

UK Power Networks

Business plan (2015 to 2023)

Annex 2: Forecast Outputs

March 2014

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

Document History

Version	Date	Revision Class	Originator	Section Update	Details
1.0	03/02/2014	N/A	Adrian Searle	N/A	Initial version (ED1 July 2013 Submission baseline)
1.1	06/03/2014	Major	Robert Friel	Sections 3 4, 7 and 10	Guaranteed Standards added to Customer Service. Updated costs, HI, LI and CI/CML comparisons for 12/13. Innovation section (new Tier2 projects and associated income)
1.2	10/03/2014	Minor	Robert Friel	Section 9	Workforce Renewal updates



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Executive Summary

1.1 Current performance and its impact on our RIIO-ED1 Outputs

UK Power Networks was created in October 2010 and since then has transformed its business strategy and performance, with significant benefits for customers. In the first three years of the current price control period (2010-2015):

- Our operational focus has delivered a step change in Customer Interruptions (EPN 25 per cent, LPN 25 per cent and SPN 34 per cent better than target) and Customer Minutes Lost (EPN 28 per cent, LPN 18 per cent and SPN 40 per cent better than target)
- Our investment programme has exceeded the agreed targets for network health (EPN 93 per cent, LPN 60 per cent and SPN 82 per cent delivered after only 60 per cent of the period)
- We have optimised our network reinforcement programme for the impact on demand of the global economic crisis to both exceed targets and reduce expenditure to achieve cost savings which will be shared with customers. The number of heavily loaded sites are as follows: EPN: 25 compared to a target of 56; LPN: 27 compared to a target of 21; SPN: 25 compared to a target of 40. UK Power Networks never automatically executes its investment plans as approved by the regulator, we always update them for changing economic conditions to make sure we are only doing work that is really necessary for the benefit of customers
- Our refocusing of the business on customer service has improved our average customer satisfaction score for faults, connections and general enquiries from 7.13 to 8.06 – although we recognise our customer service performance still requires further improvement. We have launched a business transformation programme at considerable expense to our shareholders to modernise our processes and systems to allow us to realise these gains
- We believe that we are the most innovative DNO group. Our London network already utilises many 'smart grid' techniques on a business-as-usual basis, including meshed networks, high levels of automation and control, and contracted demand side reduction. We have the largest portfolio of major innovation projects of any DNO group

This track record of improvement is second to no other UK DNO, particularly considering that UK Power Networks operates in the most challenging, fastest growing, and highest cost part of the country, including London.

UK Power Networks will build on these improvements and continue to deliver improved outputs for its customers and stakeholders in the next planning period. This annex set out our outputs targets for the RIIO-ED1 period. Our key focus during the RIIO-ED 1 will be to:

- Achieve for zero harm to our staff and customers. This is a challenging objective, but one we must always continue to strive for.
- Achieve upper third performance in customer satisfaction, by:
 - improving our services to new connections customers;
 - continuing to improve our response to interruptions;
 - addressing complaints quickly and
 - Continuing to listen to our stakeholders about how we can improve our services.

1.2 The outputs delivered by our updated plan

The table below sets out the outputs and associated performance measures that UK Power Networks is proposing to deliver over the 2015 to 2023 planning period.

Table 1 UK Power Networks' 2015 to 2023 output performance measures

Output category	2015-23 Performance Commitments
Customer satisfaction	<ol style="list-style-type: none"> 1. Improve performance of all UKPN DNOs in all components of the customer satisfaction survey achieving an average overall performance of 8.3 for EPN and SPN and 8.1 for LPN over RIIO-ED1 2. On average, answer calls from customers in less than 5 seconds 3. Resolve 70% of all customer complaints within 1 day and 95% within 31 days 4. Contact 100% customers within 24 hours to ensure any work they have requested has been completed to their satisfaction 5. Get the lights back on for 90% of HV power cuts within 2 hours 6. Provide multiple ways for customers to stay regularly updated on the estimated time for supply restoration and of any changes to the estimated time. As a minimum this will include phone, SMS text, twitter and online 7. Proactively contact 100 per cent of registered vulnerable customers to offer support if they are without power 8. Continue with our three critical friends panels per DNO per annum 9. Publish and review a UKPN business plan update every year 10. Publish an annual strategic development statement for Central London 11. Review our economic assumptions with our critical friends panels each year 12. Appoint an independent chairperson to our critical friends panels 13. Hold a Distributed Generation forum annually 14. Continue to use our stakeholder feedback to improve our customer facing business processes
Reliability and availability	<ol style="list-style-type: none"> 15. Maintain LPN's position as having the lowest level of customer interruptions and customer minutes lost in the UK targeting 23 CIs (7% improvement) and 30 CMLs (8% improvement) due to unplanned interruptions 16. Reduce EPN and SPN customer interruptions by more than 12 per cent targeting 51 CI in EPN and 49 CI in SPN due to unplanned interruptions 17. Reduce EPN and SPN customer minutes lost by more than 19 per cent targeting 35 CML in EPN and 35 CML in SPN due to unplanned interruptions 18. Maintain the health of the network during RIIO-ED1 as measured by the health index, at least at the end of DPCR5 levels 19. Continue to improve the load index of the networks by reducing the number of highly rated sites to 18 in EPN, 14 in SPN and 12 in LPN 20. Protect 78 substations sites from the risk of flooding 21. Reduce the number of 12 hour failures by more than 30 per cent 22. Reduce worst served customers to less than 10,000 in both EPN and SPN
Environment	<ol style="list-style-type: none"> 23. Reduce our business carbon footprint by 2% per annum 24. Continue to recycle 70 per cent of office and depot waste and 98 per cent of street works spoil 25. Maintain sulphur hexafluoride (SF6) leakage at less than 0.2% as a proportion of SF6 in

Output category	2015-23 Performance Commitments
	<p>service</p> <p>26. Reduce cable fluid leakage of 207,000 litres by 2 per cent per annum</p> <p>27. Undergrounding the equivalent of 80km of HV overhead line in SPN and 96km of HV overhead line in EPN in Areas of Outstanding Natural Beauty and National Parks</p> <p>28. Innovation expenditure of 0.5% of allowed revenues and win largest market share of the NIC competition</p> <p>29. Investigate all noise issues and address all non-compliant sites</p>
Connections	<p>30. Achieve average time to quote from the time of enquiry of 8.2 days for low voltage single services and 11.7 days for low voltage multiple services</p> <p>31. Achieve average time to connect of 42 days for low voltage single services and 53 days for low voltage multiple services</p> <p>32. Achieve in excess of 99% of our Guaranteed Standards of Performance (GSoP) targets</p> <p>33. From Q3 2014 we will commence the introduction of new online services for customers requiring new or altered metered services and all customers requiring unmetered connections. These services will include;</p> <ul style="list-style-type: none"> a. On-line submission of service requests b. On-line quotations and estimates c. Service request and job delivery tracking d. On-line payment e. Appointment booking <p>34. Integrate Flexible Plug and Play service (as per our Low Carbon Network Fund Project) into business as usual by Q2 2015</p> <p>Meet our improvement commitments to major connections customers</p> <p>35. Engage regularly with other connections stakeholders on a frequency agreed with them</p> <p>36. From 2014, agree and publish a service development plan with associated Key Performance Indicators</p> <p>37. Publish quarterly updates to communicate progress against the service development plan</p> <p>38. Review and revise plan annually in agreement with stakeholders</p> <p>39. Publish annual progress update to Ofgem and stakeholders</p> <p>40. Complete an annual independent audit of our achievements against the agreed service development plan</p> <p>41. Work with Connections stakeholders to develop our products and services through 'user groups' 3 times per annum with common interest customer groups (highway services, distributed generation, metered customers) to gain insight into their needs and requirements and shape innovation and development within UKPN.</p> <p>42. Offer account management to any business/commercial customer who requests this service</p> <p>Develop more 'pre-application' support for customers to enable them to make informed decisions on their schemes</p> <p>43. Extend our "Ask the Expert" service to include phone, web chat and face to face options</p> <p>44. Publish 'heat maps' to provide an overview of current network capacities by location</p> <p>45. Provide access via a web portal to cable diagrams allowing customer access to up to date information</p> <p>46. Extend the online price illustrator to include all market segments and provide indicative</p>

Output category	2015-23 Performance Commitments
	<p>timescales in addition to cost illustrations.</p> <p>47. Extend our current DG surgery sessions to other customer groups to allow customers to discuss their connection proposals informally prior to application.</p> <p>Increase the choice and flexibility of connections services available to customers</p> <p>48. The introduction of wider office hours for our contact centre</p> <ul style="list-style-type: none"> a. 08.00 to 20.00 weekdays b. 09.00 to 16.00 Saturdays <p>49. Offer 2 hour time banded appointments for site visits</p> <p>50. Schedule work delivery across a wider working window to include evenings and weekends</p> <p>51. Extend the convertible quotes concept so that quotations offered in a competitive market segment can be fully or partly accepted dependent on the customers preference</p> <p>Continue to support and promote competition in the connections market place through innovative change</p> <p>52. Self-determination of the Point of Connection for an increasing range of connections</p> <p>53. HV jointing to existing networks to include all associated planning and operational activities.</p> <p>54. Extend live LV jointing to the LPN interconnected area</p>
Safety	<p>55. No formal notices or prosecutions by the HSE under applicable legislation</p> <p>56. Deliver the high safety criticality element of the asset health /risk index (deliver all asset improvements with a high safety criticality score (4) in the asset risk index</p> <p>57. Reduce the Total Recordable Injuries (Accident rate per 100,000 hours worked) by 10% per annum to less than 0.5</p> <p>58. Reduce the Lost Time Recordable Injuries (Accident rate per 100,000 hours worked) by 10% per annum to less than 0.05</p> <p>59. Achieve at least one year with no RIDDOR reportable lost time incidents for employees and contractors by the end of the period</p> <p>60. At least one year with no RIDDOR Reportable public harm resulting from our activities</p> <p>61. Engage with 2 million children and members of the public , either through face to face or via on line interaction, on public safety issues over the regulated period</p>

Output category	2015-23 Performance Commitments
Social	<p>Continue to improve the service provided to vulnerable customers</p> <ul style="list-style-type: none"> 62. Double the number of customers on our PSR 63. Proactively contact all registered vulnerable customers to offer support if they are without power 64. Extend our local authority joint response pilot across our geographical footprint and standardise triggers 65. Provide every vulnerable customer an alternative high priority dedicated number 66. Distribute Welcome Packs to all new PSR customers <p>Maintain community engagement during RIIO-ED1</p> <ul style="list-style-type: none"> 67. Host two subject-specific priority issue focus groups on vulnerable customers and fuel poverty every year 68. Maintain our community fund investing £300,000 per annum <p>Work proactively with third parties to reduce the level of fuel poor in our three networks</p> <ul style="list-style-type: none"> 69. Work with National Energy Action (NEA) to map and profile fuel poor customers within our footprint 70. Publish information to targeted customers on how energy efficiency and demand- side activity can be used to manage energy consumption 71. Deliver a series of targeted consumer surgeries for vulnerable residents designed to raise awareness of energy efficiency and how to manage energy bills 72. Publish a strategy to explain how smart meters can be used to reduce fuel poverty 73. Create a group of UK Power Networks local community energy champions 74. Develop a project with NEA to educate young carers about energy efficiency 75. Organise and deliver school activity days to encourage safe, efficient use of energy <p>Be an employer of choice</p> <ul style="list-style-type: none"> 76. We will measure ourselves against other companies and seek inter and intra sector recognition/accreditation by participating in external benchmarking such as achieving membership of the Sunday Times Top 100 Best Companies. 77. We will recruit and train over 1000 staff as well as up-skill and develop existing employees to ensure that we maintain a suitably skilled and motivated workforce.

2 Purpose of the Document

This document sets out the measures against which we will assess our performance during the RIIO-ED1 period.

UK Power Networks have consulted extensively with their customers and other stakeholders in preparing this updated Business Plan. We have listened to, and understood, what they have said and on this basis over the period 2015 to 2023 we are committed to delivering 77 output measures in the six output areas as defined by Ofgem being network performance, 65 are voluntary additional outputs and are based on feedback from our consultation with our customers and other stakeholders.

We will be measured against the targets for each of the output measures and we will report our performance regularly to Ofgem and our customers and other stakeholders. The targets reflect what we understand our customers and other stakeholders want us to deliver over the 2015 to 2023 planning period.

A detailed discussion of our historic output performance can be found in [Annex 1: Historic Outputs](#).

3

Customer Satisfaction

3.1 Overview

UK Power Networks is committed to being a customer-driven business. We are committed to monitoring and improving the service we deliver to achieve a high level of customer satisfaction on everything that we do. We are also concerned with ensuring effective stakeholder engagement across a range of services and activities which directly impact our customers. A detailed discussion of our customer satisfaction strategy can be found in [Annex 4: Customer Satisfaction Strategy](#).

The customer service outputs comprise the following primary outputs and secondary deliverables:

Customer satisfaction performance commitments

Primary Outputs

The broad measure of customer service (BMCS) - this is intended to replicate the sorts of measures typically used by customer-facing Networks in competitive markets to monitor and improve the service they offer their customers and comprises the following three components:

Customer satisfaction survey
Complaints metric
Stakeholder engagement

Secondary deliverables

Stakeholder Engagement
Speed of call answering
Call all registered vulnerable customers affected by power cuts

Target performances

1. Improve performance of all UKPN DNOs in all components of the customer satisfaction survey achieving an average overall performance of 8.3 for EPN and SPN and 8.1 for LPN over RIIO-ED1
2. On average, answer calls from customers in less than 5 seconds
3. Resolve 70% of all customer complaints within 1 day and 95% within 31 days
4. Contact 100% customers within 24 hours to ensure any work they have requested has been completed to their satisfaction
5. Get the lights back on for 90% of HV power cuts within 2 hours
6. Provide multiple ways for customers to stay regularly updated on the estimated time for supply restoration and of any changes to the estimated time. As a minimum this will include phone, SMS text, twitter and online
7. Proactively contact 100 per cent of registered vulnerable customers to offer support if they are without power
8. Continue with our three critical friends panels per DNO per annum
9. Publish and review a UKPN business plan update every year
10. Publish an annual strategic development statement for Central London
11. Review our economic assumptions with our critical friends panels each year

12. Appoint an independent chairperson to our critical friends panels
13. Hold a Distributed Generation forum annually
14. Continue to use our stakeholder feedback to improve our customer facing business processes

Incentive mechanisms

Broad Measure of Customer Service - +/- 1.5% base revenues

Customer satisfaction survey +/- 1%,

Complaints -0.5%,

Stakeholder engagement +0.5%

3.2 Broad measure of customer service

Customer satisfaction with our performance is measured through the broad measure of customer service (BMCS). This is intended to replicate the sorts of measures typically used by customer-facing businesses in competitive markets and improve the service they offer their customers.

The BMCS comprises the following three components:

- Customer satisfaction survey. This comprises of a three elements, Interruptions, minor Connections and General Enquiries.
- Complaints metric
- Stakeholder engagement

UK Power Networks' BMCS targets for the next period highlight its commitment to significantly improve its performance, particularly in the area of connections and for LPN, general enquiries. In 2012/13, SPN and EPN's general enquires performance improved providing confidence that the measures implemented will enable them to meet the challenging 2015 to 2023 targets. Efficiencies arising from the implementation of best practice systems and processes as part of the transformation process will also facilitate UK Power Networks achievement of these targets.

UK Power Networks will introduce a glide path approach to achieving the RIIO-ED1 targets which will involve setting increasingly higher targets for the remainder of the planning period to incentivise continual improvement in its performance.

3.3 Target Performance

3.3.1 Target performance- customer satisfaction

We are committed to improving our performance against these measures in the 2015 to 2023 planning period. Table 2 below shows the BMCS Customer Satisfaction for each Network for the current and next planning periods.

Our targets reflect the service sector upper quartile customer satisfaction performance, which represent as a score of 8.2. We believe this represents the level of performance distribution network operator should be striving to achieve. The individual scores for Interruptions, Connections and General Enquiries are scaled from the relative all DNO performance upper quartile performance. For Interruptions performance we have established that service scores are strongly linked adversely to the proportion of interruptions service performance that is driven by underground LV network performance and the targets we have set reflect this. This results in a lower target for LPN of 8.1 overall but a slightly harder target of 8.3 for EPN and SPN.

Compared to current performance these targets represent a significant improvement challenge particularly in Connections and LPN General Enquiries. Our performance in general enquires has improved in SPN and EPN 2012/13 indicating that the measures we are putting in place will enable UK Power Networks to meet these challenging targets for RIIO-ED1.

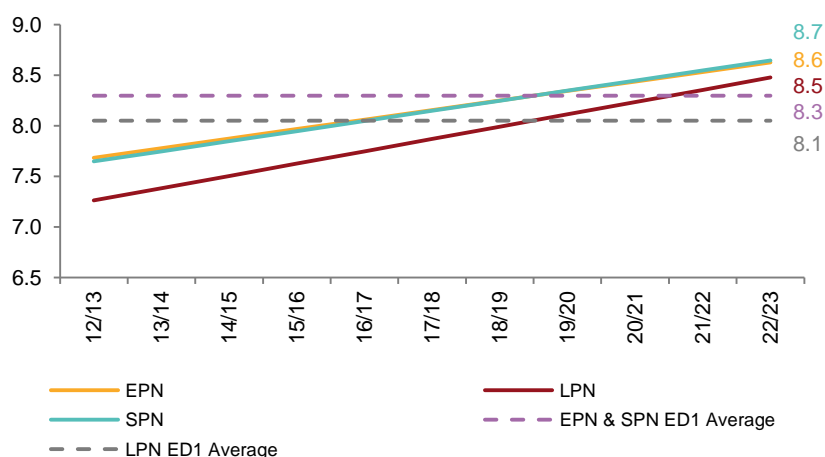
Table 2 UK Power Networks' overall customer satisfaction survey scores

DNO	BMoCS component	DPCR-5 (2012/13 Regulatory Year)	UKPN's forecast average performance for RIIO ED1	UKPN's forecast target performance for 2023
EPN	Interruptions	8.1	8.6	8.8
	Connections (minor)	7.2	8.1	8.6
	General Enquiries	8.2	8.4	8.6
	Overall	7.7	8.3	8.6
LPN	Interruptions	7.6	8.1	8.3
	Connections (minor)	7.2	8.1	8.6
	General Enquiries	6.9	8.0	8.6
	Overall	7.3	8.1	8.5
SPN	Interruptions	7.9	8.6	8.9
	Connections (minor)	7.3	8.1	8.5
	General Enquiries	8.1	8.4	8.6
	Overall	7.7	8.3	8.7

In 2012/13, SPN and EPN's general enquires performance improved providing confidence that the measures implemented will enable them to meet the challenging 2015 to 2023 targets.

UK Power Networks has set a glide path approach to achieving the RIIO-ED1 targets which will involve setting increasingly higher targets for the remainder of the planning period to incentivise continual improvement in its performance.

Figure 1 Overall customer satisfaction survey target scores to 2023



To ensure we achieve and exceed these targets we have the following planned improvements:

- We have implemented a business-wide customer service training and development programme to support all employees, so that they understand the standards expected of them, but also have the competencies to deliver service which satisfies our customers

- We are building on our multi-channel strategy by continuing to monitor closely developments in communications technology to ensure that our customers can continue to engage with us using the channels that are most convenient for them. We have already introduced updates via Twitter and the channels we will provide for customer information and contact will as a minimum include:
 - Phone
 - SMS Text
 - Twitter
 - Online
- We are working to improve our telephony systems so that, in conjunction with the additional call centre staff, we can ensure that call wait time are reduced to less than five seconds on average over the RIIO-ED1 period.

The service we deliver to our customers in carrying out work on their supplies or restoring power after power cuts has a major bearing on customer satisfaction.

- In addition to our network CI and CML performance targets which relate to average performance and our 12 hour restoration targets which relate to long duration interruptions, we have set ourselves a target of restoring 90% of customers affected by high voltage faults in 2 hours. This target is appropriate as high voltage faults cause the majority of customer interruptions and can often be restored quickly by switching on the network.
- Where we carry out work on a customers' behalf, for example shrouding an overhead service so work can be carried out safely on their premises , we will contact the customer within 24 hours of the work being completed to ensure the work has been completed to their satisfaction.

3.3.2 Target Performance - Complaints

Resolving customer complaints is important to us. We are committed to getting the job right first time, every time which is reflected in our commitment to eliminate repeat complaints and complaints awarded to the ombudsman in the 2015 to 2023 planning period as shown in .

Table 3 below.

The complaints metric measures performance on four indicators that are weighted to calculate a composite score (the weightings are shown in brackets): the percentage of total complaints outstanding after one day (10 per cent) the percentage of total complaints outstanding after 31 days (30 per cent) the percentage of total complaints that are repeat complaints (50 per cent) the percentage of Energy Ombudsman decisions that find in favour of the complainant (10 per cent).

We are committed to getting the job right first time, every time which is reflected in our commitment to resolve 70% of complaints in one day, eliminate repeat complaints and complaints awarded to the ombudsman in the 2015 to 2023 planning period. This is a significant challenge in improving our complaints performance, particularly around repeat complaints. Our performance in 2012/13 indicates that we are well on the way to eliminating these by the end of DPCR5.

Table 3 Complaints metric

	DPCR-5 Average - EPN	DPCR-5 Average - LPN	DPCR-5 Average- SPN	UK Power Networks's forecast performance for RIIO ED1
Complaints not resolved within 1 Day (%)	67	69	62	30
Complaints not resolved within 31 Days (%)	9	9	9	5
Repeat Complaints (%)	12	13	12	0
Ombudsman Complaints awarded to the customer (%)	0	1	1	0
Overall Complaints Metric Score (%)	15	16	15	5

Engaging with our Customers

We recognise that our business plan and business process, particularly the customer facing services, have benefited significantly from our enhanced stakeholder engagements processes during 2011 and 2012. We have therefore made the following RIIO-ED1 commitments:

- To continue with our stakeholder critical friends panels during RIIO-ED1 holding three sessions in each DNO every year
- To hold an annual DG forum for distributed generation customers every year
- To annually present an updated review of our business plan for discussion at one of these panels
- Publish an annual strategic development statement for Central London
- To annually present an update on our economic projections at one of these panels
- To appoint an independent chairperson to the critical friend panels
- To continue with our review, implement and challenge cycle of process improvements
- To present our Business Transformation outputs during the 2013 critical friend panels

3.4 Guaranteed Standards of Performance

The Guaranteed Standards below to which all network operators comply to, set out a standard minimum level of service a DNO should be able to provide to its customers. The standards aim to ensure that the customer affected by the failure to meet a service standard receives an appropriate payment direct from the network operator. The standards are split into two sets covering the provision of service to existing connections and provision of services related to new connections.

3.4.1 Promoting Guaranteed Standards of Performance

We proactively contact customers when we believe we may have failed any of the service standards.

We will take every opportunity to promote guaranteed standards entitlement to customers. We already make sure customers are aware of the standards of service that apply when we have contact with them and they are included in correspondence we distribute with any written communication we have with customers. We will also promote them through the social media channels we use such as Twitter. On our web site we have clearly signposted information on what compensation we provide for failure in service and clear information on the Guaranteed Standards and how customers can claim.

3.4.2 Guaranteed Standards for existing connections

These standards mostly refer to situations where customers experience a problem with their existing connection to the network.

Where customers experience an interruption to their supply, they should be assured that it will be restored as quick as is reasonably possible. If this is a planned loss of supply, they should be given appropriate notice as to when they will be without power. These standards have been put in place to ensure that when a customer does not get the level of service they expect, they are compensated appropriately.

Currently where customers experience an electricity supply interruption lasting more than 18 hours, they are entitled to a compensation payment under the Electricity (Standards of Performance) Regulations 2010. Domestic customers receive a payment of £54 and non-domestic customers receive a payment of £108, and both receive a further £27 payment for every additional 12 hours off supply. UK Power Networks has voluntarily increased the payments it makes to domestic customers to £100. The standards under the Regulations will become more challenging in the 2015 to 2023 period. Customers will be entitled to compensation following 12 hour supply interruptions and compensation payments will increase to £75 for domestic customers and £150 for non-domestic customers, with a further £35 payment for every additional 12 hours off supply. UK Power Networks takes its responsibilities to its customers seriously and is committing to double all the payments it makes where standards have been breached.

The table below shows the significant improvement UK Power Networks has made in reducing long duration interruptions. We welcome the change in the guaranteed standard and will focus on ensuring that the Networks outperform the new restoration standard to minimise the number of these incidents, so that long duration outages

become increasingly rare for all customers. In particular, UK Power Networks will aim to restore all customers in under 12 hours with a commitment to reduce over 12 hour failures by 30 per cent.

Table 4 Number of customers interrupted for over 12 hours

	09/10	10/11	11/12	12/13	RIIO-ED1 Target
EPN	62,067	23,895	5,360	8,854	5,000
LPN	87,151	18,642	3,815	4,822	3,000
SPN	37,241	21,361	6,992	8,727	5,500
UKPN	186,459	63,898	16,167	22,403	13,500

In the table below we set out our commitments relating to each standard relating to existing supplies.

Table 5 Non-Connection Guaranteed Standards

Reporting code	Required level of service	Guaranteed Standards payment for failure	Current Number of failures (per 100,00 customers)	UK Power Networks' commitment to improve or uphold performance in this area
EGS1	Responding to failure of distributor's fuse We must attend the customer's premises within 3 hours on a normal working day, and 4 hours on any other day (within working hours)	£30 for domestic and non-domestic customers	1	We will double the mandated payment to customers where we fail this standard
EGS2	Supply restoration - normal conditions We must restore power to the customer within 12 hours when they experience a loss of supply under normal conditions	£75 for domestic customers (voluntarily increased to £100) £150 for non-domestic customers, £35 for each further 12 hours	7	We will double the mandated payment to customers where we fail this standard
EGS2A	Supply restoration: multiple interruptions Customers should experience no more than 3 interruptions to supply that last longer than 3 hours within a regulatory period (April-March)	£75 for domestic and non-domestic customers	3	We will double the mandated payment to customers where we fail this standard
EGS2B	Supply restoration - normal conditions (5,000 or more premises interrupted) We must restore power to the customer within 24 hours where more than 5,000 premises are interrupted by a single fault	£75 for domestic customers, £150 for non-domestic customers, £35 for each further 12 hours up at a cap of £300	0	We will double the mandated payment to customers where we fail this standard

Reporting code	Required level of service	Guaranteed Standards payment for failure	Current Number of failures (per 100,00 customers)	UK Power Networks' commitment to improve or uphold performance in this area
EGS2C	<p>Supply restoration – rota disconnections</p> <p>If power supply needs to be shared amongst an area on a rota basis due to a major loss of supply, the maximum cumulative time a customer can be off for is 24 hours</p>	£75 for domestic customers, £150 for non-domestic customers	0	We will double the mandated payment to customers where we fail this standard
EGS4	<p>Notice of planned interruption to supply</p> <p>Where we need to undertake planned work causing a loss of supply, customers should be informed at least two days in advance</p>	£30 for domestic customers, £60 for non-domestic customers	16	We will double the mandated payment to customers where we fail this standard
EGS5	<p>Investigation of voltage complaints</p> <p>When a customer expresses concerns about the voltage of their supply, we must visit the premises within 7 working days, or give the customer an explanation of the probable cause within 5 working days</p>	£30 for domestic and non-domestic customers	0	We will double the mandated payment to customers where we fail this standard
EGS8	<p>Making and keeping appointments</p> <p>If we arrange to visit a customer, we must agree a morning, and afternoon or a time within a 2 hour slot, and keep to that appointment</p>	£30 for domestic and non-domestic customers	2	We will double the mandated payment to customers where we fail this standard
EGS9	<p>Payments owed under the standards</p> <p>We must make a payment for failure of standards within 10 working days</p>	£30 for domestic and non-domestic customers	1	We will double the mandated payment to customers where we fail this standard
EGS11 (EGS11A, EGS11B and EGS11C)	<p>Supply restoration: severe weather conditions</p> <p>In severe weather conditions, we must restore power within 24 hours (category 1 severe weather), 48 hours (category 2 severe weather) or longer in more severe conditions</p>	£35 for domestic and non-domestic customers, plus £35 for each further 12 hours up to a cap of £300 per customer	0	We will double the mandated payment to customers where we fail this standard

3.4.3 Connections Guaranteed Standards

Customers looking to connect to our networks want a efficient processes that can meet their individual specifications. Ofgem have set out a number of standards relating to the connections process to ensure that we deliver these services in a way that ensures customers' needs are met, as shown below. As with the above standards, any failure will result in a payment being made to the affected customer(s) and UK Power Networks will again double the statutory level.

Table 6 Connection-related Guaranteed Standards

Reporting code	Required level of service	Guaranteed Standards payment for failure	UK Power Networks' commitment to improve or uphold performance in this area
1A	<p>Provision of budget estimate <1MVA</p> <p>We must deliver a budget estimate to the customer within 10 working days of a request</p>	£65 - One off payment	We will double the mandated payment to customers where we fail this standard
1B	<p>Provision of budget estimate >1MVA</p> <p>We must deliver a budget estimate to the customer within 20 working days of a request.</p>	£65 - One off payment	We will double the mandated payment to customers where we fail this standard
2A	<p>Provision of a quotation for a single LV single phase service connection</p> <p>We must deliver a quote to the customer within 5 working days of a request.</p>	£15 for each working day after the end of the prescribed period up to and including the day on which the quotation is dispatched	We will double the mandated payment to customers where we fail this standard
2B	<p>Provision of a quotation for small LV projects:</p> <p>2-4 LV single phase domestic services</p> <p>or for connections to 1-4 LV single phase domestic premises involving an extension to the LV network or a single two or three phase whole current metered connection (not requiring an extension to LV network)</p> <p>We must deliver a quote to the customer within 15 working days of a request.</p>	£15 for each working day after the end of the prescribed period up to and including the day on which the quotation is dispatched	We will double the mandated payment to customers where we fail this standard
3A	<p>Provision of any other LV demand quotation</p> <p>We must deliver a quote to the customer within 25 working days of a request for Demand connections, and within 45 days for Distributed Generation</p>	£65 for each working day after the end of the prescribed period up to and including the day on which the quotation is dispatched	We will double the mandated payment to customers where we fail this standard
3B	<p>Provision of a HV demand quotation</p> <p>We must deliver a quote to the customer within 35 working days of a request for Demand connections, and within 65 days for Distributed Generation</p>	£135 for each working day after the end of the prescribed period up to and including the day on which the quotation is dispatched	We will double the mandated payment to customers where we fail this standard
3C	<p>Provision of a EHV demand quotation</p> <p>We must deliver a quote to the customer within 65 working days of a request for a connection</p>	£200 for each working day after the end of the prescribed period up to and including the day on which the quotation is dispatched	We will double the mandated payment to customers where we fail this standard

Reporting code	Required level of service	Guaranteed Standards payment for failure	UK Power Networks' commitment to improve or uphold performance in this area
4A	<p>Contact customer (post acceptance) about scheduling <5 LV service connections covered by 2A & 2B</p> <p>Once a customer has accepted a quotation, we must contact the customer to start the process within 7 working days of acceptance</p>	£15 for each working day after the end of the prescribed period up to and including the day on which contact occurs	We will double the mandated payment to customers where we fail this standard
4B	<p>Contact customer (post acceptance) about scheduling other LV demand connections</p> <p>Once a customer has accepted a quotation, we must contact the customer to start the process within 7 working days of acceptance</p>	£65 for each working day after the end of the prescribed period up to and including the day on which contact occurs	We will double the mandated payment to customers where we fail this standard
4C	<p>Contact customer (post acceptance) about scheduling HV demand connections</p> <p>Once a customer has accepted a quotation, we must contact the customer to start the process within 10 working days of acceptance</p>	£135 for each working day after the end of the prescribed period up to and including the day on which contact occurs	We will double the mandated payment to customers where we fail this standard
4D	<p>Contact customer (post acceptance) about scheduling EHV demand connections</p> <p>Once a customer has accepted a quotation, we must contact the customer to start the process within 15 working days of acceptance</p>	£200 for each working day after the end of the prescribed period up to and including the day on which contact occurs	We will double the mandated payment to customers where we fail this standard
5	<p>Commence LV, HV & EHV demand works on customer's site</p> <p>Work must be commenced on site by the date agreed with the customer beforehand</p>	£25 for each working day after the agreed date up to and including the day on which the works are commenced	We will double the mandated payment to customers where we fail this standard
6A	<p>Complete service connection works</p> <p>Work must be completed on site by the date agreed with the customer beforehand</p>	£35 for each working day after the agreed date up to and including the day on which the works are completed	We will double the mandated payment to customers where we fail this standard
6B	<p>Complete LV works (including phased works)</p> <p>Work must be completed on site by the date agreed with the customer beforehand</p>	£135 for each working day after the agreed date up to and including the day on which the works are completed	We will double the mandated payment to customers where we fail this standard
6C	<p>Complete HV works (including phased works)</p> <p>Work must be completed on site by the date agreed with the customer beforehand</p>	£200 for each working day after the agreed date up to and including the day on which the works are completed	We will double the mandated payment to customers where we fail this standard

Reporting code	Required level of service	Guaranteed Standards payment for failure	UK Power Networks' commitment to improve or uphold performance in this area
6D	<p>Complete EHV works (including phased works)</p> <p>Work must be completed on site by the date agreed with the customer beforehand</p>	£270 for each working day after the agreed date up to and including the day on which the works are completed	We will double the mandated payment to customers where we fail this standard
7A	<p>Complete LV energisation works (including phased works)</p> <p>Work must be energised by the date agreed with the customer beforehand</p>	£135 for each working day after the agreed date up to and including the day on which energisation occurs	We will double the mandated payment to customers where we fail this standard
7B	<p>Complete HV energisation works (including phased works)</p> <p>Work must be energised by the date agreed with the customer beforehand</p>	£200 for each working day after the agreed date up to and including the day on which energisation occurs	We will double the mandated payment to customers where we fail this standard
7C	<p>Complete EHV energisation works (including phased works)</p> <p>Work must be energised by the date agreed with the customer beforehand</p>	£270 for each working day after the agreed date up to and including the day on which energisation occurs	We will double the mandated payment to customers where we fail this standard
8A	<p>Emergency Fault Repair response</p> <p>When notified of a fault with the potential to cause harm or damage, we must respond within 2 hours to rectify the issue</p>	£65 one off payment	We will double the mandated payment to customers where we fail this standard
8B	<p>High Priority Fault Repair – Traffic Light Controlled</p> <p>When notified of a fault in an area where Traffic Lights are involved, we must repair the fault within 2 calendar days</p>	£15 for each working day after the end of the prescribed period up to and including the day on which the fault rectification works are completed	We will double the mandated payment to customers where we fail this standard
8C	<p>High Priority Fault Repair – non Traffic Light Controlled</p> <p>When notified of a fault in an area where Traffic Lights are NOT involved, we must repair the fault within 10 calendar days</p>	£15 for each working day after the end of the prescribed period up to and including the day on which the fault rectification works are completed	We will double the mandated payment to customers where we fail this standard
8D	<p>Multiple unit fault repair</p> <p>When notified of a multiple unit fault, we must complete restoration within 20 working days</p>	£15 for each working day after the end of the prescribed period up to and including the day on which the fault rectification works are completed	We will double the mandated payment to customers where we fail this standard
8E	<p>Single unit fault repair</p> <p>When notified of a single unit fault, we must complete restoration within 25 working days</p>	£15 for each working day after the end of the prescribed period up to and including the day on which the fault rectification works are completed	We will double the mandated payment to customers where we fail this standard

Reporting code	Required level of service	Guaranteed Standards payment for failure	UK Power Networks' commitment to improve or uphold performance in this area
9	<p>Provision of a quotation – New Works order (1-100 units)</p> <p>We must deliver a quote to the customer within 25 working days of a request for a connection</p>	£15 for each working day after the end of the prescribed period up to and including the day the quotation is dispatched	We will double the mandated payment to customers where we fail this standard
10A	<p>New works order -completion of works on a new site</p> <p>Work must be completed on site by the date agreed with the customer beforehand</p>	£15 for each working day after the end of the prescribed period up to and including the day the works are completed	We will double the mandated payment to customers where we fail this standard
10B	<p>New works order -completion of works on adopted highways</p> <p>Work must be completed on site within 35 working days of acceptance of a quotation</p>	£15 for each day after the end of the prescribed period up to and including the day on which the works are completed	We will double the mandated payment to customers where we fail this standard
11A	<p>Quotation accuracy review scheme challenge single LV single phase service connection (aligns to 2A)</p> <p>We will review all quotations to ensure the accuracy and completeness of our process, refunding any overcharging and making an additional payment</p>	£335 - one off payment	We will double the mandated payment to customers where we fail this standard
11B	<p>Quotation accuracy review scheme challenge for small LV projects (aligns to 2B)</p> <p>We will review all quotations to ensure the accuracy and completeness of our process, refunding any overcharging and making an additional payment compensation</p>	£670 – one off payment	We will double the mandated payment to customers where we fail this standard
12	<p>Where a Distributor fails to make a payment under the regulations</p> <p>We must ensure we make all correct payments for failures of the above guaranteed standards within the specified timescales</p>	£65 – one off payment	We will double the mandated payment to customers where we fail this standard

4

Reliability and Availability

4.1 Overview

UK Power Networks is committed to ensuring the long term condition and resilience of its Networks to ensure that the number and duration of customer supply interruptions are minimised.

The network reliability outputs comprise the following primary outputs and secondary deliverables:

Network availability and reliability performance commitments

Primary Outputs

Customer Interruptions (CI) (planned as well as unplanned): Number of customers whose supplies have been interrupted per 100 customers each year;

Customer Minutes Lost (CML): (planned as well as unplanned): duration of unplanned interruptions to supply each year, measured by average customer minutes lost per customer where an interruption of supply to the customer lasts three minutes or longer

Secondary deliverables

Health, Criticality and Risk Index – maintaining the overall risk for our networks. The Health of assets will be combined with a measure of criticality to comprise a risk index;

Load Index – maintaining a similar level of utilisation across our networks – with improvements on the consistency of application across the industry.

Guaranteed Standards of Performance

Target performances

15. Maintain LPN's position as having the lowest level of customer interruptions and customer minutes lost in the UK targeting 23 CIs (7% improvement) and 30 CMLs (8% improvement) for unplanned interruptions
16. Reduce EPN and SPN customer interruptions by more than 12 per cent targeting 51 CI in EPN and 49 CI in SPN due to unplanned interruptions
17. Reduce EPN and SPN customer minutes lost by more than 19 per cent targeting 35 CML in EPN and 35 CML in SPN due to unplanned interruptions
18. Maintain the health of the network during RIIO-ED1 as measured by the health index, at least at the end of DPCR5 levels
19. Continue to improve the load index of the networks by reducing the number of highly rated sites 18 in EPN, 14 in SPN and 12 in LPN Protect 78 substations sites from the risk of flooding
20. Reduce the number of 12 hour failures by more than 30 per cent
21. Reduce worst served customers to less than 10,000 in both EPN and SPN

Incentive mechanisms

The Interruption Incentive Scheme (IIS) is the primary incentive on interruptions to supply and has been effective in driving significant improvements in service to customers. (+/-250 RORE basis points)

The delivery of health outputs is also incentivised in the RIIO-ED1 framework, with a positive incentive to deliver additional work where merited, rather than just a penalty for under delivery (2.5% of value of over or under delivery).

Potential penalties for inefficient non delivery of Load Index (2.5% of value of under delivery)

Guaranteed Standards restoration standard where compensation paid for interruptions that exceed the timescales set, 12hrs in normal weather.

Worst served customer allowance for set improvements accessible on an as required basis

4.2 Customer Interruptions (CI) and Customer Minutes Lost (CML)

Table 7 below summarises UK Power Networks' actual performance over the current period (2011 and 2012) and target performance for the next planning period which commit it to deliver further improvements in relation to:

- CIs, which refer to the number of customers whose supplies have been interrupted per 100 customers each year and
- CMLs, which refer to the duration of unplanned interruptions to supply each year, measured by average customer minutes lost per customer where an interruption of supply to the customer lasts three minutes or longer

This commitment is underpinned by UK Power Networks' [Quality of Supply Strategy \(Annex 6\)](#), which is focused on achieving:

- Greater network automation and remote control to increase its ability to remotely restore loss of supply
- Improvements to inspections and faults processes across the Networks including through changes to working patterns that better align with the volume and timing of fault calls

Table 7 Unplanned interruptions performance - current period performance and RIIO ED1 targets

DNO	CI and CML's	DPCR-5 average performance	UK Power Networks forecast 2015-23 average performance	% reduction from DPCR-5 average	UK Power Networks forecast 2023 target performance
EPN	CIs	61.2	52.1	15%	51.1
	CMLs	44.8	36.5	19%	35.2
LPN	CIs	24.6	22.7	7%	22.5
	CMLs	32.9	30.3	8%	29.6
SPN	CIs	56.5	49.7	12%	49.0
	CMLs	44.2	35.9	19%	34.9

The improvements in EPN's, LPN's and SPN's CI and CML performance during the current period is shown in Figure 2 to Figure 4. In particular, they show that the Networks are expected to outperform the CI and CML targets set by Ofgem for the current period, thereby delivering a more reliable service to customers. This improvement has largely been driven by recent investment which has focused on the efficient and innovative use of the existing network assets.

This performance improvement has enabled UK Power Networks to achieve the second lowest CI and CML performance of all fourteen DNOs in 2012/13. UK Power Networks also delivered the third lowest proportion of customer interruptions lasting more than 12 hours as a percentage of the number of customers interrupted

EPN has the fourth lowest average restoration time (as measured by CMLs per CI) of all 14 UK DNOs reflecting the significant improvements in restoration performance over the current period. EPN's average restoration time per customer improved by 26 minutes between 2008/09 and 2011/12 (reducing from an average of 101 to 75 minutes) although performance fell back to 88 minutes in 2012/13

Figure 2 EPN's unplanned interruptions performance

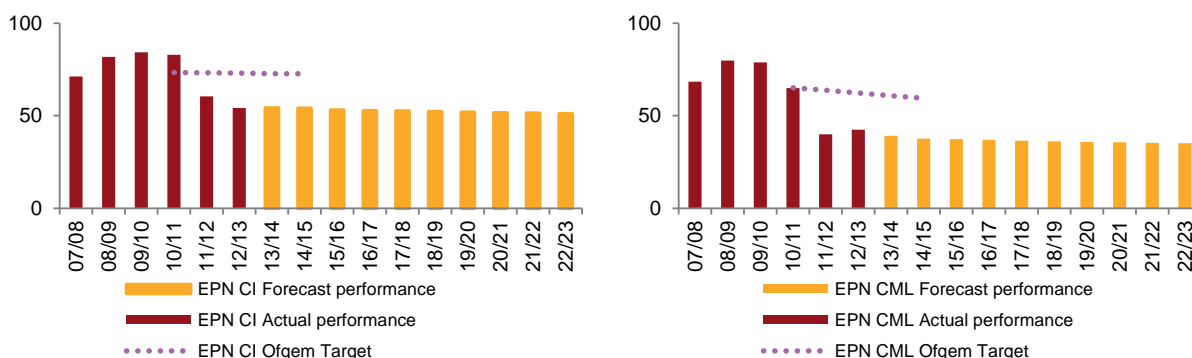


Figure 3 shows that LPN has consistently delivered high levels of network reliability as reflected in its CI and CML targets set by Ofgem for the current period. LPN has outperformed these targets with outperformance being most pronounced in 2010 and 2011 due to the mild weather. LPN's RIIO-ED1 targets commitment to improved reliability and availability of supply, notwithstanding growth in demand on its network.

The expectations of stakeholders with regards to operational network performance are higher in central London than our other network distribution areas. This has been further reinforced through our experience gained during the London 2012 Olympic Games and recent operational incidents in London (i.e. Carnaby Street and Victoria) and the high level of media attention they have attracted.

We have included a further £12.2 million per annum of expenditure in RIIO-ED1 to deliver improved operational performance in central London and we expect this to reduce our CI and CML performance by a further 0.5 CI and 0.78 CML. We are proposing to improve the level of services received by customers served by the central London network through:

- The establishment of two central London operational depots
- 24 hour manned fault response
- Removal of technical constraints
- Removal of service constraints

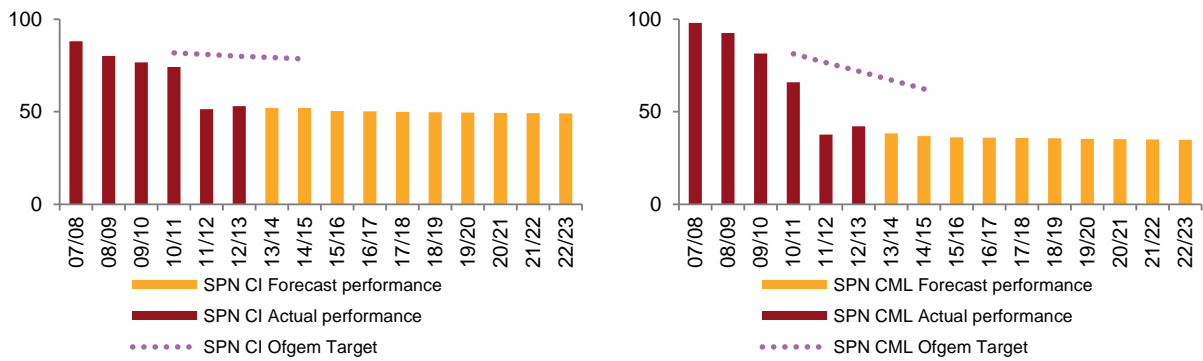
We propose to achieve improved outcomes through our replacement, refurbishment and maintenance and inspections programmes relating to, amongst other things, link boxes, cable pits, radicalisation of poorly performing mesh networks and network automation.

Figure 3 LPN's unplanned interruption performance



SPN has maintained the fifth lowest average restoration time of all 14 UK DNOs in 2012/13 reinforcing the significant improvements in restoration performance over the current period. SPNs average restoration time per customer improved by 34 minutes between 2008/09 and 2011/12 (reducing from an average of 114 to 80 minutes) although this fell slightly to 86 minutes in 2012/13.

Figure 4 SPN's unplanned interruption performance



Planned Interruptions

Planned interruptions will be based on a company's three year rolling average with a two year delay to allow performance to be reported and targets adjusted. UK Power Networks supports this mechanism as it ensures that there is an incentive to limit the number of planned interruptions, protects companies from the uncertainty of the impact of smart meter roll out and any additional work should more work have to be undertaken than forecast, whilst not encouraging high bids for planned interruptions allowances.

UK Power Networks expects planned interruptions to remain at similar levels to DPCR5 during the majority of RIIO-ED1, although the smart meter roll out could likely to lead to an increase in planned interruptions

Figure 5 EPN's planned interruptions performance

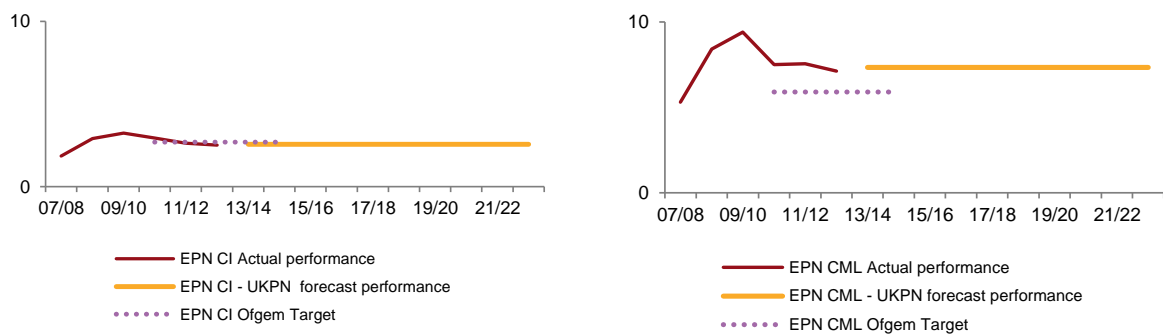


Figure 6 LPN's planned interruption performance

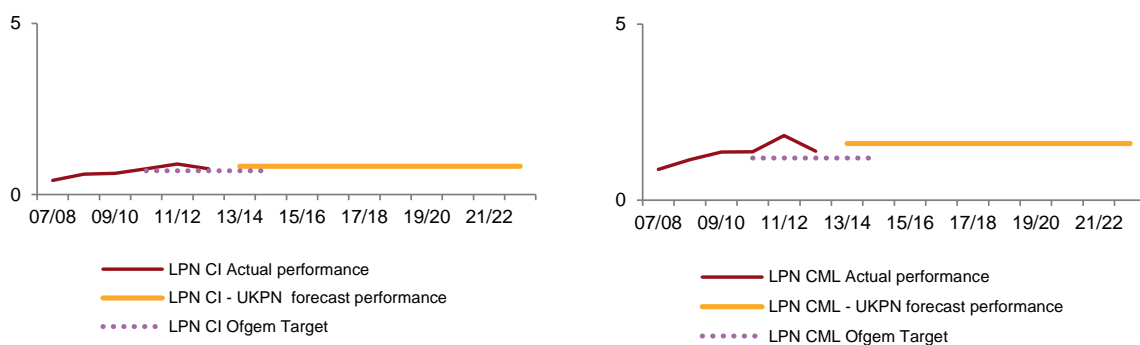
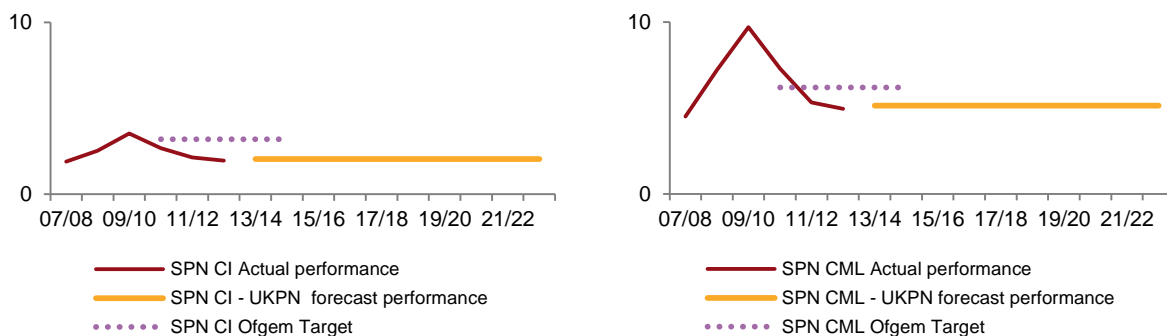


Figure 7 SPN's planned interruption performance



4.3 Network health, criticality and risk index (RI)

The health, criticality and risk framework is concerned with asset condition. The DPCR5 Health Index (HI) is a framework collating information on the health (i.e. condition) of distribution assets and for tracking changes in condition over time. This index has been developed to separately identify the importance or criticality (CI) of each asset to give a measure of asset risk (RI). The index is based on the following five categories:

Figure 8 Health, Criticality and Risk Framework

		Asset Health				
		HI1	HI2	HI3	HI4	HI5
Asset Criticality	C1	RI1	RI1	RI1	RI2	RI3
	C2	RI1	RI1	RI2	RI2	RI3
	C3	RI1	RI1	RI2	RI3	RI4
	C4	RI1	RI1	RI2	RI4	RI5

We have been reporting against HIs since 2010. The health index covers asset condition from new (HI1) through to end of serviceable life (HI5). The criticality measure will cover the impact of failure of an asset in terms of network reliability and availability, safety, environment and the financial consequences of repair. Criticality is banded against the average criticality for the asset type; C1 representing low criticality and C4 representing very high criticality (more than double the average criticality).

It is our intention to largely maintain the current health profile. Investments in RIIO-ED1 have been subject to quantitative and qualitative cost benefit assessments, which have informed our asset replacement and refurbishment decisions. The results of these decisions are encapsulated in the asset health measures.

The addition in RIIO-ED1 of a measure of criticality is something UK Power Networks has been working towards. Criticality is the consequence of failure derived from the combined measurement of a number of factors including customer impact, environmental impact, safety and financial impacts.

A detailed discussion of the specific asset health movements is included in the respective technical narrative sections.

At the end of the 2012/13, UK Power Networks was ahead of its agreed HI output delivery targets for all three of its Networks. This is highlighted in Figure 9 to Figure 14 which show EPN's, LPN's and SPN's progress against HI output scores monitored by Ofgem over the current period and the forecast performance HI targets for RIIO-ED1. This delivery outperformance has been achieved in combination with around 13 per cent underspend in asset replacement expenditure against allowances over the three years to March 2013, demonstrating our track record as an efficient operator and resulting in savings for customers.

Figure 9 EPN's performance against Ofgem's DPCR-5 HI scores

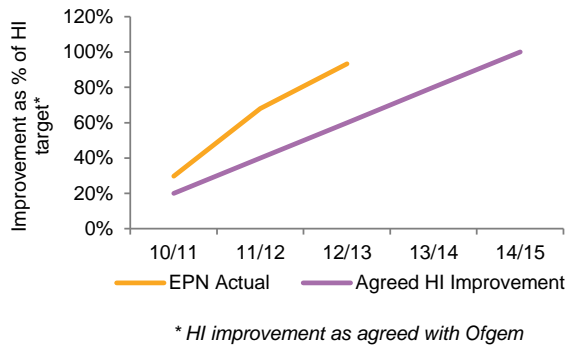


Figure 10 % change in EPN's HI scores over ED1

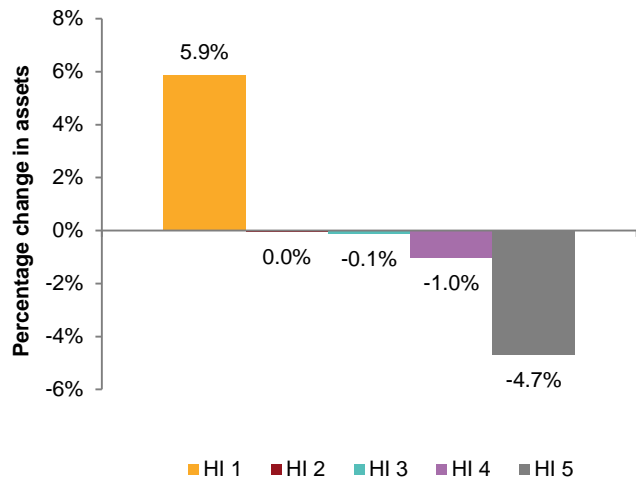


Figure 11 LPN's performance against Ofgem's DPCR-5 HI scores

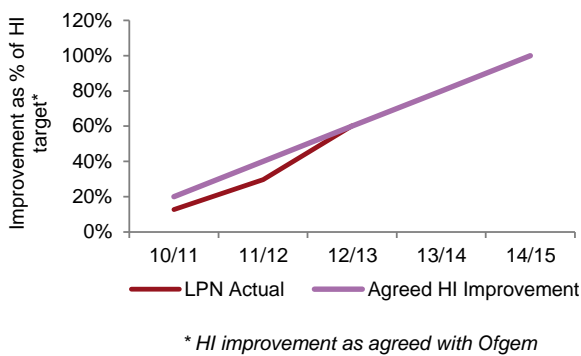


Figure 12 % change in LPN's HI scores over ED1

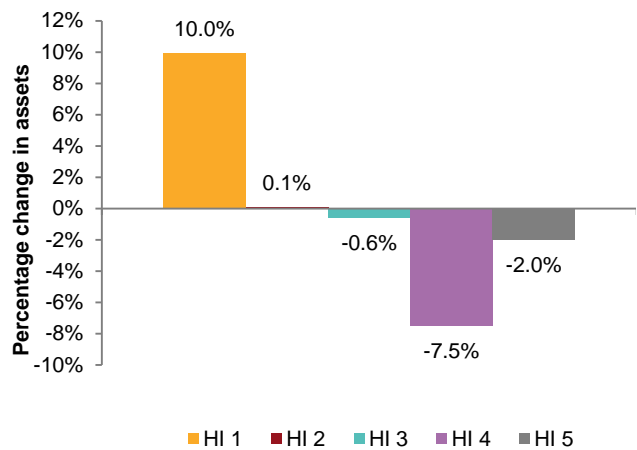


Figure 13 SPN's performance against Ofgem's DPCR-5 HI scores

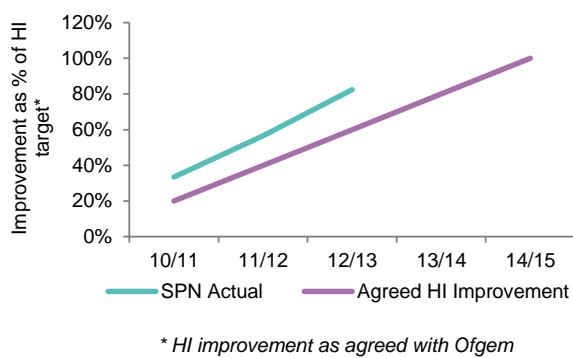
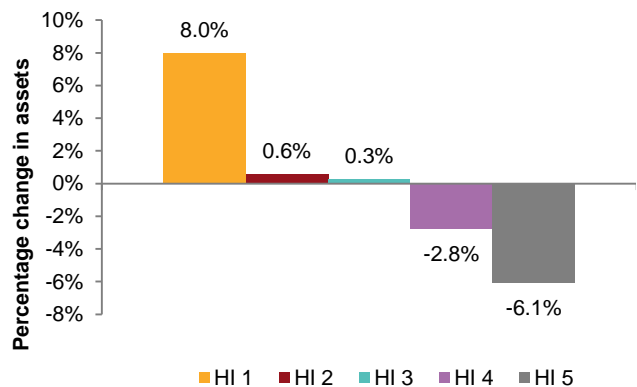


Figure 14 % change in SPN's HI scores over ED1



UK Power Networks will maintain the profile of its asset health risk for each Network broadly consistent over RIIO-ED1. This will involve maintaining the number of assets in each index category broadly consistent, and in particular not allowing the numbers of HI 4 and 5 assets to increase materially.

In RIIO-ED1 an additional measure of criticality will cover the impact of failure of an asset in terms of network performance, safety, environment and the financial consequences of repair. Combines with asset health this provides a measure of asset risk. Criticality is banded against the average criticality for the asset type; C1 representing low criticality and C4 representing very high criticality (more than double the average criticality). UK Power Networks will maintain risk.

UK Power networks plans for the RIIO-ED1 period maintain the health of the most critical assets (C3 and C4) as shown in the figures and tables below. These show the percentage of the assets in each health and criticality band at the beginning and end of the RIIO-ED1 period. The higher proportions of more critical assets in LPN reflect the higher customer density which drives higher network performance consequences

Figure 15 EPN Asset Criticality: % Assets by Criticality

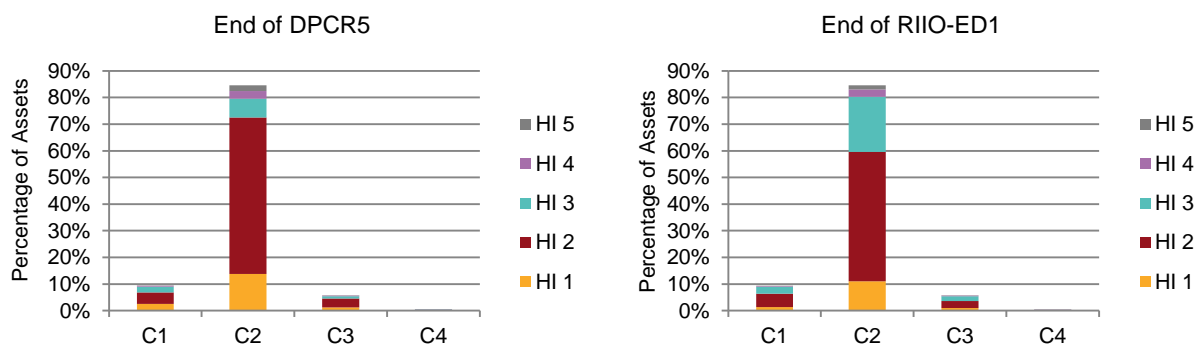


Table 8 EPN Asset Criticality: % Assets by Criticality

% Assets in Criticality Bands	End of DPCR5					End of RIIO-ED1				
	HI 1	HI 2	HI 3	HI 4	HI 5	HI 1	HI 2	HI 3	HI 4	HI 5
EPN	HI 1	HI 2	HI 3	HI 4	HI 5	HI 1	HI 2	HI 3	HI 4	HI 5
C1	3%	4%	2%	0%	0%	1%	5%	3%	0%	0%
C2	14%	59%	7%	3%	2%	11%	49%	21%	3%	2%
C3	1%	3%	1%	0%	0%	1%	3%	2%	0%	0%
C4	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Figure 16 LPN Asset Criticality: % Assets by Criticality

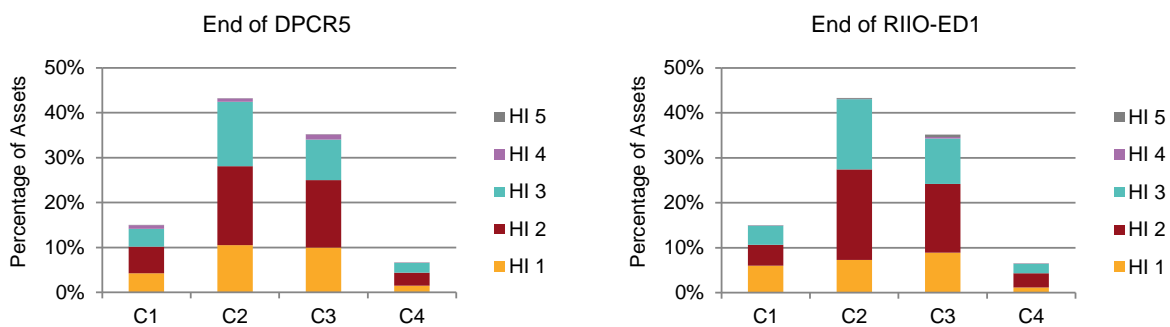


Table 9 LPN Asset Criticality: % Assets by Criticality

% Assets in Criticality Bands	End of DPCR5					End of RIIO-ED1				
	HI 1	HI 2	HI 3	HI 4	HI 5	HI 1	HI 2	HI 3	HI 4	HI 5
LPN										
C1	4%	6%	4%	1%	0%	6%	5%	4%	0%	0%
C2	11%	18%	14%	1%	0%	7%	20%	16%	0%	0%
C3	10%	15%	9%	1%	0%	9%	15%	10%	0%	0%
C4	1%	3%	2%	0%	0%	1%	3%	2%	0%	0%

Figure 17 SPN Asset Criticality : % Assets by Criticality

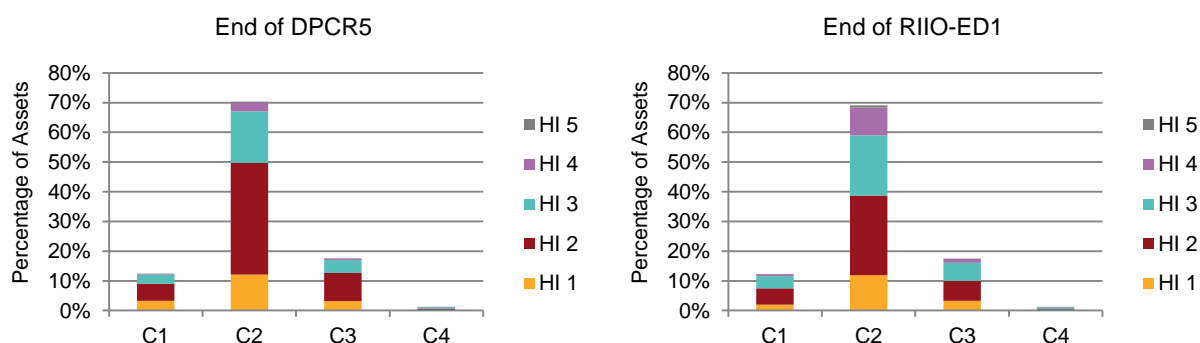


Table 10 SPN Asset Criticality: % Assets by Criticality

% Assets in Criticality Bands	End of DPCR5					End of RIIO-ED1				
	HI 1	HI 2	HI 3	HI 4	HI 5	HI 1	HI 2	HI 3	HI 4	HI 5
SPN										
C1	3%	6%	3%	0%	0%	2%	5%	4%	1%	0%
C2	12%	38%	17%	3%	0%	12%	27%	20%	9%	1%
C3	3%	9%	4%	1%	0%	3%	7%	6%	1%	0%
C4	0%	0%	1%	0%	0%	0%	0%	1%	0%	0%

We are also developing a Health output for the condition of our Civil assets, that is substation buildings, cable bridges and tunnels.

UK Power Networks will maintain the profile of its asset health risk for each Network broadly consistent over the upcoming period. This will involve maintaining the number of assets in each index category broadly consistent.

4.4 Load Index (LI)

UK Power Networks is committed to maintaining its LI at current levels in the RIIO-ED1. The LI framework relates to the utilisation of the assets supplying a demand group and therefore involves assigning each primary or grid substation a load index number from 1 to 5, representing an increasing level of utilisation or loading.

The Load Index framework has assigned a Load Index from 1 to 5 to each major substation (called primaries and grids (which supply other primaries)). UK Power Networks has defined the bands as set out below. In defining our investment we have considered the profile of our investments against these definitions.

The LI definitions used in DPCR5 and our planning process for the RIIO-ED1 business plan are as follows. In our discussion below we have considered the movements in terms of the number of sites having an LI 4 or LI 5. The change in definitions of the bandings to Ofgem’s will not change the total number of LI4 and LI5 sites.

Table 11 LI bandings

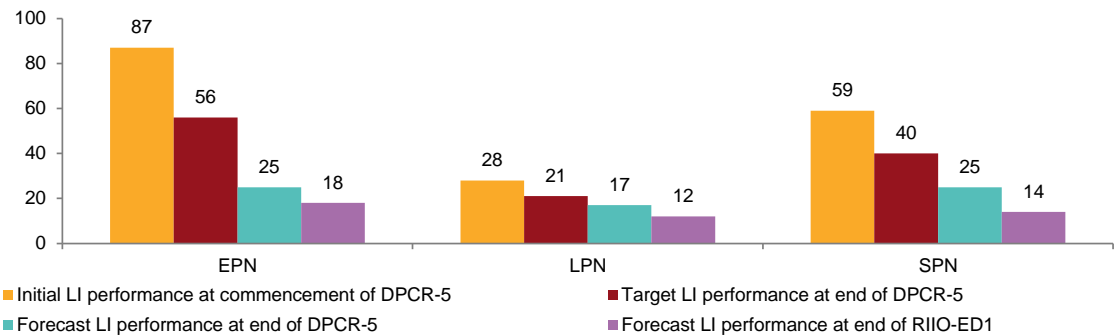
LI Band	DPCR5		Ofgem RIIO-ED1	
	% of Rated Capacity		% of Rated Capacity	
LI Band	Lower bound	Upper bound	Lower Bound	Upper Bound
LI1	0	0	0	80%
LI2	70%	70%	80%	95%
LI3	85%	85%	95%	99%
LI4	100%	<500 MWh	100%	<9h
LI5	100% >=500 MWh		100% >=9hrs	

Table 12 shows EPN’s, LPN’s and SPN’s progress against the LI scores monitored by Ofgem over the current period and forecast performance for the next planning period.

Table 12 UK Power Networks’ LI performance and forecast future performance

UK Power Networks number of LI 4&5 sites	Initial LI performance at commencement of DPCR5	Target LI performance at end of DPCR5	Forecast LI performance at end of DPCR5	Forecast LI performance at end of RIIO-ED1
EPN	87	56	25	18
LPN	28	21	17	12
SPN	59	40	25	14

Figure 18 EPN, LPN and SPN performance (number of LI 4&5s)

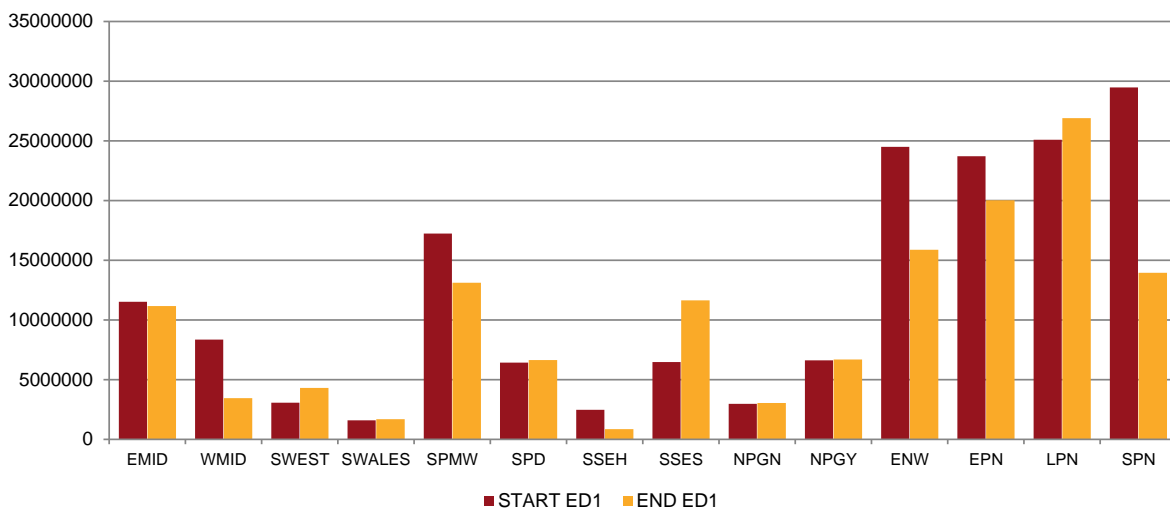


At the start of DPCR-5 our networks had considerably more heavily loaded sites than other DNOs. Table 12 above shows that over the current period the Networks have outperformed the target number of LI4 and LI5 substations, meaning that that there are fewer assets in these categories than forecast at the start of the current period. This means that, overall, assets have more headroom capacity (or less loading). Figure 18 shows that UK Power Networks’ 2015 to 2023 load related investment plans will reduce the number of heavily loaded sites, bringing our load index profile more in line with other DNOs whilst maintaining efficient utilisation of the installed capacity. This will be achieved through a combination of traditional reinforcement and investment in smart

network solutions and are supported by the assumptions relating to the growth in forecast demand over the upcoming planning period. At the end of RIIO-ED1 the more heavily utilised sites will represent approximately 3% of substations in EPN, 11% in LPN and 5% in SPN. Whilst we are proposing significant reductions in the number of the most heavily utilised substations, we believe that we will still be making the most effective utilisation of major substation capacity in the industry.

Ofgem measure this utilisation in LI risk points which is a weighted score derived from the LI rating of each substation and the number of customers on that substation. This gives a measure of the number of customers supplied from heavily utilised networks. Networks with a higher score are more heavily utilised and it would follow that investment to maintain this would be higher. Figure 19 below shows that we still have relatively high risk points compared with all other DNOs except Electricity North West at the start of RIIO-ED1 and will have higher utilisation than the other networks on average across our three networks at the end of RIIO-ED1.

Figure 19 Network utilisation as measured by Ofgem’s LI risk points



4.5 Resilience

Resilience is the ability of the distribution system to continue to supply electricity during a disruptive event (such as flooding or severe storms) and the speed of recovery to resume normal operations after the event. UK Power Networks applies a proactive approach to improving its network resilience and in RIIO ED1 will undertake:

- Flooding resilience for a further 36 substations in EPN, 18 substations in LPN and 24 substations in SPN
- Black start resilience by ensuring all UK Power Networks’ sites meet the 72 hour resilience standards within the RIIO-ED1 periods

UK Power Networks is committed to maintaining average fault rates on overhead lines in RIIO-ED1 at the current period average rate.

Flooding

This will be a measure of the number of customers protected as a result of investing in flood defences to meet 1 in 100 or 1 in 1,000 year flood risk as required by the industry standard, ETR 138, developed after the 2007 floods and the Pitt Report. The focus, particularly in London where many sites are protected by London’s flood defences, will move onto ensuring protection from surface and sub-surface water flooding, due for example to burst water mains.

Black Start

Black start resilience ensures that supplies can be safely restored following a prolonged interruption to a large area. Whilst this is a very unlikely situation, adequate resilience is required to ensure that critical safety systems such as network protection systems do not deplete their back up systems during a long outage to a large number of sites.

For Black Start we will ensure all our sites meet the 72 hr resilience standards within the RIIO-ED1 period.

Overhead Lines

This output that will be monitored to measure the resilience will be the fault rates of overhead line networks including exceptional events.

Fault rates on overhead lines vary with the severity of the weather. High winds, particularly while trees are in leaf lead to higher fault volumes. This can be mitigated by ensuring trees and hedges are cut a suitable distance away from overhead lines. Snow and ice can build up on lines and the weight of this can cause overhead lines to fail.

Year on year overhead line fault rates (including severe weather exceptional events) will vary depending on the weather conditions experienced. Our objective will be to ensure that average fault rates on overhead lines during RIIO-ED1 will be no worse than the DPCR5 average.

4.6 Worst Served Customers

Worst served customers are defined as those customers who experience on average at least four higher voltage interruptions per year, over a three year period, subject to a minimum of three in each year. This high a number of high voltage faults over such a period of time is a characteristic of overhead line networks and no incentive applies in LPN.

The RIIO-ED1 definition widens the scope of those classified as worst served from DPCR5 which required at least five higher voltage interruptions per annum. For some circuits the principal cause of faults is tree encroachment and if tree cutting needs to be brought forward this will be done as an operational expense. If restrictions to cutting exist it may be economic to underground spans using worst served customer funding.

During DPCR5 to date, UK Power networks has identified opportunities that meet the incentive criteria to address service to 727 worst served customers in EPN and 1634 customers in SPN under the DPCR5 incentive.

UK Power Networks will continue to make such investments in the next planning period and will target reducing the number of worst served customers does not exceed 10,000 in both EPN and SPN.

Table 13 UK Power Networks' worst served customers

DNO	2011/2012		2012/2013	
	DPCR5 Definition	ED1 Definition	DPCR5 Definition	ED1 Definition
EPN	3,234	9,951	3,747	11,750
LPN	0	0	0	0
SPN	1,644	3,842	2,249	11,258

We support investment to improve service quality to the worst served customers, and have undertaken investment in the current period where it is funded to do so under the regulatory arrangements. We will continue to make such investments in the next planning period.

Additionally, investments such as automatic sectionalising links and further remote control and automation will also contribute to reducing the number of worst served customers.

Low voltage networks also give rise to repeat faults. These are monitored on a regular basis through our daily quality of supply daily calls. LV repeats are often caused by faults which cannot immediately be located but which are subsequently located and repaired.

4.7 Guaranteed Standards of Performance

Where customers experience an electricity supply interruption lasting more than 18 hours, they are entitled to a compensation payment under the Electricity (Standards of Performance) Regulations 2010. Domestic customers receive a payment of £54 and non-domestic customers receive a payment of £108, and both receive a further £27 payment for every additional 12 hours off supply. UK Power Networks has voluntarily increased the payments it makes to domestic customers to £100. The standards under the Regulations will become more challenging in the 2015 to 2023 period. Customers will be entitled to compensation following 12 hour supply interruptions and compensation payments will increase to £75 for domestic customers and £150 for non-domestic customers, with

a further £35 payment for every additional 12 hours off supply. UK Power Networks will voluntarily double these payments as discussed in Section 3.4 Guaranteed Standards of Performance.

Table 14 UK Power Networks' 12 hour restoration performance below shows the significant improvement UK Power Networks has made in reducing long duration interruptions. We welcome the change in the guaranteed standard and will focus on ensuring that the Networks outperform the new restoration standard to minimise the number of these incidents, so that long duration outages become increasingly rare for all customers. In particular, UK Power Networks will aim to restore all customers in under 12 hours with a commitment to reduce over 12 hour failures by 30 per cent.

Table 14 UK Power Networks' 12 hour restoration performance

UK Power Networks 12 hour restoration	09/10	10/11	11/12	12/13	RIIO-ED1 Target
EPN	62,067	23,895	5,360	8,854	5,000
LPN	87,151	18,642	3,815	4,822	3,000
SPN	37,241	21,361	6,992	8,727	5,500
UKPN	186,459	63,898	16,167	22,403	13,500

5

Environment

5.1 Overview

Target performance

As a DNO, we are committed to the low carbon transition. In addition to playing our role in facilitating a low carbon economy, we are also reducing our own CO2 emissions. We have reduced our business footprint by 11 per cent and we are committed to reducing it further. Figure 20 on the following page shows our progress to date in reducing our carbon footprint.

We have sought the views of our stakeholders on how our environmental performance is measured. Stakeholders felt that reducing carbon emissions is now simply good business practice and we should concentrate our efforts on the biggest CO2 emitting operations of our business.

Our environmental performance over the forecast business plan period will be measured against the following indicators:

- Innovation funding to facilitate the low carbon economy: percentage of allowance used – more than 80 per cent of allowance used over the forecast business plan period
- Business Carbon Footprint (BCF): Carbon emission related to business operations according to categories of building energy usage, operational and business transport, etc. – top third sector performance for our London network on average over the forecast business plan period.

The Network Losses incentive has been removed until issues with data can be overcome post the roll out of smart meters during RIIO-ED1. UK Power Networks will continue to invest to manage our network losses and find new ways to manage existing infrastructure.

This section considers the impacts of our operations on the environment. The outputs comprise the following primary outputs and secondary deliverables:

Environmental performance commitments
Primary Outputs
Business Carbon Footprint (BCF) Innovation Funding. Undergrounding in Areas of Outstanding Natural Beauty and National Parks
Secondary deliverables
Cable Oil Leakage SF6 Leakage Noise Reduction Minimising landfill Recycling spoilage waste from street works
Target performances

Environmental performance commitments

23. Reduce our business carbon footprint by 2% per annum
24. Continue to recycle 70 per cent of office and depot waste and 98 per cent of street works spoil
25. Maintain sulphur hexafluoride (SF6) leakage at less than 0.2% as a proportion of SF6 in service
26. Reduce cable fluid leakage of 207,000 litres per annum (3% of oil in service) by 2 per cent year on year
27. Undergrounding the equivalent of 80km of HV overhead line in SPN and 96km of HV overhead line in EPN in Areas of Outstanding Natural Beauty and National Parks
28. Innovation expenditure of 0.5% of allowed revenues and win largest market share of the NIC competition
29. Investigate all noise issues and address all non-compliant sites

Incentive mechanisms

Losses Licence requirement

Losses discretionary award up to £32m across all DNOs in 3 tranches

Undergrounding allowance for Areas of Outstanding Natural Beauty and National Parks

Business Carbon Footprint is a reputational incentive using a league table and baseline

Oil leakage and SF6 are reputational incentives based on reporting

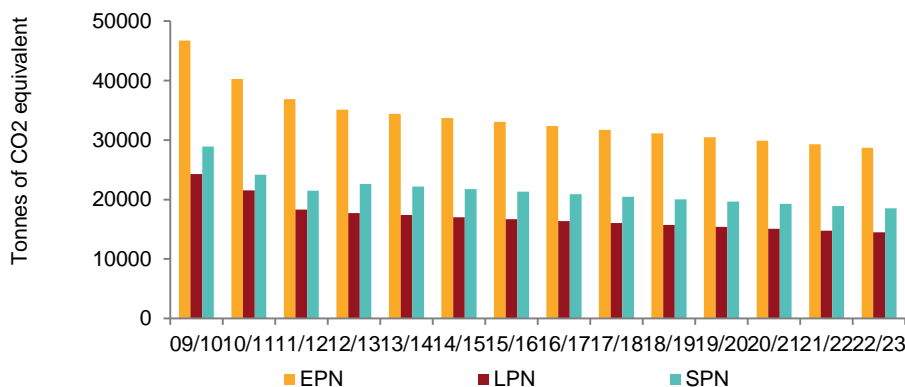
5.2 Business Carbon Footprint

UK Power Networks is committed to the low carbon transition. In addition to playing a key role in facilitating a low carbon economy through the connection of low carbon generation, it is also concerned with reducing its own CO2 emissions. Over the current period UK Power Networks has reduced its business footprint by 24 per cent. UK Power Networks is committed to achieving further reductions including by reviewing the operational areas of its business that create CO2 emissions. To achieve upper third performance we are targeting a 2% year on year improvement.

Table 15 UK Power Networks actual and forecast BCF performance (excluding electricity line losses)

	DPCR-5 Average - EPN	DPCR-5 Average - LPN	DPCR-5 Average - SPN	DPCR-5 Average - UKPN	UKPN's RIIO ED1 average forecast performance
BCF	36,076	18,401	22,451	76,927	66,271

Figure 20 UKPN Business Carbon Footprint



UK Power Networks has already taken significant steps to improve its business carbon footprint. The largest contributors to UK Power Networks' BCF arise from its transport and fuel usage. Some activities such as use of temporary generation to restore customers can directly increase UK Power Networks' carbon footprint. UK Power Networks' current forecast BCF performance in the next planning period is based on the average performance over the current period. UK Power Networks is signing up to the global reporting initiative and is committed to achieve upper third performance amongst comparable industries.

We are signing up to the global reporting initiative and our aim is to be an upper third performer against comparable industries. This will give us a wider benchmark for our operations.

5.3 Other Environmental Outputs

UK Power Networks also monitors a number of other environmental indicators including:

- Management of equipment containing SF6 (i.e. switch gear and transformers)
- Management of oil leakage
- Noise reduction
- Undergrounding in AONB and national parks
- Minimising landfill
- Recycling spoilage waste from street works

Over the 2015 to 2023 planning period, UK Power Networks is committed to:

- Reducing the impact of our street works through the current on-going programme of work by recycling 98 per cent of its street-works spoil from its term contractors, and is committed to exploring new ways of treating the remaining waste so that it is re-usable. The learning from street-works spoil recycling will be applied to maximise the recycling of waste from major construction projects
- Reduce cable fluid leakage of 207,000 litres per annum (3% of oil in service) by 2 per cent year on year
- Maintaining its SF6 gas leakage at 0.2 per cent of the installed mass by focussing on older items of switchgear which is designed to lower standards
- Use allowance for undergrounding in Areas of Outstanding Natural Beauty (AONB) and National Parks £10.5 million in SPN and £9.7 million in EPN to underground the equivalent of 80km of HV overhead line in SPN and 96km of HV overhead line in EPN

Waste

We currently divert 70% of our office and depot waste from landfill. Further reductions are challenging and our target is to continue to meet this level through the RIIO-ED1 period.

We recycle 98% of the streetworks spoil under our groundworks term contracts. The remaining 2% of contaminated material is not readily recyclable. We will continue to meet this level and aim to meet the same level in our large projects construction materials waste.

Undergrounding in Areas of Outstanding Natural Beauty and National Parks

This is an incentive to allow companies to support investment to improve visual amenity of overhead lines in sensitive locations.

We have already identified more opportunities for undergrounding of overhead lines than the DPCR5 allowance caters for especially in the SPN area which includes a significant part of the South Downs National Park. Deliverability issues mean that some schemes already been identified have been scheduled for the RIIO-ED1 period. We are therefore confident that we will be able make full use of the allowance to underground overhead lines over the longer 8 year period (£10.5 million in SPN and £9.7 million in EPN) to underground the equivalent of 80km of HV overhead line in SPN and 96km of HV overhead line in EPN. The exact works are selected in conjunction with stakeholders.

SF₆

Sulphur Hexafluoride is an important gas that replaced oil as an electrical insulator in modern equipment. It makes equipment cheaper, safer and smaller, and is essential in 132kV and EHV equipment on sites where

space is limited. We will therefore increase the amount in service as oil filled switchgear is replaced. However it is an exceptionally strong greenhouse gas so we aim to use it where appropriate and manage the leakage of gas from equipment. Over the RIIO-ED1 period we will aim to manage leakage at current levels which at [0.2%] are much lower than industry standards allow (0.5%).

	Current Gas Capacity on network (kg)	Gas Capacity on network 2023 (kg)	Increase Gas Capacity of Installed SF6 (kg) over RIIO-ED1	Increase as %
EPN	30,926	38,671	7,745	25%
LPN	41,174	44,549	3,375	8%
SPN	18,670	26,757	8,087	43%

IEC 62271-1 is the international standard that specifies the maximum allowable leakage rate on SF6 switchgear. The current 2008 edition allows either 0.5% or 1% pa. The earlier version of the IEC allowed 1% or 3% which explains why the some of the older equipment in service inherently leaks more than newer equipment. The UK industry standard EATS 41-36 which UK Power Networks quote in our specifications requires a lower figure of 0.5%. From the leakage rates that we report we are currently running at about 0.2% and we would expect to maintain this despite the increase in mass of SF6 in service by repairing the worse performing older equipment.

Oil leakage

We operate 2317km (1.7% of cables) of 33kV, 66kV and 132kV cables that are insulated by pressurised oil. This technology dates from before the advent of modern polymeric insulation materials. The majority were installed in the 1960s. If the lead sheath around these cables corrodes, they can leak oil into the environment. The importance of some of these cables means that we must try to keep them in service while we detect and repair leaks. We have introduced new approaches that allow leakages to be detected and repaired more quickly reducing oil leakage significantly and we have a programme to replace those sections that are economic with the aim of reducing leakage over time and we take these out of service as and when the network develops and they become redundant.

Oil leakage is currently less than 4% per annum of the cable oil in service which still represents a significant loss to the environment of over 200,000 litres per annum. Whilst the oil cables are an aging technology and we expect some degradation of the remaining assets, we are aiming to reduce our oil leakage over the period from 2015-2023 by 7% through replacement and the use of chemical tracers, already in use in by us, are expected to improve leak location and allow us to reduce leakage by 2% per annum. Without this investment leakage would be expected to increase by 35-40% over the RIIO-ED1 period.

The replacement programme we are proposing in LPN is expected to reduce oil leakage by 29%.

Noise Reduction

We will respond as required to any complaints we receive about noise associated with our equipment and address any issues in the most practicable way.

Management of network losses

Technical losses are an inevitable consequence of the science of distributing electricity and of transforming from one voltage to another. The main components are:

- 'Variable' or Copper (Cu) losses which are due to electrical resistance of conductors and hence have a quadratic relationship with the current passing through the conductor
- 'Fixed' or Iron (Fe) losses (also known as 'no load' losses) which are incurred as a result of the magnetising forces involved in transforming electricity.

It has long been recognised that managing distribution network technical losses is integral to good distribution engineering practice. However, from a network design perspective (which will naturally assume the optimal day-to-day operation of the network with regard to overall efficiency and security), optimising losses is essentially a trade-off between up-front investment (for example in lower loss equipment and/or additional network capacity)

and the longer term cumulative benefits of reduced losses. In pure business terms, the optimum design from a losses perspective is that which delivers the highest NPV of incremental cost benefit in terms of initial investment and longer term revenues arising from reduced losses. However, besides the economic assessment for managing network losses, a very specific driver is our responsible attitude towards environmental sustainability.

We will implement a losses optimisation strategy consisting of the following key areas:

Category of loss	Optimisation strategy
Valuation of losses	Valuing losses fully over the lifetime of the asset and using this ongoing value to 'capitalise' losses in our network design and investment analyses will tend to give rise to a lower value of specified losses in our plant and equipment technical standards.
Network architecture considerations	Reviewing major asset renewal / reinforcement strategies can reveal opportunities for beneficial circuit reconfiguration in order to both optimally distribute, and reduce the distances, of power flows. This in turn will minimise copper losses as well as improving overall utilisation of plant and equipment and even reliability.
Legacy non-standard network architecture and voltages	The remaining networks operating at the now discontinued voltage levels of 22kV and 6.6kV will gradually be replaced through natural evolution and investment synergies. In general, this will provide losses reduction opportunities due to the (higher) standard voltages now employed.
Voltage, power factor, and power quality management	Maintaining voltage at the highest permissible level within the statutory limits will also ensure that variable losses (as a percentage of energy supplied) are minimised. The impact of poor (less than unity) power factor is that for a given level of demand (in kW) a higher current will be required. This higher current will then have the effect of increasing variable losses due to the electrical resistance in the supplying circuits and transformers. Power quality management.
Optimising energy usage at operational buildings	Whilst not generally considered in the context of 'pure' technical losses, energy used to operate cooling fans and pumps (i.e. for OFAF transformers) and other auxiliary energy supplies directly associated with electricity distribution (including substation heating, lighting, ABCB air compressors, tunnel cooling systems, etc.) can be considered a further source of losses in the sense that this represents energy used in the distribution of electricity.

Our detailed losses strategy can be found in [Annex 7: Losses Strategy](#)

5.4 Innovation to meet Decarbonisation

Over the current period, UK Power Networks has significantly increased expenditure on innovation investment related to low carbon initiatives. In particular, UK Power Networks' expenditure under the Low Carbon Network Fund (LCNF) in 2011/12 was £78.2 million or around 0.72 per cent of revenue and increased to £12.7 million which is around 0.98 per cent of revenue in 2012/13. Further information is provided in Chapter 7 .

6

Connections

6.1 Overview

UK Power Networks is committed to facilitating competition in the connections market and making it easier for customers seeking connection by ensuring:

- Customers receive high quality information on the process and cost of connecting to our networks
- Customer connection are completed in reasonable timeframes that meet customers' expectations

The outputs in this section are focused on the specific improvements we will make to our connections performance. Connections performance represents 50% of the Broad measure of Customer Satisfaction, out targets for which are discussed in section 3.3. The connections outputs comprise the following primary outputs and secondary deliverables:

Connections performance commitments

Primary Outputs

Average time to produce a quote

Average time taken from quotation acceptance to complete work

Engagement with major connections customers and the definition of a programme of improvement actions.

Secondary deliverables

Connections Guaranteed Standards of Performance (GSOP)

Target Performance

30. Achieve average time to quote from the time of enquiry of 8.2 days for low voltage single services and 11.7 days for low voltage multiple services
31. Achieve average time to connect of 42 days for low voltage single services and 53 days for low voltage multiple services
32. Achieve in excess of 99% of our Guaranteed Standards of Performance (GSoP) targets
33. From Q3 2014 we will commence the introduction of new online services for customers requiring new or altered metered services and all customers requiring unmetered connections. These services will include;
 - a. On-line submission of service requests
 - b. On-line quotations and estimates
 - c. Service request and job delivery tracking
 - d. On-line payment
 - e. Appointment booking
34. Integrate Flexible Plug and Play service (as per our Low Carbon Network Fund Project) into business as usual by Q2 2015

Meet our improvement commitments to major connections customers

35. Engage regularly with other connections stakeholders on a frequency agreed with them

36. From 2014, agree and publish a service development plan with associated Key Performance Indicators
37. Publish quarterly updates to communicate progress against the service development plan
38. Review and revise plan annually in agreement with stakeholders
39. Publish annual progress update to Ofgem and stakeholders
40. Complete an annual independent audit of our achievements against the agreed service development plan
41. Work with Connections stakeholders to develop our products and services through 'user groups' 3 times per annum with common interest customer groups (highway services, distributed generation, metered customers) to gain insight into their needs and requirements and shape innovation and development within UKPN.
42. Offer account management to any business/commercial customer who requests this service

Develop more 'pre-application' support for customers to enable them to make informed decisions on their schemes

43. Extend our "Ask the Expert" service to include phone, web chat and face to face options
44. Publish 'heat maps' to provide an overview of current network capacities by location
45. Provide access via a web portal to cable diagrams allowing customer access to up to date information
46. Extend the online price illustrator to include all market segments and provide indicative timescales in addition to cost illustrations.
47. Extend our current DG surgery sessions to other customer groups to allow customers to discuss their connection proposals informally prior to application.

Increase the choice and flexibility of connections services available to customers

48. The introduction of wider office hours for our contact centre
 - a. 08.00 to 20.00 weekdays
 - b. 09.00 to 16.00 Saturdays
49. Offer 2 hour time banded appointments for site visits
50. Schedule work delivery across a wider working window to include evenings and weekends
51. Extend the convertible quotes concept so that quotations offered in a competitive market segment can be fully or partly accepted dependent on the customers preference

Continue to support and promote competition in the connections market place through innovative change

52. Self-determination of the Point of Connection for an increasing range of connections
53. HV jointing to existing networks to include all associated planning and operational activities.
54. Extend live LV jointing to the LPN interconnected area

Incentive mechanisms

Time to Connect incentive (+0.4% base revenue)

Incentive on Connection Engagement (-0.9% base revenue)

Broad Measure of Customer Service for minor connections customers (+/- 0.5% base revenue)

6.2 Improvement Initiatives

Since formation in 2010, UK Power Networks has focused on improving connection services by undertaking a number of improvement initiatives including:

- The redesign of its website to include improved information on the connection process including in relation to: connection timeframes; customer information requirements; and third party providers. This will assist customers understand the choices they have, the information we need from them and our commitments to them

- The introduction of a web based self-service system designed to improve the process for less complex connection enquiries by enabling customers to create an illustrative quotation
- Stakeholder engagement to understand what our stakeholders and customers, including third party providers, consider to be the priority areas for improvement in the areas of connection services.

Customers and other stakeholders have told us that this is an area in which we could improve further. UK Power Networks agrees with stakeholders and is committed to undertaking further improvements over the next planning period. In particular, UK Power Network is committed to implementing an End-to-End Connection Project, as part of its business transformation project, which will lead to further improvements.

Listening to our customers

We will work with Connections stakeholders to develop our products and services through 'User Groups' 3 times per annum with common interest customer groups (Highway Services, Distributed Generation, Metered Customers) to gain insight into their needs and requirements and shape innovation and development within our Company.

As a result of these engagements we will publish two action plans, which we will update annually. These will be:

- A major connections service improvement plan setting out what we will do to improve services to customers wanting to or considering making larger, more complex connections to our network
- A competition improvement plan describing what we will do to facilitate competition in connections service provision in our service area

We will publish progress updates against service improvement plans quarterly and publish an annual progress update on the extent of competition in our service areas.

To help customers better communicate with use we will offer Account Management to any business/commercial customer who requests this service

Time to Connect

RIIO-ED1 has introduced two measures of performance for low voltage service, the average time to quote and average time to connect.

To this end, UK Power Networks' performance targets for the next planning period as shown in Table 16 and Table 17 commit it to delivering even further performance improvements that would enable it to reach top-third performance amongst the 14 UK DNOs.

Table 16 Average time to quote (days)

	DPCR-5 Average - EPN	DPCR-5 Average - LPN	DPCR-5 Average - SPN	UK Power Networks' RIIO ED1 forecast performance
Low voltage single services	9.9	9.4	10.0	8.2
Low voltage multiple services	15.6	15.4	17.6	11.7

Table 17 Average time to connect (days)

	DPCR-5 Average - EPN	DPCR-5 Average - LPN	DPCR-5 Average - SPN	UK Power Networks' RIIO ED1 forecast performance
Low voltage single services	42	49	49	42
Low voltage multiple services	53	70	63	53

Guaranteed Standards of Performance

Overall performance for connections activities are measured by a number of guaranteed standards of performance. Overall UK Power Networks has achieved better than 99% in all these measures and intend to maintain this performance through RIIO-ED1.

Table 18 Connections overall guaranteed standards of performance

	Overall Connections Guaranteed Standards Performance	12/13
EPN	All metered standards related to budget estimates and quotations (in aggregate)	99.5%
	The rest of the metered standards (in aggregate)	99.9%
	All unmetered standards (in aggregate)	99.5%
LPN	All metered standards related to budget estimates and quotations (in aggregate)	99.7%
	The rest of the metered standards (in aggregate)	99.9%
	All unmetered standards (in aggregate)	99.5%
SPN	All metered standards related to budget estimates and quotations (in aggregate)	99.6%
	The rest of the metered standards (in aggregate)	99.8%
	All unmetered standards (in aggregate)	99.3%

Improving processes

Customers and other stakeholders have told us that this is an area in which we could improve further. We agree with our stakeholders and are committed to undertaking further improvements over the next planning period. In particular, we are committed to implementing an End-to-End Connection Project, as part of our business transformation project, which will lead to further improvements.

A key part of these improvements will be the introduction of web based online service for less complex connections activities. This is likely to cover new or altered metered services and all unmetered services. The range of services on line will depend on the complexity of the customers' request. The range of services available online may include:

- On-line submission of service requests
- On-line quotations and estimates
- Service request and job delivery tracking
- On-line payment
- Appointment booking

We will also develop more 'pre-application' support for customers to enable them to make informed decisions on their schemes including:

- Extending our Ask the Expert service to include phone, web chat and face to face options
- Publishing 'heat maps' to provide an overview of current network capacities by location
- Providing access via a web portal to cable diagrams allowing customer access to up to date information
- Extending the online price illustrator to include all market segments and provide indicative timescales in addition to cost illustrations.
- Extending our current DG surgery sessions to other customer groups to allow customers to discuss their connection proposals informally prior to application.

We will also seek to increase the choice and flexibility of connections services available to customers by:

- The introduction of wider office hours for our contact centre from 08.00 to 20.00 weekdays and 09.00 to 16.00 Saturdays
- Offer 2 hour time banded appointments for site visits
- Schedule work delivery across a wider working window to include evenings and weekends

- Extend the convertible quotes concept so that quotations offered in a competitive market segment can be fully or partly accepted dependent on the customers preference

Implementing learning from the Low Carbon Networks Fund

We have learnt a considerable amount about customer's priorities through our Low Carbon Networks Fund project, Flexible Plug and Play, which explored different commercial arrangements to speed up and reduce the costs of generation connections. The project concludes in December 2014 and we are committing to building in the outcomes into our business as usual process by the second quarter 2015.

Meeting our improvement commitments to major connections customers

We also recognise that our major customers have particular needs arising from the type of projects they are involved in. We are making the following commitments:

- Engage regularly with other connections stakeholders on a frequency agreed with them
- Agree and publish a service development plan and any associated Key Performance Indicators
- Publish quarterly updates to communicate progress against the service development plan
- Review and revise plan annually in agreement with stakeholders
- Publish annual progress update to Ofgem and stakeholders
- Complete an annual independent audit of our achievements against the agreed service development plan

In particular we will:

- Offer Account Management to any business/commercial customer who requests this service

Facilitating Competition

UK Power Networks is committed to facilitating competition in the connections market and improving its customer service in the area of customer connections by making it easier for customers seeking connection including by ensuring:

- Customers receive high quality information on the process and cost of connection
- Connections are completed in reasonable timeframes that meet customers' expectations

We recognise that there will be an ongoing need to facilitate the competitive provision of connections services in our service area. We will continue to support and promote competition in the connections market place through innovative change, for example:

- Self-determination of the Point of Connection for an increasing range of connections
- HV jointing to existing networks to include all associated planning and operational activities.
- Extend live LV jointing to the LPN interconnected area

In June 2012, we submitted our Competition Notice to Ofgem that demonstrates that we have effective competition in connections across our three networks. We have worked hard to remove barriers to allow competition to flourish.

We submitted a Competition Notice covering six market segments for each of our service areas; (i) metered demand Low Voltage (LV) work, (ii) metered demand High Voltage (HV) work, (iii) metered demand HV and Extra High Voltage (EHV) work, (iv) Distributed Generation (DG) HV and EHV work, (v) unmetered Local Authority (LA) work and (vi) unmetered Private Finance Initiative (PFI) work.

We were successful in having the following market segments passed; metered Distributed Generation (DG) High Voltage (HV) and Extra High Voltage (EHV) work and unmetered connections Private Finance Initiatives (PFI).

In their decision Ofgem noted that UK Power Networks had made a 'step change' in our approach to addressing issues raised as barriers to competition but that some of the changes were very recent. Ofgem also noted that they had not seen enough evidence that it was easy for customers to choose a competitive alternative and that responses to their consultation indicated that in some low value sub-segments competitive alternatives may not exist.

We have made a further application in April 2013 for regulation to be lifted in six segments and are working hard to facilitate competition in the remaining market segment.

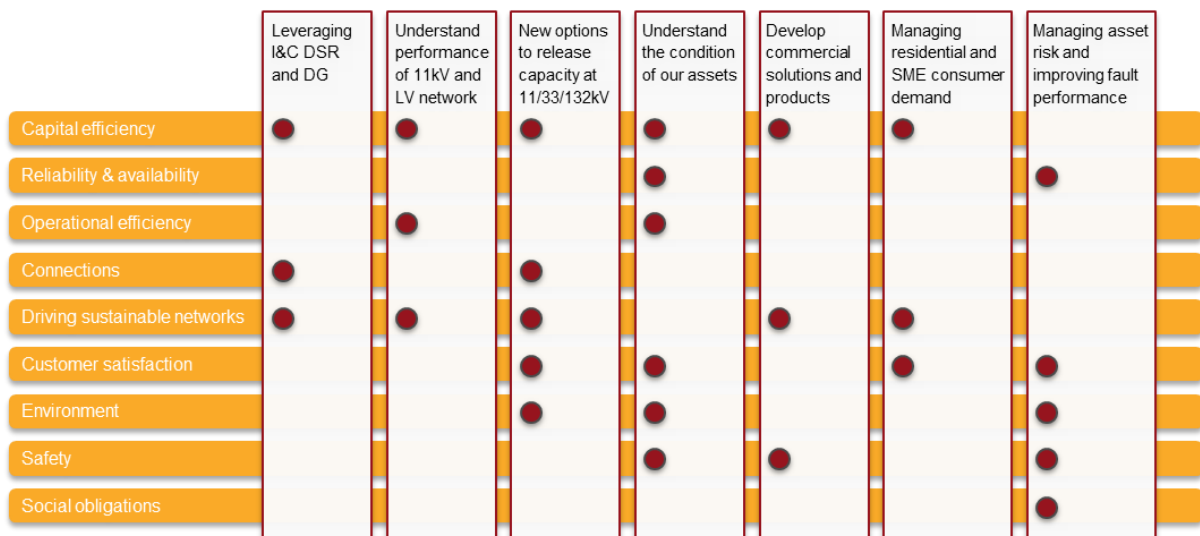
7

Facilitation of the Low Carbon Economy

7.1 Overview

We have made a conscious decision to be leading in innovation over the option of being a ‘fast follower’, relying on our right of access to others’ R&D results and implementing the lessons learned on our own network. We believe that much of the learning and knowledge transfer takes place as a result of experiences in-project and are not fully conveyed by end of project summaries. This position is also key to our ‘employer of choice’ vision, as it allows our staff to be exposed first hand to new developments in their fields and to understand implications of policy decisions made by government or Ofgem. Full details of our innovation strategy can be found in our [Innovation Strategy](#) document.

Figure 21 Alignment of UK Power Networks’ innovation themes with Ofgem’s RIIO-ED1 framework



UK Power Networks has a strong track record of network innovation and has made extensive use of incentives such as the Innovation Funding Incentive, Registered Power Zone and Low Carbon Network Fund to develop bespoke demonstration projects and selectively participate in major European research programmes. UK Power Networks is committed to continually implementing new ideas or methods that improve the way it operates its networks and transports electricity. UK Power Networks uses innovation to deliver its vision, improve its customer satisfaction, deliver cost efficiencies, optimise investment and network planning and meet the challenges of the low carbon economy and keep customers’ bills down. UK Power Networks has been successful in winning funding in each year of the first three years of the Low Carbon Network Fund Tier 2 competition. The three projects for which it has been awarded funding: Low Carbon London; Flexible Plug & Play Networks; and Smarter Network Storage, explore the scope for both technological and commercial innovation to enhance the capability of electricity distribution networks and the wider system to accommodate new low carbon technologies such as electric vehicles, heat pumps and renewable generation.

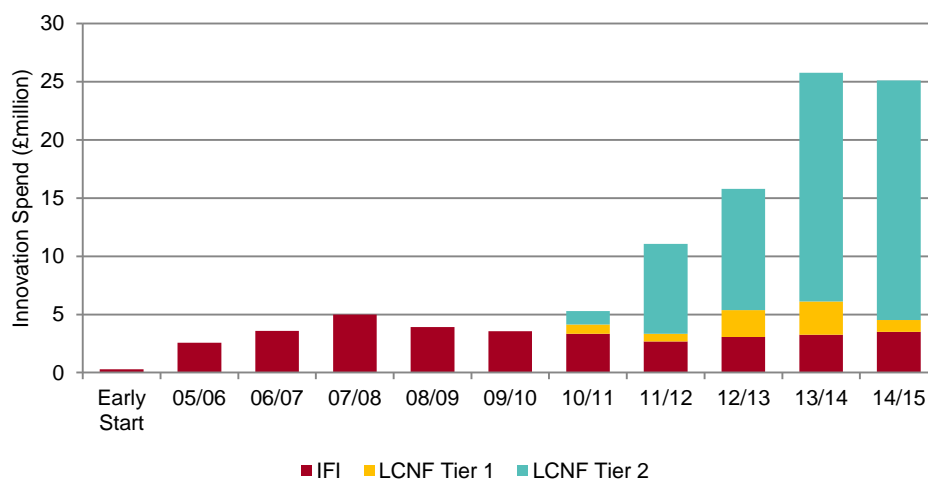
The innovation outputs comprise the following primary outputs and secondary deliverables:

Innovation performance commitments	
Primary Outputs	
% of allowed revenue invested in innovation to support the low carbon economy	
Secondary deliverables	
none	
Target performances	
Spend 0.5% of revenues on low carbon innovation	
Incentive mechanisms	
Network Innovation Allowance	
Network Innovation Competition	
Innovation Roll-out Mechanism	

7.2 Innovation investment over the current period

Over the current period, UK Power Networks has significantly increased expenditure on innovation. Total innovation expenditure (LCNF tier 1 and 2 and IFI) has increased from £3.3 million in 2008/09 (or 0.5 per cent of allowed revenue) to £15.8 million in 2012/13 (or to 1.2 per cent of allowed revenue). IFI and LCNF Tier 1 expenditure has increased from £3.9 million in 2010/11 to £5.4 million in 2012/13. The remaining expenditure relates to LCNF Tier 2 and has risen from £1.1 million to £10.4 million over the same period. The efficiency and value of this expenditure was tested through the LCNF Tier 2 competitive bidding process. This is shown in Figure 22.

Figure 22 UK Power Networks' innovation related expenditure



A short summary of UK Power Networks' investments under the LCN fund and IFI is provided below:

UK Power Networks' current period LCNF tier 1 investments

To date, the following five projects have been registered:

- Short-term energy storage on the distribution network (June 2010). The focus of this project is investigating the use of storage, as an alternative to traditional network reinforcement, to provide additional network capacity (thermal or voltage support) for limited periods where the demand is uncertain.

- Distribution network visibility (September 2010). The focus of this project is assessing the benefits of collecting, utilising and visualising available network data to improve our operational and investment decisions e.g. to improve time required to connect new customers.
- LV current sensor technology evaluation (December 2011). This is a joint UK Power Networks' and Western Power Distribution project - and UK Power Networks' first joint project. It evaluates a range of network monitoring solutions that assist in understanding the available network capacity, thereby minimising customer disruption or delay when low-carbon technologies are deployed in the future.
- Validation of Photovoltaic (PV) connection assessment tool (January 2012). This project tests the validity of UK Power Networks' new planning tool, which assesses the impact of concentrations of small scale generation on its distribution networks e.g. solar panels, which enable it to provide improved services to customers.
- Smart urban low voltage network (July 2012). This is a joint project with TE Connectivity, to develop a new solid-state switching technology. This project will increase flexibility with respect to remote switching and re-configuration of the LV network. Solid-state switching technology provides greater visibility of power flows on the network, using the near real-time communications and built in sensors. This enables extensive load monitoring so as to better understand the live state of the LV network.

UK Power Networks' current period LCNF tier 2 investments

To date, Ofgem has awarded UK Power Networks funding for the following projects under the LCNF Tier 2 scheme:

- Low Carbon London (October 2010) – This was UK Power Networks' first flagship project. Ofgem awarded UK Power Networks £24.9 million of the available £64 million (to all DNOs) to pursue smart network initiatives which focused on innovative ways to deliver sustainable electricity to businesses and communities in a low carbon future UK Power Networks has contributed an additional £5 million to support this project
- Flexible Plug and Play (November 2011) - This was UK Power Networks' second flagship project. Ofgem awarded UK Power Networks £6.8 million to trial innovative technical and commercial solutions in order to provide cheaper and faster connections of renewable generation, such as wind power, to the electricity distribution network
- Smarter Network Storage (November 2012) - This project involves the installation of a larger scale storage plant to solve a network constraint. Electricity storage could provide value for customers by reducing the need for network reinforcement and has wider system benefits such as providing network services such as reserve and response to help balance electricity supply and demand
- Flexible Urban Networks – Low Voltage (December 2013) - Ofgem awarded UK Power Networks £6.53 million to trial the use of power electronic devices, for the first time in the UK, on the low voltage electricity network. This will enable us to transfer spare capacity across traditional network barriers, making the network more resilient and facilitating the forecasted growth in electric vehicle charging, heat pumps and microgeneration on our network.
- Vulnerable Customers and Energy Efficiency (December 2013) – Ofgem awarded UK Power Networks £3.3 million to trial energy efficiency and demand-side response (DSR) with fuel poor and vulnerable customers. The project will provide DNOs with evidence-based learning on the extent that this small, but socially important group, can engage in DSR and energy savings activities, ensuring they are part of the low-carbon transition, and enabling savings on their bills

UK Power Networks will continue to bid for expenditure to be approved under the LCNF where it identified projects which will deliver long term benefits to customers.

UK Power Networks' current period IFI projects

UK Power Networks expenditure on approved IFI projects falls into three high level areas:

- Innovation and current assets
- Managing customer demand through innovation
- Using innovation to release extra capacity in our networks.

Further information on UK Power Networks' innovation expenditure in the current period is set out in:

- UK Power Networks' Innovation Strategy, which will also be published on 1 July 2013
- UK Power Networks IFI / LCNF Annual Report April 2011 to March 2012.

7.3 Innovation investment in the 2015 to 2023 planning period

UK Power Networks is seeking a regulated Network Innovation Allowance of 0.5 per cent of total regulated revenue over the upcoming planning period. As noted, UK Power Networks is forecasting to spend around 0.5 per cent of its total regulated revenue over the current 2010 to 2015 period and has spent around 0.4 per cent in 2010/11 and 2012/13.

The innovation mechanisms that will apply in the 2015 to 2023 period are different to the mechanisms applied by Ofgem in the current period and include:

- The Network Innovation Competition (NIC). This will replace tier two of the LCN Fund. The NIC will provide competitive funding for large scale low carbon and environmental projects
- The Network Innovation Allowance (NIA). This will replace the IFI programme and tier one of the LCN Fund. This will provide a fixed annual regulatory allowance of between 0.5 and 1.0 per cent of allowed annual revenue for each year of the 2015 to 2023 planning period
- The Innovation Roll out Mechanism (IRM). This will provide funding for business as usual innovative projects that are not funded under either the NIC or NIA. Funding is provided under a revenue adjustment mechanism whereby DNOs will be able to apply for funding at specified times (application windows) during the price control where the costs are material (proposed expenditure multiplied by the DNOs efficiency rate is greater or equal to one per cent of revenue base) and satisfy defined criteria including supporting the delivery of outputs.

UK Power Networks is only seeking 0.5 per cent under the NIA and will actively bid for funding for specific projects available annually on competitive basis via the NIC where it identifies projects that satisfy the required criteria and that will assist it to deliver its outputs in a manner that provides long term benefits for customers. UK Power Networks considers that having a low regulated allowance under the NIC will deliver the best value for customers.

UK Power Networks considers that this level of funding will support it achieve its vision of delivering top-third performance amongst the 14 UK DNOs in the area of safety, network reliability, customer service, cost efficiency and employee engagement. It will also strongly position UK Power Networks to address the challenges, changes and opportunities that lie ahead over the next ten years whilst continuing to deliver long term benefits for customers.

Further information on UK Power Networks' innovation strategy for the next period is set out in UK Power Networks' Innovation Strategy.

Our Innovation Strategy sets out in more detail the work we expect to undertake in these areas as shown below

RIIO-ED1 deliverable	Timing	Using the following tools defined by the Smart Grid Forum
Enhanced network flexibility and interoperability	2021-23	HV/LV Tx Monitoring Comms FABRIC Advanced control systems
Enhanced system integrity	2021-23	HV Circuit Monitoring (along feeder) w/ State Estimation Smart Metering infrastructure – Distribution Control Centre (DCC) to DNO 1 way HV Circuit Monitoring (along feeder)
Improved load and loss load factor	2021-23	Generator network support – HV connected Generation constraint management – EHV connected DNO to residential

		HV connected Electrical Energy Storage (EES) – large
Losses optimisation	2021-23	DNO to HV commercial DSR DNO to residential Dynamic Network Reconfiguration – LV
Provision of upstream system balancing services	2021-23	Generation constraint management – HV connected Generation constraint management – HV connected HV connected EES – large
Smart management of Distributed Energy Resources	2021-23	Enhanced Active Voltage Conditioner (AVC) – LV circuit voltage regulators Enhanced AVC – HV/LV Transformer Voltage Control Smart Metering infrastructure – DCC to DNO 1 way HV Circuit Monitoring (along feeder)
Smart management of Electric Vehicles (EVs) and heat pumps	2021-23	DSR – Products to remotely control loads at consumer premises DNO to residential DNO-controlled EV charging – LV domestic connected
System voltage optimisation	2021-23	STATCOM – EHV
Facilitating higher levels of DG penetration	2018-20	Dynamic Network Reconfiguration – EHV Generation constraint management – EHV connected HV Non-superconducting fault current limiters
Improved network visualisation	2018-20	Design tools HV Circuit Monitoring (along feeder) Advanced control systems

We expect to spend 0.5% of our allowed revenues on innovation during the RIIO-ED1 Period.

Further details of our smart grid strategy can be found in [Annex 9: Smart Grid Strategy](#).

8

Safety

8.1 Overview

UK Power Networks are committed to ensuring safety and minimising the risks associated with operating our Networks to achieve zero harm to customers, contractors and staff.

Safety relates to the physical, mechanical and electrical safety of network assets. UK Power Networks is bound by the framework and obligations set out in the Health and Safety Legislation to ensure its network assets do not present a safety risk to the public or its employees and contractors. This is enforced through the Health and Safety Executive (HSE), the national safety regulator.

The safety outputs comprise the primary outputs and secondary deliverables detailed in Table 19 below:

Table 19 UK Power Networks' safety outputs

Safety Performance Commitments
Primary Outputs
Compliance with legislation and directives. <ul style="list-style-type: none">– Electricity Safety Quality and Continuity Regulations (ESQCR) 2002– Health and Safety at Work Act (HSWA) 1974– Electricity at Work Act (EAWR) 1989
Secondary deliverables
Asset Health, Criticality and Risk Index – see Network Reliability. This provides a framework for managing risk including safety.
Engage on public safety.
Accident Rate per 100 employees*all 3 DNOs
Number of Improvement Notices served by HSE
Target performances
55. No formal notices or prosecutions by the HSE under applicable legislation
56. Deliver the high safety criticality element of the asset health /risk index (deliver all asset improvements with a high safety criticality score (4) in the asset risk index
57. Reduce the Total Recordable Injuries (Accident rate per 100,000 hours worked) by 10% per annum to less than 0.5
58. Reduce the Lost Time Recordable Injuries (Accident rate per 100,000 hours worked) by 10% per annum to less than 0.05
59. Achieve at least one year with no RIDDOR reportable lost time incidents for employees and contractors by the end of the period
60. At least one year with no RIDDOR Reportable public harm resulting from our activities
61. Engage with 2 million children and members of the public , either through face to face or via on line interaction, on public safety issues over the regulated period
Incentive mechanisms

Safety Performance Commitments

No financial incentives on safety within the Ofgem RIIO framework

Safety has a strong reputational incentive and is subject to criminal fines for breaches of Health and Safety Law

Operating a safe electricity network for our customers and our staff is an essential objective of our business. The RIIO-ED1 primary output is compliance with safety legislation and directives, including the primary legislation and any notices under the acts from the Health and Safety Executive.

UK Power Networks measures safety performance against a number of outputs

- Total Recordable Injuries – this is the total number of injuries per 100 employees including major and minor injuries
- Lost Time Injuries – these are injuries that resulted in an employee being unavailable for work [for more than 1 day]
- RIDDOR Dangerous Occurrences – The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) defines a number of injuries as being sufficiently serious, such that they constitute a “Major Injury” these include but are not limited to; fractures, hypothermia, dislocation, electric shock, electrical burns, eye injuries causing temporary or permanent loss of sight.
- Public Injuries – We measure the number of public injuries that were in some way related to our actions operating the network, for example injuries due to members of the public falling into excavations in the street. We exclude incidents such as road traffic accidents involving our network or instances where the injury resulted from a deliberate act.

8.2 Target performance

We are committed to striving to improve the performance against these measures in the 2015 to 2023 planning period, particularly those within our control.

We are aiming to reach our target of zero lost time injuries by the end of the forecast plan period. We also have a zero injury target for members of the public.

We will continue to actively promote public safety at county shows where we can get our message across to a wide audience and through our schools programme. Through this programme we will engage children on public safety with face to face sessions in schools and using our interactive website, 'Powerup!', targeting two million interactions during the 8 years of the price control. The active management of our network, rapid resolution of potential safety issues such as low conductors and poor condition street furniture (such as linkboxes and streetlights), are a major part of our focus on maintaining public safety. We will also continue to focus on managing security of our substations through passive security features, active monitoring and patrols and maintaining a high level of engagement with the police and other authorities, as theft of earthing metalwork does create safety risks for customers.

8.2.1 Zero harm

UK Power Networks' vision is to deliver top third industry performance in the area of safety. Our safety performance is our highest priority – UK Power Networks recognises the potential safety risk associated with electricity assets if they are not appropriately managed. UK Power Networks is committed to identifying ways to eliminate risk to achieve zero harm to customers, contractors and staff.

8.2.2 Loss Time Injuries (LTI) and Total Recordable Injuries (TRI)

Since acquisition by our current owners, we have been on a journey to improve our safety performance. This has resulted in significant improvement in our accident rate and injuries. Our accident rates have improved from being one of the highest in the industry to being one of the leading performances in 2011/12 and a good performance in 2012/13.

We have set ourselves the challenge of improving our accident rate performance for both total injuries and lost time injuries by 10% per annum and will aim to achieve 12 months with no RIDDOR reportable lost time incidents for employees and contractors.

Table 20 UK Power Networks' actual and forecast safety performance

	2010/11	2011/12	2012/13	UKPN's DPCR 5 target performance	UKPN's RIIO ED1 target performance
LTIFR Lost time injuries per 100,000 hrs worked	0.21	0.12	0.15	0.1	0.05
TRIFR Total Injuries per 100,000 hrs worked	1.72	0.99	1.14	0.9	0.5

8.2.3 Public safety

UK Power Networks will continue to actively promote public safety including by:

- Actively managing our network including through rapid resolution of potential safety issues such as low conductors and poor condition street furniture (such as link-boxes and streetlights).
- Managing the security of our substations to through passive security features, active monitoring and patrols as well as maintaining a high level of engagement with the police and other authorities. This will minimise theft of earthing metalwork may create safety risks for customers
- Education programs including at county shows and schools. Our schools program will include both face to face sessions and line interaction via our interactive website 'powerup'. Our target is to have 2 million interactions with members of the public, either through face to face or via on line interaction, on public safety issues over the regulated period in RIIO-ED1.

8.2.4 Asset Health and Risk

The overall health and condition of UK Power Networks' assets is an important contributor to staff and public safety. UK Power Networks has well developed maintenance, refurbishment and replacement activities and programmes of work which ensure the overall condition of its network assets, the overall health of which is measured through the Health Index (HI).

In particular, the RIIO Strategy Decision introduces a criticality component which is incorporated into the risk index. Asset criticality is concerned with the consequence of failure and specifically has regard for safety, reliability and environmental issues.

The risk index is a secondary deliverable for the network reliability and availability output and is discussed in detail in Chapter 4 of this document.

8.2.5 Employee wellbeing

UK Power Networks' approach to safety is wider than solely reducing LTIs. We have put significant effort into promoting the health of those who work for us. We have published an Occupational Health and Wellbeing Strategy and have launched Fitness to Work assessments for all of our operational staff. Other preventative measures include a flu vaccination programme that is available to all staff. We have also arranged 'office walk-arounds' by physiotherapists to promote good posture.

In May 2013 we launched our Employee Assistance Programme which is a 24/7, confidential counselling and information service to assist with personal or work-related problems that may be affecting health, well-being or performance. This service is provided by a well-respected a professional and independent Employee Assistance provider who support over 200 organisations in the UK . We will continue to build on these services through RIIO-ED1.

9

Social Obligations

9.1 Overview

UK Power Networks understands that electricity is an essential service which is important to its customers. UK Power Networks considers that a basic customer requirement for all its customer groups, especially those that are vulnerable to supply interruptions, is an affordable price and dependable electricity service.

Further details of our social obligations strategy can be found in [Annex 5: Social Commitments](#).

Social Obligations Commitments

Primary Outputs

Improving the quality of information on vulnerable customers

Demonstrating effective solutions for vulnerable customers integrated into core business

- Publicise the Priority Services Register

Engagement with wide range of stakeholders on how best to use the information held on customers in vulnerable situations.

Community Fund awards

Secondary deliverables

Developing new, and strengthen existing, partnerships with suppliers, local government authorities and community organisations to improve services to vulnerable consumers

Target performances

Continue to improve the service provided to vulnerable customers

62. Double the number of customers on our PSR
63. Proactively contact all registered vulnerable customers to offer support if they are without power
64. Extend our Local Authority joint response pilot across our geographical footprint and standardise triggers
65. Provide every vulnerable customer an alternative high priority dedicated number
66. Distribute Welcome Packs to all new PSR customers

Maintain community engagement during RIIO-ED1

67. Host two subject-specific priority issue focus groups on vulnerable customers and fuel poverty every year
68. Maintain our community fund investing £300,000 per annum

Work proactively with third parties to reduce the level of fuel poor in our three networks

69. Work with National Energy Action (NEA) to map and profile fuel poor customers within our footprint
70. Publish information to targeted customers on how energy efficiency and demand- side activity can be used to manage energy consumption
71. Deliver a series of targeted consumer surgeries for vulnerable residents designed to raise awareness of energy efficiency and how to manage energy bills
72. Publish a strategy to explain how smart meters can be used to reduce fuel poverty
73. Create a group of UK Power Networks local community energy champions

74. Develop a project with NEA to educate young carers about energy efficiency

75. Organise and deliver school activity days to encourage safe, efficient use of energy

Be an employer of choice

76. We will measure ourselves against other companies and seek inter and intra sector recognition/accreditation by participating in external benchmarking such as achieving membership of the Sunday Times Top 100 Best Companies.

77. We will recruit and train over 1,000 staff as well as up-skill and develop existing employees to ensure that we maintain a suitably skilled and motivated workforce

Incentive mechanisms

Broad Measure of Customer Service – Stakeholder Engagement (0.5% reward)

9.2 Priority Services Register (PSR) for vulnerable consumers

Vulnerable customers cover a wide range of people and we group them into the following three discrete categories:

- **Category 1:** OAP Normal, Elderly (60+), Disabled, Speech Difficulty, Foreign Language, Learning Difficulty, Restricted Movement, Dementia and Other, Parents with Infants.
- **Category 2:** No Life Support, Mobility Problems, Blind, Partially Sighted, Deaf, OAP Vulnerable, Hearing Impairment, Stair Lift and Bath Hoist.
- **Category 3:** Life Support Equipment, Nebuliser, Heart/Lung Machine, Kidney Dialysis, O2 Concentrator, Ventilator, Apnoea Monitor and Medical Dependant on Electricity.

UK Power Networks maintains a PSR which captures important information on its vulnerable customers in order to assist it in providing services to these customers. There are currently around 280,000 vulnerable customers on our PSR. As a respected corporate citizen, UK Power Networks is committed to doing everything possible to identify and support vulnerable customers.

In RIIO-ED1 we aim to double the number of vulnerable customers registered in our PSR.

Over the current period, UK Power Networks has improved its service offerings to vulnerable customers including by introducing:

- Letters to all Members of Parliament in our network areas requesting lists of vulnerable customers
- A welcome pack including luminous stickers with UK Power Networks' contact details and practical advice on preparing for a power cut
- A priority number enabling an immediate point of contact
- Real-time updates offered by way of call backs or SMS messages
- Mobile generators to care homes, critically ill customers and those with a medical dependency
- Hotel and meal allowances in certain circumstances
- Home visits from an engineer before leaving the site

We have also written to local members of parliament (MPs) to verify and inform our register and have introduced an electronic flagging system, which enables us to easily identify vulnerable customers in our database and fault management system. As we improve the quality of the data this will allow us to ensure we have the correct information to ensure all registered vulnerable customers can be contacted proactively in the event of a power cut.

Over the next planning period, UK Power Networks will continue to build on these recent improvements. In particular, it is committed to, amongst other things :

- Proactively contact all registered vulnerable customers to offer support if they are without power
- Ensure vulnerable customers can talk to an advisor without any delays in the telephony system
- Distribute welcome packs to all new PSR customers

- Developing new, and strengthen existing, partnerships with suppliers, local government authorities and community organisations to improve services to vulnerable consumers by extending our pilot across our geographical footprint and developing standardised triggers for notifying relevant authorities
- Provide vulnerable customers with targeted information on how to improve energy efficiency by including fuel efficiency material in the brochure given to all vulnerable customers when registering on the PSR
- Using all available channels to promote the PSR and clearly and simply explain our priority service offerings. For instance, UK Power Networks will seek to do this during calls with customers, in SMS correspondence, via its website and via twitter
- Where practical, enhance its service offerings to:
 - Offer notices in braille, for visually impaired customers
 - Simplify telephone options, so it is simpler and quicker to contact a customer advisor
 - More simply explain to customers our pricing methodology.

9.3 Fuel poverty

Fuel poor customers are those who would need to spend 10 per cent of their income on fuel to maintain an adequate level of warmth (21 degrees in the main living area, and 18 degrees for other occupied rooms). It is estimated that approximately five million households in the UK are fuel poor and a large percentage of these customers (around 80 per cent) are also vulnerable.

UK Power Networks is committed to undertaking initiatives to reduce fuel poverty.

In December 2012, we organised a Vulnerable and Fuel Poor focus group in London. A number of stakeholders attended where we discussed the issue of fuel poverty and explored ways that as a DNO we could support our fuel poor customers. We have agreed to become formal sponsors of National Energy Action (a national charity focussed on the eradication of fuel poverty).

Key areas of focus in the next planning period include:

- Work in partnership with National Energy Action to develop a joint project to maps and profile vulnerable customers within our geographic footprint. Understanding our customers better will enable us to undertake targeted initiatives such as expand our community surgeries programmes for vulnerable residents more effectively (see below)
- Publish targeted information on how energy efficiency and demand- side activity can be used to manage energy consumption better
- Publish a strategy to explain how smart meters can be used to reduce fuel poverty
- Deliver a series of targeted consumer surgeries for vulnerable residents designed to raise awareness around key topics including energy efficiency in the home and how to manage energy bills, the causes of fuel debt and how to apply to fuel poverty alleviation programmes
- Develop an information booklet that would be used as stand-alone educational tools for distribution. These will act as teaching aids for use by teachers during school activities, giving useful information around safety, fuel efficiency and the support available through UK Power Networks
- Explore the possibility of offering assisted connections to vulnerable customers, understanding what work should be included and what level of discount would be considered meaningful. The first phase will be limited to undertaking market research
- Support the development of local community energy champions among UK Power Networks employees through training such as the City & Guilds Certificate in Delivering Energy Efficiency Projects 6281-40
- Develop a project with NEA that engages young carers through training workshops. These would be targeted specifically to them and their families and focus on basic energy efficiency advice, information on how to deal with a power cut, electrical safety issues and support on where to seek assistance with energy bills
- We will work with a third party to organise and deliver school activity days. These will be a series of one-day activity workshops in local schools across our three licence areas. The aim will be to encourage behavioural change by educating school children to be more thoughtful, efficient and safe in their use of energy. The activities will incorporate a mix of interactive drama and practical discussion around energy efficiency and the safe use of electricity

9.4 Community engagement

As an essential service provider, UK Power Networks is committed to helping sustain livelihoods and lifestyles for many people in the East and South East of England and London.

During RIIO-ED1 we will host two subject specific focus groups every year on vulnerable customers and fuel poverty to improve our understanding of the impact we are having and continue to improve our initiatives in these areas.

UK Power Networks strengthens local economies and communities through infrastructure investment, as well as through everyday actions including supporting:

- The British Red Cross assistance for vulnerable customers
- Wildlife trusts in our distributions area
- Public safety education in schools and county shows
- Charity aid foundations

Community fund and staff volunteering

In addition to our existing commitments, we have recently established a community grant programme that provides funding (from shareholder returns) for community based projects relating to low carbon projects, vulnerable customers and communities. Quarterly grants of £1,000 to £10,000 are available under the scheme depending on the project's size and merit with a total of £100,000 available for each network in the first year of the scheme. The grant programme is about bringing ideas to life and the possibilities are endless.

Successful projects might include:

- Renewable and low carbon energy installations for community buildings, e.g. heat source pumps; heat exchangers; solar heating; and solar energy
- Community projects that reduce energy costs for the community and/or disadvantaged groups
- Initiatives that address social concerns, e.g. fuel poverty, poor housing and unemployment

We have a well-established employee volunteering programme under which staff are encouraged to take two days a year to help the community. Successful community fund projects will be encouraged to take advantage of this.

9.5 Our Workforce

The UKPN technically skilled workforce totals 5,146 employees, made up of 3,217 UKPN staff and 1,929 Tier 1 contractors working on our network (we also have c. 2,500 employees not working directly on the network). UKPN has been working with EU skills to develop a model to forecast workforce recruitment requirements. This model takes into account work volume changes in RIIO-ED1, expected retirement profile, expected natural wastage and productivity. During RIIO-ED1 UKPN expects 19% of our workforce to retire and for this to rise further to 27% in RIIO-ED2.

We will use the following recruitment and training pathways to manage this potential workforce shortfall:

- UKPN apprentice programmes (skill level 3) – we will recruit a further 108 general and 36 smart metering apprentices between 2014 and 2015 and we will recruit a further 236 general and 36 smart metering apprentices in RIIO-ED1
- Engineering development programme (skill level 4-5) – we will up-skill 47 trainees between 2014 and 2015, and we will up-skill 146 trainees in RIIO-ED1
- Graduate recruitment (skill level 5-7) – we will recruit 40 trainees between 2014 and 2015, and we will recruit 120 trainees in RIIO-ED1
- Market place recruitment (skill level 1–8) – we will recruit 343 staff between 2014 and 2015, and we will recruit a further 509 in RIIO-ED1

UKPN uses contractors for the delivery of additional work programmes, specialist work and to manage peak workloads. This strategy will continue in ED1 with the contractor to direct staff ratio forecast to change from 28%/72% in 2015/16 to 21%/78% in 2022/23.

[Annex 16: Workforce Renewal](#) describes our workforce strategy in further detail.

10 Expenditure

This section provides a high level overview of our expenditure proposals for the RIIO-ED1 planning period 2015-2023. A comparison is made to the expenditure in the current DPCR5 period on an eight year equivalent basis.

Costs are presented in 2012/13 prices and include ongoing efficiencies.

10.1 Overall Expenditure

Table 21 Actual compared to forecast 2015 to 2023 expenditure

£ billion Real 2012/13 prices	DPCR5- Regulatory allowance (8yr equivalent)	DPCR5 UKPN actual expenditure (8yr equivalent)	% difference	UKPN RIIO-ED1 forecast	% difference between DPCR5 actual expenditure and ED1 forecast
Load related capex	1.22	0.79	-35%	1.05	33%
Non-load related capex	1.89	1.86	-1%	2.02	8%
Network operating costs	1.27	1.45	14%	1.17	-19%
Indirect costs	1.87	1.78	-5%	1.64	-8%
Non-operational capex	0.25	0.29	15%	0.23	-22%
Pension contributions	0.24	0.26	7%	0.27	5%
RPEs	-	-	-	0.27	-
Total	6.74	6.42	-5%	6.65	3%
Pensions Deficit	0.49	0.71	44%	0.58	-18%
Total inc pensions deficit	7.23	7.13	-1%	7.23	1%

Our forecast total expenditure (totex) is £6.7 billion in real terms, a 3% increase from our forecast expenditure of £6.4 billion in the current DPCR5 period. The increases are focused on capital expenditure associated with increased forecast work volumes. Unit costs and direct operating costs are lower in RIIO-ED1, whilst indirect overhead costs are down 8%, notwithstanding that we will be doing more work.

Diversions expenditure for DPCR5 has been represented in non-load related capex consistent with its treatment in RIIO-ED1.

10.1.1 EPN

Table 22 Actual compared to forecast 2015 to 2023 expenditure

£ billion Real 2012/13 prices	DPCR5 regulatory allowance (8yr equivalent)	DPCR5 EPN actual expenditure (8yr equivalent)	Percentage difference	RIIO-ED1 forecast	Percentage difference between DPCR5 actual expenditure and ED1 forecast
Load related capex	0.53	0.30	-44%	0.37	23%
Non-load related capex	0.69	0.84	23%	0.89	6%
Network operating costs	0.63	0.68	7%	0.54	-20%
Indirect costs	0.78	0.76	-3%	0.67	-11%
Non-operational capex	0.10	0.11	12%	0.10	-12%
Pensions contributions	0.11	0.11	5%	0.12	7%
RPEs	-	-	-	0.11	-
Total	2.84	2.80	-1%	2.80	0%
Pensions Deficit	0.07	0.10	51%	0.09	-11%
Total incl pensions deficit	2.90	2.90	0%	2.89	0%

EPN's total proposed expenditure for the next planning period is £2.8 billion. This represents no increase to the current 2010 to 2015 period expenditure, adjusting for the difference in the length of the planning period.

10.1.2 LPN

Table 23 Actual compared to forecast 2015 to 2023 expenditure

£ billion, Real 2012/13 prices	DPCR5- Regulatory allowance (8yr equivalent)	DPCR5 LPN actual expenditure (8yr equivalent)	% difference	LPN RIIO-ED1 forecast	% difference between DPCR5 actual expenditure and ED1 forecast
Load related capex	0.42	0.31	-27%	0.46	48%
Non-load related capex	0.50	0.46	-8%	0.53	16%
Network operating costs	0.30	0.35	17%	0.30	-15%
Indirect costs	0.56	0.48	-14%	0.46	-4%
Non-operational capex	0.07	0.10	41%	0.06	-37%
Pensions contributions	0.06	0.06	1%	0.07	5%
RPEs	-	-	-	0.08	-
Total	1.92	1.77	-8%	1.96	11%
Pensions Deficit	0.23	0.32	37%	0.26	-17%
Total inc pensions deficit	2.15	2.08	-3%	2.23	7%

LPN's total proposed expenditure for the next planning period is £2.0 billion. This is an increase of £0.23 billion or 11% compared to the current 2010 to 2015 period expenditure, adjusting for the difference in the length of the planning period. The increase is primarily driven by the London Infrastructure Plan, increased work volumes and smart meter readiness including interventions.

10.1.3 SPN

Table 24 Actual compared to forecast 2015 to 2023 expenditure

£ billion	DPCR5-Regulatory allowance (8yr equivalent)	DPCR5 SPN actual expenditure (8yr equivalent)	% difference	SPN RIIO-ED1 forecast	% difference between DPCR5 actual expenditure and ED1 forecast
Load related capex	0.26	0.18	-31%	0.22	23%
Non-load related capex	0.70	0.56	-20%	0.60	7%
Network operating costs	0.34	0.42	23%	0.33	-21%
Indirect costs	0.53	0.54	2%	0.51	-6%
Non-operational capex	0.09	0.09	-1%	0.07	-18%
Pension contributions	0.07	0.08	15%	0.09	5%
RPEs	-	-	-	0.08	-
Total	1.99	1.86	-6%	1.89	1%
Pensions Deficit	0.19	0.29	50%	0.22	-22%
Total inc pensions deficit	2.18	2.15	-1%	2.11	-2%

SPN's total proposed expenditure for the next planning period is £1.9 billion. This represents a £0.03 billion or 1% increase compared to the current 2010 to 2015 period expenditure, adjusting for the difference in the length of the planning period. The increase is primarily driven by increased work volumes and smart meter readiness including interventions.

10.2 Expenditure by Output Category

Table 25 below shows our expenditure including customer contributions in connections for the forecast period 2015 to 2023 against the key output categories.

We have categorised our expenditure in this manner to demonstrate that our plans ensure a balance is achieved in investing to maintain a safe, reliable network, ensuring there is capacity available for customers to connect, managing its impact on the environment and ensuring good customer service.

Table 25 Expenditure by Output Categories including connections

£ billion Real 2012/13 prices Gross	EPN RIIO-ED1 expenditure forecast	LPN RIIO-ED1 expenditure forecast	SPN RIIO-ED1 expenditure forecast	UKPN RIIO-ED1 expenditure forecast
Customer Satisfaction	0.6	0.4	0.4	1.4
Reliability and Availability	1.7	1.4	1.1	4.2
Environment	0.4	0.2	0.3	0.9
Connections	0.5	0.4	0.3	1.2
Safety	0.1	0.1	0.1	0.3
Social Commitments	0.1	0.3	0.2	0.6
Other Costs				0.0
Total	3.4	2.8	2.4	8.6

10.3 Detailed expenditure forecast tables

Table 26 to Table 29 set out the detailed expenditure building blocks for total UK Power Networks and each of the DNOs.

Table 26 Detailed expenditure forecast UKPN

UKPN RIIO-ED1 total expenditure forecast (£m Real 2012/13 prices)											
Item	DPCR5 average	RIIO- ED1 average	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	RIIO- ED1 total
Load related expenditure	98.7	127.8	135.4	140.2	145.6	127.3	124.6	118.8	121.4	109.3	1,022.6
Non-load related expenditure	232.7	248.8	271.8	275.1	256.8	250.8	254.3	241.2	224.8	215.6	1,990.4
Faults	108.4	78.0	79.9	79.0	77.9	77.5	76.4	76.9	77.7	78.5	623.8
Inspections & maintenance	42.0	34.6	36.3	35.7	35.4	35.2	34.7	34.6	32.8	31.9	276.6
Tree-cutting	23.1	24.0	23.9	24.0	24.2	24.2	24.3	24.0	23.7	23.4	191.7
Electricity	7.9	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	78.4
Closely associated indirect costs	142.0	138.0	151.5	145.3	140.3	139.2	135.8	131.2	131.4	129.0	1,103.7
Business support costs	79.9	67.3	69.9	69.7	68.0	67.5	67.0	66.3	65.6	64.3	538.3
Smart metering	0.5	7.1	4.7	8.1	10.3	11.2	11.1	8.1	1.8	1.8	57.1
IT (non op capex)	19.8	14.4	10.7	24.6	15.9	15.9	15.3	12.9	10.6	8.9	114.8
Other non-op capex	16.5	13.9	14.5	16.4	10.8	14.5	15.0	10.7	16.4	13.2	111.5
Pension costs	32.4	34.1	39.3	38.3	37.0	35.6	33.9	32.0	29.3	27.1	272.5

UKPN RIIO-ED1 total expenditure forecast (£m Real 2012/13 prices)											
Item	DPCR5 average	RIIO-ED1 average	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	RIIO-ED1 total
RPEs	-	33.5	5.2	14.4	22.5	30.6	38.9	45.6	52.5	58.3	268.0
Total core costs	803.9	831.2	852.9	880.6	854.5	839.3	841.1	812.1	797.8	771.1	6,649.4
Pensions deficit repair	88.4	72.4	72.4	72.4	72.4	72.4	72.4	72.4	72.4	72.4	579.2
Total core costs inc pensions deficit	892.3	903.6	925.3	953.0	926.9	911.7	913.5	884.5	870.2	843.5	7,228.6
Business rates	73.5	77.3	77.3	77.3	77.3	77.3	77.3	77.3	77.3	77.3	618.4
National Grid charges	61.2	101.1	75.5	84.3	89.9	97.5	107.9	116.1	117.6	119.9	808.7
Other	21.8	7.9	11.4	8.0	8.3	9.5	7.7	9.8	4.3	4.3	63.3
Connections outside RAV	1.4	-5.0	-6.8	-5.8	-5.0	-5.0	-4.5	-4.1	-4.2	-4.2	-39.6
Total	1,050.2	1,084.9	1,082.7	1,116.8	1,097.4	1,091.0	1,101.9	1,083.6	1,065.2	1,040.8	8,679.4

Table 27 Detailed expenditure forecast EPN

RIIO-ED1 total expenditure forecast (£m Real 2012/13 prices)											
Item	DPCR5 average	RIIO-ED1 average	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	RIIO-ED1 total
Load related expenditure	37.2	44.5	47.3	48.8	44.0	38.2	41.0	45.4	47.9	43.2	355.8
Non-load related expenditure	105.2	109.7	121.0	115.4	113.6	115.2	113.1	103.5	101.1	94.3	877.2
Faults	46.6	34.4	34.8	34.7	34.3	34.3	33.5	34.0	34.4	34.8	274.8
Inspections & maintenance	18.8	13.0	13.8	13.2	13.1	13.0	12.8	12.9	12.7	12.6	104.1
Tree-cutting	15.8	15.8	15.7	15.8	16.0	16.0	16.0	15.8	15.6	15.4	126.3
Electricity	3.8	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	36.0
Closely associated indirect costs	61.7	57.4	62.7	60.1	58.5	57.8	56.8	54.6	54.6	53.8	458.9
Business support costs	32.7	26.5	27.4	27.3	26.7	26.7	26.5	26.2	26.0	25.5	212.3
Smart metering	0.2	2.9	1.9	3.4	4.3	4.6	4.5	3.2	0.8	0.8	23.5
IT (non op capex)	8.5	6.3	4.6	10.9	7.0	7.1	6.9	5.5	4.4	3.8	50.2
Other non-op capex	5.2	5.8	4.9	9.5	5.2	7.1	7.5	3.4	4.4	4.2	46.2
Pension costs	14.1	15.0	17.2	16.7	16.2	15.6	14.9	14.1	13.1	12.0	119.8

RIIO-ED1 total expenditure forecast (£m Real 2012/13 prices)											
Item	DPCR5 average	RIIO-ED1 average	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	RIIO-ED1 total
RPEs	-	14.2	2.2	6.0	9.3	12.9	16.4	19.3	22.6	25.0	113.7
Total core costs	349.8	349.9	358.0	366.3	352.7	353.0	354.4	342.4	342.1	329.9	2,798.8
Pensions deficit repair	12.7	11.3	11.3	11.3	11.3	11.3	11.3	11.3	11.3	11.3	90.4
Total core costs inc pensions deficit	362.5	361.2	369.3	377.6	364.0	364.3	365.7	353.7	353.4	341.2	2,889.2
Business rates	35.5	36.0	36.0	36.0	36.0	36.0	36.0	36.0	36.0	36.0	288.0
National Grid charges	24.0	41.1	32.5	35.6	36.8	39.2	42.3	48.1	46.4	47.9	328.8
Other	9.3	3.4	5.5	3.9	3.4	3.8	3.2	3.9	1.9	1.9	27.5
Connections outside RAV	0.5	-2.0	-2.7	-2.3	-1.8	-2.1	-1.9	-1.6	-1.7	-2.0	-16.1
Total	431.8	439.7	440.6	450.8	438.4	441.2	445.3	440.1	436.0	425.0	3,517.4

Table 28 Detailed expenditure forecast LPN

LPN RIIO-ED1 total expenditure forecast (£m, Real 2012/13 prices excluding pensions)											
Item	DPCR5 average	RIIO-ED1 average	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	RIIO-ED1 total
Load related expenditure	38.8	56.3	61.6	56.7	65.9	62.9	62.2	52.3	45.7	43.1	450.4
Non-load related expenditure	57.7	65.6	75.3	76.7	64.3	58.2	65.6	66.9	60.5	57.1	524.6
Faults	28.5	21.3	22.2	21.8	21.4	21.1	20.9	20.9	21.0	21.2	170.5
Inspections & maintenance	13.4	13.6	14.3	14.3	14.1	14.2	14.0	13.8	12.1	11.6	108.4
Tree-cutting	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Electricity	2.4	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	23.2
Closely associated indirect costs	35.8	37.6	41.6	39.3	37.9	38.1	37.2	35.9	35.6	34.8	300.4
Business support costs	24.2	20.1	21.1	21.1	20.5	20.1	19.9	19.7	19.5	19.0	160.9
Smart metering	0.2	2.5	1.7	2.9	3.7	4.0	4.0	3.0	0.5	0.5	20.3
IT (non op capex)	5.7	3.8	3.1	6.5	4.2	4.0	3.8	3.4	2.9	2.4	30.3
Other non-op capex	6.3	3.7	6.6	3.5	2.7	2.5	2.5	3.0	5.3	3.6	29.7
Pension costs	8.0	8.3	9.7	9.3	9.0	8.7	8.3	7.8	7.2	6.7	66.7
RPEs	-	9.7	1.6	4.2	6.6	8.9	11.6	13.5	14.9	16.4	77.7
Total core costs	221.0	245.4	261.7	259.2	253.2	245.6	252.9	243.1	228.1	219.3	1,963.1

LPN RIIO-ED1 total expenditure forecast (£m, Real 2012/13 prices excluding pensions)											
Item	DPCR5 average	RIIO-ED1 average	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	RIIO-ED1 total
Pensions deficit repair	39.8	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	264.0
Total core costs inc pensions deficit	260.8	278.4	294.7	292.2	286.2	278.6	285.9	276.1	261.1	252.3	2,227.1
Business rates	25.3	25.4	25.4	25.4	25.4	25.4	25.4	25.4	25.4	25.4	203.2
National Grid charges	24.8	42.6	28.2	32.6	35.6	40.9	47.7	49.8	52.8	53.4	341.0
Other	9.5	2.2	2.9	2.0	2.4	2.8	2.2	2.9	1.1	1.1	17.4
Connections outside RAV	-0.2	-1.6	-2.2	-1.7	-1.7	-1.5	-1.4	-1.4	-1.5	-1.4	-12.8
Total	320.2	347.0	349.0	350.5	347.9	346.2	359.8	352.8	338.9	330.8	2,775.9

Table 29 Detailed expenditure forecast SPN

SPN RIIO-ED1 expenditure forecast (£m in real 2012/13 prices excluding pensions)											
Item	DPCR5 average	RIIO-ED1 average	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	RIIO-ED1 total
Load related expenditure	22.7	27.1	26.5	34.7	35.7	26.2	21.4	21.1	27.8	23.0	216.4
Non-load related expenditure	69.8	73.6	75.5	83.0	78.9	77.4	75.6	70.8	63.2	64.2	588.6
Faults	33.3	22.3	22.9	22.5	22.2	22.1	22.0	22.0	22.3	22.5	178.5
Inspections & maintenance	9.8	8.0	8.2	8.2	8.2	8.0	7.9	7.9	8.0	7.7	64.1
Tree-cutting	7.3	8.2	8.2	8.2	8.2	8.2	8.3	8.2	8.1	8.0	65.4
Electricity	1.7	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	19.2
Closely associated indirect costs	44.5	43.1	47.2	45.9	43.9	43.3	41.8	40.7	41.2	40.4	344.4
Business support costs	23.0	20.6	21.4	21.3	20.8	20.7	20.6	20.4	20.1	19.8	165.1
Smart metering	0.1	1.7	1.1	1.8	2.3	2.6	2.6	1.9	0.5	0.5	13.3
IT (non op capex)	5.6	4.3	3.0	7.2	4.7	4.8	4.6	4.0	3.3	2.7	34.3
Other non-op capex	5.1	4.5	3.0	3.4	2.9	4.9	5.0	4.3	6.7	5.4	35.6
Pension costs	10.3	10.8	12.4	12.3	11.8	11.3	10.7	10.1	9.0	8.4	86.0
RPEs	-	9.6	1.4	4.2	6.6	8.8	10.9	12.8	15.0	16.9	76.6
Total core costs	233.2	235.9	233.2	255.1	248.6	240.7	233.8	226.6	227.6	221.9	1,887.5
Pensions deficit repair	35.9	28.1	28.1	28.1	28.1	28.1	28.1	28.1	28.1	28.1	224.8

SPN RIIO-ED1 expenditure forecast (£m in real 2012/13 prices excluding pensions)											
Item	DPCR5 average	RIIO-ED1 average	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	RIIO-ED1 total
Total core costs inc pensions deficit	269.1	264.0	261.3	283.2	276.7	268.8	261.9	254.7	255.7	250.0	2,112.3
Business rates	12.7	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	127.2
National Grid charges	12.4	17.4	14.8	16.1	17.5	17.4	17.9	18.2	18.4	18.6	138.9
Other	3.0	2.3	3.0	2.1	2.5	2.9	2.3	3.0	1.3	1.3	18.4
Connections outside RAV	1.1	-1.3	-1.9	-1.8	-1.5	-1.4	-1.2	-1.1	-1.0	-0.8	-10.7
Total	298.3	298.3	293.1	315.5	311.1	303.6	296.8	290.7	290.3	285.0	2,386.1

10.4 Load related expenditure

Table 30 Load related expenditure

UKPN RIIO-ED1 total expenditure forecast (£m Real 2012/13 prices excluding pensions)											
Item	DPCR5 average	RIIO-ED1 average	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	RIIO-ED1 total
Load related expenditure	98.7	127.8	135.4	140.2	145.6	127.3	124.6	118.8	121.4	109.3	1,022.6

Our load related expenditure forecast is based on the work volumes that we estimate are necessary to deliver our reliability and availability output targets, including our load index objectives. We use a number of models to inform the volume and nature of work that needs to be undertaken to maintain our LI targets including:

- Planning Load Estimator (PLE) – this assesses site specific investment requirements at HV and EHV substations to meet our statutory requirements
- Imperial College Load Related model (ICLR) – this assesses investment requirements at a whole of system level, rather than at a site specific level
- Smart Grid Forum Work Stream 3 (WS3) Transformer model – this provides an indication of the nature and scope of smart grid investment that could be adopted based on a generic network

Taken together, these models provide a robust view of the nature and volume of work that must be undertaken to deliver our overall output commitments to customers. The work programme identified by the models is further tested and assessed by expert engineers who take into account, amongst other things, the following factors to ensure that it is prudent and efficient:

- The opportunities for synergies between work programmes, such that the replacement schedule can coincide with other major works including National Grid's investment plans
- The underlying reasons for any step change in average historic volumes
- Whether there is scope to trade off or substitute Load Related capex for other categories of capex including non-load related or quality of supply or opex
- Whether there are other feasible and efficient alternative investment options that could achieve the same outcomes including non-network solutions or innovative investments
- The cost-benefit of alternative solutions having regard for network risk
- The impact on quality of supply if investment is deferred or not undertaken

Reinforcement in London to maintain capacity and resilience

The London Central Business District (CBD) has a significant commercial and political impact on the UK economy. Customers served by our London Network include the many internationally significant businesses in the City of London, the West End and Canary Wharf, and the many strategic government and royal sites around Parliament Square, Whitehall and Green Park. It is therefore important that the London network, and particularly the CBD, has capacity and resilience that is comparable with other world cities. To this end, we have incorporated c.£100m of strategic reinforcement expenditure on new substations and on increased automation in our 2015 to 2023 Business Plan. This is included as part of the £1 billion of total load related reinforcement UK Power Networks is proposing to spend during RIIO-ED1.

10.5 Non-load related expenditure

Table 31 Non-load related expenditure

UKPN RIIO-ED1 total expenditure forecast (£m Real 2012/13 prices excluding pensions)											
Item	DPCR5 average	RIIO-ED1 average	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	RIIO-ED1 total
Non-load related expenditure	232.7	248.8	271.8	275.1	256.8	250.8	254.3	241.2	224.8	215.6	1,990.4

We are committed to maintaining the health and condition of the network, including health index targets, in line with current levels over the RIIO-ED1 period, and we are committed to further improving our CI and CML performance.

We use a number of models to inform the volume and nature of work that needs to be undertaken to maintain our HI targets including:

- Asset Risk Prioritisation (ARP) – this assigns a numeric representation of condition of individual asset classes in terms of the HI scores (HI1 to HI10), by drawing on a range of inputs including age, location, and inspection data
- Asset health (Civil) – this assigns a numeric representation of condition of individual asset classes in terms of the HI scores (HI1 to HI4)
- Criticality ARP – this provides a relative comparison of the consequences of failure within the HI categories by assigning a criticality score
- Criticality (ESQCR) – this assigns a severity score indicating the deadline within which issues need to be resolved

Taken together, these models provide a robust view of the current health of the network, by assets and the number of interventions (volume of work) required to maintain the health at the current overall level. The outputs from the criticality ARP are important to informing how work programmes should be prioritised, having regard for the consequences of failure.

The work programme identified by the models is further tested and assessed by expert engineers to ensure that it is prudent and efficient.

Diversions and Wayleaves

There are two primary drivers to diversion and wayleaves expenditure, customer requests to move UK Power Networks infrastructure and the volume of capital investment. UK Power Networks has used the historic level of expenditure and revenue to forecast customer driven diversions. The majority of these costs are charged directly back to customers who incur the work.

10.6 Network operating costs

Table 32 Network Operating costs

UKPN RIIO-ED1 total expenditure forecast (£m Real 2012/13 prices excluding pensions)											
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Item	DPCR5 average	RIIO-ED1 average	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	RIIO-ED1 total
Fault repair	108.4	78.0	79.9	79.0	77.9	77.5	76.4	76.9	77.7	78.5	623.8
Inspections & maintenance	42.0	34.6	36.3	35.7	35.4	35.2	34.7	34.6	32.8	31.9	276.6
Tree maintenance	23.1	24.0	23.9	24.0	24.2	24.2	24.3	24.0	23.7	23.4	191.7
Other including Electricity purchased	7.9	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	78.4
Total Network Operating costs	181.4	146.3	149.9	148.5	147.3	146.7	145.2	145.3	144.0	143.6	1170.5

Network operating costs fall into three broad categories of activity that are required to operate the network on an on-going 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. We will optimise the amount of work carried out in these activities through a combination of historic trend analysis, asset health records, intervention scheduling optimisation and required frequency of visits.

Fault repair

Fault repairs arise from both network failures and interruptions to power as a result of third party activities (e.g. cable strikes). The historic failure rate of our network has been relatively stable over the last five years and our network investment programme has been constructed to ensure that the number of interruptions does not increase over time. Therefore we have used the historic 5 year average to forecast the number of expected network failures.. Although there is more variability in the number of interruptions as a result of third party activities, it is not expected that the long term trend will change significantly over time and therefore the long run average has again been assumed. The overall reduction in the costs of the fault repair expenditure in RIIO-ED1 is as a result of the forecast improvement in the unit costs of our activities as our direct cost efficiency and business transformation programmes take effect over 2013-2015.

Inspections and maintenance

UK Power Networks inspects and maintains its 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.

Broadly our Inspection and maintenance volumes in RIIO-ED1 are expected to remain flat when compared to DPCR5. We have also moved to the overall upper quartile unit cost target in RIIO-ED1. There is a £1.5m per annum increase in LPN as a result of the implementation of the London operational strategy. There is also an increase in inspection expenditure in the last two years of DPCR5 as UK Power Networks has committed to the Health & Safety Executive to inspect and where required replace, all cable pits and underground link boxes.

Tree maintenance

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 no overhead lines in LPN that require tree-cutting. Expenditure in RIIO-ED1 is expected to stay at a constant level when compared to DPCR5.

Other costs including electricity purchased

There are a number of other small costs that are treated as network operating costs. The most significant (accounting for approximately [80%] of this category) is the purchase of electricity to run the network. UK Power Networks has implemented significant cost cutting programmes during DPCR5 through the implementation of

demand reduction (reduced heating, the use of light timer switches in substation) and the total costs (above inflation and real price effects) are not expected to increase further in RIIO-ED1.

10.7 Closely associated indirect costs

Table 33 Closely associated indirect costs

UKPN RIIO-ED1 total closely associated indirect cost forecast (£m Real 2012/13 prices excluding pensions)											
Item	DPCR5 average	RIIO-ED1 average	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	RIIO-ED1 total
Closely associated indirect costs	142.0	138.0	151.5	145.3	140.3	139.2	135.8	131.2	131.4	129.0	1,103.7

Closely associated indirect costs are activities that are required to support the operational activities (capital investment and network operating costs) of UKPN. UKPN has seen a significant reduction in these costs during DPCR5 and they are expected to remain constant in RIIO-ED1 except where there is a forecast increase in the volume of direct activities and new activities (smart metering) are undertaken. The costs above include workforce renewal costs discussed below.

10.8 Training, work force planning and renewal

Our Workforce renewal strategy sets out the average growth in our workforce that will be required over the RIIO-ED1 period to deliver our investment and output commitments to our customers and other stakeholders.

Table 34 workforce renewal (WFR) expenditure in RIIO-ED1

UKPN RIIO-ED1 work force renewal cost forecast (£m Real 2012/13 prices excluding pensions)											
Item	DPCR5 average	RIIO-ED1 average	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	RIIO-ED1 total
Workforce renewal	10.4	10.0	12.8	10.9	9.7	9.8	8.5	9.0	9.9	9.4	80.1

The UKPN technically skilled workforce totals c5,150 employees, made up of 3,220 UKPN staff and 1,930 Tier 1 contractors working on our network (we also have c. 2,500 employees not working directly on the network). UK Power Networks has been working with EU Skills to develop a model to forecast workforce recruitment requirements. This model takes into account work volume changes in RIIO-ED1, expected retirement profile (aged 65), expected natural wastage (1.9% per annum) and productivity improvements (1% per annum in EPN and SPN and 1.25% in LPN). During RIIO-DPCR5 UK Power Networks forecasts that 6% of this workforce will retire and has developed a flexible recruitment and training strategy to ensure that this does not restrict programme delivery or leave a technical skills gap whilst minimising total costs for customers. In ED1 UK Power Networks expects the number of retirees to rise to 19% of our workforce and for this to rise further to 27% in RIIO-ED2.

10.9 Business support costs

Table 35 Business support costs

UKPN RIIO-ED1 Business Support cost forecast (£m Real 2012/13 prices excluding pensions)											
Item	DPCR5 average	RIIO-ED1 average	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	RIIO-ED1 total
HR & Non-operational Training	5.7	5.0	5.1	5.1	5.1	5.0	5.0	4.9	4.9	4.8	39.8
Finance & Regulation	24.6	22.4	23.2	23.1	22.8	22.6	22.3	22.1	21.8	21.4	179.3
CEO	5.9	5.5	5.6	5.7	5.6	5.6	5.5	5.5	5.4	5.3	44.1
IT & Telecoms	26.5	22.6	23.6	23.8	22.6	22.6	22.5	22.3	22.0	21.6	181.0
Property Management	15.6	11.7	12.5	12.0	11.9	11.8	11.7	11.6	11.4	11.2	94.0
Total business support costs (includes Network Policy for DPCR5)	79.9	67.3	69.9	69.7	68.1	67.5	67.0	66.3	65.6	64.3	538.3

Business support costs are associated with corporate functions of a DNO. The main activities are:

- HR and Non-Operational Training
- Finance & Regulation
- CEO
- IT & telecoms operational costs (see also section 10.11)
- Property Management

UK Power Networks has worked with PA Consulting to benchmark our business support cost base and identify where future cost reductions are required. This has resulted in total business support costs which are reduced by an average of £11m per annum in RIIO-ED1 when compared to DPCR5.

10.10 Smart metering

The Government's decision to mandate the rollout of smart meters to all domestic and non-domestic customers by the end of 2020 (reflecting the one year delay in the roll out programme) is a major national change programme introduced to support its commitment to transitioning to a low carbon economy and meet its long-term challenges including providing an affordable, secure and sustainable energy supply.

Table 36 Smart Metering expenditure in RIIO-ED1

UKPN RIIO-ED1 total smart metering cost forecast (£m Real 2012/13 prices excluding pensions)									
RIIO-ED1 (£m, Real 12/13 Prices) excluding pensions	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	ED1 Total
Smart metering	4.7	8.1	10.3	11.2	11.1	8.1	1.8	1.8	57.1

Smart meters, which are an enabling technology, will replace the existing meters and will empower consumers to better manage their energy consumption and their energy bill by providing real-time information on energy usage. They will also facilitate more sophisticated energy management techniques and should bring an end to estimated billing – consumers will only be billed for the energy actually used.

Smart meters will also deliver direct benefits to UK Power Networks and other network operators, including real-time data on customers interrupted in a fault situation giving us the ability to improve customer service and restore supplies more quickly, and information on load and voltage, enabling us to better target network reinforcement. We will also have the ability to improve services to vulnerable and fuel poor customers.

Details of our smart metering strategy can be found in [Annex 10: Smart Metering](#).

10.11 IT expenditure

Table 37 Summary of our planned expenditure

UKPN RIIO-ED1 total IT expenditure forecast (£m Real 2012/13 prices excluding pensions)									
RIIO-ED1 (£m, Real 12/13 Prices) excluding pensions	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	ED1 Total
IT & Telecoms Capital Expenditure	12.0	14.0	16.6	16.1	16.8	17.5	18.3	18.1	129.4
IT Non Operational Capital Expenditure	10.7	24.5	16.0	15.9	15.2	12.8	10.6	8.9	114.8
IT & Telecoms Operational Expenditure	23.6	23.8	22.6	22.6	22.5	22.3	22.0	21.6	181.0
Total	46.3	62.4	55.2	54.7	54.6	52.6	50.9	48.6	425.2

Our IT platform is critical to assisting us to meet the opportunities and challenges that we face in delivering our output commitments over the RIIO-ED1 period. This includes amongst other things, the use of smart interventions and the transition to a smart grid, the roll out of smart meters, improved data quality, improved customer service, and more sophisticated use of large scale data in asset management.

Managing our IT systems by maintaining, replacing and refreshing them in an efficient and effective way to ensure that they remain reliable, resilient and secure, will deliver benefits and value for money over the RIIO-ED1 period. We have developed a comprehensive IT strategy which will provide a key capability to support the delivery of our output commitments, while providing value for money. The overall objectives of our RIIO-ED1 IT strategy are to adopt a different investment strategy compared to DPCR5 by:

- Creating a simpler platform that is easier to manage
- Rationalising and integrating IT applications
- Mitigate risk through refresh

Details of our IT strategy can be found in [Annex 11: IT Strategy](#).

10.12 Pensions

Table 38 below shows the forecast pensions contributions and deficit reduction payments we expect to make during RIIO-ED1. We inherited a closed (but active) pension scheme that still contains a significant number of employees. The benefits under this pension scheme are protected under primary legislation that was introduced at the time of privatisation of the electricity industry in 1990. Under the last price control Ofgem established five pension principles to ensure that customers and shareholders appropriately shared the risks of a deficit arising in the scheme. We have not altered these assumptions for our RIIO-ED1 business plan submission. The costs will be reviewed as part of the tri-annual efficiency evaluation. The next evaluation is expected to be completed in 2014.

Table 38 Summary of our pensions forecasts

UKPN RIIO-ED1 total expenditure forecast (£m Real 2012/13 prices)											
Item	DPCR5 average	RIIO-ED1 average	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	RIIO-ED1 total
Ongoing pension costs	32.4	34.1	39.3	38.3	37	35.6	33.9	32	29.3	27.1	272.5
Pensions Deficit	88.4	72.4	72.4	72.4	72.4	72.4	72.4	72.4	72.4	72.4	579.2
Total	120.7	106.5	111.7	110.7	109.4	108.0	106.3	104.4	101.7	99.5	851.7

10.13 Business rates and National Grid costs

Table 39 Business rates and national grid cost forecasts

UKPN RIIO-ED1 total expenditure forecast (£m Real 2012/13 prices excluding pensions)											
Item	DPCR5 average	RIIO-ED1 average	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	RIIO-ED1 total
Business rates	73.5	77.3	77.3	77.3	77.3	77.3	77.3	77.3	77.3	77.3	618.4
National Grid charges	61.2	101.1	75.5	84.3	89.9	97.5	107.9	116.1	117.6	119.9	808.7
Total	134.7	178.4	152.8	161.6	167.2	174.8	185.2	193.4	194.9	197.2	1,427.1

Business rates

UK Power Networks is able to pass through costs that it is charged by central and local government for the rates payable by the licensee in respect of any land and heritages. These are forecast to increase by £3.8m per annum in RIIO-ED1.

National Grid costs

National Grid charges are payable by UK Power Networks for charges that are levied by National Grid as connection charges by direct reference to the number or nature of connections between UK Power Networks and the National Grid. They include any associated Transmission Use of System Charges and any remote Transmission Asset Rentals payable by the licensee. National Grid are subject to a separate price control and these costs are forecast to increase by £39.9m per annum in RIIO-ED1.

10.14 Other costs

Table 40 Non-operational capex and other costs

UKPN RIIO-ED1 total expenditure forecast (£m Real 2012/13 prices excluding pensions)											
Item	DPCR5 average	RIIO-ED1 average	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	RIIO-ED1 total
Non-operational capex property	5.1	4.8	6.7	5.3	2.7	4.2	6.1	2.4	6.0	5.0	38.4
No-operational capex – other	11.4	9.2	7.9	11.1	8.2	10.4	8.9	8.2	10.4	8.2	73.4
Ofgem licence fee	4.1	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	34.9
Innovation	15.6	0.3	1.6	0.8	-	-	-	-	-	-	2.4
Other costs	1.6	3.2	5.4	2.9	3.9	5.0	3.3	5.3	-	-	26.0
Total Other	38.0	21.9	26.0	24.5	19.1	24.0	22.7	20.4	20.8	17.5	174.9

10.15 Improving Quality of Supply

These costs are expected to be funded through incentives and no ex-ante funding has been included in our RIIO plan. This section is included for completeness regarding our investment plans.

Table 41 Quality of supply expenditure

UKPN RIIO-ED1 total expenditure forecast (£m Real 2012/13 prices excluding pensions)											
Item	DPCR5 average	RIIO-ED1 average	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	RIIO-ED1 total
Quality of Supply expenditure also included in NLRE	7.2	3.3	3.5	3.7	3.7	3.2	3.2	3.2	3.2	3.2	26.7

We have set an overall business objective to improve continuity of supply in all three licence areas so that our CI and CML performance for RIIO-ED1 is in the top third compared to other DNOs, and to eliminate over 18 hour and significantly reduce surely 12 hour restoration failures. Delivering this objective will reduce fault costs, improve customer service, and increase rewards under the regulatory incentive scheme.

Details of our quality of supply strategy can be found in [Annex 6: Quality of Supply](#). Details of our target performance improvements can be found in section 4.2 of this annex.

