 Smart Meters

#### 7.2.1 UK Power Networks' Revised Plan

Although the mandatory smart meter roll will be supplier-led, there are four significant dependencies on and opportunities for, Distribution Network Operators (DNO). These are

- DNO Interventions
- Industry Interface and Income Management
- Security and privacy
- Data Communications Company (DCC) costs

#### 7.2.2 UK Power Networks' proposed total expenses adjustment

Following our Smart Meter Business Plan submission, we have made substantial indirect cost reductions and a review of the content of the 2% intervention volumes.

We have reviewed our resourcing strategy into a mix of contractors and in-house resources and adjusted expenditure proposals accordingly. Our revised submission includes further justification of our direct costs particularly where we believe the mix of three phase and single phase cut-out changes differs in our high density environment. The overall reduction from the submission is £33 million. UK Power Networks is reducing the expected smart metering variant costs by £12 million in ED1 due to the elimination of incorrectly allocated costs.

## **7.3 Operational IT and Telecommunications**

### **7.3.1 UK Power Networks' Revised Plan**

The Information Systems directorate provides support across UK Power Networks. In our July 2013 submission, we stated that we required a total expenditure of £136 million in order to meet the output targets defined within our ED1 submission.

### **7.3.2 Proposed Amendments to UK Power Networks' Plan**

Following further analysis of this area we have identified £95 million of expenditure that was inadvertently excluded from our July 2013 ED1 business plan tables. It was however, included in the commentary and this relates principally to replacements of Remote Terminal Units (RTU). Although this activity is new for the industry, we were the first DNO to install RTUs extensively, as part of our business as usual network investment in LPN. As a result, these assets are coming to the end of their natural economic life and require replacement.

A detailed justification for this expenditure can be found in the Asset Stewardship Report for RTUs. This has resulted in the increase in expenditure between DPCR5 and ED1 in this category.

## **7.4 Variant Costs**

### **7.4.1 Summary of variant cost changes**

Variant costs are a new cost category within the ED1 settlement. They are costs that are allowed to flex during the price control as they are determined by the actual volume of work undertaken. Although the costs included in this cost category have been included in DNOs' business plans in previous price controls they are treated differently in the new price control framework and therefore have been excluded from the costs included in the benchmark. Worst served customers and Areas of Outstanding Natural Beauty are included in this cost category.

UK Power Networks is not proposing to alter the proposed spend in ED1 for worst served customers and areas of outstanding natural beauty.

## **7.5 Real Price Effects and Ongoing Efficiencies**

Real Price Effects are increase in prices over and above increases in the Retail Price Index (RPI). For example, increases in the cost of copper, steel, direct or contract labour over and above increases in RPI.

### **7.5.1 Summary**

UK Power Networks has reviewed our forecast of ongoing efficiencies and real price effects following Ofgem's fast-track assessment. UK Power Networks has decided not to make any significant changes to its assumptions but has now had the opportunity to apply the ongoing efficiencies at a table level within our business plan. This has resulted in a marginal reduction in the net impact to 0.0% p.a. in the ED1 period. UK Power Networks remains concerned that the fast-tracking assessment of ongoing efficiencies and RPEs remains unequitable across all DNOs and therefore not in customers' interests, for example, the real price effects of WPD was considerably higher than that of UK Power Networks.

### **7.5.2 UK Power Networks' Revised Plan**

Key elements of our cost base for the next planning period will increase at a greater rate than the retail price index (RPI), which measures general prices in the economy, due to the specialist labour and materials required to operate our networks. UK Power Networks engaged NERA Economic Consulting to independently estimate the Real Price Effects (RPEs), being the real price movements, relative to RPI for the next planning period for: labour, materials, plant and equipment.

### 7.5.3 UK Power Networks' proposed total expenses adjustment

There has been no change in our assumptions from the original July 2013 business plan; however, we have carefully reflected the ongoing efficiencies into the detailed tables that were submitted to Ofgem in July 2013.

Real price effects and ongoing efficiency comparisons – agreed that UK Power Networks remains at **0.1%** as per or original submission on the basis that WPD was fast-tracked.

We have adopted NERA's mid-point RPE estimates as shown in Table 40. The RPEs applied by UK Power Networks are lower than those applied by Ofgem in its RIIO electricity and gas transmission decision (on a consistent weighting of activity).

**Table 40 Real Price Effects and Efficiencies for the 2015 to 2023 Planning Period**

	Operational activities (%)	Network investment (%)
Real price effects	1.2	1.0

## 7.6 Applying Ongoing Efficiencies

### 7.6.1 Ofgem Fast-Track Assessment

Ofgem required that ongoing efficiencies were factored into the detailed cost tables. UK Power Networks has now completed this with a marginal reduction in costs of £15 million.

Table 41 summarises NERA's ongoing efficiency estimate.

**Table 41 Ongoing Efficiencies (NERA's estimate)**

NERA's ongoing efficiency estimate	Operational activities (%)	Network investment (%)
Mid-point	0.7	0.6
Upper bound	1.1	0.8
Lower bound	0.4	0.4
RIIO-ED1 Transmission/ gas decisions	1.0	0.7
Efficiency savings adopted	1.0 (1.25% in LPN)	0.7

The split of ongoing efficiency savings was also reflected in the Real price effects and ongoing efficiencies' business plan tables and although further detail was requested, the same factors were applied to all opex and capex categories.

UK Power Networks can only apply one unit cost over the ED1 business planning period due to limitations in its asset planning processes for projects.

Ofgem subsequently requested that UK Power Networks split out only its gross ongoing efficiencies and reflect them in the detailed cost tables.

In applying ongoing efficiencies to our resubmission we have applied the same ongoing efficiency assumptions and factors for real price effects (those key elements of our cost base for the next planning period will increase at a greater rate than the Retail Price Index (RPI), which measures general prices in the economy, due to the specialist labour and materials required to operate our networks) i.e. we have assumed an impact due to ongoing efficiencies in the first year of RIIO-ED1.



Total ongoing efficiencies were then calculated from our gross costs at an opex and capex level. In order to appropriately distribute these savings appropriately at UK Power Networks, we had to decide where we believe ongoing savings would be realised. In doing this, UK Power Networks has ensured that the overall assumptions within the business plan are maintained, whilst being pragmatic and not over-complicating the task. UK Power Networks, therefore, took the decision to only apply the efficiency scaling to the main cost activities. In summary these were in Cost Matrix, Remunerated and excluded Services, Customer Funded Connections, Indirect Costs, Asset Replacement, Asset Replacement, Operational IT & Telecommunications, Occurrences Not Incentivised and Inspection and Maintenance for all our DNOs. Additionally, the Refurbishment and Tree Cutting categories has on going efficiencies applied for SPN and EPN only LPN has low levels of tree management and refurbishment expenditure in ED1. Applying changes to the smaller categories (in terms of value) proved to be too complicated when ensuring that the overall change in opex and capex was consistent with the original business plan for each DNO.

# 8

## Improved Justification of our business plan

### Our cost benefit analysis asset replacement plan will save UK Power Networks' customers money compared to other DNOs

#### 8.1 Cost Benefit Analysis

##### 8.1.1 UK Power Networks' Revised Plan

Cost Benefit Analysis has been used to support the investments we are proposing on our networks. The scope of the analysis has been extended to more than 60% of our total capital expenditure and clear option analysis has been included. UK Power Networks is not proposing to make significant changes to our opex policies in ED1. Cost Benefit Analysis of opex activities therefore provides no further justification of a DNOs' expenditure than traditional benchmarking analysis.

##### 8.1.2 UK Power Networks' proposed total expenses adjustment

Since Ofgem issued revised guidance asking DNOs to use a baseline consistent with their DPCR5 strategy/ investments, UK Power Networks have reviewed all of the cost benefit analyse that we submitted and revised our options to address the guidance. We have included clear information on the decisions in both our annex and our cost benefit analysis models.

In updating the optional strategies considered, we provided alternative volumes and comparative benefits based on alternative condition based scenarios using observable industry average and fast-track replacement strategies to demonstrate that our asset management approach and investment proposals deliver class leading benefits to customers.

The additional cost benefit analysis covers

- Overhead line replacement and refurbishment
- Reinforcement
- ESQCR investment
- Flooding
- Linkboxes
- BT21 Century Networks

A detailed explanation of the outcomes from this assessment can be found in [Annex 13a: Regional Cost Justification](#) and for non-load expenditure in chapter 3.

Table 42 provides a summary of the cost benefit analysis outcomes for other capex excluding reinforcement and non load expenditure. It shows a positive benefit in ED1 of £90 million. This includes UK Power Networks additional investment in central London and investment in infrastructure to minimise the impact of existing distributed generation connections.

**Table 42 Cost Benefit Analysis Summary Whole Life Benefit of Outcomes (other capex)**

Investment driver	Whole Life Benefit				Annual benefit	ED1 total
	EPN	LPN	SPN	UKPN	UKPN	UKPN
Flooding	45.6	17.8	24.1	87.5	1.9	15.6
ESQCR	14.3		3.6	17.8	0.4	3.2
BT21CN	7.4		7.3	14.7	0.3	2.6
Central London		£36.5		36.5	0.8	6.5
Low Carbon Generation investment	15.4			15.4	0.3	2.7
Losses	97.9	97.9	97.9	293.6	6.5	52.2
Smart Grid	0.3	0.0	0.1	0.8	0.0	0.2
Quality of Supply	22.6	2.2	14.3	39.1	0.9	7.0
Total	203.4	154.4	147.2	505.5	11.2	89.9

## 8.2 Enhancements to Regional Costs Justification

This section details the additional costs faced by UK Power Networks as a result of operating in London and the South East. The scope includes

- Analysis of regional labour cost differentials in all of our areas affecting UK Power Networks' DNOs
- Quantification and evidence of specific costs unique to operating in London, the "London Factor" costs, over and above the Labour cost differentials
- Explanation of how these costs are incorporated in UK Power Networks' business plans for ED1

The original version of this [Regional Cost Justification \(Annex 13a\)](#) was submitted in July 2013. Following Ofgem's assessment, a number of revisions have been made to the document including

- Adoption of Ofgem's methodology for quantifying regional labour cost differentials
- Updated and revised calculation of the "London Factor" cost
- Further justification and rationale in some areas in the light of new and more accurate information

Key areas of regional cost differences are set in Table 43, together with estimates of their impact on UK Power Networks' three DNOs. These costs have increased from £22 million to £30 million in LPN. There has been no change in costs in SPN. UK Power Networks has also provided better justification of these costs in [Annex 13a: Regional Cost Justification](#), improved clarity of cost mapping into the business plan data templates and supporting positive a cost benefit analysis for our central London strategy.

**Table 43 Regional cost differences reflected in LPN's and SPN's 2015 to 2023 expenditure forecasts**

London Factor	Description of unique cost	LPN average cost (£m p.a.)	SPN average cost (£m p.a.)
Labour and contractor costs	Higher labour and contractor costs due to higher cost of living	7.0	3.5
Central London Network strategy	Additional costs of providing the enhanced service demanded by customers in Central London	11.2	0
Transport & Travelling	Congestion charging, exceptional parking and servicing costs and the cost of moving plant overnight to avoid heavy traffic.	0.6	0
Excavation	Exceptional lane rental, permitting and traffic management costs in London.	2.6	1.0
Operations	The extra cost of maintaining and repairing assets in the London environment; including primary and secondary substations and LV, HV and EHV cable systems.	8.4	5.5
Security	Network preparations and unplanned demobilisations associated with major events.	1.8	0.5
Properties	Increased insurance premiums incurred due to LPN's terrorism risk and indirect premiums incurred as a result of the higher cost of operation.	0.5	0.2
Tunnels	Inspection, maintenance and defect repair and charges for accessing tunnels owned by local authorities.	2.2	0
TOTAL		33.3	10.7

### 8.2.1 Regional labour cost differentials

As part of our examination of how the regions we operate within impact upon our expenditure, we have considered the implications of the higher cost of living in London and the South East. This is a well-recognised feature which feeds through directly into higher salary costs, but also provides further upward pressure on salary and benefits, as employers seek to recruit and retain staff.

An economic factor is somewhat different to the other factors detailed in this chapter. Firstly it can only be quantified through analysis of external data sources, and secondly it applies to all three of our networks, whilst the remainder of the document focuses on LPN only.

### 8.2.2 London Factor Costs

UK Power Networks proudly accepts the challenge and responsibility for maintaining the electricity supply to London and surrounding area. Unfortunately this comes at a price that would not feature in maintaining electricity supplies to any other City in the UK. This is the "London Factor" which is explained in depth in the in [Annex 13a: Regional Cost Justification](#).

The LPN area covers an area of 722km sq. of London, which encompasses London's chief financial district (which is one the world's three most important financial centres, along with Tokyo and New York City), the UK centre of Government, the seat of the Royal Family and home to over 7.5 million Londoners. For the LPN electricity distribution network this brings unique challenges and costs

- The maximum demand of 5,167MW is higher than some distribution networks covering an area 20 times greater

- It has the highest load density in Europe of 8 MW/km sq. and circa 2 million customers
- The network serves some very demanding key customers ranging from government departments to prestigious internationally known stores such as Harrods
- These particular challenges are the key driving factors of the London Factor costs described in this document

### 8.2.3 London Factor Costs in the ED1 Business Plans

The London Factor costs and regional labour differentials are implicitly built into the costs of doing business in UK Power Networks' DNO regions. This puts UK Power Networks at a potential disadvantage when benchmarking business plan costs against those of other DNOs. Therefore, we feel Ofgem must make regional adjustments as part of its modelling of efficiency costs in order to ensure companies are compared on a like-for-like basis.

Regional labour and the London Factor costs are treated separately by Ofgem in benchmarking. To account for regional Labour differentials, a weighting (or regional labour cost indices) is applied to all labour, pensions and contractor costs for all DNOs, thus equalising the labour costs before benchmarking. The London Factor costs must first be identified within the business plans, before making an appropriate level of adjustment to the relevant parts of the business plan costs. In [Annex 13a: Regional Cost Justification](#), UK Power Networks provides an approximate mapping of the London Factor costs to the appropriate parts of the business plan cost submission. This is not an exact science as for many of the costs there is no 1:1 mapping to the reported business plan tables. However, they are built into the unit costs of performing certain defined activities. UK Power Networks believes that the proposed allocations provide suitably accurate representation of the London Factor costs within each table for the purpose of benchmarking. UK Power Networks has provided a detailed mapping of regional costs to RIGs tables for both LPN and SPN in Appendix A.1.

At UK Power Networks we take our responsibilities seriously to ensure that London's electricity network is fit for purpose and comparable to other world cities in terms of resilience, quality of supply, and the ability to deliver new connections. London needs reliable and modern infrastructure to maintain its position against other competing global cities over the long-term. This investment proposed for ED1 supports that goal and improves London's infrastructure to support long-term economic growth in the area, in line with the interests of customers and wider stakeholders.

Our forecast investment will add significant network capacity in London as part of a wider programme of adding capacity including proposed new main substations across central areas of London. The West End being one of these, with others proposed including Vauxhall-Nine Elms-Battersea and developments at White City.

The West End has existing capacity constraints with substations operating above firm capacity, with load supported by transfers between sites. The forecast electricity demand growth means the viability of continuing this approach will be rapidly eroded during the ED1 period leading to non-compliance with planning standard Engineering Recommendation P2/6, the current distribution planning standard, for two sites. It is clear that additional capacity is required in the area to support forecast load growth. Our assessment of the distribution network in the area suggests that space constraints at existing sites would not deliver the capacity required and would not improve resilience that stakeholders consider is necessary for the central business districts.

## 8.3 Data Quality Improvement

Following Ofgem's fast-track decision, UK Power Networks has taken positive steps to improve the quality of our data. This section details how we have assured our data following material technical errors made in the July 2013 submission. As well as a thorough internal review, we have used a number of external consultants to verify our processes and data we submitted in July 2013.

The objectives of the data quality review were

- Check actuals against forecasts: is the profile correct
- Check for missing asset data within our tables
- Check the logic between assets with a relationship (e.g. poles and conductor, towers and fittings)
- Check for duplicate and incorrect mapping of projects

This exercise resulted in a movement of £14.6 million from the July 2013 business plan.

KPMG analysed the Ofgem model that UK Power Networks completed, in order to identify

- Potential incomplete and/or missing data

- Negative costs or volumes
- Potential inconsistencies between volume and cost entries by identifying instances where costs have no associated volume (or vice versa)
- Potential inconsistencies between historical numbers and forecast numbers through trend analysis of historical and forecast periods

The results of KPMG's work can be summarised as follows

- Data analysis was performed on approximately 1.2 million input cells from the Ofgem business plan data template, which resulted in only 5,278 cells (less than 0.5% where further investigation or clarification was required to confirm that an appropriate treatment was applied by UK Power Networks to the cell)
- After confirming that the appropriate treatment was applied by UK Power Networks, less than 38 cells (less than 0.003%) remained to be considered by management. The content of these cells was considered and where a material issue was identified a change was made

KPMG also tested on a sample basis the cost and data inputs on the Asset Replacement and Reinforcement and Demand Side Management business plan data tables to the underlying Portfolio Information Management System (PIMS) records as well as a targeted number of checks on a sample of items from the Asset Replacement and Reinforcement and Demand Side Management business plan data tables in order to consider whether the narrative description is consistent with the description of the items in PIMS. Their work indicated that the cost and data inputs on the Asset Replacement and Reinforcement and Demand Side Management business plan data tables agreed to the underlying PIMS records and no issues were identified.

## 8.4 2013/14 Re-forecast

Our costs 2013/14 costs were forecast at the time of July 2013 submission and have now transformed into actuals for the nine month period April 2013 – December 2014.

For the March 2014 revised plan, we have reforecast our costs for the 2014 regulatory year so the data is better aligned to actual cost data. We applied an ongoing efficiencies methodology to assess how much money we wanted to change from the July 2013 plan.

In order correctly to do this, we have used Ofgem's guidance provided in revising our forecast. The methodology is as follows

### Capex

UK Power Networks has adjusted volumes and costs through a scaling factor for the capex programme. This scaling factor is calculated by looking at outturn to date and year end forecast and comparing that against the original business plan. This has been done on a high-level category analysis (load, connections, diversions and wayleaves, reinforcement, transmission connections points, high value projects).

### Opex

UK Power Networks has updated the faults tables with nine months of actual costs until December 2013 and forecast (volumes and costs) the remaining 3 months (January-March 2014).

- Inspection and Maintenance: we repeated capex exercise of scaling individual categories based on nine months actuals and three months forecast compared to the original forecast
- Tree Cutting: there has been no change as we are broadly on track against original forecast

# 9

## Changes to Financial Assumptions

### 9.1 UK Power Networks' Revised Plan

Our final business plan submitted in July 2013 had substantial associated financing requirements. Over RII-ED1, our Regulatory Asset Value (RAV) is projected to grow by £2.2 billion after inflation. This requires £1.5 billion of additional debt which, after including existing debt maturing during the period implies a debt financing requirement of £2.9 billion. Shareholders' equity committed to the business grows by £0.6 billion. Therefore, it is critical that our revised business plan includes acceptable financing assumptions.

### 9.2 UK Power Networks' proposed total expenses adjustment

UK Power Networks has reviewed its financing assumptions included in the business plan with reference to the changing economic climate and the Competition Commission's and Ofgem's cost of capital reviews. We have kept all of our assumptions consistent with our original July 2013 business plan submission with the exception of the cost of equity, and the split of fast and slow money.

UK Power Networks has decided to adopt Ofgem's new reference cost of equity of 6.0% in its revised business plan. This represents a reduction of 0.7% or circa £20 million per annum from our July 2013 plan assumption of 6.7% and implies a vanilla return of 3.79% in 2015/16, falling to 3.47% by 2022/23.

UK Power Networks does not accept that the long term cost of capital has reduced since the final price controls in gas and transmission. We believe the proposed allowed return by Ofgem is too low. However, UK Power Networks expects that Ofgem will assess companies' business plans using a cost of equity of 6.0% whatever companies propose. Therefore not accepting 6.0% would simply result in a penalty charge under Ofgem's Information Quality Incentive mechanism. Applying a cost of equity allowance of 6.0% results in a significant tightening of forecast credit metrics. As a result of this, UK Power Networks is proposing to alter its fast and slow money split from 70/30% to 68/32% to maintain financeability, in particular Post Maintenance Interest Cover Ratios (PMICR).

Due to the importance of financeability, our acceptance of the 6.0% cost of equity is conditional on Ofgem accepting our overall business plan package, including our proposed totex and financeability proposals.



# 10 Stakeholder Engagement

## 10.1 UK Power Networks' approach to the resubmission

The UK Power Networks' July 2013 business plan was developed following extensive stakeholder engagement. Following the submission of the business plan to Ofgem, stakeholder engagement at UK Power Networks continued as business-as-usual, with sessions held on a variety of subjects proposed by a wide cross-section of stakeholders and the independently elected chairmen of the panels.

We carried out additional engagement, specifically on the resubmission, following Ofgem's decision not to fast-track our business plan. That engagement included three Critical Friends' panels (one per DNO area) in February 2014, in which UK Power Networks

- briefed stakeholders on Ofgem's business plan assessment criteria
- presented a high-level comparison between UK Power Networks' business plan and those of other DNOs in key areas
- updated stakeholders on Ofgem's feedback and methodology, notably with regard to cost assessment, and the challenge that UK Power Networks faced from Ofgem to cut cost and volume of work on the network in RIIO-ED1
- discussed how we proposed to address the challenge without altering the 77 output commitments that it made as a result of extensive stakeholder engagement
- provided an opportunity for stakeholders to raise questions and seek clarifications

A cross-section of stakeholders were present, including from Consumer Futures, the British Red Cross, local authorities, including district and parish councils, emergency planning teams and regional charities as well as a number of developers and banks, representatives from the. Many of the stakeholders had attended earlier consultations that UK Power Networks held as part of the consultation to put together the original July 2013 business plan. Those who had not previously attended were provided with the slides and transcripts from the earlier sessions as well as an extensive telephone or face-to-face briefing prior to the sessions.

All three sessions on the resubmission of the business plan were well received. Transcripts of the meetings can be found online at

[www.ukpowernetworks.co.uk/internet/en/have-your-say/events-consultations/reports-presentations/](http://www.ukpowernetworks.co.uk/internet/en/have-your-say/events-consultations/reports-presentations/)

## 10.2 Ofgem Fast-Track Assessment

Ofgem endorsed UK Power Networks' July 2013 business plan as well informed by stakeholders and UK Power Networks continues to believe that this is the case of our revised business plan, although there has been limited time to engage with stakeholders in extensive discussions regarding Ofgem's fast-track proposals.

## 10.3 UK Power Networks' Business as Usual Stakeholder Engagement

UK Power Networks has continued with our ongoing business-as-usual stakeholder engagement, hosting Critical Friends' panels and issue-specific forums on a variety of subjects. UK Power Networks has regularly reported back to stakeholders through the sessions, reports and newsletters as well as face-to-face meetings.

We have provided a short synopsis of some of the stakeholder engagement activities that UK Power Networks conducted between July 2013 and March 2014

- Issue-specific focus groups on Vulnerable Customers and Fuel Poverty, connections and Distributed Generation forums and Highway Services workshops etc.
- Critical Friends' panels examining
  - UK Power Networks' large-scale Transformation Programme and what improvements it will bring to our customer service
  - Issues of sustainability, environment and corporate social responsibility
  - UK Power Networks' response to the St. Jude storm in October 2013
  - UK Power Networks' response to the December 2013 and February 2014 storms
- Public consultations/drop-in sessions in the communities worst affected by storms, including Yalding, Bramley, New Ash Green and Whitfield
- Presentations at Parish Council meetings
- Young Carers' workshops designed to raise awareness among this hard-to-reach stakeholder group on issues such as energy efficiency and how to cope in electrical emergencies.

The above is by no means an exhaustive list of all stakeholder activities undertaken since July 2013 and is in addition to UK Power Networks' sessions on the re-submission of the business plan.

UK Power Networks held bi-lateral meetings with key city stakeholders such as the Corporation of London, the Greater London Authority (GLA) and London First. We have also met with the HSE regarding ESQCR cable pit risk mitigation.

# 11 Impact on Customers' Prices

## 11.1 UK Power Networks' Revised Plan

This chapter refers to the impact our revised business plan will have on the end-customers' electricity bill. We have estimated the impact on prices for domestic and non-domestic customers by applying the percentage change in forecast revenue required to finance our plans in the next planning period to the current charges.

## 11.2 Revenues and prices

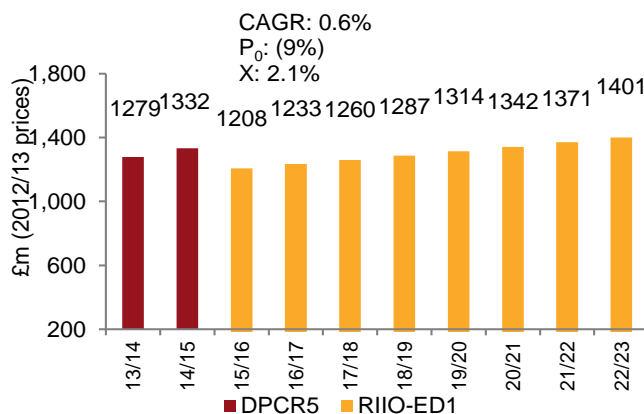
UK Power Networks is proposing to reduce its initial ED1 prices in 2015/16 by 9.3% on average real terms. This is a 5% reduction in EPN, 12% reduction in LPN and a 13% reduction in SPN. This is a bigger initial reduction than initially proposed in the July 2013 business plan (8%).

After the initial cut, UK Power Networks' customers' prices are forecast to increase at an annual rate of 2.1% (compared to 1.7% in July 2013).

On average prices are forecasted to decrease by 2% in ED1 (2% in EPN, -6% in LPN and -5% in SPN), compared to the end of DPCR5. The total impact on UK Power Networks' revenue in ED1 is shown in Figure 14.

Figure 14 describes our annual revenue requirements.

Figure 14 UK Power Networks' annual revenue requirement



Our revised business plan demonstrates that our customers will continue to receive amongst the lowest prices in the UK at the end of ED1.

# 12 Appendices

## A.1 Scheme Justification Papers (Load)

### EPN

All of the cost numbers displayed in this document are before the application of ongoing efficiencies and real price effects.

In total there are 87 schemes papers for EPN at a total forecast cost in ED1 of £234 million.

**Table 44 Key to explain for business driver in Table 45, Table 47 and Table 49**

Business Driver	Meaning
N-1	Ensures sufficient capacity available for normal network design allowing for a single outage (maintenance or failure)
N-2	Ensures sufficient capacity to meet network planning standards where this requires two simultaneous networks outages (1x maintenance and 1x fault)
Fault level	Fault level reinforcement is work carried out on the existing networks where the prime objective is to alleviate fault current level issues associated with switchgear or other equipment.
TCP	Transmission Connection Points are the shared costs of any reinforcement or change to National Grid's infrastructure initiated by a DNO.
LV/HV	Reinforcement of the LV/HV (6.6kV/11kV) distribution network.

**Table 45 EPN Load Scheme Justification Papers**

Project ID	Scheme Justification Papers (Load)	Business Driver	Cost £m total	Cost £m ED1	Delivery Year
2053	Romford - general primary substation reinforcement.	N-1	2.3	2.3	2019/20
2072	Abberton/Shrub End 33kV Circuits - reinforce 33kV circuits (2 x 730A)	N-1	0.3	0.3	2022/23
2075	Tiptree 33/11kV Primary Substation - ITC (2x11/18/23MVA)	N-1	1.1	1.0	2015/16
2141	Belchamp 132/33kV Grid Substation - Replace 33kV switchboard (Fault Level)	Fault Level	1.8	1.8	2020/21

Project ID	Scheme Justification Papers (Load)	Business Driver	Cost £m total	Cost £m ED1	Delivery Year
2169	Burwell 132/33kV Grid Substation - Replace 33kV switchboard (Fault Level)	Fault Level	1.7	1.7	2017/18
2221	Hadleigh Rd/Lawford 132 kV Tower Line (PJ) Circuit - reinforce (300mm)	N-1	3.1	0.6	2015/16
2234	Horningsea T/Arbury/Histon 132kV OHL (PTK/PMK) Circuits - reinforce (925A(W))	N-1	6.8	6.8	2016/17
2240	Horningsea T/Fulbourn - reinforce 132kV capacity	N-1	10.0	10.0	2022/23
2316	Cromer 33/11kV Primary Substation - replace 11kV switchboard (2000A)	N-1	0.8	0.9	2019/20
2365	March Grid 132/33kV Grid Substation - ITC (2 x 90MVA units)	N-1	3.4	2.9	2016/17
2409	Rye House 132/33kV Grid Substation - improved transformer utilisation	N-1	2.7	1.2	2015/16
2451	Cockfosters 33/11kV Primary Substation - ITC T1 (1x 20/30/40MVA) & 11kV Switchgear	N-1	1.5	1.5	2016/17
2508	Stowmarket 132/33kV Grid Substation - Uprate 33kV Switchgear (2000A)	N-1	1.6	0.7	2015/16
2671	Nevendon 132/33kV Grid Substation - Replace 33kV Switchgear (Fault Level)	Fault Level	1.7	0.7	2015/16
2716	Parker Avenue 132/33kV Grid Substation - Install Grid Transformers (2 x 90MVA) and 132kV Circuits	N-2	22.6	15.4	2017/18
2818	Braintree GSP 132/33kV Exit Point - Replace 33kV switchboard (Fault Level)	Fault Level	1.7	1.6	2016/17
2978	Crowlands/Romford Nth 33kV FFC Circuits - reinforce cables	N-1	1.2	0.1	2022/23
3440	Abberton/Peldon 33kV OHL Circuit - reinforce OHLs (570A)	N-1	0.3	0.3	2018/19
3477	Hornchurch 132/33kV Grid Substation - segregate banked 33kV Circuits	N-2	0.4	0.4	2017/18
3501	Stowmarket 132/33kV Grid Substation - New 132kV Switchboard Reinforcement (N-2)	N-2	17.3	17.3	2021/22
3560	Wisbech Railway 33/11kV Primary Substation - ITC (2 x 18/30/40MVA) and 11kV switchgear	N-1	2.1	2.1	2019/20
3570	Hornchurch/Cranham proposed 33kV Interconnection (N-2)	N-2	1.6	1.6	2017/18
3585	Bramford 132kV GSP Exit Point - Reinforce 132kV Switchgear (Fault Level)	Fault Level	13.1	13.1	2021/22
3588	Southery 33/11kV Primary Substation - Replace Primary Transformer (T1)	N-1	0.6	0.2	2022/23
3589	Lt Massingham 33/11kV Primary Substation - Replace Primary Transformer (T1)	N-1	0.6	0.6	2016/17
3614 5619 5593	Eaton Socon / Little Barford 132kV circuit reconfiguration (HVP)	N-2	30.3	22.0	2017/18

Project ID	Scheme Justification Papers (Load)	Business Driver	Cost £m total	Cost £m ED1	Delivery Year
3640	(RDP - Braintree)Howbridge Hall (Witham South) Proposed 33/11kV Primary Substation - (2 x 12/24MVA)	N-1	7.2	0.4	2015/16
3653	Bainton Proposed 400/132kV Exit Point (N-2)	TCP	5.1	5.1	2021/22
3684	Maldon/South Woodham - Proposed new Primary Substation (Temp Name - Purleigh Primary)	N-1	4.6	2.6	2022/23
3788	(RDP - Crowlands) Gidea Park Proposed 132/33kV Grid Substation - (2 x 90MVA)	N-1	8.8	8.8	2018/19
3798	(RDP - Fleethall/Southend) Fleethall 132/33kV Grid Substation - ITC (2 x 90MVA)	N-1	3.5	3.5	2020/21
3800	Rayleigh Local/Uplands Park 33kV FFC Circuits - reinforce circuits (600A)	N-1	1.2	1.1	2015/16
3840	Kings Lynn South 132/33kV Grid Substations - replace switchboard (2000A)	N-1	0.6	0.6	2021/22
3847	Writtle St & West Chelmsford FFC Circuits - reinforce	N-1	1.6	1.6	2021/22
3850	Mucking Creek Proposed 33/11kV Primary Substation - (2 x 18/30/40MVA)	N-1	2.1	2.1	2017/18
3873	Ipswich 132/33 Grid Substation - ITC (2 x 90MVA units)	N-1	3.1	1.9	2016/17
3924	March Grid/Chatteris Primary 33kV Circuits - Rebuild (575A)	N-1	1.2	1.2	2020/21
3950	Clacton Grid /Old Road Tee - Reinforce 33kV Circuit	N-1	3.4	1.2	2022/23
3956	Little Barford 132/33kV Grid Substation - Replace 33kV switchboard (Fault Level)	Fault Level	1.7	1.7	2021/22
3986	(RDP - Braintree) Lawford/Rayleigh 132kV Circuits (PNB, PUD, PAE) - reinforce	N-2	5.4	1.5	2022/23
3997	Walsoken/March 132kV Tower Line (POD) Circuits - Install 132kV CB's	N-1	0.8	0.8	2017/18
4009	Icknield Way Proposed 33kV Switching Station & Icknield Way Proposed 33kV Switching Station - land aquisition (RDP*)	N-1	2.8	2.8	2021/22
4015	Halstead 33/11kV Primary Substation - ITC (2 x 18/30MVA) and 11kV switchgear	N-1	2.0	0.8	2015/16
4069	Rye House/Harlow West 132kV Tower Line (PDE/PCK) - Separate 132kV circuits (N-2)	N-2	5.4	5.4	2019/20
4091	March Grid Proposed Local 33/11kV Primary Substation - (1 x 11/18/24MVA)	N-1	1.6	1.6	2018/19
4173	Upwell (Lakes End) 33/11kV Primary Substation - ITC (2 x 7/11/15MVA)	N-1	1.4	1.4	2021/22
4203	Warners End 33/11kV Primary Substation - Demand Side Response (DSR)	N-1	0.7	0.7	2017/18
4271	Tilney Proposed 33/11kV Primary Substation – New Substation (1 x 7/11/18MVA)	N-1	1.5	1.5	2019/20
4272	Red Lodge Proposed 33/11kV S/S (RDP*) - (2 x 11/18/24MVA)	N-1	6.1	6.1	2022/23

Project ID	Scheme Justification Papers (Load)	Business Driver	Cost £m total	Cost £m ED1	Delivery Year
4291	Reed 33/11kV Primary Substation - ITC (1 x 7.5/15MVA & 1 x 11/18/24MVA)	N-1	2.8	2.8	2022/23
4306	South Stevenage 33/11kV Primary Substation - ITC (3rd 18/30/40MVA), extend 11kV switchboard and new 33kV circuit	N-1	3.1	3.1	2017/18
4325	Eriswell Proposed 33kV Switching Station.	N-1	1.8	1.8	2018/19
4406	East Letchworth 33/11kV Primary Substation - ITC (2 x 18/30/40MVA) & switchboard (2000A)	N-1	1.7	1.6	2016/17
4408	Manton Lane 33/11kV Primary Substation - ITC (2 x 18/30/40) & switchboard	N-1	1.7	1.7	2020/21
4409	Chaul End 33/11kV Primary Substation - ITC (T3: 11/18/23MVA)	N-1	0.6	0.6	2017/18
5006	Lt. Barford/Sandy 33kV OHL Circuits - 3rd U/G circuit.	N-1	2.4	2.4	2022/23
5009	Luton North Grid Local 33/11kV Substation - ITC (new 3rd 18/30/40MVA), 33kV circuit breaker and 11kV switchboard extension	N-1	0.7	0.7	2016/17
5010	Thorpe 132/33kV Grid Substation - replace 33kV switchgear (Fault Level)	Fault Level	1.5	1.5	2018/19
5397	Highfield 33/11kV Primary Substation - ITC (2x18/30/40MVA), 11kV switchgear and 33kV circuits	N-1	3.8	3.8	2020/21
5399	Ladysmith Rd 33/11kV Primary Substation - ITC (2 x 18/30/40MVA), 11kV switchgear and 33kV cables	N-1	3.0	3.0	2022/23
5402	Merryhill 33/11kV Primary Substation - ITC (2 x 20/30/40MVA) & 11kV switchgear	N-1	2.0	1.9	2016/17
5408	East Finchley 33/11kV Primary Substation - ITC (2x 20/30/40MVA) and 11kV switchboard	N-1	2.0	2.0	2016/17
5409	Greenhill 33/11kV Primary Substation - ITC (18/30/40MVA), switchgear and cables	N-1	1.9	1.9	2018/19
5555	Peterborough Central/Farcet 33kV OHL Circuit - Reinforcement (575A)	N-1	0.1	0.1	2016/17
5566	St Anthony Steet 33/11kV Primary Substation - ITC (2 x 18/30/40MVA) and 11kV switchboard	N-1	2.0	2.0	2021/22
5602	Bellhouse Lane 33/11kV Primary Substation - ITC (2 x 12/18/24MVA) and 11kV switchboard	N-1	2.4	2.4	2018/19
5608	Pinner Green 33/11kV Substation - ITC (1x11/18/24MVA)	N-1	0.9	0.9	2020/21
5609	East Hertford 33/11kV Primary Substation - ITC (2 x 11/18/24MVA)	N-1	1.1	1.1	2017/18
5698	Huntingdon 132/33kV Grid Substation - Replace 33kV switchboard (Fault Level)	Fault Level	1.7	1.7	2018/19
5724	Hapton 33/11kV Primary Substation - ITC (2x11/18/24 MVA)	N-1	1.3	1.3	2016/17
5729	Thaxted Local Primary 11kV Reinforcment	N-1	1.1	1.1	2016/17

Project ID	Scheme Justification Papers (Load)	Business Driver	Cost £m total	Cost £m ED1	Delivery Year
5730	Fairstead 33/11kV Primary - ITC (2 x 18/25.4/40 MVA)	N-1	1.3	1.3	2022/23
5779	Earlham Grid/Wymondham 33kV Circuit - phase 2 reinforcement (770A(W))	N-1	2.0	2.0	2020/21
5812	North Drive 33/11kV Primary Substation - ITC (T1: 12/18/24MVA) & Switchgear	N-1	1.1	1.1	2017/18
5848	Lawford - Cliff Quay 3 & Ipswich 1 PEC Route reinforcement	N-2	3.0	3.0	2020/21
5860	Abberton Grid 132kV Sectionalisation	N-1	0.6	0.6	2020/21
6092	Chelmsford East Local 33/11kV Primary Substation - ITC (2x 11/18/24MVA)	N-1	1.1	1.1	2021/22
6186	Finchley 132/33kV Grid Substation - Load transfer (transfer Bellevue Primary to Hendon Grid)	N-1	1.8	1.8	2022/23
6191	Brockenhurst/Mil Hill 33/11kV Primary Substations - ITC (2 x 12/18/24MVA) and 11kV Network Reinforcement	N-1	1.5	1.5	2017/18
6197	Hornsey Grid 132/11kV Substation - 11kV Switchgear (2000A double bus)	N-1	1.5	1.5	2017/18
6201	Berkhamstead 33/11kV Primary Substation - ITC (2 x 20/30/40MVA), 11kV switchgear and 33kV Circuits	N-1	4.9	4.9	2022/23
6342	Fulbourn 132/33kV Grid Substation - Replace 33kV switchboard (Fault Level)	Fault Level	1.9	1.9	2022/23
6353	Trowse 132/33kV Grid Substation - Install 3rd 132/33kV GT and replace 33kV switchboard	N-1	3.0	3.0	2020/21
8183	Godmanchester 33/11kV Primary Substation - ITC (2x12/24MVA)	N-1	1.7	1.7	2016/17
8201	Croydon 33/11kV Primary Substation - ITC (1 x 7.5/15MVA)	N-1	0.5	0.5	2018/19
8529	DG - Proposed new Grid Substation between March and Peterborough	N-1	8.5	6.0	2022/23
8530	DG - Rebuild Funtham's Lane - Chatteris Tee No2 - 200SCA	N-1	0.9	0.9	2018/19
<b>Total</b>			<b>277.3</b>	<b>233.7</b>	

**Table 46 EPN Scheme justification papers by investment driver**

Table Description	Scheme Value £m ED1	Non Scheme Value ED1	Total Table Value ED1	Incl. RPE & Efficiencies
General, Fault Level Reinforcement	207.5	76.4	283.9	295.2
Legal & Safety	3.4	44.8	48.2	49.9
IT & Telecoms	1.2	48.0	49.2	48.3
High Value Projects	22.0	0.0	22.0	22.2
Total	234.1	169.2	403.3	415.5
(Rounding)	0.4			



## LPN

In total there are 47 schemes papers for LPN at a total forecast cost in ED1 of £308.8 million.

**Table 47 LPN Load Scheme Justification Papers**

Project ID	Scheme Justification Papers (Load)	Business Driver	Cost £m total	Cost £m ED1	Delivery Year
1270	New Cross - Wellclose Square Cable Tunnel Construction	N-1	2.6	2.6	2015/16
2579	Eltham Grid: Install 4th 132/33 kV transformer	N-1	3.1	1.6	2016/17
2635	Shorts Gardens: Establish new 132/11kV Substation	N-1	10.4	10.4	2021/22
2638	Silvertown 66/11kV: ITC	N-1	6.4	5.0	2022/23
2660	Willesden 132kV GSP fourth 132kV SGT	TCP	0.7	0.7	2017/18
3657	Hearn Street: ITC and asset replacement	N-1	12.8	12.8	2021/22
3659	King Henrys Walk: Uprating to 132kV	N-1	10.7	10.7	2021/22
3667	Wandsworth Grid 132/66kV Group Reinforcement	N-2	10.4	10.4	2019/20
3668	Wellclose Square: Establish new 132/11kV Substation	N-1	17.7	17.7	2020/21
3724	Islington: Establish new 400/132kV GSP	TCP	11.6	2.8	2016/17
3730	Wimbledon 132kV circuit breaker replacement	N-2	13.5	13.0	2018/19
4252	Edwards Lane: ITC	N-1	3.0	1.8	2015/16
4322	Verney Rd: ITC	N-1	4.8	3.9	2022/23
4349	Carnaby Street: Reinforcement Phase 2	N-1	3.7	3.0	2016/17
4367	Hatchard Rd: ITC	N-1	12.1	12.1	2020/21
4368	Holloway / Islington: 132kV network reconfiguration	N-2	0.2	0.2	2016/17
5578	Fisher St 132/11kV Reinforcement: ITC	N-1	4.4	0.9	2015/16
5582	Fisher St 132/11kV Reinforcement: Install 132kV cables from Bankside	N-1	1.8	0.1	2015/16
5591	Finsbury Market: Establish 132kV interconnection to Osborn Street	N-1	4.9	4.9	2018/19
5717	Wandsworth 66kV: Feeder circuit reconfiguration	N-1	0.2	0.2	2021/22
5741	Waterloo Road: upgrade at 132kV	N-1	13.2	13.2	2022/23
5744	Lithos Road 66/11kV ITC	N-1	12.2	12.2	2018/19

Project ID	Scheme Justification Papers (Load)	Business Driver	Cost £m total	Cost £m ED1	Delivery Year
5795	Calshot Street: Establish 2x66MVA 132/11kVsubstation	N-1	7.5	7.1	2016/17
5799	Eglinton: Establish 3x33MVA 132/11kV substation	N-1	12.5	10.6	2017/18
5815	VNEB: Establish new 2x66MVA 132/11kV substation (HVP)	N-1	31.5	25.8	2019/20
5824	Old Brompton Road: Transformer uprating	N-1	0.3	0.3	2015/16
5842	White City: Establish new 132/11kV mainsubstation	N-1	16.4	13.5	2017/18
6104	New 132/11kV substation in Hoxton	N-1	13.9	10.3	2022/23
6105 8343	West End new 66/11kV substation (HVP)	N-1	43.9	37.0	2020/21
6106 3524	New Cross-Osborn Street - Install 3x132kV Circuits	N-1	1.5	1.5	2015/16
6111	Wellclose Square: Establish 132/33kV Substation	N-1	3.6	3.4	2022/23
6156	Finsbury Market B 33kV feeder reconfiguration	N-1	1.1	1.1	2018/19
6158	Ludgate Circus: Establish 11kV Satellite Switchboard	N-1	1.8	1.7	2022/23
6327	West Ham 132kV: 5th SGT	TCP	4.5	4.5	2022/23
6331	Paternoster: Reconfiguration to Finsbury Market B	N-1	0.2	0.2	2019/20
6332	Clapham Park Rd: ITC	N-1	6.0	6.0	2018/19
6333	Wimbledon Grid C: ITC	N-2	6.6	6.6	2022/23
6336	New Cross 132kV GSP fourth SGT	TCP	0.6	0.6	2021/22
6337	Verney Rd: Reactor installation	Fault Level	0.3	0.3	2016/17
8340	Hackney - Waterloo Rd cable tunnel	N-1	17.3	15.6	2018/19
8371	New Cross to Bankside: Third circuit	N-2	6.2	1.7	2022/23
8471	Plumtree Court - 11kV Switchboard Extension	N-1	0.7	0.5	2015/16
8490	Aberdeen PI B reinforcement	N-1	1.3	1.3	2022/23
8492	Kimberley Rd reinforcement	N-1	4.9	4.9	2022/23
8495	Brixton B reinforcement	N-1	1.5	1.4	2022/23
8496	Wandsworth Central reinforcement	N-1	3.0	3.0	2022/23

Project ID	Scheme Justification Papers (Load)	Business Driver	Cost £m total	Cost £m ED1	Delivery Year
8637	Replacement of 66kV Lodge Rd-Carnaby St circuits	N-1	9.2	9.2	2020/21
<b>Total</b>			<b>356.7</b>	<b>308.3</b>	

**Table 48 LPN Scheme justification papers by investment driver**

Table Description	Scheme Value £m ED1	Non Scheme Value ED1	Total Table Value ED1	Incl. RPE & Efficiencies
General, Fault Level Reinforcement	225.4	112.5	337.9	350.7
Legal & Safety	1.1	39.7	40.8	41.9
IT & Telecoms	1.2	51.8	53.0	51.1
High Value Projects	62.9	26.3	89.2	92.4
Civil Works	18.2	50.4	68.6	70.7
Total	308.8	280.7	589.5	606.8
<i>Rounding</i>	0.5			

Civil works value relates to project ID 8340 Hackney – Waterloo Rd cable tunnel (£15.6 million), and project ID 1270 New Cross – Wellclose Square Cable Tunnel Construction (£2.6 million).

### SPN

In total there are 47 schemes papers for SPN at a total forecast cost in ED1 of £137.8 million.

**Table 49 SPN Load Scheme Justification Papers**

Project ID	Scheme Justification Papers (Load)	Business Driver	Cost £m total	Cost £m ED1	Delivery Year
3057	Etchinghill 132kV Switching Station	N-1	6.8	1.8	2022/23
3095	Hastings Main – 132kV capacitor banks	N-1	0.3	0.3	2015/16
3096	Marden Tee 132kV Switchboard	N-2	4.8	4.6	2017/18
3193	Epsom 33/11kV Reinforcement – Add 12/24 MVA T3 & 5km of 33kV UGC circuit from Chessington	N-1	2.2	1.7	2022/23
3214	Canterbury North 132kV – switching station	N-1	9.1	9.1	2022/23
3351	Sutton B 33/11kV Reinforcement – Replace T3/T4 with 20/40 MVA units & add 0.3 km of UGC circuit from Sutton Grid	N-1	1.2	0.7	2022/23
3701	Capel 33/11kV Substation Reinforcement – Replace T1/T2 with 12/24 MVA units	N-1	1.0	0.7	2022/23
3719	Romney Warren 33/11kV Reinforcement - Replace T1/T2 with 12/24 MVA units & replace 8 panel GEC VMX SWB (73ptimised)	N-1	1.8	1.4	2016/17
3744&	Weybridge 33/11kV Reinforcement - Replace T1/T2 with	N-1	3.3	3.3	2017/18

Project ID	Scheme Justification Papers (Load)	Business Driver	Cost £m total	Cost £m ED1	Delivery Year
8157	20/40 MVA units & replace 11 panel SWB & Weybridge 33kV Reinforcement-Install a third 33kV circuit from West Weybridge.				
3753	Guildford Grid 33 kV Switchgear Replacement for Fault Duty	Fault Level	2.1	1.8	2017/18
4375	Dormansland 33 kV Substation-Reactive compensation	N-1	1.0	1.0	2017/18
5543 & 8037& 8345	Guildford Grid 132/33kV Reinforcement – Add GT3 & Guildford Grid 132kV Reinforcement for (N-2) – Installation of a 3 <sup>rd</sup> 132kV circuit (Phase 1 – 12 km from Guildford to Effingham) & Guildford Grid 132kV Reinforcement for (N-2) – Installation of a 3 <sup>rd</sup> 132kV circuit (Phase 2 – 9km from Effingham to Leatherhead)	N-2	17.9	17.4	2019/20
5548	Chelsfield Grid reinforcement – enabling transfers	N-2	0.1	0.0	2015/16
8015	Merrow 33kV/11kV Reinforcement – Third 12/24 MVA transformer, 3 km of UGC circuit & replace 10 panel SWB	N-1	2.5	2.5	2022/23
8059	St Helier 33kV/11kV Reinforcement – Replace T1/T2 with 20/40 MVA, install 3 <sup>rd</sup> 3 km UGC circuit & replace 11 panel SWB	N-1	3.3	2.9	2017/18
8067	Brighton Town-Replace 11kV switchboard	Fault Level	1.3	1.3	2018/19
8068	Capel Switching Station 33kV Reinforcement		1.0	0.8	2017/18
8072	Littlehampton T1/ T2 33kV Group Reinforcement – Reconductor 12 km of DC 33kV OHL and replace 7 km of DC 33kV UGC	N-1	5.6	5.0	2017/18
8081	Canterbury Town 33kV/11kV – Install 4 <sup>th</sup> 12/24 MVA transformer, install 1.2 km of 33kV UGC circuit from Canterbury South & replace 22 panel 11kV SWB	N-1	2.5	2.5	2018/19
8085	Ramsgate 33kV/11kV Reinforcement – Replace T1/T2 with 20/40 MVA units	N-1	1.1	1.1	2019/20
8087	Shepway 33kV/11kV Reinforcement – Replace T1/T2 with 20/40 MVA units	N-1	1.1	0.2	2015/16
8089	St Peters 33kV/11kV Reinforcement – Replace T1/T2 with 20/40 Transformers	N-1	1.6	1.0	2022/23
8092	Cerl 33kV/11kV – Replace T1/T2 with 12/24 MVA TXs	N-1	1.2	0.9	2016/17
8103	Rainham 33kV/11kV Reinforcement – 3rd 12/24MVA transformer, 33kV RMU	N-1	1.2	0.1	2015/16
8111	Baldslow 33kV/11kV Reinforcement – Replace T1/T2 with 20/40 MVA units & 10 panel 11kV SWB	N-1	2.1	0.6	2015/16
8112	Broadoak Group 33kV Reinforcement-Establish a new 132/33kV grid	N-1	5.4	5.4	2017/18
8117 & 8118 & 8119	Marden 33kV/11kV – ITC & Marden 33kV/6.6kV – ITC & Marden Total 11kV/6.6kV – ITC	N-1	2.1	1.4	2022/23
8123	Ripe 33kV/11kV Reinforcement – Replace T1 and add T2	N-1	1.5	1.5	2017/18

Project ID	Scheme Justification Papers (Load)	Business Driver	Cost £m total	Cost £m ED1	Delivery Year
8125	Uckfield 33kV/11kV Reinforcement – Replace 2 x 10 MVA with 2 x 12/24 MVA PTxs	N-1	1.2	0.5	2015/16
8126	Wadhurst 33kV/6.6kV Reinforcement – Replace T2 with 7.5 MVA 33/6.6kV unit	N-1	0.6	0.1	2015/16
8129	Gravesend Town 33kV/6.6kV Reinforcement – Add T3 and replace 6.6kV switchboard	N-1	4.4	4.4	2017/18
8133	Stone Marshes 33kV Reinforcement – Replace 5km of 33kV Conductor	N-1	0.4	0.4	2019/20
8134	Sundridge 33kV/11kV Reinforcement-Replace 1x15MVA with 12/24MVA & add 3 <sup>rd</sup> tx	N-1	0.5	0.5	2018/19
8146	Tenterden 33kV/6.6kV Reinforcement – Replace T2 with 7.5/15 MVA unit & re-conductor 12 km of 33kV OHL conductor on wood pole	N-1	1.4	1.4	2019/20
8147	Warehorne 33kV/11kV – ITC	N-1	1.0	1.0	2018/19
8148	Brookwood 33kV/11kV Reinforcement – Replace T1/T2 with 20/40 MVA units & replace 11 panel 11kV switchgear	N-1	1.8	0.5	2015/16
8149	Byfleet 132kV/11kV & 132/33kV group – 132kV OHL conductor replacement	N-1	1.7	1.0	2016/17
8151	Byfleet 132kV/33kV & West Weybridge 132kV/33kV Group Reinforcement – Replace GT3 & GT4 with 2x90 MVA and replace 12 panel 33kV SWB at West Weybridge	N-1	2.9	1.7	2016/17
8154	Guildford B 11kV – Replace 17 panel 11kV switchgear for fault duty	Fault Level	0.9	0.4	2015/16
8245	Smeeth 33kV/11kV – Replace T1/Add T2 as 7.5/15 MVA units	N-1	1.1	1.1	2020/21
8339	Sutton A 33/11kV Reinforcement: Replacement of 11kV switchboard due to fault level	Fault Level	0.9	0.8	2017/18
8445	Beddington 132/33kV transformer tails reinforcement	N-1	0.5	0.5	2019/20
8482	Brookwood 33kV Reinforcement – Install 10 km of 33kV UG circuit from Byfleet	N-1	3.7	3.7	2017/18
8629	Shepway 33kV Reinforcement – Install 3 <sup>rd</sup> 3km x 33kV UGC circuit from Maidstone Grid	N-1	1.4	1.4	2017/18
8680	Moulsecoomb 132/33kV Reinforcement – Install a 2 <sup>nd</sup> 9km 132kV circuit and 90 MVA GT2	N-1	8.5	8.5	2022/23
3318	Overhead line PO Route replacement harmonised with Newhaven/ Lewes group reinforcement (HVP)	N-2	36.7	31.0	2020/21
8948	Croydon Scott Transformer Network Replacement	HV/LV	8.0	8.0	2022/23
<b>Total</b>			<b>162.7</b>	<b>137.9</b>	

**Table 50 SPN Scheme justification papers by investment driver**

Table Description	Scheme Value £m ED1	Non Scheme Value ED1	Total Table Value ED1	Incl. RPE & Efficiencies
General, Fault Level Reinforcement	104.4	73.3	177.7	184.2

Legal & Safety	1.7	32.8	34.5	35.6
IT & Telecoms	0.7	36.8	37.5	36.8
High Value Projects	31.0	0.0	31.0	31.8
Total	137.8	142.9	280.7	288.4
<i>Rounding</i>	0.1			

## A.2 Scheme Justification Papers (Non-Load)

### EPN

In total there are 10 scheme papers for EPN at a total forecast cost in ED1 of £32.5 million.

**Table 51 EPN Non-Load Scheme Justification Papers**

Project ID	Scheme Justification Papers (Non-load)	Cost £m total	Cost £m ED1	Delivery Year
2152	Pelham 132kV Grid Supply Point - Replace 132kV Switchgear	7.9	7.9	2019/20
2197	Diss/Kenninghall 33kV OHL Circuit - 33kV Wood Pole OHL Replacement (575A)	1.5	1.5	2018/19
2476	Watsons Road 33/11kV Primary Substation - Replace 11kV Switchgear	1.3	1.3	2020/21
7535	PDG - Aylesbury East Grid/Luton South Grid - Conductor Replacement	5.4	5.4	2019/20
7552	ARA/RAE 132kV Tower Line (PW ) - 132kV Tower Line Refurbishment	0.9	0.9	2019/20
7597	Tilbury Grid / Marshfoot Rd Primary 33kV Fluid Filled Cables - 33kV FFC Replacement	1.4	1.4	2017/18
7598	Wymondley Local / Letchworth Grid 132kV Fluid Filled Cables - 132kV FFC Replacement	7.5	7.5	2022/23
7626	Houghton Regis 132/33kV Grid Substation - Replace 33kV Switchgear	1.8	1.8	2016/17
7713	Burwell Local Grid - Replace Grid Transformers (GT1, GT2, GT3)	4.7	4.7	2019/20
7738	Stopsley Primary Substation - Refurbish Primary Transformer (T3)	0.2	0.2	2016/17
<b>Total</b>		<b>32.6</b>	<b>32.6</b>	

**Table 52 EPN Scheme justification papers by investment driver**

Table Description	Scheme Value £m ED1	Non Scheme Value ED1	Total Table Value ED1	Incl. RPE & Efficiencies
Legal & Safety	0.4	47.8	48.2	49.9
IT & Telecoms	0.1	49.1	49.2	48.3
Civil Works	3.2	81.2	84.4	87.7
Asset Replacement	28.6	431.9	460.5	450.6

Asset Refurbishment	0.2	32.4	32.6	31.9
<b>Total</b>	<b>32.5</b>	<b>642.4</b>	<b>674.9</b>	<b>668.4</b>
<i>Rounding</i>	0.1			

## LPN

In total there are 11 schemes papers for LPN at a total forecast cost in ED1 of £110.4 million.

**Table 53 LPN Non-Load Scheme Justification Papers**

Project ID	Scheme Justification Papers (Non-load)	Cost £m total	Cost £m ED1	Delivery Year
2589	Hackney 66kV: Replace Switchgear	13.3	13.3	2018/19
7804	Lithos Rd A - Replace 11kV Switchgear	2.5	2.5	2018/19
7861	Old Brompton Rd 11kV - Replace Grid Transformers (GT2)	1.6	1.5	2015/16
7939	Wimbledon 132kV SEC 1&2-Kingston 132kV (Circuit 1-B,Circuit 2-B & Circuit 2-C) - 132kV FFC Replacement	15.4	15.4	2022/23
7948	Wimbledon 132kV SEC 1&2-Bengeworth Rd 33 (Circuit 2-J) - 132kV FFC Replacement	5.0	5.0	2017/18
7951	New Cross 66kV – South Bank (Circuit 3B & Circuit 1A) – 66kV FFC replacement	6.7	6.7	2020/21
7954	Bromley Grid-Hurst (Circuit 1-B-C & Circuit 2 B-C) - 132kV FFC Replacement	11.2	11.2	2021/22
7955	Beddington - Sydenham (Circuit 2 A-B) - 132kV FFC Replacement	12.6	12.6	2020/21
8301	Hackney-King Henrys Walk 66kV Gas Cable Scheme	5.1	2.6	2015/16
8400	Barking-Brunswick Wharf 132kV Gas Cable Replacement	15.3	13.4	2016/17
8401	Eltham-Sydenham Park 132kV Gas replacement (HVP)	26.4	26.4	2022/23
<b>Total</b>		<b>115.1</b>	<b>110.6</b>	

**Table 54 LPN Scheme justification papers by investment driver**

Table Description	Scheme Value £m ED1	Non Scheme Value ED1	Total Table Value ED1	Incl. RPE & Efficiencies
Legal & Safety	0.1	40.7	40.8	41.9
IT & Telecoms	0.0	53.0	53.0	51.1
Civil Works	1.7	66.9	68.6	70.7
Asset Replacement	82.2	232.3	314.5	302.5
High Value projects	26.4	62.8	89.2	92.4
<b>Total</b>	<b>110.4</b>	<b>455.7</b>	<b>566.1</b>	<b>558.6</b>
<i>Rounding</i>	0.2			

## SPN

In total there are 10 schemes papers for SPN at a total forecast cost in ED1 of £34.0 million.

**Table 55 SPN Non-Load Scheme Justification Papers**

Project ID	Scheme Justification Papers (Non-load)	Cost £m total	Cost £m ED1	Delivery Year
3284	Hastings Main - 132kV Switchboard Replacement	8.9	8.9	2018/19
7811	Sittingbourne Grid - Replace 33kV Switchgear	1.6	1.6	2017/18
7880	Crawley Industrial East 33/11kV - Refurbish Primary Transformer (T1, T2)	0.3	0.3	2017/18
7895	Kingston Grid 132kV - Replace Grid Transformer (GT1, GT2, GT3, GT4)	5.8	5.8	2019/20
7924	Chatham Hill - Replace 11kV Switchgear	1.5	1.5	2017/18
7970	Beddington Local 33kV-Sutton Grid 33kV (Circuit 1-E-J & Circuit 2-E-J) - 33kV FFC Replacement	1.7	1.7	2015/16
7972	Beddington-Addington Grid - 132kV Fluid Filled Cable Replacement	11.1	11.1	2017/18
8173	100913314 - 33kV Medway Grid/Wrotham Heath No2 - OHLReplacement	0.4	0.4	2017/18
8661	Betteshanger Grid 132kV Switchgear Replacement	0.8	0.8	2016/17
8921	Littlehampton ESQC Resolution Strategy	3.0	2.3	2017/18
<b>Total</b>		<b>34.4</b>	<b>34.4</b>	

**Table 56 SPN Scheme justification papers by investment driver**

Table Description	Scheme Value £m ED1	Non Scheme Value ED1	Total Table Value ED1	Incl. RPE & Efficiencies
Legal & Safety	2.8	31.7	34.5	35.6
IT & Telecoms	0.1	37.4	37.5	36.8
Civil Works	3.7	39.6	43.3	45.0
Asset Replacement	27.4	269.8	297.2	291.7
<b>Total</b>	<b>34.0</b>	<b>378.5</b>	<b>412.5</b>	<b>409.1</b>
<i>Rounding</i>	0.4			



# 13 Glossary

## A

### **Asset Stewardship Report**

Describe the optimum asset management strategy and proposals for different groups of assets. Each report defines the most efficient maintenance and inspection regimes needed and all documents detail the new forms of innovation which is required to maximise value, service and safety for all customers and staff throughout the ED1 regulatory period. Outline proposals for the ED2 period are also included.

## B

### **Black Start**

Black Start is the procedure to recover from a total or partial shutdown of the distribution network system which has caused an extensive loss of supplies.

### **Broad measure of customer satisfaction (BMoCS)**

A composite incentive consisting of a customer satisfaction survey, a complaints metric and stakeholder engagement. It was introduced for DPCR5 and is designed to drive improvements in the quality of the overall customer experience by capturing and measuring customers' experiences of contact with their DNO across the range of services and activities the DNOs provide

### **BT 21<sup>st</sup> Century Networks (BT21CN)**

A programme upgrade the UK's telephone network from the AXE/System X Public Switched Telephone Network (PSTN) to an Internet Protocol (IP) system.

## C

### **Capital expenditure (Capex)**

Expenditure on investment in long-lived distribution assets, such as underground cables, overhead electricity lines and substations

### **Closely Associated Indirect (CAI)**

Closely Associated Indirect costs are activities that are required to support the operational activities such as the capital investment and network operating costs of UK Power Networks.

### **Compound Annual Growth Rate (CAGR)**

The year-over-year growth rate of an investment over a specified period of time. UK Power Networks' CAGR is eight to reflect the eight year ED1 period.

### **Critical National Infrastructure**

The UK defines its Critical National Infrastructure (CNI) as "certain 'critical' elements of infrastructure, the loss or compromise of which would have a major, detrimental impact on the availability or integrity of essential services, leading to severe economic or social consequences or to loss of life.

### **Customer interruptions (CIs)**

The number of customers whose supplies have been interrupted per 100 customers per year over all incidents, where an interruption of supply lasts for three minutes or longer, excluding re-interruptions to the supply of customers previously interrupted during the same incident.

### **Customer minutes lost (CMLs)**

The duration of interruptions to supply per year – average customer minutes lost per customer per year, where an interruption of supply to customer(s) lasts for three minutes or longer

## D

### DECC

Department of Energy and Climate Change

### Distributed generation (DG)

Distributed generation (also known as embedded or dispersed generation) refers to an electricity generating plant connected to the distribution network. There are many types and sizes of distributed generation facilities. These include Combined Heat and Power (CHP), wind farms, hydro-electric power or one of the new smaller generation technologies such as photo-voltaic cells

### Distribution network operators (DNOs)

A DNO is a company which operates the electricity distribution network which includes all parts of the network from 132kV down to 230V in England and Wales. In Scotland 132kV is considered to be a part of transmission rather than distribution so their operation is not included in the DNOs' activities. There are 14 DNOs in the UK which are owned by six different groups

### Distribution price control review 5 (DPCR5)

Distribution price control review 5. This price control runs from 1 April 2010 until 31 March 2015

### DUoS

Distribution Use of System: are charges that are paid to the distribution network operator (DNO) on whose network the meter point is located.

## E

### Eastern Power Networks (EPN)

One of the three distribution network licence areas owned and operated by UK Power Networks. The EPN network covers the East of England

### Electricity, safety, quality and continuity regulations 2002 (ESQCR)

The ESQCR specify safety standards, which are aimed at protecting the general public and customers from danger. In addition, the regulations specify power quality and supply continuity requirements to ensure an efficient and economic electricity supply service to customers

### Engineering Recommendation P2/6

The current distribution planning standard

### Extra high voltage (EHV)

Voltages over 20kV up to, but not including, 132kV

## F

### Fast money

Fast money is the revenue that is matched to the year of expenditure

### Forecast business plan questionnaire (FBPQ)

Questionnaire through which data is submitted to Ofgem to help form Ofgem's initial views on the revenue requirements for price control reviews

## G

### Gas and Electricity Markets Authority (GEMA)

The Office of Gas and Electricity Markets (Ofgem) operates under the direction and governance of GEMA which determines the strategy and decides on major policy issues. GEMA's principal objective is to protect the interests of consumers, both present and future, wherever appropriate by promoting effective competition.

### Gigawatt (GW)

Measure of power equal to one billion watts

## H

### Health index (HI)

Framework for collating information on the health (or condition) of distribution assets and for tracking changes in their condition over time. The HI will be used by Ofgem to inform an assessment of the efficacy of the DNOs' asset management decisions over the price control period. Health index arrangements were introduced as a part of DPCR5

### High Impact, Low Probability (HILP)

High Impact, Low Probability expenditure is designed to increase the security of supply to specific areas of the network that have a level of economic activity over and above a specified threshold.

### High Value Projects (HVP)

A High Value Project is a project over £25 million.

## High voltage (HV)

Voltages over 1kV up to, but not including, 22kV

## I

### Information technology (IT)

Technology systems used to manage information. In UK Power Networks this includes our management information systems, asset information systems and operational IT

### Inspections and maintenance (I&M)

The activities of both:

Inspections – the visual checking of the external condition of assets

Maintenance – the invasive ('hands on') examination of plant and equipment

### Interruption incentive scheme (IIS)

The interruption incentive scheme is a symmetric annual rewards and penalties scheme based on each DNO's performance against their targets for the number of customers interrupted per 100 customers (CI) and the number of customer minutes lost (CML)

## K

### KiloWatt hour revenue driver (kWh)

A revenue allowance based on units distributed (kWh)

## L

### Load index (LI)

Framework for collating information on the utilisation of individual substations or groups of interconnected substations and for tracking changes in their utilisation over time. The LI will be used by Ofgem to inform an assessment of the efficacy of the DNOs' general reinforcement decisions over the price control period. The load index was introduced as a part of DPCR5

### Load related expenditure (LRE)

The installation of new assets to accommodate changes in the level or pattern of electricity or gas supply and demand

## London Power Networks (LPN)

One of the three distribution network licence areas owned and operated by UK Power Networks. The LPN network covers Greater London

## Low voltage (LV)

This refers to voltages up to, but not including, 1kV

## M

### Megawatt (MW)

Measure of power equal to one million watts

### Megawatt-hour (MWh)

A measure of energy production or consumption equal to one million watts produced or consumed for one hour

### Modern Equivalent Asset Value (MEAV)

The gross capital cost of replacing an existing asset with a technically up-to-date new asset with the same service capability.

## N

### Network Operating Costs

These costs relate to the restoration of electricity supply as a result of network electrical faults, inspection and maintenance of our assets and tree maintenance.

### Non-load related expenditure (NLRE)

The replacement or refurbishment of assets which are either at the end of their useful life due to their age or condition, or need to be replaced on safety or environmental grounds

### Non-operational Capital Expenditure

Non-operational Capital Expenditure covers IT, vehicles and small tools.

## N-1

A form of resilience that ensures network availability in the event of component failure, i.e one network failure

## N-2

A form of resilience that ensures network availability in the event of component failure, i.e. two network failures

## O

### Office of gas and electricity markets (Ofgem)

Responsible for regulating the gas and electricity markets in the UK to ensure consumers' needs are protected, including their interests in the reduction of greenhouse gases and in the security of the supply of gas and electricity. This involves promoting competition, wherever appropriate, and regulating the monopoly companies which run the gas and electricity networks

### Occurrences Not Incentivised

Fault Occurrences Not Incentivised, through the Information Incentive Scheme, relates to customer supply restoration for individual premises and public and street furniture.

### Ongoing efficiencies

UK Power Networks has included an ongoing productivity estimate of 1.0% per annum for operational expenditure (including total indirect costs) and 0.7% for network investment.

### Other Non Load Related Capital Expenditure

## P

### P0

Price in year zero.

## R

### Real price effects (RPE)

Increase in prices over and above increases in the Retail Price Index (RPI). For example, increases in the cost of copper, steel, direct or contract labour over and above increases in RPI.

### Regulatory asset value (RAV)

The value ascribed by Ofgem to the capital employed in the licensee's regulated distribution or (as the case may be) transmission business (the 'regulated asset base'). The RAV is calculated by summing an estimate of the initial market value of each licensee's regulated asset base at privatisation and all subsequent allowed additions to it at historical cost, and deducting annual depreciation amounts calculated in accordance with established regulatory methods. These vary between classes of licensee. A deduction is also made in certain cases to reflect the value realised from the disposal of assets comprised in the regulatory asset base. The RAV is indexed to RPI in order to allow for the effects of inflation on the licensee's capital stock. The revenues licensees are allowed to earn under their price controls include allowances for the regulatory depreciation and also for the return investors are estimated to require to provide the capital

### Regulatory Instructions and Guidelines (RIGs)

Are instructions and guidance to Electricity Distribution Network Operators to enable them to complete the reporting requirements associated with the fifth price control arrangements (DPCR5) which runs from 1 April 2010 to 31 March 2015.

### Revenue = incentives + innovation + outputs (RIIO)

Ofgem's new regulatory framework, stemming from the conclusions of the RPI-X@20 project, to be implemented in forthcoming price controls. It builds on the success of the previous RPI-X regime, but better meets the investment and innovation challenge by placing much more emphasis on incentives to drive the innovation needed to deliver a sustainable energy network at value for money to existing and future consumers

### RIIO electricity distribution 1 (RIIO-ED1)

The first RIIO price control review to be applied to the electricity distribution network operators, following DPCR5. This price control will run from 1 April 2015 to 31 March 2023.

### Remote terminal unit (RTU)

Communications device that transmits readings and information about the status of the network back to the control centre.

### Ring main unit (RMU)

A HV switchgear arrangement for the connection and protection of distribution transformers

## S

### **Slow money**

Slow money is where costs are added to the RAV and revenues allow recovery of the costs over time together with the cost of financing this expenditure in the interim

### **South Eastern Power Networks (SPN)**

One of the three distribution network licence areas owned and operated by UK Power Networks. The SPN network covers the South East of England

### **Smart Meter**

Smart meters are high-tech electricity and gas meters that will replace your existing meter. They will measure your exact gas and electricity use and, most importantly, send all the information back to your energy supplier – meaning no more estimated bills. For distributors, we will have better visibility of our networks for fault restoration and maintenance.

### **SW 1:20**

The severe weather 1:20 relates to a severe weather storm occurring once in every twenty years per DNO.

## T

### **Total operating and capital expenditure (totex)**

Total of capital expenditure (capex) plus operational expenditure (opex)

### **Transmission Connection Point (TCP)**

## W

### **Wayleaves**

These legal rights provide utility companies with access to private land to install and maintain cabling and wires in return for some form of payment.

