2015-2023

RIIO-ED1 Business Plan

Draft Business Plan for stakeholder consultation

March 2013

WESTERN POWER DISTRIBUTION

Serving the Midlands, South West and Wales

Foreword
by Robert Symons, CEO, Western Power Distribution (WPD)

Our business is a simple one. Our purpose is to make sure the electricity network of poles, pylons, cables, wires and substations in our four distribution areas safely delivers power to homes and businesses around the clock.

Outstanding customer service combined with technical excellence, innovation and a clear business structure have made WPD the best electricity distribution business in the UK.

The WPD South West and WPD South Wales businesses have been industry leaders in the UK for many years. In April 2011 we purchased the former 'Central Networks' distribution businesses based in the West and East Midlands. These two businesses were known to be significantly less efficient than WPD with both poor levels of customer service and work delivery (the businesses are now known as WPD West Midlands and WPD East Midlands).

As part of the acquisition of the Midlands businesses we promised Ofgem (the regulator for electricity distribution companies) that we would significantly improve customer service whilst lowering costs. By applying our simple operational philosophy, where continuous change and innovation is part of what we do every day, to the Midlands businesses, we have been able to effect dramatic improvements in the region within 12 months of the acquisition:

- 20% reduction in operating costs;
- 40% reduction in the average amount of time a customer is without electricity;
- 96% reduction in the number of customers who have a power cut in excess of 18 hours;
- 70% reduction in the number of customer complaints to the industry ombudsman.

Put simply - we deliver on our promises. We are proud of our record but we are not complacent.

The next regulatory period will be eight years from April 2015 to March 2023 - a time in which many new challenges are predicted. These include safeguarding network security and providing reliability at an affordable cost, and continuing to push forward the boundaries of customer service excellence. In addition it is becoming increasingly important to deliver on a range of environmental commitments, including the facilitation of new 'Low Carbon Technologies' – specifically heat pumps for domestic heating, solar photovoltaic for electricity generation and electric vehicle charging.

Our business plan sets out our view of this future and has been influenced by engagement with our stakeholders. It explains what we intend to deliver, the amount we propose to invest and how this will impact customers.

Our aim is to keep our business simple, to deliver on our promises and to continue to innovate. This will enable our customers to receive the highest levels of customer service at an efficient cost and for WPD to continue to be the industry leader in electricity distribution.

Contents

1 Introduction

1.1 This document is the draft Western Power Distribution (WPD) Business Plan for the period from April 2015 to the end of March 2023. It includes what we intend to deliver, how much it will cost and the benefits provided to customers and stakeholders.

1.2 This version of the plan is specifically aimed at stakeholders, providing an opportunity to review our proposals in detail before we finalise our plans in June 2013. It was prepared in advance of the Ofgem (Office for Gas and Electricity Markets) Strategy Decision (published on 4 March 2013) and the final version will be updated to reflect additional guidance that has been provided by Ofgem.

1.3 The eight year period aligns with the next Ofgem regulatory price control review period, known as RIIO-ED1; the first for electricity distribution to be determined using the Revenue = Incentives, Innovation and Outputs framework. The final Business Plan, detailed cost tables and financial models form the submission under RIIO-ED1 to Ofgem, who will use the information to determine allowed revenues.

1.4 The current price control is called Distribution Price Control Review 5 (DPCR5) and it spans a five year period from April 2010 to March 2015.

Structure of this document

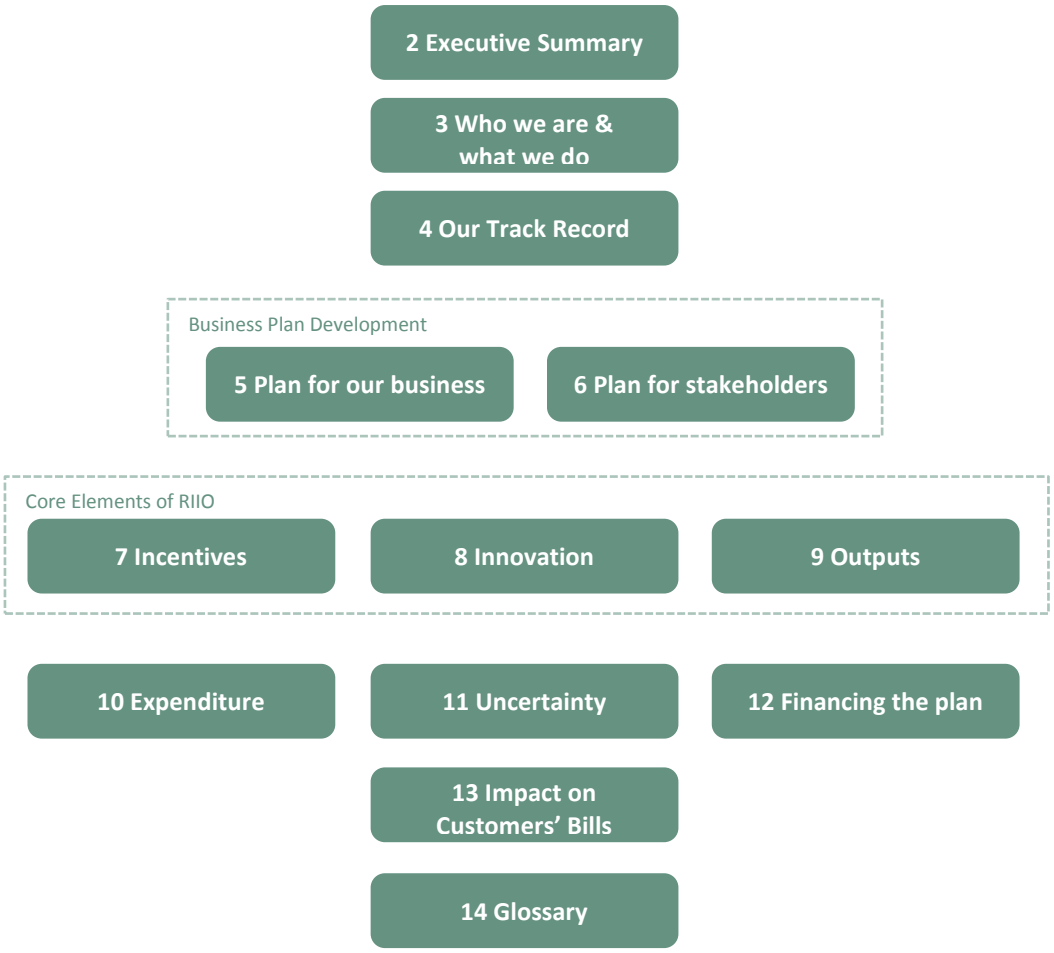
1.5 We appreciate that the readers of this document will range from regulatory experts and well informed stakeholders through to new customers who may have had little previous knowledge of WPD. We have therefore set out to provide a simple overview of our plans and wherever possible have sought to avoid using acronyms or 'industry jargon'. We include a glossary at the end of the document to help explain specific terms used.

1.6 The final Business Plan that we submit to Ofgem will have more technical and detailed information presented in supplementary annexes aimed at readers who have a specialist interest.

1.7 The document is subdivided into the following sections:

Chapter	Title	Content
2	**Executive summary**	An overview of the Business Plan, its aims and its conclusions
3	**Who we are and what we do**	A simple description of our business
4	**Our track record**	What we have achieved
5	**Developing the plan for our business**	The key business objectives and long term strategy that drive our business
6	**Developing the plan for our stakeholders**	An overview of our stakeholder engagement process and the preferences of stakeholders
7	**Incentives**	The incentives that we believe should be active in RIIO-ED1
8	**Innovation**	An overview of our Innovation Strategy
9	**Outputs**	The key services and results we are going to deliver
10	**Expenditure**	The amount we will be spending and on what
11	**Uncertainty**	Details of where there is uncertainty that could affect the overall programme planned for RIIO-ED1
12	**Financing the plan**	How we will finance the network investment through debt and equity
13	**Impact on customers' bill**	An illustration of how the costs for customers will change as a consequence of the expenditure in the plan
14	**Glossary**	An explanation of specific terms and acronyms

Document map



2015-2023

RIIO-ED1 Business Plan

Executive summary

WESTERN POWER DISTRIBUTION

Serving the Midlands, South West and Wales

2 Executive summary

Who we are and what we do

2.1 WPD is a Distribution Network Operator (DNO) and distributes electricity to 7.7 million customers across the Midlands, South Wales and the South West. Our role is simple:

- we operate our network assets effectively to 'keep the lights on';
- we maintain our assets so that they are in a condition to remain reliable;
- we fix our assets if they get damaged or if they are faulty;
- we upgrade the existing networks or build new ones to provide additional electricity supplies or capacity to our customers.

2.2 Our costs make up around 16% of a domestic customer's bill.

Our track record

2.3 We keep the business simple and operate an efficient business model, with a flat structure that only has three layers between our field staff and the Chief Executive.

2.4 Our staff put customers first, treating customers the way they would like to be treated themselves.

2.5 Our track record is second to none:

- we deliver excellent network performance, restoring customers' supplies after power cuts faster than any other network operator;
- we provide the best customer service, consistently appearing at the top of customer satisfaction surveys;
- we carry out the greatest proportion of innovation projects across the industry;
- we deliver our work programmes, adjusting them as circumstances change, but never losing sight of getting them completed;
- we operate a local team based organisational structure that is predominantly made up of our own staff and delivers work in a low cost and efficient way.

2.6 In April 2011 we took over the West Midlands and East Midlands licences. Within a year, we had fully reorganised the businesses, reduced overhead costs, implemented WPD systems and operating procedures and most importantly improved customer service and network performance at lower cost.

Business environment

2.7 The greatest challenge facing our business is to adapt to the demand for a low carbon environment. There is great uncertainty about the scale of Low Carbon Technology (LCT) that will be adopted by customers to support the Government's objective of reducing greenhouse gases.

2.8 The Department for Energy and Climate Change (DECC) is forecasting high volumes of electric vehicles, solar panels and heat pumps, which could have a significant impact on how much additional capacity the network will require. Within the plan we have used our 'best view', informed by independent analysis, of the scale of this LCT and its impact on the network. In

addition we have also modelled alternative scenarios to provide us with a range of potential volumes.

2.9 Our plans ensure that we can cater for the adoption of LCT irrespective of the volume or mix.

Our stakeholders' views are important

2.10 In the preparation of this Business Plan we have embarked on a comprehensive and extensive stakeholder engagement process. We have published consultation documents, carried out surveys and engaged directly with hundreds of stakeholders at workshops.

2.11 Due consideration has been taken of the wide range of views that were expressed throughout the engagement process.

Our programme of innovation

2.12 We will complete innovation projects that can be deployed on the network that will either improve the service we deliver, reduce our costs or both.

2.13 We will share what we learn with others, irrespective of the results, so that the wider industry can benefit.

The outputs we will deliver in RIIO-ED1

2.14 We will continue to provide excellent levels of network performance and industry leading customer service whilst maintaining efficient costs. The main outputs that we will deliver are summarised below:

Category	Output
Safety	• Reduce the staff accident frequency rate by 10%. • Enhance security measures at 50 electricity distribution sites. • Distribute 500,000 safety advice documents. • Educate 400,000 children about electrical safety through classroom discussions. • Ensure compliance with legislation with a target of zero improvement or enforcement notices being served by the Health and Safety Executive (HSE). • Seek to work in partnership with the HSE.
Reliability	• Reduce the average number of times our customers lose their power supply by 13%. • Reduce the length of time our customers are without power by 20%. • Ensure that a minimum of 85% of customers are restored within an hour on HV faults. • Reduce by 20% the number of customers who suffer a power cut lasting more than 12 hours. • Reduce by 20% the number of customers who are classified as worst served. • Increase our resilience tree cutting programme by 40% to reduce storm related power loss. • Protect 75 electricity substation sites from the risks of flood damage.
Environment	• Facilitate the connection of increased volumes of LCTs. o Dynamic Line Ratings for EHV overhead lines will be developed into WPD policy to apply across the whole business. o Analysis of real time customer load and generation from our 'LV Templates' project will be applied to our planning and design tools. o The output from the Lincolnshire 33kV low carbon hub project will be

	implemented across the whole business. • Reduce the carbon footprint of the business by 5%. • Reduce leaks from electricity equipment - 75% less oil and 17% less SF_6 gas. • Improve visual amenity in National Parks and Areas of Outstanding Natural Beauty (AONBs) by selective undergrounding of 40 km of overhead lines.
Connections	• Provide quotations to customers 20% faster. • Complete the physical works 20% faster. • Reduce the overall 'average time to connect' by 20%. • Provide improved communication with customers including internet based quotations and job tracking facilities. • Deliver zero failures against the 'Guaranteed Standards of Performance'. • Ensure that we facilitate a competitive market and pass the Ofgem competition tests.
Customer Satisfaction	• Continue to be the best DNO group in the Ofgem Broad Measure of Customer Satisfaction. • Maintain stakeholder engagement to refine business objectives throughout RIIO-ED1 and beyond. • Enhance communication with customers by use of call backs, text messages or other social media formats to suit the needs of our customers. • Have the fastest answering response time to inbound customer telephone calls.
Social Obligations	• Contact our vulnerable customers every two years to ensure we have accurate data on the Priority Services Register. • Enhance services provided to vulnerable customers who lose their power supply. • Maintain our work with charities and support organisations to understand and react to current social issues with respect to power supply. • Help to address fuel poverty by making it easier for customers to access key information.

Safety

2.15 Safety is at the heart of everything we do. We will continue to target improvements in our safety performance. Whilst our safety performance is already very good, we will reduce the accident frequency rate involving our own staff by 10%.

2.16 Substations that are being targeted by vandals or thieves can present serious risks to members of the public, contractors or our own staff. In addition the removal or destruction of electrical equipment leads to the loss of power to our customers. Sites that are identified as high risk will have enhanced security measures applied to them to reduce this risk.

2.17 School children are not always aware of the potential danger of electricity or the potential danger of the electricity network. During RIIO-ED1 we will educate 400,000 school children about the potential dangers of electricity via our on-going programme of school visits.

2.18 We will continue our practice of targeted mailshots of our safety literature and will send out over 500,000 copies to specific landowners, businesses or leisure operators whose clients could be exposed to higher risks should those activities be conducted near to our equipment.

2.19 We will work cooperatively with the Health and Safety Executive to not only ensure our practices and policies continue to be compliant with health and safety legislation but also to seek out and apply best practice in the management of safety.

Reliability

2.20 We will replace poor condition assets and provide additional network capacity where necessary to prevent faults.

2.21 Where power cuts occur we will respond quickly, restoring supplies as a priority. We will ensure that a minimum of 85% of our customers are restored within one hour when affected by a high voltage fault.

2.22 Whilst we currently have very few failures against the requirement to restore power within 18 hours maximum, we will reduce this timeframe target to 12 hours maximum. We will improve the performance against the new 12 hour target by 20% over RIIO-ED1.

2.23 We will reduce the number of customers who are classified by Ofgem as "Worst Served". This will ensure 99.9% of our customers are not worst served.

2.24 Severe weather can lead to loss of power due to our overhead network being hit by windborne debris or trees. To increase the network resilience we have a programme to clear trees that are in the immediate vicinity of the network. We will increase the volume of resilience tree works by 40%.

2.25 Substations that become flooded can lead to the loss of power to many of our customers for extended periods. We will continue our programme of flood prevention works at sites that are identified as prone to flooding to reduce this risk.

Environment

2.26 We will monitor the take up of LCTs and facilitate wherever possible their connection.

2.27 We will take the results of the 'Registered Power Zone' (RPZ1) project and develop them into WPD policy. This will lead to more flexible arrangements with customers allowing the connection of load or generation without the need for more traditional reinforcement. This will mark the innovation's full implementation to become 'business as usual' in RIIO-ED1.

2.28 The detailed analysis of real time customer load from our 'LV Templates' project will be applied to our planning and design tools. This will ensure that the understanding and knowledge from the project is applied as a business tool. The need for network reinforcement will only be undertaken where absolutely necessary, facilitating the connection of LCTs or other demand quicker and cheaper.

2.29 The Lincolnshire Low Carbon Hub project will test methods for controlling load flows on the 33kV network in conjunction with new commercial arrangements with generators or large customers to avoid the costs that would normally be required for network reinforcement.

2.30 We will continue to reduce the impact of our activities on the environment by reducing our own carbon footprint by 5% through actions to reduce:

- our energy consumption by 5%;
- the amount of oil that leaks from underground cables by 75%;
- the volume of SF_6 gas lost by 17%;
- the volume of waste sent to landfill by 5% per annum.

2.31 We will improve visual amenity in National Parks or Areas of Outstanding Natural Beauty (AONBs) through the undergrounding of an additional 40km of overhead lines.

Connections

2.32 We already provide an excellent connections service. However, we propose to reduce the overall time to connect by 20% by reducing both the time to provide a quotation and the time to complete the physical works.

2.33 We will continue to work with relevant customers and stakeholders to improve our communication with them including the provision of internet based quotations and tracking of their jobs.

2.34 The Guaranteed Standards of Performance (GSOPs) set out the minimum service standards that DNOs must meet under the regulatory framework. Where a standard is not met then a payment is made to that customer. WPD will continue to have the lowest failure payments made to customers under these connections GSOPs.

2.35 Over recent years we have been working with third party connection providers to facilitate competition within the connections market. We will continue to work with them, improving processes and data availability, so that the scope for competition is expanded to provide greater choice for customers.

Customer satisfaction

2.36 We will continue to be the best DNO for customer satisfaction.

2.37 We will maintain our stakeholder engagement process to understand and refine our service delivery to ensure our customers continue to get the service that they want.

2.38 We will keep customers updated during power outages by the use of call backs or text messages or other social media methods in accordance with customers' preferences.

2.39 We will have the lowest response times for answering telephone calls in the industry.

2.40 We will have the fastest response timescales to customers who complain and provide them with an effective response.

2.41 Whilst the majority of customers prefer to use the telephone, we will develop a range of communication methods during the current price control to include on-line information exchange and the use of social media. We propose to continue to introduce new methods of communication as technology evolves during RIIO-ED1.

Social obligations

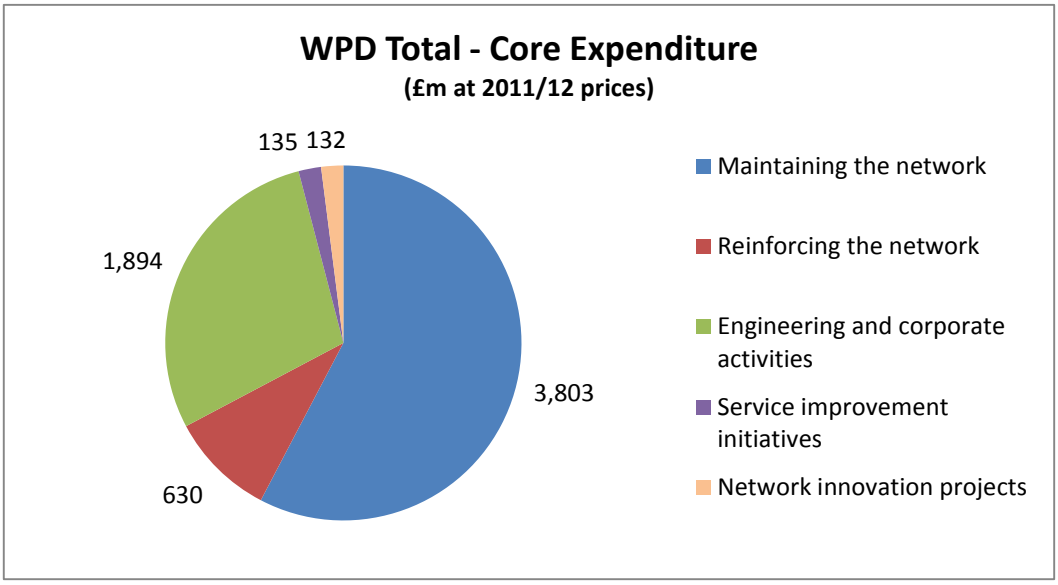
2.42 We will ensure that we know who and where our vulnerable customers are so that we can give them extra help during power cuts. As a minimum we will contact every customer on the Priority Services Register every two years to validate the information we hold.

2.43 We will play a role in addressing fuel poverty by improving staff training to pick up on the warning signs of fuel poverty, enhancing the provision of relevant information and building a database of regional referral partners.

2.44 Where customers would benefit from information and periodic support we will refer them to these partner organisations that have the relevant experience and expertise to help.

Expenditure

2.45 Over the RIIO-ED1 period we will be investing £6.6bn in core distribution business activities, funded through Distribution Use of System Charges (DUoS).



2.46 £3.8bn will be for maintaining the existing network through replacement of assets, maintenance of assets, repairing faults and other associated activities. £630m will be spent on reinforcing the network to accommodate load growth and the impact of low carbon technology on the network. £1.9bn will be used for running the business including the costs of call centres, stores, purchasing, finance, human resources, maintaining IT systems, engineering management, and the costs for recruiting and training our workforce. An additional £135m will be spent on service improvement initiatives, improving the resilience of the network and reducing our environmental impact. There will also be £132m invested in innovation projects.

2.47 A further £3.0bn is required to cover the costs of non-core activities and costs such as smart metering, transmission charges, pensions and business rates.

Uncertainties

2.48 The Business Plan covers the period April 2015 to the end of March 2023. In drafting the plan there are therefore a number of uncertainties that could present a financial risk to the business. The principle uncertainties around our investment expenditure are:

- The volume and type of LCT that will connect to the network;
- Permit Scheme and Lane Rental costs imposed by Local Authorities;
- The impact of the smart metering roll out.

2.49 Whilst we are best placed to manage the risk of delivery of our plan, there are some areas of uncertainty which need additional mechanisms due to the external nature of the uncertainty and its potential impact.

2.50 During DPCR5 Ofgem introduced a reopener mechanism that limited financial risk providing a safety net for companies where actual costs are materially higher than forecast. We propose that Ofgem continue to use reopener mechanisms.

Financing the plan

2.51 The expenditure proposals will require WPD to raise around £1.7bn of new debt and shareholders will re-invest £800m. In addition £900m of long term debt matures and will need to be re-financed. To calculate our allowed revenues and cash flows we have assumed:

Parameter	Value	Details
Cost of Debt	2.3%	Based on forecasts by RBS and Lloyds banks.
Cost of Equity	6.7%	The same as DPCR5 and GD1.
Gearing	65%	The same as DPCR5.
Vanilla WACC	3.8%	Derived from cost of debt and cost of equity.
Capitalisation	80%	The same as DPCR5 after taking into account changes in definition.
RAV Depreciation	35 years	For RIIO-ED1 we will transition from the DPCR5 20 year life to a 45 year life using the transition methodology included in NGET's final proposals.

Impact on customers' bills

2.52 Over RIIO-ED1 our charges will reduce by an average of 10% (before inflation).

In conclusion

2.53 We have developed a plan that improves network performance, provides excellent customer service and facilitates a move to a low carbon future. This plan balances the needs of investors, customers, stakeholders and the environment.

2015-2023

RIIO-ED1 Business Plan

Who we are and what we do

WESTERN POWER DISTRIBUTION

Serving the Midlands, South West and Wales

3 Who we are and what we do

3.1 Western Power Distribution (WPD) is an electricity Distribution Network Operator (DNO). We are responsible for the network of engineering assets that allows the distribution of electricity to customers' premises from the 'National Grid'.

3.2 WPD does not buy or sell electricity, or send any bills to electricity customers.

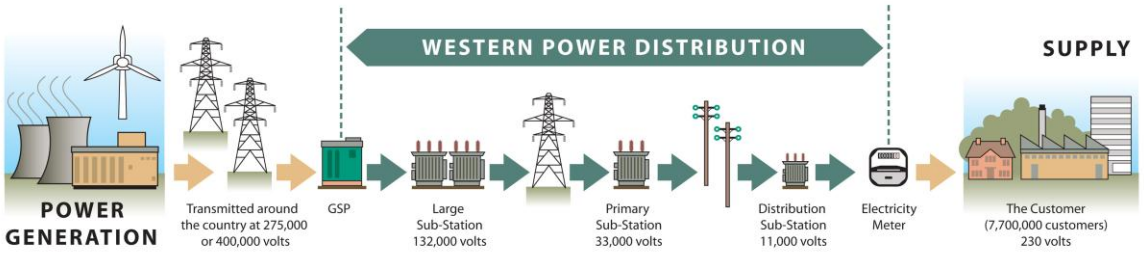
3.3 What we do is simple and comprises 4 key tasks:

- we operate our network assets effectively to 'keep the lights on';
- we maintain our assets so that they are in a condition to remain reliable;
- we fix our assets if they get damaged or if they are faulty;
- we upgrade the existing networks or build new ones to provide additional electricity supplies or capacity to our customers.

3.4 All of these tasks are carried out having the highest regard to the levels of safety, whether that is to members of the public, contractors or our own operational staff.

3.5 Our distribution network consists of transformers (which convert electricity from one voltage to another), underground cables and overhead lines (which carry electricity across long distances), switches (to turn on, off or to alter the routing of electricity), and service connections (which take the electricity into customers' premises).

3.6 This network sits between what was traditionally known as the 'National Grid' transmission network and the customer.



3.7 The network currently comprises:

Network Assets							
Asset Type	**Units**	**West Midlands**	**East Midlands**	**South Wales**	**South West**	**WPD TOTAL**	**WPD total as a percentage of All DNOs**
Overhead Lines	km	24,000	22,000	18,000	28,000	92,000	33%
Underground Cable	km	40,000	50,000	17,000	22,000	129,000	24%
Transformers	Each	50,000	43,000	40,000	52,000	185,000	31%
Switchgear	Each	87,000	99,000	35,000	76,000	297,000	25%
Poles	Each	372,000	292,000	280,000	442,000	1,386,000	34%
Towers (Pylons)	Each	4,000	6,000	3,000	4,000	17,000	34%
Service Connections	Each	2,412,000	2,607,000	1,104,000	1,557,000	7,680,000	28%
Licenced Area	Sq km	13,300	16,000	11,800	14,400	55,500	24%

3.8 The network we operate covers a geographic area of some 55,500 sq.km serving 7.7 million customers.

3.9 Our network is the largest in the UK, covering densely populated residential areas and widely dispersed rural communities. We operate from the Lincolnshire coast in the East Midlands, through to Gloucestershire in the West Midlands, to Monmouthshire and Pembrokeshire in South Wales, and down into the South West to the counties of Somerset, Devon and Cornwall.

3.10 Our teams are based in local offices where they take responsibility for local issues, deliver local work programmes and respond to local power cuts quickly.

3.11 At WPD we try to get whatever we are delivering right first time. To encourage this we stress that all employees should:

- Take personal responsibility;
- Follow the problem through until the end;
- Work with others to find a solution;
- Keep the customer informed;
- Follow the Golden Rule – treat customers the way you would like to be treated.

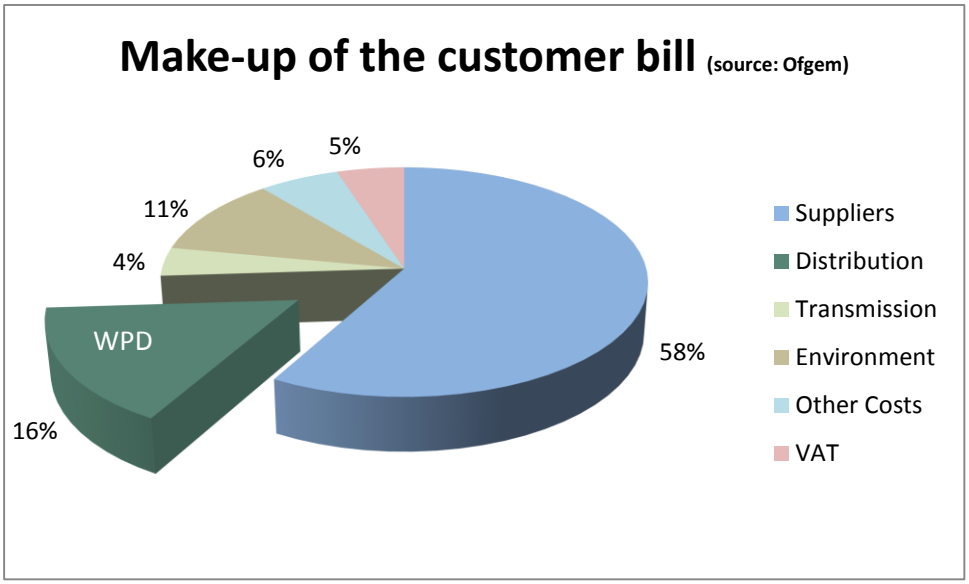
3.12 We continue to look for and make use of innovative techniques and encourage creativity such that we carry out all of our work in an effective and efficient manner. This helps to ensure value for money for our customers, stakeholders and our shareholders.

3.13 Although we are facilitating competition in some of the services we provide (such as new connections) we are still a natural monopoly within the geographic area we serve. We are, therefore, regulated by the Office of Gas and Electricity Markets (Ofgem).

3.14 Ofgem issues licences to DNOs that set out the obligations and responsibilities of the companies and also determines the revenues they are allowed to earn each year. WPD has four licences covering the four geographic areas of the West Midlands, East Midlands, South Wales and the South West.

3.15 Periodically, Ofgem scrutinises the business plans of DNOs through a process known as a Distribution Price Control Review. This determines how much DNOs are allowed to charge in total per year for network investment, operating costs and allowed returns.

3.16 This charge, known as DUoS, is payable by the electricity suppliers who, in turn, incorporate it into electricity charges to customers. Our costs account for around 16% of the make-up of an average domestic customer's bill.



2015-2023

RIIO-ED1 Business Plan

Our track record

WESTERN POWER DISTRIBUTION

Serving the Midlands, South West and Wales

4 Our track record

Delivering our promises

4.1 Whilst the Business Plan sets out our forward thinking with respect to delivering outputs at efficient cost, it is important to recognise that this is the continuation of excellent historic performance within WPD.

4.2 We have a demonstrable track record of setting out high quality, accurate plans and then consistently delivering on our commitments. This should create confidence in this Business Plan and our ability to deliver it.

Reducing our costs following acquisition of the Midlands businesses

4.3 Financial analysis prior to the acquisition of West Midlands and East Midlands (formerly Central Networks) indicated that we would make cost savings in the order of £108m per annum once the Midlands businesses were fully integrated into WPD.

4.4 We acquired the Midlands businesses on 1st April 2011 and within eight months had changed the Midlands organisation to the WPD team structure. In addition we had exited from expensive 'Alliance' and 'Turnkey' contracts and reduced overall staff numbers by over 800 despite increasing the number of direct field staff employed by over 200. We also harmonised terms and conditions of employment and implemented WPD IT and telecoms systems.

4.5 In the twelve months following the implementation of these changes we delivered the savings, outperforming the original target:

Annual cost savings following acquisition of the Midlands businesses	
Cost Activity	**Savings Per Year**
Engineering management	£42m
Corporate activities	£20m
Network operating costs	£7m
Network investment	£50m
Total cost saving	**£119m**

4.6 Engineering management savings: this activity relates to the day to day management of network operations. Efficiencies have arisen from the implementation of the flat geographic based WPD team structure and the discontinuation of the previous 'Alliance' and 'Turnkey' contracts that duplicated engineering management activity.

4.7 Corporate activity savings: these include head office functions such as finance, human resources and IT. Cost savings arise from scale efficiencies of having one set of head office functions.

4.8 Network operating savings: these costs are associated with network faults, inspection, maintenance and tree cutting activities. WPD has more efficient unit costs.

4.9 Network Investment savings: these costs are for the replacement of existing assets (equipment) or the reinforcing of an existing asset on the network. 'Alliance' and 'Turnkey' contracts were prevalent in both West and East Midlands resulting in the network investment programme being delivered by third parties. WPD employs direct staff to deliver this activity

and the savings are as a result of being both more efficient and not paying a profit margin to a third party.

Proven management of work delivery

4.10 WPD takes a long term view of network reliability and the related investment decisions. We do not make short term savings at the expense of having huge backlogs in future years.

4.11 The price control process requires each DNO to state the proposed volumes and costs of work. Ofgem analyses these submissions, benchmarks them across the industry, adjusts the volumes and determines an efficient amount of capital allowance. DNOs are then required to deliver those volumes in line with the level of expenditure that is allowed.

4.12 WPD has a very good record of delivery in line with the volumes and financial settlement agreed with Ofgem. We have demonstrated over successive price controls the establishment of robust work programmes, the setting of clear targets and the delivery of those activities.

4.13 However WPD also has an excellent track record of being able to adapt to changed circumstances where it becomes necessary. Should this occur we make quick decisions, establish revised work programmes, set new targets and ensure we deliver against these adjusted work programmes.

4.14 An example of this would be in how we deal with a specific type of plant failure that is subsequently identified as having a defect specific to all of that type of equipment. This can occur at any time in a regulatory period and can involve significant volumes of equipment being affected. We can demonstrate our ability to adapt our programmes as necessary and alter budgets accordingly to ensure the delivery of the revised programme.

4.15 Our proven ability to adapt and reprioritise allows us to better deal with the uncertainty surrounding the take up of the LCTs through RIIO-ED1.

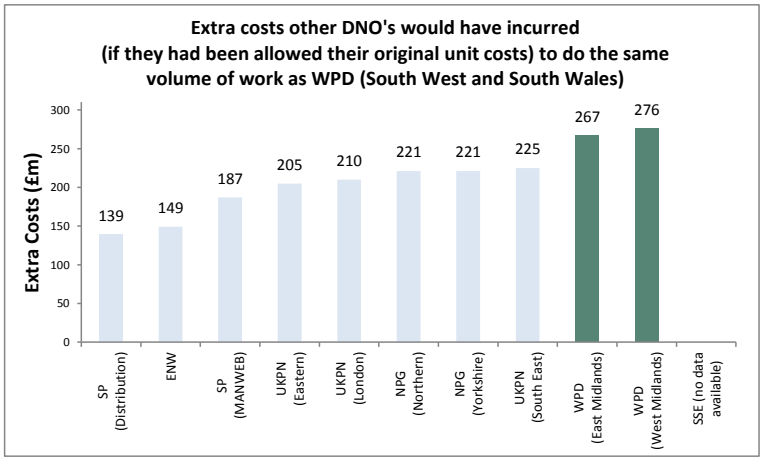
Proven efficient cost of delivery

4.16 WPD's business model, using locally based insourced staff, leads to work being delivered at low costs. This also has the benefits of retaining expertise within the company and flexibility where staff can be quickly redirected.

4.17 In setting allowances, Ofgem benchmark the DNOs to determine an efficient unit cost for each type of investment activity.

4.18 For DPCR5, replacement work accounts for 54% of all DNO network investment costs. Within Ofgem's benchmarking, South Wales and South West were assessed as having the most efficient unit costs for capital replacement works.

4.19 WPD unit costs were significantly lower than other DNOs in the first submissions made to Ofgem in 2007/08. The chart below illustrates the extra costs that companies would have incurred in delivering the South West and South Wales programmes if they had been allowed their submitted unit prices. The same work completed by the other DNOs would cost between £139m and £276m extra.



4.20 As a result of the WPD efficient costs being below the average and in recognition of the capital efficiency that WPD has been able to deliver, Ofgem rewarded WPD with an additional £66m capital allowance for DPCR5.

4.21 This difference was also used to demonstrate the potential efficiency savings that could be achieved following the acquisition of the East Midlands and West Midlands. Under previous ownership, costs in these DNOs were the highest in the industry and they are now being driven down by the application of WPD working practices.

Proven management of network performance

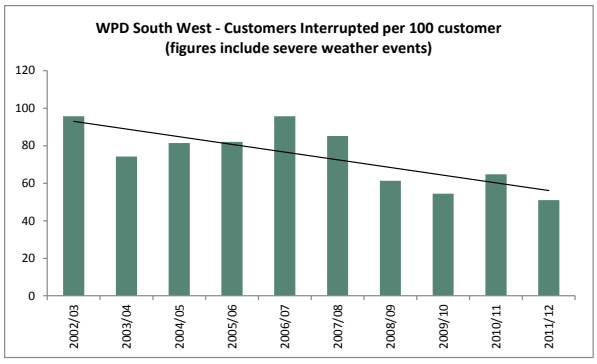
4.22 WPD has a proven track record of improving the network reliability for customers. A number of measures exist for determining how well a distribution business is performing.

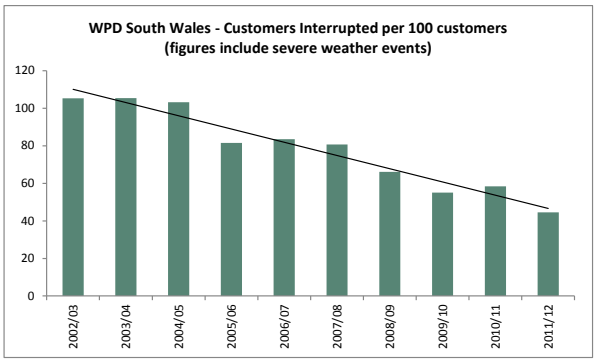
Customers Interrupted (CIs)

4.23 One measure is to record how many times customers are without an electricity supply for any duration over 3 minutes (measured per 100 customers). The data is externally audited annually to ensure we are correctly monitoring and accurately recording the impact on customers.

4.24 For DPCR5 we set out to outperform on the CI targets as set by Ofgem by at least 10% in both South West and South Wales businesses.

4.25 The long run performance of the South West and South Wales businesses including the effects of severe weather events is shown below:





4.26 By 2011/12 we had outperformed the CI target by 27% in the South West and 33% in South Wales.

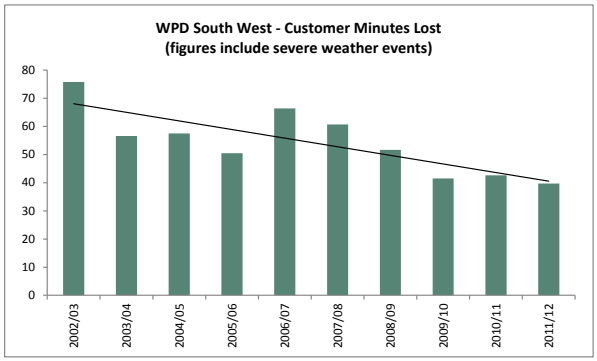
Customers Minutes Lost (CMLs)

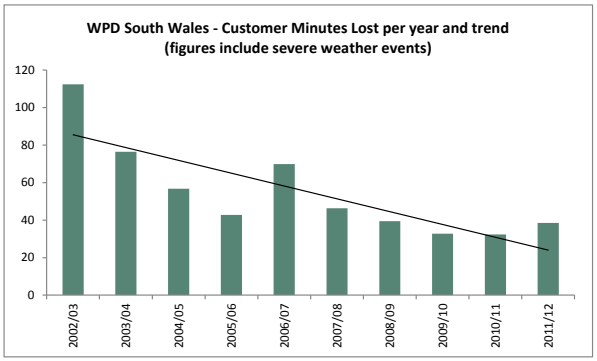
4.27 In addition to how many times a customer might be off supply a further key measure is the actual number of minutes a customer is off supply on average. This is known as "Customer Minutes Lost".

4.28 Our results in driving the number of customer minutes down reflects our desire and our ability to get the customer supplies back on quickly.

4.29 For DPCR5 we set out to outperform the CML targets as set by Ofgem by at least 12% in the South West and South Wales.

4.30 The long run performance improvements of our South West and South Wales businesses are shown below:





4.31 By 2011/12 we had outperformed the target by 22% in the South West and 30% in South Wales.

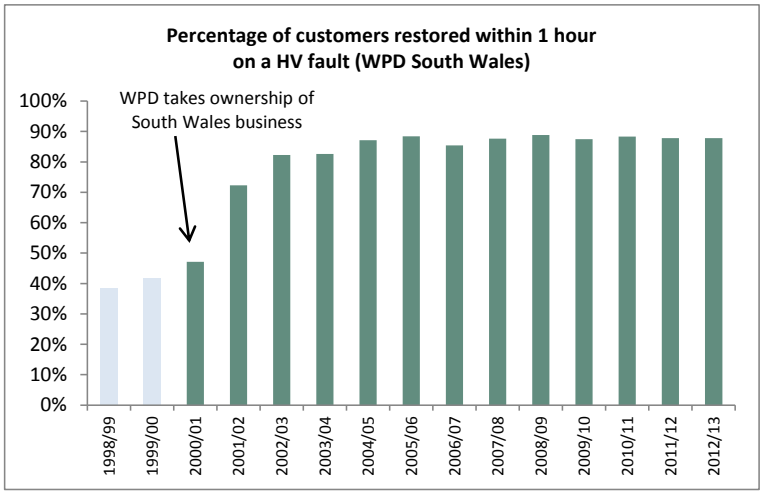
Target 60

4.32 One mechanism used by WPD to drive down the time for restoration is to have an internal target for the percentage of customers restored within 60 minutes of a high voltage (HV) fault, known as "Target 60".

4.33 All of WPD's staff recognise the importance of seeking to get the maximum number of customers restored in the shortest time that they can. Healthy competition between operational teams ensures that the level of performance continues to improve. This has the consequential effect of reducing the average customer minutes lost.

4.34 Target 60 performance is displayed in all of the WPD depots and is monitored within the regional and executive board level key performance indicators.

4.35 The Target 60 philosophy was implemented in South Wales following WPD's acquisition of the business in 2000. The effect was both immediate and significant, as can be seen in the following chart:



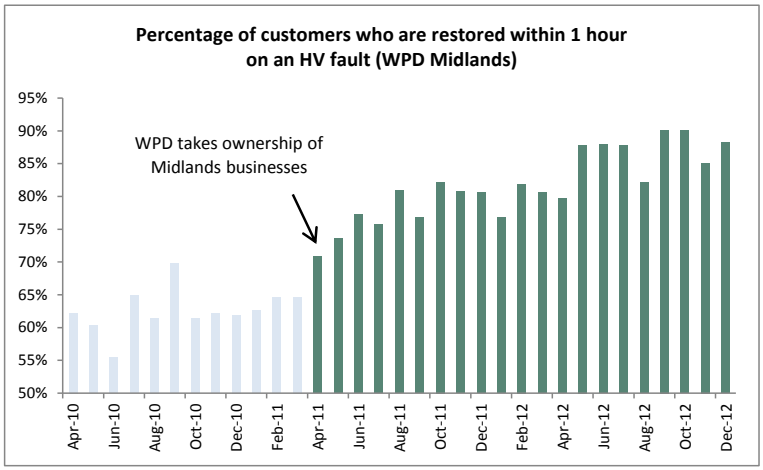
Target 60 performance in the Midlands following acquisition

4.36 Following the acquisition, in April 2011, of the Midlands businesses WPD set about changing working practices, providing clarity of business objectives to staff and applying greater managerial focus and commitment - in particular to the speedy restoration of electricity supplies in the event of a fault.

4.37 Key to this focus was ensuring that all staff understood that WPD was fully committed to improving the Midlands performance to match that achieved in both the South West and South Wales.

4.38 In the first month of WPD ownership the Midlands areas were able to increase the number of customers restored within 60 minutes by over 10%. This was bettered to 15% in the second month and after the first full year of WPD ownership had been improved by 25% over the previous year.

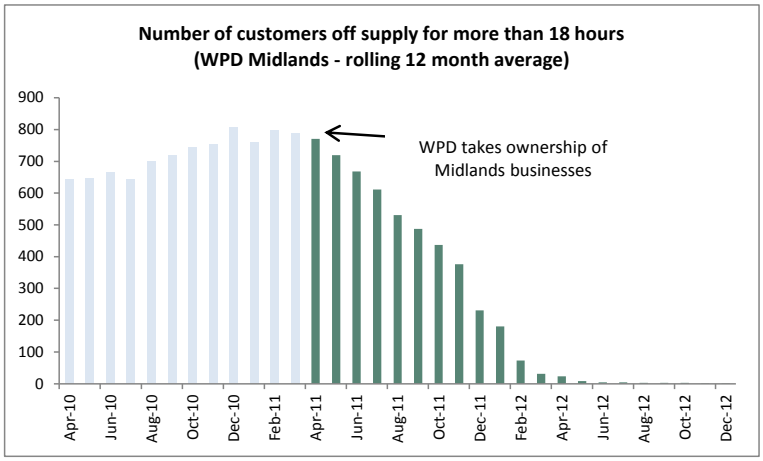
4.39 This improvement has continued through the second year of WPD ownership and to date now stands at 36% higher than under the previous ownership. Almost 87% of Midlands customers are now being restored within one hour of an HV fault occurring.



Restoration of supplies within 18 hours

4.40 We have also made significant improvements in the number of customers who remain with no electricity after 18 hours. This measure is covered by a regulatory Guaranteed Standard of Performance which is audited annually.

4.41 In the first month of ownership of the Midlands businesses WPD was able to decrease the number of customers remaining off supply after 18 hours by over 87%. After our first full year of ownership the reduction achieved was in excess of 96%.



4.42 This improvement has continued throughout our second year of ownership with only 7 customers being affected out of a customer base of over 5 million. This contrasts with over 7,000 customers affected over a similar period in the last year under previous ownership.

4.43 These incidents have been virtually eliminated through the commitment of staff and the use of more innovative measures to restore supplies. This focus and the consequent levels of improved performance allows WPD to be able to move readily towards a new measure under RIIO-ED1 of "customers who remain off supply for 12 hours".

Proven delivery of excellent customer service

4.44 Our simple Golden Rule, 'Treat customers the way you would like to be treated', has become second nature to all WPD staff. We empower staff and expect them to take ownership of any problems, concerns or complaints that customers may bring to us and to ensure that these are followed through with the customer being kept regularly informed. We do not transfer customers unnecessarily or 'bounce' them from one department to another.

4.45 This simple philosophy has enabled WPD to be recognised as the top performer in respect of customer satisfaction.

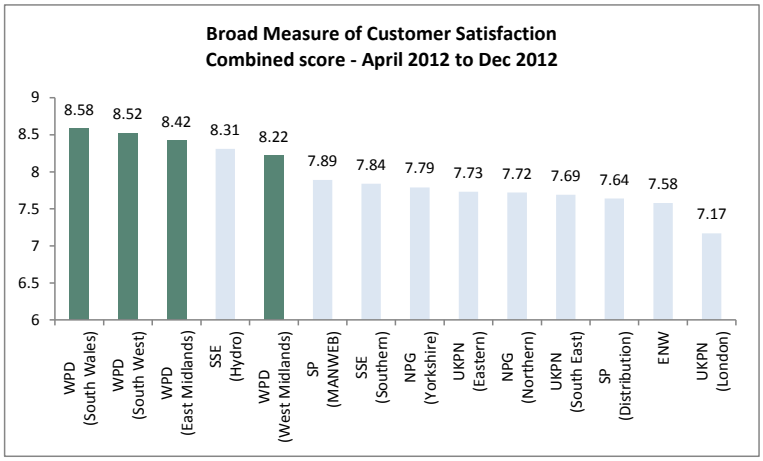
Ofgem's Broad Measure of Customer Satisfaction (BMCS)

4.46 Ofgem introduced the Broad Measure of Customer Satisfaction (BMCS) in the final proposals for DPCR5 that were to become effective in April 2012. Our corporate objective was to be ranked consistently in the top quartile under the new measures.

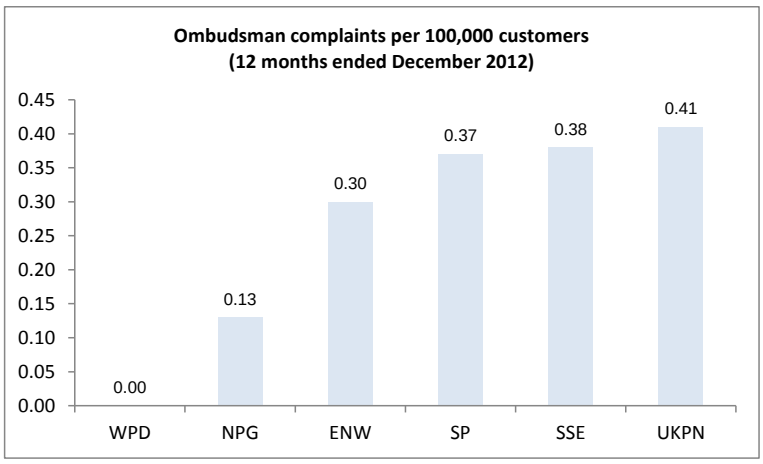
4.47 We conducted surveys from May 2011 to allow us to understand any areas of our delivery where our customers felt we could improve.

4.48 As a result of our own surveys we made a number of changes within the business to improve our customer service delivery ahead of the BMCS going live.

4.49 Since the formal introduction of the BMCS in April 2012, customer responses have consistently placed the four WPD businesses in the top five places. The results of the various questions are combined into an overall score for each DNO. This allows comparison across all of the 14 licenced DNO businesses. The overall score performance through to December 2012 is detailed below:



4.50 The BMCS also measures the number of complaints that are upheld by an independent assessor called the Ombudsman. The WPD companies are ranked 1st, 2nd, 3rd and 4th in respect of best performers. In the 12 months ended December 2012 the four WPD businesses had zero complaints.

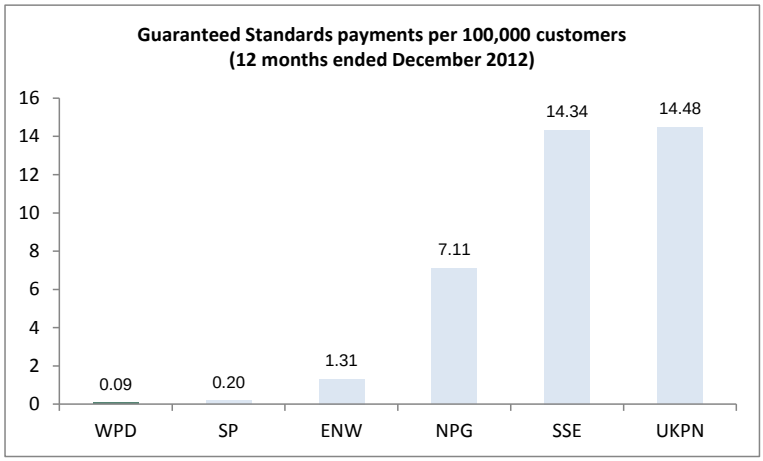


Guaranteed Standards of Performance (GSOPs)

4.51 Another measure of customer delivery is in respect of the volume of payments that a DNO must pay where it fails to comply with a range of different minimum GSOPs.

4.52 Our objective is to be the best performer with respect to GSOPs throughout the DPCR5 period.

4.53 Again WPD leads the way with the lowest payments per 100,000 customers.

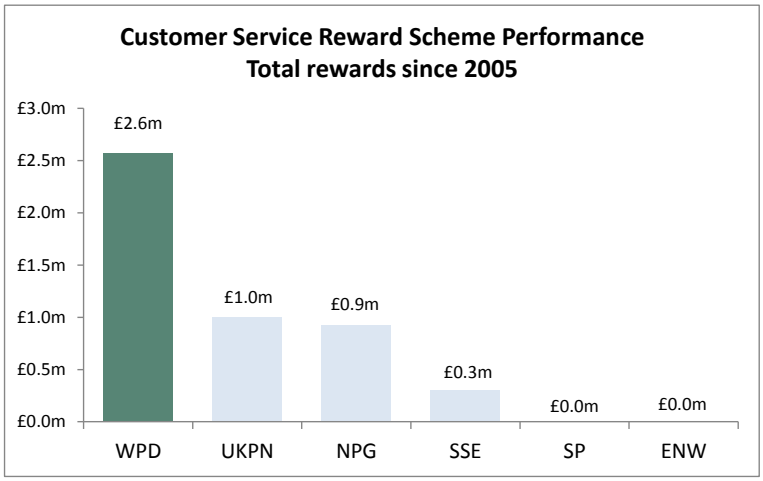


Ofgem Customer Service Reward Scheme

4.54 From 2005/6 to 2010/11 Ofgem conducted an annual Customer Service Reward Scheme for DNOs, designed to encourage innovation and improvements in customer service. Rewards were made to companies that were judged, by an independent panel of industry experts, to have exceeded their license requirements and demonstrated that they are continually serving the best interests of customers.

4.55 The categories covered by the scheme included priority customer care, wider communication strategies and corporate social responsibility.

4.56 The WPD businesses were the top performers and recognised in every year of the scheme. WPD received the highest number of rewards of any DNOs and were commended for continually leading the way with innovations in customer service.



Proven delivery of reducing our environmental impact

4.57 In our plans for the DPCR5 period, we set out to deliver increased levels of environmental performance when compared to 2009/10 against seven key targets.

4.58 Within three years we have already met three of the targets:

- reduced CO_2 emissions per vehicle by 5%;
- reduced the volume of waste being sent to landfill by 5%;
- reduced our own electricity usage in offices by 5%.

4.59 The remaining four targets have progressed significantly and are on track to deliver within the DPCR5 timeframe. These are to:

- increase our investment recovery (money obtained from the sale of scrap and equipment no longer required) by 5%;
- reduce the volume of SF_6 gas leakage from our installed equipment by 25%;
- reduce the loss of oil from fluid filled cable leaks by 5%;
- complete a programme to establish oil retaining 'bund' walls around 100% of our transformers (high volume oil filled transformers rated at 33kV and above) to prevent inadvertent ground pollution by oil. This has already been completed in South Wales and will be complete in the South West by the end of 2013.

4.60 In addition to the original seven targets we have obtained ISO 14001 certification for environmental management across all of our Midlands depots. This will be extended to South Wales by the end of 2013 and South West by the end of 2014.

Record of business-wide innovation

4.61 Innovation is not purely about studies, reports and large projects but is about real changes in working practices that deliver benefits to our business and our customers. Innovation happens across the WPD business and our willingness to adopt and embed innovations into our operating practices has contributed to making WPD the most efficient DNO group.

Technical and operational innovation

4.62 Technical innovation enhances working methods, speeds up processes and improves network performance. WPD has a history of developing and implementing a number of technical and operational innovations such as:

- using 'ENMAC Mobile' - that allows field staff to request and receive operational instructions on hand held devices and to provide real-time job-status updates. This significantly reduces the need for two way dialogue between field staff and the control room speeding up communication and allowing activities to proceed without delay.
- using mobile switchboards and high voltage generation for faster restoration of faulty equipment and quicker restoration of customer supplies;
- continuing to train apprentices in house and utilising a WPD developed 'Task completion' approach rather than NVQ modules reducing bureaucracy and allowing greater control and efficiency in the training of apprentices.

Customer service innovation

4.63 We have gained industry leading customer service by being innovative in how we interact with customers. Some examples of what we have done include:

- working in partnership working with WRVS, British Red Cross and other organisations that can assist vulnerable customers and with Warm Front and National Energy Action in respect of fuel poverty;
- calling customers back to keep them updated about supply interruptions and to check that they are back on supply rather than expecting the customer to call us;
- 'Ramping up' contact centres – we have trained general office staff specifically in the use of contact centre and call taking systems. In the event of bad weather or storms we are able to increase the number of call takers significantly. This enables us to deal with high volumes of calls during the very busy periods whilst maintaining staff numbers at an efficient number for day to day work-loads. In addition we also enable staff to take calls from home by deploying contact centre systems into home locations. This ensures that the levels of service can be maintained even if staff are prevented from travelling to the office due to the severe weather.

Environmental innovation

4.64 We have established effective environmental management processes that have been assessed against ISO 14001.

4.65 We have undertaken a number of innovation and other projects which have a direct impact on the environment such as:

- trialling the use of electric Transit vans and other small electric vehicles;
- refurbishing buildings to the highest BREEAM standards;
- applying PFT tagging of fluid filled cables - this adds a special tracer element to the oil that can then be detected from above the ground speeding up leak location, reducing the environmental impact of digging and reducing the volume of oil lost into the environment.
- completing the 'Registered Power Zone' (RPZ1) project which investigated the possibility of applying dynamic line ratings on the 132kV system. A traditional rating for how much load the conductor can carry is based on a one-off summer or winter calculation. By using wind speed and temperature sensors the rating of the line can be calculated continuously. This project was successful and its results are being developed into a WPD policy, marking the innovation's full implementation to become 'business as usual' in RIIO-ED1. The major benefit being that we can allow more LCTs to connect and avoid significant reinforcement costs that would have applied under a traditional approach.

Large scale innovation projects

4.66 Under Ofgem's Low Carbon Network Fund, WPD has secured 5 of the 16 large scale projects funded through the competitive 'Tier 2' process and is managing 11 of the 31 self-certifying 'Tier 1' smaller projects. The following table summarises the scope of the five large projects aimed at developing networks that can deal with the challenges of low carbon technology.

4.67 These projects will enhance the speed and volumes of LCTs that can connect to our network:

Name	Project Description
LV Templates	This project uses statistical clustering techniques to identify patterns in electricity consumption behaviour. Nearly 1,000 substations are being monitored and analysis will develop an understanding of how low voltage networks can best cope with future demands of low carbon technology.
Project Falcon	Through this project we aim to get a better understanding of the dynamic nature of the utilisation of the 11kV network and to assess a number of alternative solutions to network reinforcement. It also aims to provide better knowledge of the IT and telecommunication requirements.
SoLa Bristol	This project aims to determine how community based battery storage can assist in deferring the need for network reinforcement by storing excess energy from photo voltaic generation and releasing it during peak demand. Providing large enough batteries for each customer would be prohibitively expensive and therefore lower capacity batteries are linked across the community taking advantage of the fact that customers use power at different times. The technology has been implemented in ten schools, one office and thirty homes.
Lincolnshire 33kV low carbon hub	This project aims to test methods for controlling load flows on the 33kV network in conjunction with new commercial arrangements with generators to avoid the costs that would normally be required for network reinforcement.
FlexDGrid	This project seeks to explore the potential benefits arising from trials of three complementary methods for managing fault level including enhanced fault level assessment; real-time management of fault level; and fault level mitigation technologies.

Proven record of resource recruitment

4.68 WPD has a good track record of delivering resource plans. Over the five year period from 2007 to 2012, in South Wales and South West, WPD recruited 307 staff to replace retirees and other leavers. 159 of the new recruits were apprentices joining our in-house industry respected apprentice training programme. Over the same period West Midland and East Midlands recruited 280 apprentices. All new apprentices are enrolled onto WPD's in-house scheme.

4.69 In the DPCR5 Business Plan, WPD submitted a need to recruit and train an additional 265 new staff specifically for the delivery of extra work programmes in DPCR5 and beyond. These staff were recruited, trained and established in front line roles within two years of the start of DPCR5.

4.70 WPD has the ability to train staff for all key operational roles within its own training schools based predominantly in two locations: Taunton in Somerset and Tipton in the West Midlands. With 34 skills trainers, 27 classrooms, 12 workshops and 5 training fields we are self-sufficient for the training of new starters, for the training of refresher courses for existing staff and for the 'upskilling' of existing staff in more advanced skills or operations.

Sharing best practice

4.71 WPD has always had an open approach with other companies in respect of demonstrating how we drive high standards of customer service and operational delivery. We continue to innovate throughout the business finding better ways to serve our customers and improve the efficiency of our delivery.

4.72 Likewise we are also happy to learn from other DNOs, utilities or related companies to ensure we apply best practices to our business. For example we have developed the cable fault sniffer from techniques used for gas leak location and incorporated self-quote packs for service alterations previously used in the gas industry.

4.73 We have regularly demonstrated and shared how we have achieved our very high standards with other DNOs or indeed other Utility companies or other organisations who may wish to know. Ofgem has encouraged us to continue to do this as they can see the potential benefits to customers served by these other companies in respect of improved service levels and reduced costs.

4.74 Whilst the list below is not exhaustive it demonstrates that over recent months representatives from utility organisations including all of the other DNO groups have been welcomed to WPD to review aspects of our customer service, operational IT systems or training school facilities and apprentice programmes.

Location	Business Activity	Visitors
Lamby Way, Cardiff, South Wales	Control, Contact centre, Operational despatch, High Volume Call Taker, Customer service.	Northern Power Grids, Scottish Power Manweb, Scottish and Southern, National Grid, Northern Gas, Wessex Water
Pegasus Office, Castle Donington, East Midlands	Control room, Operational despatch, Contact centre, Customer service, Stakeholder engagement	UK Power Networks, National Grid, Northern Gas, Wales and West Utilities, Severn Trent, Anglian Water, Scottish Power Networks, Scottish and Southern
Toll End Road, Tipton, West Midlands	Control room, Operational despatch, Contact centre, Customer service	Electricity North West
Avonbank, Bristol, South West	Information resources, Stakeholder engagement, ENMAC team, High Volume Call Taker, Customer services	UK Power Networks, Scottish Power Manweb, National Grid
Taunton Training Centre, Somerset and Tipton Training Centre, West Midlands	Skills training – overhead linesman, jointing and fitting, Apprentice programme, Graduate programme, Technical staff trainee programme, Operations training	Jersey Electricity, MANX Electricity authority, UKPN, ENA, ENW, S&SE, Environment Agency.

PAS 55 accreditation of asset management processes

4.75 Publicly Available Standard (PAS) 55 has been developed by the Institute of Asset Management as a standard for carrying out asset management. The standard covers 28 elements of asset management including the specification of objectives, risk management, performance and condition monitoring, development of work plans, progress monitoring, and continuous improvement, underpinned by the commitment of senior management.

4.76 As an asset intensive business, the approach taken to managing assets is critical to the long term operational and financial success of WPD. In recognition of this, WPD was the first DNO to attain accreditation against PAS 55 in 2006 and continued conformance is monitored through annual surveillance and 3-yearly recertification visits by Lloyds Register.

4.77 The last assessment was carried out in October 2012, where recertification was applied to all four licences. The auditors were impressed with how well the West Midlands and East Midlands had been integrated into WPD in a very short time, finding consistency throughout the whole organisation.

2015-2023

RIIO-ED1 Business Plan

Business plan development

A plan for our business

A plan for our stakeholders

WESTERN POWER DISTRIBUTION

Serving the Midlands, South West and Wales

5 Developing the plan for our business

5.1 The WPD RIIO-ED1 Business Plan builds on WPD's excellent track record as the leading DNO.

5.2 It considers business objectives and stakeholder requirements in the context of the business environment and long term strategy.

5.3 Extensive planning, analysis and consultation have been used to ensure that the plan delivers benefits for current customers and sets the foundations for the future.

5.4 Expenditure forecasts have been derived by considering many sources of information such as:

- national forecasts of future energy use;
- detailed analysis by independent expert organisations;
- comprehensive modelling using specially developed third party tools;
- bespoke in-house forecasting models;
- the proposals and requirements from specific WPD teams with expert knowledge;
- feedback from local teams on the observed state of the network;
- regulatory frameworks and incentive mechanisms;
- stakeholder views and requirements.

5.5 Stakeholder engagement is embedded in business processes and consultation is continuous. Since 2011, the focus of the engagement has been aimed at future requirements to be delivered in RIIO-ED1 and beyond. Stakeholder priorities, willingness to pay and scale of investment programmes have all featured in the consultations that have taken place.

5.6 Investment proposals continue the programmes developed for DPCR5, with refinements made for changes in the business environment and stakeholder requirements. The proposals have been under development since 2011 and an initial view of expenditure requirements was presented to Ofgem in July 2012. Since then, more detailed modelling and cost benefit analysis has led to updated proposals.

5.7 Senior managers with detailed knowledge of the business have contributed to the contents of the Business Plan. A core RIIO-ED1 group has co-ordinated the development of the plan and challenged the proposals to ensure that the work programmes meet the needs of the business and stakeholders.

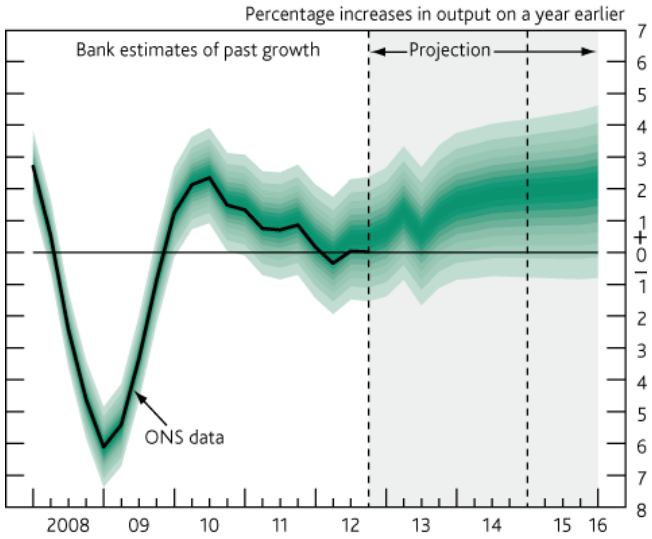
5.8 This has resulted in a well-balanced plan that improves network performance, provides excellent customer service and facilitates a move to a low carbon future.

Business environment

Economic conditions

5.9 The speed and scale of recovery from recession is uncertain. Bank of England projections (illustrated below) suggest that growth will continue at low levels leading up to the start of RIIO-ED1.

The Bank of England's February 2013 forecasts of GDP growth



5.10 This overall economic uncertainty carries over into uncertainty about growth in electricity usage and the number of new connections we can expect. It is also likely to impact on the willingness of customers to invest in LCTs as lower economic activity or confidence may delay capital investments by customers.

5.11 The introduction of any significant new subsidies to encourage LCTs is unlikely in the early part of the RIIO-ED1 price control period.

The Government's carbon reduction objectives

5.12 The UK Government has committed to undertake positive action on climate change by reducing the emission of greenhouse gasses and has developed a roadmap within its Carbon Plan.

5.13 For WPD the major impact will be changes to the network for LCTs used for electricity generation, transportation and heating. Part of WPD's role is to enable cost effective and timely connection of distributed generation (such as solar panels) and to provide sufficient capacity in the network to accommodate the increased loads from electric vehicle charging and heat pump domestic heating systems.

5.14 DECC has established forecasts for the scale of uptake of LCTs which will require the distribution networks to increase capacity and be more flexible to deal with fluctuations in generation and demand.

Changes to European Union (EU) legislation

5.15 The EU is considering the introduction of new legislation for the energy efficiency of 'small' transformers. This would require all new distribution transformers to be constructed to reduce electrical losses.

5.16 It is estimated that the cost of a transformer would double as a consequence. This price increase would add approximately £5m per annum to the costs of asset replacement and load reinforcement programmes.

5.17 As the timing and specific requirements are unknown, current cost forecast assume that the change does not occur during RIIO-ED1, but will have an impact in the longer term.

Business objectives

Business objectives

5.18 WPD's business objectives are simple. They are:

- to minimise the safety risks associated with WPD's distribution network;
- to improve the reliability of electricity supplies and to make the distribution network more resilient;
- to reduce WPD's impact on the environment and to facilitate low carbon technology;
- to consistently deliver outstanding customer service;
- to meet the needs of vulnerable customers;
- to engage with our stakeholders;
- to be efficient, effective and innovative in everything we do.

Returns for shareholders

5.19 In summary the main objective of the business is to deliver frontier levels of performance at an efficient level of cost.

5.20 The achievement of frontier performance will be reflected in a high return on regulatory equity (RORE), thereby rewarding our shareholders with an equity return above the 6.7% base assumption in our Business Plan.

Long term strategy

5.21 WPD's long term strategy is to deliver our business objectives through an efficient and scalable organisational structure that can evolve to accommodate the challenges of the future.

Efficient organisational structure

5.22 The current flat organisational structure with locally based teams of in-sourced labour has been the foundation of WPD's success. It gives responsibility to front line staff to deliver work programmes and the absence of multiple layers of management minimises costs.

5.23 There are no plans to change this successful business model.

5.24 One of the big advantages of the geographical team structure is scalability. More staff can be added to an individual team where increases in future work cluster together or additional teams can be created where there are more widespread increases in workload. These changes can be achieved quickly.

Self-sufficiency

5.25 WPD's resourcing strategy is to use in-sourced labour. This ensures that knowledge is retained, allows greater flexibility to redeploy staff where needed and builds a strong culture of staff motivated to deliver business objectives.

5.26 The development of in-house apprentice schemes, training facilities, technical knowledge, operational capability and bespoke systems increases the self-sufficiency. This allows the

business to respond quickly to new requirements and obligations and have better control over succession planning.

Investment in technology and innovation

5.27 Developing better ways of doing things is encouraged throughout the business. Innovative ideas are captured, tested and rolled-out into the business on a regular basis.

5.28 Technology can provide benefits of improved performance or efficiency. The deployment of technology is carried out in a way to ensure that compatibility is maintained. This applies equally to IT equipment, communications infrastructure and the roll out of new innovative network management techniques. This keeps costs low as fewer interfaces are required.

Understanding the long term needs of the network

5.29 Network monitoring, independent information sources and modelling techniques are used to predict investment requirements into the long term.

5.30 Asset replacement forecasts show that in the future more investment will be required to replace an ageing cable population. Monitoring of fault rates and analysis of causes will enable targeted investment programmes to be established. An example where this already exists is in the replacement of Consac cables that were installed in the 1970s but have since been found to have a greater than average fault rate.

5.31 DECC LCT forecasts suggest that there will be extensive requirements for network reinforcement growing exponentially into RIIO-ED2. Smart solutions are being trialled utilising innovation funding to develop lower cost ways of providing network capacity.

Economically doing more than the legal minimum

5.32 As a minimum the activities carried out aim to comply with licence obligations and the Electricity Act. Where identified as being in line with our business objectives, additional activities will be carried out to provide better service or provide additional network capacity.

5.33 This approach ensures that our incremental investment above legal requirement is made to bring about clearly identified benefits to our customers, stakeholders and our business.

Completing work programmes

5.34 WPD does not delay work programmes. Whilst short term savings would provide a financial benefit under the regulatory efficiency incentive (IQI) such action is not commensurate with providing a longer term reliable network for customers.

5.35 Unless objectives change, work programmes are completed.

Adapting the network for climate change

5.36 We engage with DECC and the industry to identify common climate change impacts and set about implementing changes to ensure that our networks remain reliable into the long term future.

5.37 We have used available projected climate data to assess risks resulting in three priority areas relating to increased lightning activity, flooding and impact of temperature rise on overhead lines.

5.38 Lightning activity is predicted to increase across the whole WPD area. Even in the medium term, by the end of the RIIO-ED1 period, we expect activity to increase by up to 11% in the South West and East Midland areas. The effects are being mitigated by adding lightning protection devices to the network.

5.39 Site specific flood risk assessments are used to identify the most prudent method to adopt. Mitigation measures include protection of individual items, protection of buildings, protection of the site as a whole or in extreme cases site relocation.

5.40 Predicted increases in ambient temperature will not only mean that thermal expansion will affect the overhead line clearances but also the thermal loading limits will be reached more quickly. We have introduced new overhead design requirements to increase ground clearance and have prepared new conductor ratings for overhead lines.

Governance of Business Plan development

5.41 The Business Plan has been developed following extensive engagement with our stakeholders, ranging from domestic customers and large users to electricity suppliers and Ofgem. We have listened to all of our stakeholders to ensure we formed a balanced view as we developed this Business Plan.

5.42 The RIIO–ED1 project governance structure was set up and agreed by the Executive Management Council in September 2011 to ensure clarity of roles and responsibilities along with a formal and accountable reporting structure. An overview of the project structure is below:

5.43 The WPD Board has been fully involved in the development of this Business Plan. The proposals we have set out deliver the company's objectives while providing real value for money.

6 Developing the plan for our stakeholders

6.1 WPD regularly engages with stakeholders.

6.2 Stakeholder engagement is not separate to our day-to-day activities. Members of the WPD senior management team, especially those who are responsible for delivering the work locally, have facilitated our stakeholder workshops, so they can learn from our customers first hand. True improvements in customer service and business delivery come from understanding the areas where we can do better.

6.3 On an on-going basis we undertake a wide range of engagement activities with different stakeholders including:

- domestic and business customers;
- major energy users;
- local authorities;
- parish councils;
- other DNOs;
- other utilities (including electricity suppliers);
- environmental groups;
- vulnerable customer representatives;
- emergency planners;
- distributed generation customers and developers;
- future customers.

6.4 Stakeholders have influenced and shaped the Business Plan.

6.5 We have used a range of engagement methods tailoring them to individual stakeholder's knowledge, interest and understanding of our business. Since 2011, we have engaged with over 2,500 stakeholders specifically on our plans for RIIO-ED1, via:

- 14 stakeholder workshops (with a wide cross-section of stakeholders);
- 5 Customer Panel meetings (with "expert" stakeholders);
- 8 focus groups (with domestic customers);
- 1,208 'willingness to pay stated preference' interviews (with domestic customers);
- 434 'willingness to pay stated preference' interviews (with business customers);
- 6 connections and distributed generation surgeries;
- 374 distributed generation customer interviews.

6.6 Following stakeholder workshops we publish reports detailing all of the feedback received, as well as a WPD response outlining the conclusions we have reached and how this will impact on our plans.

Our stakeholder engagement strategy

6.7 Our CEO reviews and approves our stakeholder engagement strategy annually. The strategy is to:

- **identify who our stakeholders are** by maintaining an up-to-date database of active stakeholders that is segmented by stakeholder group/interest.

- **understand how stakeholders use our network** by engaging stakeholders across a range of issues including overall investment priorities, low carbon network initiatives, information and communication requirements, price changes, local work schemes and other specific topics identified by stakeholders.

- **inform and engage stakeholders** using a range of methods, which include workshops, media campaigns, bilateral meetings and regional forums, our website, written/email notifications, market research and customer committees.

- **make information and all stakeholder feedback available** by publishing feedback reports from all of our major stakeholder consultation events at www.westernpower.co.uk/About-us/Stakeholder-information.aspx, including a WPD response, so everyone can see what actions we will be taking as a result.

- **listen to stakeholders, act on their feedback and measure the benefits** by reviewing our engagement programme annually to ensure our methods provide valid and reliable results and publishing an annual stakeholder report.

- **use stakeholder feedback to improve service in the short and long term** by using feedback to improve our day-to-day business, making effective changes to our policies, procedures and working practices, as well as informing our longer term plans for RIIO-ED1 and beyond.

Our approach to stakeholder engagement for RIIO-ED1

6.8 Our RIIO-ED1 engagement programme has the following five phases:

Phase	Objective
1 - Preliminary engagement	to ensure all stakeholders are identified, that we understand their preferred method of communication and to hear first-hand the issues that most concern them.
2 - Willingness to pay research	to group stakeholders' priorities into common areas for focus within the Business Plan, to identify specific levels of service improvement achievable under each priority area and to understand customers' 'willingness to pay' for improved performance.
3 - Business Plan consultation	to communicate the key aspects of our draft Business Plan including the impacts on customers and present stakeholders with options for network investment, the level of service improvement each option would deliver, the overall costs and the impact on the average electricity bill.
4 - Business Plan outcomes	to communicate how we have incorporated stakeholder feedback into our Business Plan, highlighting any significant changes from our draft proposals, and to identify the key performance measures stakeholders would like us to use to monitor our progress and enable them to hold us to account for delivering on our promises.
5 – Business Plan delivery/performance review	to provide an update on the progress in delivering investment plans and performance against key output measures and to identify any areas of emerging stakeholder interest or concern.

Key findings

Network reliability

6.9 **Network reliability is the number one priority for our stakeholders:** Stakeholders are not willing to see any deterioration in service.

6.10 **Network reliability during normal weather conditions**: Stakeholders would like to see, as a minimum, a 10% reduction in power cut frequency and duration.

6.11 **Network reliability for worst served customers:** Stakeholders would like to see the number of worst served customers reduced by 20%, from 10,000 to 8,000 customers. When WPD proposed to go further (improve by 40%) stakeholders told us to scale-back our plans to, what they felt was, a more reasonable cost per benefitting customer.

6.12 **Network resilience to severe weather and flooding:** The importance of this topic has increased significantly over the last 18 months, and is now viewed as one of WPD's top three priorities. Most stakeholders would like to see the initial resilience tree cutting programme accelerated to be completed in a total of 20 years. They would also like to see our flood mitigation measures extended to protect more substations from flooding.

Customer satisfaction

6.13 Stakeholders recognise that WPD currently has the highest overall customer satisfaction of any DNO group and support continuing the existing ways of monitoring customer satisfaction.

6.14 Stakeholders have told us that the telephone remains their preferred method of communication during a power cut and that having accurate, useful and up-to-date information is key. However, stakeholders would also like more control over the service they receive and would like WPD to provide different, innovative communication methods for customers to use, including options for self-service such as social media and real-time power cut information on our website. Acting on this feedback we will introduce online power cut updates in 2013, ahead of RIIO-ED1.

Connections

6.15 Our customers have told us that this is an area where we can improve further. Stakeholders believe we should shorten the overall time it takes to produce a quotation, and once the quotation is accepted, the time it takes for the connection to be completed.

6.16 Customers would also like us to make the process easier by providing more frequent, timely communication and alternative methods by which they can access information. For example, a website based self-service system to allow customers to make enquiries and applications, payments and track the progress of their jobs online.

Environment

6.17 Minimising WPD's environmental impact by reducing oil and SF_6 gas leaks from equipment is seen as a key issue by stakeholders, although it is viewed as a 'medium' priority when placed in context with other priorities for investment. Stakeholders would like to see continued incremental improvements, but do not consider significant reductions to be needed.

6.18 Undergrounding overhead lines in National Parks and Areas of Outstanding Natural Beauty remains a priority area. Stakeholders have told us they would like to see WPD continue the

current rate of undergrounding schemes but did not support the initial proposal to increase the amount and asked that we scale back to current levels.

6.19 Whilst future-proofing the network is a high priority, stakeholders are conscious of the uncertainty surrounding the timing and uptake of low carbon technologies. Stakeholders would like WPD to strike a balance in RIIO-ED1, by increasing investment in areas where we have confidence the need exists, but not to go too far ahead of need and run the risk of investing unnecessarily if the uptake of new technologies takes longer than expected.

6.20 A number of stakeholders were of the view that WPD's initial low carbon technology projections were too high, particularly regarding the uptake of electric vehicles and heat pumps. As a result, we have undertaken a detailed forecasting exercise with the Centre for Sustainable Energy (CSE) to ensure that our 'best view' scenario is evidenced and can be supported.

6.21 'Demand Side Management' (DSM) is the term used to describe the ability of a DNO to switch off or reduce a customer's electricity consumption when overall demand on the network is high. To allow this to happen a DNO will have had to reach agreement with the customer beforehand. In return for this the customer will be in receipt of lower electricity unit charges or could be rewarded with a set payment. This agreement allows a DNO to avoid the additional costs of reinforcing its electricity network for situations where the peak load on the network occurs infrequently and/or is of short duration. Whilst stakeholders can see a role for some application of DSM the majority felt that this would be restricted to commercial/industrial customers in the foreseeable future.

Social obligations

6.22 Stakeholders believe that WPD has a key responsibility to help vulnerable people know what to do during power cuts. This includes providing information and practical support to these customers, as well as readying vulnerable people in advance of an interruption.

6.23 Stakeholders state that we must take ownership for maintaining and ensuring the quality of data on our Priority Services Register and liaise with partner agencies to keep this up to date.

6.24 Stakeholders believe there may be a role for WPD in tackling wider social issues such as fuel poverty but that our efforts must not duplicate the responsibilities of other agencies, or deviate too far from our role of supporting people during power cuts.

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RIIO-ED1 Business Plan

Incentives

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7 Incentives

7.1 Incentives are a fundamental element of the RIIO regulatory framework. They are used to drive innovation and the delivery of outputs, rewarding DNOs that do well and applying penalties for poor service. Incentive measures and monitoring of appropriate outputs is an important part of ensuring that the services that customers receive are delivered at an appropriate cost.

7.2 For a financial incentive to apply there needs to be:

- clarity of the output being incentivised;
- confidence in the data being used to assess the output;
- evidence that the output is important to customers;
- confidence that the output is not covered by other incentives or other obligations.

7.3 The following describes the incentives that we and our stakeholders believe should be active in the RIIO-ED1 period.

Interruptions Incentive Scheme (IIS)

7.4 Keeping the lights on is at the top of stakeholders requirements. IIS rewards outperformance (and penalises underperformance) against targets for the number of interruptions and the duration of those interruptions. Since its introduction, it has resulted in improvements to network performance and WPD has sought opportunities through resource management, business processes and network investment to further outperform the targets.

Broad Measure of Customer Satisfaction (BMCS)

7.5 The BMCS quantifies customer views on the service level we provide and rewards outperformance. It incorporates general customer satisfaction, how complaints are resolved and the effectiveness of stakeholder engagement. Excellent customer service is a key WPD business objective and this incentive provides the opportunity for WPD to be rewarded for providing industry leading customer service.

Network Innovation Competition/Network Innovation Allowance (NIC/NIA)

7.6 Ofgem has proposed to replace the current Low Carbon Network Fund and Innovation Funding Incentive with the Network Innovation Competition and Network Innovation Allowance. Stakeholder feedback has highlighted the importance of innovation and preparation for a low carbon economy. This incentive allows innovation trials to be undertaken in preparation for larger scale rollouts as the use of the network changes.

Guaranteed Standards of Performance (GSOPs)

7.7 There are a range of GSOPs covering the provision of connections, supply interruptions and response to problems such as voltage complaints. They represent minimum levels of service and therefore where failures occur, customers are entitled to standard payments, set by Ofgem. WPD targets zero failures against the standards, but should a failure occur during RIIO-ED1, WPD will voluntarily double the payments.

Time to Connect Incentive

7.8 Connection customers suggest that the time taken for a new connection is an important aspect of good customer service for them. The time to connect incentive combines the time to provide a quotation and, once the offer is accepted, the time to complete the works. Improving the overall time taken will provide customers with a better service.

Incentive on Connections Engagement (ICE)

7.9 Major connection customers have a requirement for more detailed interactions. ICE will support the development of engagement strategies that will improve the information provided and service delivered. Delivery against these strategies will be assessed by Ofgem and where engagement is inadequate a penalty will be applied.

Information Quality Incentive (IQI)

7.10 The IQI drives DNOs to provide realistic cost forecasts for investment requirements and shares the benefit of underspending or penalty of overspending against those forecasts with customers. This means that where WPD can find more efficient ways of delivering work, there is a financial reward for the efficiency saving. Such savings also benefit customers as a proportion of the savings are returned to customers through lower DUoS charges.

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RIIO-ED1 Business Plan

Innovation

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8 Innovation

8.1 WPD's investment in developing more innovative ways of operating has helped make us the best DNO for operational performance. We have improved efficiency in all areas of our work and made use of best practice solutions.

Our approach to innovation

8.2 The purpose of the development of new technology, techniques and working practices is to respond to customer needs, reduce the investment required in the network and improve customer service levels.

8.3 Our key goals of safety, network reliability, customer service, business efficiency, cost effectiveness and carbon reduction underpin the strategy for innovation.

8.4 We identify and test new ideas and when proven we adapt them as necessary to be deployed as "business as usual" solutions.

8.5 We deliver innovation through a small team of our own specialist staff that implement their work using our networks teams. The reporting arrangements for the innovation team set them within the core of the company's Policy department where they interact with the specifiers and technical experts. This close relationship allows ideas for innovation projects to be developed quickly into workable solutions.

Innovation to date

Customer service and commercial innovation

8.6 Customer service and commercial innovation improves business efficiency and the way we interact with our customers and other stakeholders. WPD has developed and adopted a significant number of innovative ideas including:

- working in partnership with WRVS, British Red Cross and other organisations that can assist vulnerable customers;
- using 'ENMAC Mobile' that allows field staff to provide real-time job-status updates from hand held devices. These devices integrate real time with our customer service systems allowing our contact centre staff to have up to date information to pass on to our customers. The data is also used to automatically update our messaging provided to callers who do not wish to talk in person to a call taker.
- carrying out fuel poverty work with Warm Front and National Energy Action;
- establishing a Customer Panel that meets with the CEO every three months;
- self-quotation packs for simple service alterations allowing customers to quickly estimate an approximate cost and make informed decision about whether to make a formal request. Two benefits are derived: for the customer it provides a very quick process for obtaining an estimate to allow informed decisions; for WPD it reduces the volume of speculative requests for quotations and drives greater efficiency;
- calling customers back to keep them updated about supply interruptions and check that they are back on supply;
- introducing out bound text messaging providing information about outages and restoration times for customers;
- providing empathy training for contact centre staff to improve their listening skills and know-how to deal with people suffering difficulty;

- 'Ramping up' contact centre – we have trained general office staff specifically in the use of contact centre call taking systems. In the event of bad weather or storms we are able to increase the number of call takers significantly. This enables us to deal with high volumes during the periods of very bad weather but an efficient contact centre number during normal day to day work-loads.
- enabling staff to take calls from home by deploying contact centre systems in home locations. In addition to training general office staff to carry out contact centre activities, we also ensure that the levels of service can be maintained if staff are prevented from travelling to the office due to the severe weather or for business continuity (e.g. flu pandemic).

Technical and operational innovation

8.7 Our track record of network performance and cost efficiency has been built on our ability to find new ways of doing things. Some examples include:

- being the first DNO to use mobile devices to control and manage high voltage switching operations. By using a hand held device innovatively we have reduced the volume of voice traffic to our control centres and increased productivity within our field teams. The handheld devices are in continuous communication with ENMAC, which means our operational status and customer messaging remain up to date in real time.
- utilising technology from the gas industry to develop cable fault location equipment that detects the gas produced when a cable fails rather than only using the electrical characteristic of the cable. The new technology identifies the position of the fault more quickly, without the need for more specialist electrical testing. The accuracy of the method reduces the size and number of excavations required when repairing faults and reduces the inconvenience to customers.
- using the early innovation funding to complete the 'Registered Power Zone' (RPZ1) project. This project investigated the possibility of applying dynamic line ratings on the 132kV system. By using wind speed and temperature sensors the rating of the line can be calculated continuously. This allows additional load to be carried on a given conductor over and above its traditional rating where conditions allow - such as on cool windy days.
- using network automation that quickly reconfigures networks when faults occur to allow as many customers as possible to have power restored before the fault is found and fixed.
- utilising helicopter mounted thermal imaging for the detection of hot spots on overhead lines and in substations that shows where faults are likely to occur;
- using mobile switchboards and high voltage generation for faster restoration of faulty equipment and quicker restoration of customer supplies;
- introducing 'hot glove' techniques that allow certain overhead activities to be done live at 11kV reducing the need to turn off supplies to customers;
- acquiring fire engines to quickly deal with the pumping out of flooded sites;
- continuing an in-house apprentice scheme, moving away from NVQ to reduce bureaucracy and allow the training of apprentices more quickly.

Environmental innovation

8.8 We have established effective environment processes that have been assessed against ISO 14001.

8.9 Within the Ofgem Low Carbon Networks Fund we are the most successful DNO group. Of the 16 larger projects awarded up to 2012 (Tier 2), WPD is running 5 (31%). Of the 31 smaller (Tier 1) projects, WPD is running 11 (35%).

8.10 We have undertaken a number of innovation and other projects which have a direct impact on the environment such as:

- completing the 'Registered Power Zone' (RPZ1) project which investigated the possibility of applying dynamic line ratings on the 132kV system. The major benefit being that we can allow more LCTs to connect quickly and avoid significant reinforcement costs that would have applied under a traditional approach.
- Trialling the use of electric Transit vans and other small electric vehicles;
- refurbishing buildings to the highest BREEAM standards;
- using PFT tagging of fluid filled cables - this adds a special tracer element to the oil that can then be detected from above the ground, speeding up leak location and reducing the volume of oil lost into the environment.

Historic and current DPCR5 innovation funding within the UK

8.11 During DPCR4 (2005 to 2010) Ofgem set up the Innovation Funding Incentive. Its purpose was to improve the quality of research and development within the UK electricity industry.

8.12 During DPCR5, Ofgem introduced the Low Carbon Networks Fund (LCNF). This fund is designed to support the development of low carbon technologies and facilitate the changes required by the Government's Carbon Plan. In the RIIO-ED1 period the 'Network Innovation Allowance' and 'Network Innovation Competition' will replace the current funding schemes.

8.13 The Engineering and Physical Sciences Research Council and the Technology Strategy Board support innovation and we have already worked with them on various projects.

Drivers for innovation in RIIO-ED1 and beyond

8.14 We are striving to deliver ever higher levels of customer service whilst simultaneously improving the overall efficiency of our operations.

8.15 Innovation has always been a part of all areas of WPD's operations and we are now using our expertise to adapt the network to the Government's Carbon Plan.

8.16 The Carbon Plan includes scenarios which show the effect of the introduction of new technologies to reduce carbon emissions.

8.17 The Smart Grid Forum has refined the DECC scenarios to produce their report "Assessing the Impact of Low Carbon Technologies on Great Britain's Power Distribution Networks". This report sets out the areas of interest for the development of smart solutions which we are addressing in our Low Carbon Networks Fund (LCNF) and Innovation Funding Initiative (IFI) projects.

8.18 The Carbon Plan and the smart meter roll out will change the way customers use the network. We cannot plan in isolation. We will use regular stakeholder engagement to make sure that our plans are consistent with our customers' changing needs.

8.19 The existing network is designed and built to serve one way power flows from centralised generation to end customers. The growth in distributed generation on the network is causing a move away from this and we will need to develop systems that can manage a variety of sources of generation and also allow for two way flows of power.

8.20 If large volumes of LCTs connect to the networks it will increase electricity demand and change the way networks are operated. There is uncertainty about where and how new technologies will be deployed and so we need to be able to react flexibly to how customers and generators need networks to operate.

8.21 In future, network design and operation will include elements of automatic network control and reconfiguration, flexible approaches to loading and capacity, local storage of energy, demand side management of overall load and flexible meshed networks.

8.22 Our current portfolio of five Tier 2 Low Carbon Network Fund projects covers a broad area of research as shown in the table below.

Mapping of current Tier 2 LCNF project to areas of interest					
Area of Interest	**LV Templates**	**Low Carbon Hub**	**FALCON**	**BRISTOL**	**FlexDGrid**
Voltage Constraint		✓	✓	✓	✓
Thermal Constraint		✓	✓		
Fault Level Constraint					✓
Design Tools	✓				✓
Demand Side Response			✓	✓	✓
LV Monitoring				✓	
HV Monitoring			✓		
Automation			✓		✓
LV Estimation	✓				
Weather and Climate Effects	✓				
Generation	✓	✓	✓	✓	✓
Storage				✓	

What we will deliver 2015 to 2017

8.23 The Lincolnshire Low Carbon Hub project will show us how to dynamically operate a network to accommodate new Low Carbon generation. It will use dynamic line ratings and voltage optimisation to flex the network against load and available generation at 33kV. We plan to take these solutions to other locations on our network and improve our ability to connect generation. Using these techniques in a more widespread way will require them to be managed so that they can operate effectively together and we will develop the systems to achieve this.

8.24 For a network to operate effectively, load and generation need to be balanced. Low Carbon generation often has a profile which does not match with the normal load profile of our network and would need to be constrained. We will investigate methods of storing excess energy either in a conventional battery or conversion to another medium such as the generation of hydrogen. This stored energy can be used as an alternative fuel, or turned back into electricity when required.

8.25 The load and generation balance can also be met using Demand Side Response. We will investigate the possibilities and deliver trial projects which manage and control customer demand. With the take up of LCTs growing through RIIO-ED1, this will be further developed through the later years of the period.

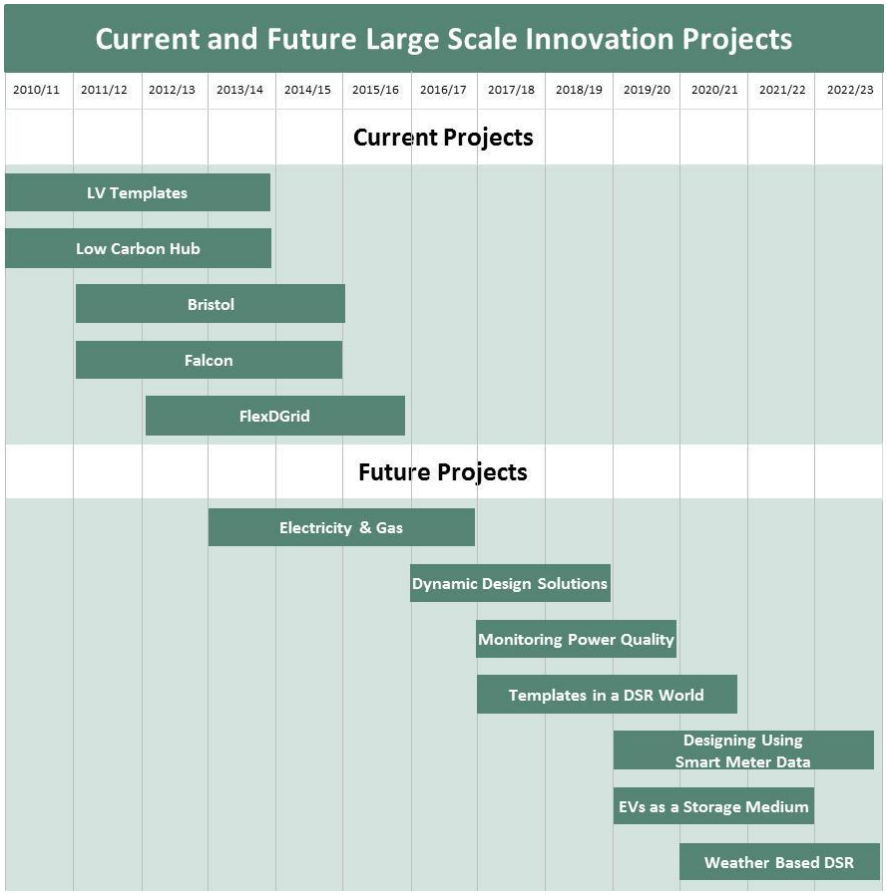
8.26 We will use the results from the LV Templates project to change the way we design for small scale embedded generation and load. The templates will allow us to predict the effect of generation and load and ultimately accept more LCTs on to our existing network. We will use detailed weather and climate simulations to improve our understanding further and, where appropriate, update the templates to increase the amount of generation that can be accepted.

What we will deliver 2018 to 2023

8.27 Later in RIIO-ED1 we will need to connect higher volumes of LCTs to our network. We will connect these LCTs cost-effectively and also take the opportunity to make use of these LCTs to provide dynamic solutions to balancing generation and demand. An example of this would be to charge electric vehicles during periods of excess generation and control the release of that stored energy into the network during periods of peak demand.

8.28 We will increase our understanding of the demand side response capabilities of LCTs. This will establish whether we can change customers demand profiles through the control of LCTs. The results should also improve demand estimation for network design.

8.29 The chart below shows the timeline for current large scale projects being funded under Tier 2 of the LCNF and our current view of future Network Innovation Competition projects up to the end of RIIO-ED1.



Future plans for innovation funding

8.30 As a larger DNO group we are able to exploit the economies of scale when developing and delivering innovative solutions. We will request a Network Innovation Allowance of 0.5% of total regulated revenue, around £55m throughout the period. We will also work with partners to provide innovative proposals for larger projects to be funded through the Network Innovation Competition. Together these projects will lead to investment of over £130m in innovation.

Our plans for ED2 and beyond

8.31 Future improvements to the communications network will bring additional benefits in the way that we can use LCTs to manage a more flexible electricity network by the beginning of RIIO-ED2. The bandwidth and reliability of communications will increase and the cost of bandwidth is expected to fall. Greater levels of network control from better communications will enable more specific and targeted management of the network.

8.32 By the end of ED2 a significant number of the domestic LCTs installed during RIIO-ED1 will be coming to the end of their useful lives. Future generations of these technologies will provide additional services for customers and by working with manufacturers we will encourage the development of features that will also enhance our ability to manage the network.

Preparations for the future

8.33 The number and technical specification of new forms of generation and demand will become more certain over time. It is likely that certain products, like domestic DSR, will not be commonplace until the Smart Meter programme is completed. Electric vehicle usage will also increase as new models become available and customers replace their petrol or diesel cars. Changes in Government incentives may alter the rate of take up or may introduce new applications.

8.34 During the development of these LCTs we will continue to deliver electricity to customers by constructing new network and reinforcing existing assets in response to known load increases and forecasts.

8.35 Where appropriate we will use simple solutions to reduce future costs e.g. installing devices that avoid the costs of having to change the assets again in the future when load changes.

8.36 Innovative preparations in the current review period include specifying low voltage distribution cabinets with higher class current transformers (CTs) fitted. These CTs provide greater accuracy and will allow us to be ready to monitor load if required. The additional cost of fitting the higher class CTs is very low (1.4% of the total cost of the cabinet) and, as at 2012, we are the only DNO making this preparation.

8.37 In a similar way, we specify that all of our 11kV distribution switchgear is pre-wired ready for remote actuators to be fitted. These actuators allow the switchgear to be operated from a remote location allowing us to increase or decrease load on parts of the network immediately in response to changing demands. Whilst the cost of actuators is high the cost of including pre-wiring is low (1.5% of the total cost).

8.38 Both of these initiatives have the added benefit of allowing us to return later to fit automation and monitoring equipment without having the need to interrupt customers or replace assets again.

8.39 Using socio-economic customer profiles data provided by the Centre for Sustainable Energy (CSE) we will identify areas on our network where the take up and clustering of LCTs is likely to create a load related problem on the network in the future.

8.40 Present information from the CSE shows that there is a forecast high take-up of Low Carbon Technologies on specific circuits that make up approximately 7% of our network.

8.41 This information will be incorporated within WPD planning systems allowing these LCT forecasts to be considered within the business when either customer driven load or generation requests have been received or when WPD asset replacement work is planned. This will enable informed decisions to be made with respect to the size of the replacement assets.

8.42 Where a high density of LCT connections is forecast there will be an opportunity to increase transformer or cable capacity whilst carrying out asset replacement. We estimate that this opportunity will occur at 95 sites and on 75km of cable. The additional costs are £0.11m and £0.3m per year respectively.

8.43 The low incremental cost of increasing capacity is significantly less the cost of changing the transformers or laying bigger capacity cables at a later date. This will save the future costs of £1m per year of changing transformers again and £5m per year on laying additional cable for a second time.

8.44 This targeted approach, where there is a high confidence of LCT clustering, will ensure that we only install larger capacity assets ahead of need where there is a strong likelihood that the higher capacity asset will be required in the future.

Sharing our results

8.45 WPD has links with a wide range of universities and businesses, both in the UK and across the world. When we choose partners we look to find an organisation that has a unique capability for the work or project being undertaken. Some projects include technology that is not from within the electricity industry and in these cases partners who would not be obvious matches can provide us the best resource.

8.46 To maximise the effect of research and innovation we participate in industry wide groups, such as those developed with EA Technology. In everything we do it is important that we learn from others and do not waste time or resources duplicating effort on topics which are consistent across the industry.

8.47 A key feature of the Low Carbon Networks Fund is the requirement for us, in common with all other DNOs, to share our learning on the projects we are completing. The main annual event for knowledge sharing is the LCNF conference which we actively support. We were pleased to be able to host the very successful 2012 event in Cardiff.

8.48 Within each of our Tier 2 projects there is a requirement for individual knowledge sharing which is achieved by specific knowledge dissemination events. We have hosted events for individual projects and for our whole portfolio of projects. Often the most important thing that we can share from our projects is data and results. We have two dedicated websites where interested parties can find out information on our projects. The www.westernpowerinnovation.co.uk site gives details of all our projects and the results they are producing. The www.lowcarbonuk.com site is aimed more at the research community and provides more details of the data and results seen on the projects.

2015-2023

RIIO-ED1 Business Plan

Outputs

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9 Outputs

9.1 Outputs are what we deliver through our investment programmes, network management decisions and customer service initiatives.

9.2 Stakeholder engagement has refined the outputs WPD will deliver for the eight years of RIIO-ED1.

9.3 Outputs have been defined in each of the six categories of the regulatory RIIO-ED1 framework and their main objectives are described below:

- **Safety** – minimise the safety risks associated with operating the network;
- **Reliability** – maintain a reliable supply of electricity through a more resilient network;
- **Environment** – reduce WPD's own impact on the environment and facilitate lower carbon technology;
- **Connections** – provide an excellent service for customers connecting to the network;
- **Customer satisfaction** – provide excellent customer service;
- **Social obligations** – meet the needs of vulnerable customers.

9.4 The following sections provide a summary of the outputs that will be delivered.

Outputs – Safety

9.5 Safety is at the heart of everything we do and we will continue to target improvements in our overall safety performance.

9.6 The objective of safety outputs is to minimise the safety risks to people. During RIIO-ED1, we will deliver the following outputs:

Reducing accidents
- Reduce our accident frequency rate by 10%;
- Maintain our active participation in the ENA SHE 'Powering Improvement' initiatives that lead to improved safety performance;
- Work with our trade unions to enhance safety performance including the provision for additional 'Behavioural Safety' initiatives;
- Investigate all accidents involving members of the public, contractors or our own staff to ensure that learning points are quickly understood and communicated.

Compliance with health and safety law
- Target zero improvement notices, prohibition notices and prosecutions from the Health and Safety Executive;
- Complete work programmes to meet the requirements for increased clearance to structures or the ground;
- Complete inspection and maintenance programmes every year.

Substation security
- Enhance security measures at 50 substations sites to reduce the number of repeat break-ins.

Educating the public
- Organise and run over 1,000 school days to provide safety information to over 400,000 school children;
- Continue to publish literature on maintaining safety around electricity apparatus and send over 500,000 copies of our booklets to targeted landowners, businesses or leisure operators.

Reducing accidents

9.7 Whilst the electricity distribution network and work upon it has many inherent hazards, the design standards, operational processes and working methods adopted by WPD minimise the risk of injury to staff, contractors and the public.

9.8 We will seek to reduce the accident frequency rate involving our own staff by 10%. This will be achieved by working with staff, trade unions and the industry to understand the causes of accidents.

9.9 Whilst incidents or accidents involving members of the public are rare when they do occur we will continue to quickly investigate the causes and ensure any appropriate action is undertaken without delay.

9.10 We will continue to work with trade unions and trade union appointed safety representatives within the business to ensure that industry best practices are shared and applied within

WPD. We will look to further enhance the safety of our staff through an understanding of behavioural safety.

Compliance with health and safety law

9.11 The Government seeks to promote the right safety behaviour of organisations and people through an extensive range of health and safety law. The Health and Safety Executive (HSE) has the responsibility of enforcing health and safety legislation and its inspectors work with the industry to prevent incidents.

9.12 We have created a strong safety culture and procedures will continue to be refined to improve upon excellent safety performance and minimise the need for intervention by the HSE.

9.13 We will ensure that assets are regularly inspected and maintained, carrying out appropriate remedial actions. In addition we will complete the work programmes to provide sufficient clearance between overhead lines and structures, and height above the ground.

9.14 We will work cooperatively with the Health and Safety Executive to ensure our practices and policies continue to be compliant with health and safety legislation but also to seek out and apply best practice in the management of safety.

Substation security and theft of equipment

9.15 Increases in the value of metal have led to high levels of theft from the network. Long range forecasts suggest metal prices will remain high throughout RIIO-ED1. In addition to the potential for electricity supplies to be interrupted, intruders to substations often leave sites in a hazardous state potentially exposing members of the public to increased risks.

9.16 WPD has been proactive working with police forces to assist in crime prevention. We have provided guidance to improve the identification of recovered stolen materials. Furthermore we have facilitated meetings with neighbouring forces to ensure that intelligence is shared across police area boundaries.

9.17 Enhanced substation security measures will be installed and incidents will continue to be investigated to minimise criminal acts against WPD.

Educating the public

9.18 School children are not always aware of the potential dangers of electricity or the electricity network. During RIIO-ED1 we will educate 400,000 school children of the potential dangers of electricity via our on-going programme of school visits. These visits provide an opportunity to make children aware of the dangers, helping them to recognise overhead lines and substations and explaining what they should avoid doing near to electricity distribution equipment.

9.19 Similarly, people engaged in work or taking part in recreational activities near network assets are usually focussed on what they are doing and can be unaware of the potential hazards around them. We will

WPD will educate 400,000 school children about electrical safety and send out 500,000 safety books to targeted landowners, businesses or leisure operators to enhance their understanding

continue our practice of targeted mailshots of our safety literature. During RIIO-ED1 we will send out over 500,000 copies to specific landowners, businesses or leisure activity providers whose activities could be higher risk if undertaken near to our equipment.

Stakeholder views

9.20 WPD maintains regular contact with the HSE and is subject to periodic inspections. These interactions serve to identify areas where improvements can be made. WPD will respond to all observations to ensure that necessary corrective actions are taken.

9.21 Other stakeholders regard safety as a 'given' requirement and therefore it remains a high priority for the way that work is carried out and how WPD interacts with customers, landowners and other parties.

Outputs - Reliability and availability

9.22 The objectives of network reliability and availability outputs are to deliver improvements to the network so that our customers have fewer and shorter power cuts.

Network performance
- Improve network performance by the end of RIIO-ED1 so that on average customers will have 13% fewer power cuts and have their electricity supplies restored 20% quicker.
- Ensure that a minimum of 85% of customers have their power restored within an hour on HV faults.

Guaranteed Standards of Performance
- Reduce by 20% the number of customers experiencing a power cut lasting 12 hours or more.
- Target zero failures on all other GSOPs.

Worst served customers
- Reduce by 20% the number of customers classified as worst served.

Enhancing network resilience
- Apply flood defences to 75 substations, reducing the risk of both damage to equipment and power cuts due to flooding.
- Accelerate the programme of tree clearance for resilience by 40% with the objective to deliver the programme five years earlier than suggested by Government guidelines, clearing 700km of overhead line per annum.
- Enhance substation battery life to be resilient for 72 hours in the event of major power losses.

Network performance

9.23 Customers expect power to be available at the 'flick of a switch' with many household activities and business processes relying on electricity. As a low carbon future becomes reality there will be a greater requirement and reliance on electricity as a source of energy. This will mean that reliability and availability become even more important.

9.24 Since 2002, Ofgem has incentivised distribution companies to improve network performance through the Interruptions Incentive Scheme (IIS) where rewards are available for outperformance and penalties applied where targets are not met. IIS measures the average number of interruptions per 100 customers and the average length of time in minutes each customer is without power (it excludes power cuts that are under three minutes).

9.25 The measures can be subdivided into three main controllable factors:

- Fault rate – the number of faults that occur;
- Customers interrupted per fault – the average number of customers that go off supply when a fault occurs;
- Duration of a fault – the average length of time it takes to restore supplies.

9.26 The number of faults is influenced by a range of activities (described under RIIO-ED1 as 'secondary deliverables'). During RIIO-ED1, we will:

- replace the assets that are in poorest condition and have the greatest consequence of failure;
- reinforce the network using both smart and traditional solutions to provide enough network capacity to prevent components overloading and failing;
- remove defective poles from the network within one year of diagnosis as defective so that there are fewer failures during poor weather;
- complete 100% of the tree clearance programmes to reduce the likelihood of branches and windborne debris affecting overhead lines;
- complete maintenance programmes to enable equipment to last for expected lives.

9.27 We will install more network protection and automatic network switching devices to reduce the number of customers affected by power cuts.

9.28 The duration of interruptions will be minimised through a clear business focus on restoring supplies quickly using technology, the effective deployment of resources and the installation of mobile generation.

9.29 As a result of these actions we will improve network performance for unplanned interruptions so that customers are on average interrupted for no more than 38 minutes (a reduction of 20% from 48 CML to 38 CML) and experience no more than 6 interruptions in ten years (a reduction of 13% from 69 CI to 60 CI).

On average, WPD customers will have their power restored 20% faster

Guaranteed Standards of Performance

9.30 The Electricity (Standards of Performance) Regulations 2010 define the standards that companies are required to meet and the level of payments to customers for failures.

9.31 WPD is the best performing company for GSOPs.

9.32 The most significant change to the standards, for RIIO-ED1 will require a payment to customers when they have been off supply for more than 12 hours. This reduces the timescale from 18 hours, which has been in place since the standards were implemented.

9.33 This change will require DNOs to respond even more quickly to power cuts. WPD has already introduced internal key performance indicators (KPIs) as a result of the proposal in Ofgem's initial consultation document for RIIO-ED1. These KPIs will allow the business to develop the correct 'mind-set' and work towards meeting the new requirements by the start of RIIO-ED1. WPD proposes to reduce by 20% on average the number of customers experiencing interruptions lasting 12 hours or more when compared to DPCR5.

WPD will ensure that 20% fewer customers suffer long power cuts

9.34 WPD will continue to aim to never fail the other standards covering the following areas:

- response to failure of a fuse (EGS1);
- multiple interruptions (EGS2A);
- supply restoration during events affecting more than 5,000 customers (EGS2B);
- supplies affected by rota disconnections (EGS2C);

- supply restoration during severe weather (EGS11).

9.35 Whilst the payments for failures are defined in the regulations, WPD proposes to voluntarily double the amount paid to customers

WPD will voluntarily double the payments made for Guaranteed Standard failures

Worst served customers

9.36 Ofgem defines worst served customers as those that regularly experience 15 or more higher voltage interruptions over a three year period. Often these customers are connected to remote parts of the network that are predominantly overhead.

9.37 In DPCR5, Ofgem introduced a new way of funding whereby a DNO could recover costs for improving service to worst served customers provided they could demonstrate that performance improvements had been achieved. The cost recovery was capped at £1000 per customer.

9.38 WPD recognises the inconvenience of frequent power cuts and has invested to make improvements for worst served customers. Further improvements will be made during RIIO-ED1 to reduce the number of worst served customers by 20%.

WPD will reduce the number of worst served customers by 20%

Enhancing network resilience

9.39 Severe storms can cause network faults and lead to interruptions in supply for large numbers of customers. Restoring supplies can take a long time when resources are dealing with multiple incidents or complex issues.

9.40 In particular strong winds can lead to overhead lines being damaged by trees. Following storms in 2002 new legislation was introduced that requires DNOs to clear trees from lines to a resilient standard that prevents damage should a tree be blown over. The rate of resilience tree clearance will be accelerated by 40% to complete the programme five years earlier than had been planned in DPCR5.

9.41 Flooding can affect substations causing supplies to be interrupted to a wide area. The risk can be reduced by erecting temporary barriers in response to floods, constructing permanent barrier walls around the perimeter of sites or critical equipment, or installing equipment higher up on structures. We will protect an additional 75 sites that are at risk of flooding.

9.42 A number of ‘blackouts’ around the world have increased the concern about widespread interruptions, resulting from coincidence of events on the electricity system causing a ‘cascade’ of disconnections. Whilst the likelihood of such an event is low, we will ensure that battery systems for communication and operation of the equipment can last 72 hours; the length of time it is expected it will take to recover from a widespread interruption.

Stakeholder views

9.43 Stakeholders have provided a very strong view that they do not want network performance to deteriorate; keeping the lights on should remain the number one priority.

9.44 Initial stakeholder engagement, indicating that improvements are expected, was reinforced during Business Plan discussions where two thirds of stakeholders stated that reducing the number and average duration of power cuts should be a high priority. Over half agreeing with WPD's proposals to reduce average frequency and duration of power cuts and a further 30% wanted even greater reductions.

9.45 Stakeholders have strongly requested a reduction in the duration of power cuts and therefore WPD will make further improvements to fault management processes and increase the use of mobile generation.

9.46 Stakeholders recognise that living in remote areas makes power cuts more likely and they support investment where it improves performance for customers receiving the poorest performance.

9.47 A number of high profile floods during 2012 made stakeholders more aware of the disturbance flooding can cause and therefore flood defences are becoming increasingly important to them.

9.48 Tree clearance to reduce the impact of storms was also supported by stakeholders, with half endorsing WPD's existing programme and over 40% wanting acceleration of the programme.

Outputs - Environment

9.49 Outputs for the environment can be subdivided into two broad categories: those that help increase the amount of low carbon technology connected to our network and those that reduce WPD's environmental impact. Each category is considered separately below.

Helping to increase the volumes of Low Carbon Technologies (LCTs)

9.50 LCT related outputs are to facilitate the connection of low carbon generation and provide network capacity to accommodate the increased use of low carbon technologies. During RIIO-ED1 we will:

Facilitate increased volumes of Low Carbon Technologies (LCTs)

- Improve the time to provide a response to customers wanting to use LCTs by 20%.
- Reduce costs for future customers by developing smart solutions to provide alternative and innovative techniques for network management.
- Identify LCT hotspots using data from smart meters, expert organisations and local authorities and use this to inform decision making.
- Selectively carry out asset replacement using larger sized assets.
- Provide additional network capacity through utilising traditional methods or smart intervention.

9.51 The Government has committed to undertake positive action on climate change by reducing the emission of greenhouse gasses.

9.52 For DNOs the major impact is in respect of the increasing number of LCTs used for electricity generation, transportation and heating for buildings. Part of WPD's role is to enable cost effective and timely connection of distributed generation (such as solar panels) and to provide sufficient capacity in the network to accommodate the increased loads from electric vehicle charging and heat pump domestic heating systems.

Provide a faster response to customers

9.53 The volume of LCTs connecting to the network is expected to grow significantly. We will improve the processing of requests during RIIO-ED1 to ensure a 20% reduction in response time. As current volumes are low we propose to establish a benchmark based upon the response provided in the last year of DPCR5.

Identification of LCT hotspots

9.54 DECC has published forecasts for the scale of uptake of LCTs that will require the distribution networks to increase capacity and be more operationally agile in order to deal with fluctuations in generation and demand.

9.55 We have used socio-economic information to predict where LCTs may connect and have then analysed the consequential impact on the network. During RIIO-ED1 we will continue to use expert organisations, information from local councils and data from smart meters to build up a better view of areas that become LCT hotspots i.e. those areas with a high probability of requiring additional capacity in the near future. We will develop a clear link to WPD network planning tools to ensure that the information is readily available for team planners dealing with future customer load enquiries.

Asset replacement using larger assets in LCT hotspots

9.56 When assets reach the end of their useful lives they are normally replaced on a like-for-like basis. In areas identified as LCT hotspots, it may be prudent to install larger capacity cables and transformers to provide adequate capacity for load growth, especially where there is high confidence that the load will increase. This will provide a lower overall cost of running the network as it will avoid the need to reinforce assets again. We will use the information about LCT hotspots to selectively install larger assets during asset replacement work.

Development of smart solutions

9.57 Where demand increases do not coincide with assets reaching the end of their useful lives alternatives to the traditional approaches to reinforcing the network by installing larger capacity assets can be more appropriate and more cost effective. Smarter ways of operating the network and providing capacity are being researched, trialled and tested. WPD's existing extensive innovation programme will continue into RIIO-ED1 and new techniques will be adopted to become 'business as usual'.

Network reinforcement using smart solutions

WPD will use smart solutions to facilitate low carbon technology

9.58 Future network development will incorporate both traditional and smart network reinforcement approaches. This will ensure that adequate network capacity is provided to deal with LCT hotspots and costs for future customers are minimised.

9.59 Dynamic Line Ratings for EHV overhead lines will be developed into WPD policy to apply across the whole business. This will result in more flexible arrangements with customers allowing the quicker connection of load or generation without the need for more traditional reinforcement – lowering costs and reducing the time to connect. This will mark the innovation's full implementation to become 'business as usual' in RIIO-ED1.

9.60 Analysis of real time customer load from our 'LV Templates' project will be applied to our planning and design tools. This will ensure that the understanding and knowledge from the project is actually applied as a business tool to improve the ability to connect LCTs.

9.61 Implement the knowledge gained from the Lincolnshire 33kV low carbon hub project and implement across the whole business. This will allow us to control load flows on the 33kV network in conjunction with new commercial arrangements with generators and large customers avoiding the need for network reinforcement.

Stakeholder views

9.62 Whilst some stakeholders are sceptical about the scale of adoption of electric vehicles and heat pump heating systems, they acknowledge that significant changes can arise in a short period of time as has been illustrated by the rapid uptake of domestic solar panels.

9.63 Provided sufficient incentives are available, stakeholders generally believe that there will be an increase in LCTs which will have an impact on the networks and WPD will need to respond by accommodating these in a cost effective manner.

Reducing the overall impact of WPD operations on the environment

9.64 The second area of WPD's Environmental Outputs has the objective to reduce the impact of the WPD business operations on the environment by reducing greenhouse gas emissions, limiting pollution, improving waste management and improving visual amenity.

9.65 During RIIO-ED1 WPD will:

Reduce the carbon footprint of the business

- Ensure all replacement vehicles have lower CO_2 emissions than those they are replacing.
- Ensure all new or substantially refurbished buildings meet, as a minimum, the 'excellent' standard under the Building Research Establishment Environmental Assessment Method (BREEAM)
- Reduce the amount of waste sent to landfill by 5% per annum

Reduce the environmental risk of leaks from equipment

- Reduce by 75% the volume of oil lost through leaks from oil filled cables.
- Reduce by 17% the volume of SF_6 gas that is lost from switchgear.
- Install effective oil containment 'bunds' around plant containing high volumes of oil

Improve visual amenity in National Parks and Areas of Outstanding Natural Beauty

- Underground 40km of overhead lines in areas of outstanding natural beauty

Reduce the carbon footprint of the business

9.66 Our business can also have an adverse impact on the environment and, as a minimum, we ensure that it meets legal obligations. Wherever possible we aim to exceed those requirements and seek to adopt best practice where legal requirements do not exist.

9.67 The network is spread over a large area so we need to operate a large fleet of vehicles. When these vehicles reach the end of their useful lives they are replaced with modern vehicles that have more fuel efficient engines. Having already trialled electric commercial vehicles, the use of electric vehicles will also be considered where they are available and can be deployed effectively. The cumulative effect of this fleet replacement is a progressive reduction in carbon and gas emissions. In addition to this WPD will provide driver training to staff to teach them how to adopt driving techniques that reduce fuel consumption.

9.68 WPD operates from 59 offices that vary in age and construction. There are opportunities to refurbish some buildings and improve their energy efficiency. Building refurbishment will be carried out to the 'excellent' standard under the Building Research Establishment Environmental Assessment Method (BREEAM) to reduce energy consumption.

9.69 WPD's business activities create waste. Many of the items can be recycled and therefore WPD has, for a number of years, segregated waste to limit the amount being sent to landfill. During RIIO-ED1 further efforts will be made to reduce the amount of waste being sent to landfill by 5% per annum.

Reducing the environmental risk of leaks from equipment

9.70 Older types of higher voltage cables (33kV and above) contain oil based fluids to assist in the insulation and cooling of the cables. During RIIO-ED1 the cables with the highest leak rates, caused by poor condition, will be replaced to reduce the volume of leakage by 75%. In addition a chemical tracer tagging system will be applied to all cables with a history of leaks. This will speed up the location of leaks and reduce the volume of oil escaping and affecting the environment.

9.71 SF_6 gas is used throughout the industry as an insulating medium in switchgear. Whilst it provides many benefits, it is a potent greenhouse gas. Since there are no current alternatives to SF_6, WPD will target the replacement of 1% of switchgear with highest leak rates to reduce the volume of SF_6 lost by 17%.

9.72 Large transformers and some items of switchgear contain large volumes of oil posing a risk of contamination should a leak arise. Containment walls or 'bunds' can be constructed around the equipment to prevent oil leaking into the environment. During RIIO-ED1 all 33kV transformers and above and any bulk storage sites (in excess of 1,500 litres) will have an effective bund. This will require both new bunds to be established and for the refurbishment of existing bunds that are in poor condition.

Improving visual amenity

9.73 There are a number of National Parks and AONBs across the WPD geographical footprint containing iconic sites where the removal of WPD overhead lines would improve the visual amenity for both locals and tourists. During RIIO-ED1 WPD will continue to underground overhead lines, working with the National Parks and AONB representatives to determine the lines that provide greatest amenity benefit.

WPD will underground 40km of overhead lines

Stakeholder views

9.74 The engagement process provided stakeholders with the opportunity to influence a range of different environmental activities.

9.75 Stakeholders were presented with different options for the replacement of leaking oil filled cables and SF_6 insulated switchgear. Whilst there was a spread of preferences, the majority favoured the removal of the worst 1% as this gave a balance between addressing the assets with the highest leak rates and value for money.

9.76 Proposals to underground overhead lines in National Parks and AONBs received a mixed response with initial engagement stages placing a high priority on increasing this activity. During further consultation on the Business Plan an alternative view was proposed that less should be done. 60% of stakeholders stated this should not be a high priority.

Outputs - Connections

9.77 Customers who require a new electricity supply need to obtain a new connection to the network. This includes all demand connections (customers who use electricity), generation connections (customers who generate electricity and may need to export it into the network) and unmetered connections (customers with equipment that does not have its own meter - such as street lighting) that are covered by the Guaranteed Standards of Performance.

9.78 The objective of connections outputs is to provide an excellent service for customers connecting to the network whilst facilitating competition in the connections market. During RIIO-ED1 we will:

Provide a faster and more efficient connections service
- Improve the overall time to deliver a connection by 20%.
- Provide excellent customer service so that customers rank WPD as the top performing DNO group in customer satisfaction surveys.
- Conduct surveys with distributed generation customers to gauge their satisfaction and identify improvements to the service provided.

Improve communication with customers
- Host quarterly 'surgeries' for connection customers to better understand processes.
- Develop and enhance online connections processing and progress tracking.
- Ensure information provided in documentation and online is effective.

Enhance engagement with Major Customers
- Work with major customers to identify where processes can be improved and quickly implement changes.

Guaranteed Standards of Performance
- Target zero failures of the connection GSOPs.

Facilitation of competitive market
- Improve customer awareness of third party connection providers and carry out regular checks with customers that they understand the options available to them.
- Work with third party connection providers to extend the scope of contestable work to HV and reinforcement work.
- Deliver service improvements to third party connection providers in-line with other outputs.

Provide a faster and more efficient connections service

9.79 The overall time to deliver a connection is a combination of the time to provide a quotation (the time to quote) and, once the offer is accepted, the time taken to construct the connection. We will assess and refine our processes, incorporating feedback from customers, to improve the overall time by 20%. Whilst Ofgem proposals suggest that this should apply to very small developments, WPD will apply this across all market segments.

9.80 Customer satisfaction is important and we will improve interactions with customers so that customers rank WPD as the top performing DNO group. We will extend the surveys to distributed generation customers so that we can monitor the performance and ensure we deliver high levels of customer satisfaction.

Improve communication with customers

9.81 Customers seeking a connection require clear information on their options, the process for connection and what they need to do. This information is provided in leaflets, online, by contacting trained contact-centre staff or directly from locally based planners. The amount of information required by customers differs depending on the experience of the customer or the complexity of the connection. It can range from simplified process explanations to detailed network parameters.

9.82 The information provided in leaflets and online will be regularly reviewed and updated to ensure it reflects improvements to business processes and incorporates feedback from customers.

9.83 Some customers have indicated they prefer to carry out transactions and track progress online. The scope of online tracking will be enhanced and new facilities provided in response to customer feedback.

9.84 Where necessary, planners will visit clients on site to discuss requirements in more detail.

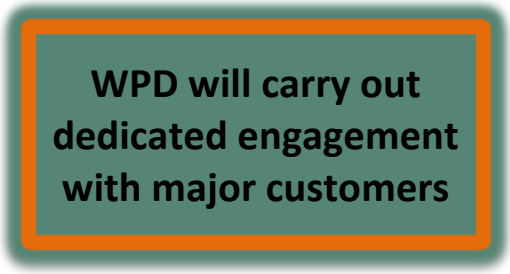
9.85 We also propose to extent the use of local 'surgeries' where connection customers can attend events hosted at local offices to learn about the connections process, discuss issues and meet the WPD staff they interact with.

Engagement with 'Major Connection' customers

9.86 Major Connection customers (generally large developments, DG customers and multiple connections) have a wide range of requirements for their connections and the connection arrangements can be complicated. Whilst generic information is available, these customers usually require additional details and a more interactive communications process.

9.87 WPD will carry out dedicated engagement with these customers to understand where improvements can be made to information provision, communication processes and work delivery interaction.

9.88 To keep major connections customers informed, we will publish an agreed plan of action and any changes resulting from the engagement.



Guaranteed Standards of Performance

9.89 The final proposals for DPCR5 introduced new standards to establish minimum levels of service and the level of compensation to customers where these are not met.

9.90 WPD targets zero failures against all the standards, but in the event of a failure will voluntarily double the value of payments to customers. This acts a strong incentive for the business to provide the necessary level of service.

Facilitating competition in connections

9.91 Providing choice for customers drives companies to improve service and become more efficient.

9.92 Prior to the introduction of competition for the provision of connections, customers could only request a connection from the incumbent DNO. Customers now have the choice of two further alternatives: Independent Connection Providers (who construct the network and pass on ownership of that network to WPD) or Independent Distribution Network Operators (who retain ownership and operation of the networks). We will continue to promote competition and identify opportunities to inform customers that they have this choice and an annual survey will be used to gauge the level of customer awareness.

9.93 Whilst third parties can provide new connections, they cannot carry out all aspects of connections work. WPD has been actively assisting competition, developing new processes and systems to allow third parties to extend the scope of what they can do. We anticipate that this will soon include interconnection to, and reinforcement of, the existing HV network. Further extension will be considered in response to the requests from third party connection providers.

9.94 We will ensure that all improvements made to connections processes and timescales apply equally to the service provided to third party connection providers.

Stakeholder views

9.95 Whilst many customers are happy with the service that WPD provides and we currently have the highest satisfaction in the industry for our connections service, customers have also given us clear feedback that this is an area where we can still do better. In particular, some customers perceive the overall process to be slow and communication sometimes difficult. Initial stakeholder engagement supported this view with stakeholders asking for the process to be made quicker and clearer, and placing a high priority on these improvements.

9.96 When options were presented to stakeholders to improve or maintain our performance with respect to the overall time to connect, connections customers were in favour of improvements; 43% of business customers and 40% of developers/connections customers wanted improvements. The option to improve by 20% gained most support amongst these customers with a direct experience of applying for a connection, although there was little support to see costs increase to the customer for doing so. Other general stakeholders were firmly of the view that any possible cost increases should be borne by the connection customers only.

9.97 Whilst many connection stakeholders would like improvements to the overall time it takes to connect, this is not always the most critical requirement. Some major customers stress that the important aspect is to have a timely connection where work is coordinated with the development. This requires good communication and co-operation between the developers and WPD.

9.98 Stakeholders were also consulted on how communication should be improved. They overwhelmingly supported the introduction of a web based self-service system to make enquiries, submit applications, process payments and track the progress of projects online. Stakeholders dismissed the provision of a single local point of contact, suggesting that it would introduce an additional person in the chain, delaying communication between the customer and the appropriate WPD contact. They also showed little support for the introduction of a dedicated contact number for more knowledgeable first contact, preferring to be put through to the local team that would be doing the work.

Outputs – Customer satisfaction

9.99 The provision of excellent customer service for WPD's 7.7 million customers is a core business objective. During RIIO-ED1, we will:

Customer service
- Continue to be the number one performing DNO group across all elements of the Broad Measure of Customer Satisfaction.
- Maintain certification to the Customer Service Excellence standard.

Telephone response
- Respond to telephone calls quickly, answering them within 2 seconds.
- Ensure abandoned calls are less than 1%.
- Always provide customers with the option to talk to a WPD call taker.

Communication with customers
- Provide a restoration time for every outage.
- Call back all customers who have been in contact about a fault.
- Contact customers within two days of receiving a non-fault enquiry.
- Provide on demand messaging via text and social media for customers who want be kept informed by means other than the telephone.
- Develop 'self-service' options for customers to find information online.

Stakeholder engagement
- Continue to host a Customer Panel where the CEO will meet with WPD's expert stakeholders four times a year.
- Continue to host a minimum of 6 stakeholder workshops per annum.
- Continue to produce a stakeholder report every year providing an update of actions taken as a result of stakeholder engagement.

Complaints
- Resolve at least 65% of complaints within one day.
- Continue to have the lowest number of complaints where the Ombudsman has to get involved.

GSOPs awareness
- Continue to send the 'Power for Life' publication to all 7.7 million customers which will include promotion of the GSOPs.

Customer service

9.100 WPD consistently achieves excellent levels of customer service that are reflected across all elements of the Broad Measure of Customer Satisfaction. During RIIO-ED1, we will continue to refine and improve the processes and practices for customer service to maintain industry leading performance.

WPD will continue to be the No1 DNO group for customer service

9.101 The Customer Service Excellence standard is a Government scheme which recognises organisations that provide effective and excellent customer service. WPD has been accredited

to the standard since 1992 (when it was known as the Charter Mark) and we will continue to assess the service provided against this standard.

Telephone response

9.102 Allowing customers to speak to someone is an essential part of good customer service and WPD is proud of the telephone response that is already provided.

9.103 We will continue to operate highly efficient Contact Centres using the latest technology to provide automated messaging for power loss and well trained staff to talk to customers who do need to speak to us. We will answer calls within two seconds and have the lowest number of abandoned calls.

Communication with customers

9.104 When supplies are interrupted, customers welcome good information about when they will be back on supply. WPD will provide a restoration time for every outage, using progress updates from field staff to provide best estimates.

9.105 All customers contacting WPD about a fault will receive a call back to provide progress updates or check that supplies are restored and gain feedback on the service provided. This will provide useful information for further service improvements.

9.106 Customers asking for action from us will be contacted by a local team member within two days of receiving the request.

9.107 Some customers want to be kept informed about what is happening on the network. We will provide messaging via text and social media to send information to customers who have asked to be kept informed. We will also enhance the 'self-service' capability of the WPD website to allow customers searching for network outage information to find it quickly and in an easy to use format.

Stakeholder engagement

9.108 Regular stakeholder engagement is used to improve day-to-day operations and inform business priorities. WPD has 4,500 stakeholder contacts, categorised into customer segments, allowing targeted engagement of specific issues. Engagement occurs throughout the business but there are specific events dedicated to stakeholder engagement.

9.109 Every quarter, WPD's CEO meets with an expert Customer Panel to shape thinking and future priorities. In addition, there are at least six stakeholder workshops held every year where key themes and investment priorities are tested and discussed with a wider audience.

WPD's CEO to meet Customer Panel four times a year

9.110 These events provide very useful feedback and will continue during RIIO-ED1.

Complaints

9.111 Whilst WPD endeavours to get things right first time, sometimes things go wrong. When complaints are received they are treated with priority and solutions developed quickly. Local

team managers are responsible for dealing with complaints, visiting customers where necessary to understand what can be done to put things right.

9.112 WPD will resolve at least 65% of complaints within one day and ensure that the response provided to all complaints result in the lowest number (across the industry) being investigated by the Ombudsman.

GSOPs awareness

9.113 GSOPs provide a means for individual customers to receive compensation payments when performance fails to meet the standards. They cover the provision of connections, supply interruptions and response to problems such as voltage complaints. WPD performs well across all categories and the number of failures is very low.

9.114 In the event of a failure WPD will voluntarily double the value of payments to customers. This will act a strong incentive for the business to provide the necessary level of service.

9.115 Every year, we will publicise the GSOPs in WPD's 'Power for Life' publication that is posted to all 7.7 million customers.

Stakeholder views

9.116 Traditionally customers have either written or called on the telephone, but advances in technology mean that more communication is available online, via e-mail, text or social media. Part of the stakeholder engagement was used to explore which additional communication methods should be utilised in RIIO-ED1. Stakeholders suggested that many organisations, including local authorities are using alternative technology and that multi-media communications should be available. They also stressed that this should be implemented quickly and at no extra cost to customers. WPD has therefore responded and will implement a number of changes during DPCR5 including the introduction of two way texting, on-line data systems and the use of social media.

9.117 Stakeholders have informed WPD that they believe that the values of Guaranteed Standard payments are too low to cover the impact of the failures. The payments were never intended to cover consequential loss and this position remains unchanged. However, since customers find that they have been inconvenienced when failures occur, WPD proposes to voluntarily double the value of the payments made.

Outputs – Social obligations

9.118 The objective of WPD's Social Obligation Outputs is to improve the accuracy of information held on vulnerable customers and improve the services provided through partnership working. During RIIO-ED1, we will deliver the following social obligation related outputs:

Improve the data held on the Priority Services Register

- Proactively contact vulnerable customers at least once every two years.
- Improve the quality of Priority Services Register data by working with other agencies and sharing information.
- Coordinate meetings with suppliers to agree criteria for vulnerability.

Improve the services provided for vulnerable customers

- Continue to provide practical support via the WRVS and British Red Cross.
- Contact all medically dependent customers every four hours during power cuts.
- Make 10,000 crisis packs available.
- Seek feedback from vulnerable customers to improve service.
- Develop mechanisms for sharing information with local resilience forums.

Address fuel poverty by supporting customers to access key information

- Build a database of regional agencies we can refer customers to for assistance.
- Work with partners to develop links to/from WPD's website.
- Develop joint information, awareness campaigns and co-ordinated assistance with partners.
- Provide bespoke training to WPD front line staff.
- Develop local outreach services.

Improve the data held on the Priority Services Register

9.119 WPD is required to hold a Priority Services Register (PSR) that records details about vulnerable customers so that additional support can be provided when the customers contact WPD or when their supply is interrupted. Bespoke services are provided by understanding the special needs of the customers. WPD groups special needs as shown in the table below:

SN01 – Critical Medical Dependency	SN02 – Medical Dependency	SN03 – Communication Needs	SN04 - Other
02 Heart/Lung Machine 03 Kidney Dialysis	01 Nebuliser 04 Oxygen Concentrator 05 Ventilator 06 Apnoea Monitor 07 Other Medical Dependency on electricity	08 Blind 09 Partially sighted 10 Deaf 11 Hearing impaired	12 Stair lift 13 Bath Hoist 14 Elderly (60+) 15 Disabled 16 Speech difficulties 17 Foreign language 18 Learning difficulties 20 Restricted movement 21 Other

9.120 Customers are added to the PSR mainly via data flows from suppliers. WPD will coordinate meetings with suppliers to agree criteria for vulnerability so that customers are treated consistently.

9.121 Circumstances can change and therefore the details held on the PSR can become out of date. The main opportunity to check the accuracy of existing records is presently during a power cut and since these can be infrequent, inaccuracies in the PSR can result over time.

9.122 WPD will establish a dedicated team of people to proactively contact customers and check the details held about them. This is a process that will be repeated every two years to ensure that the register remains up-to-date. This will be supplemented by sharing data with other service centred organisations that hold information about vulnerable customers, provided customers give their consent and data protection allows.

WPD will contact vulnerable customer every two years

Improve the services provided for vulnerable customers

9.123 Links have been established with many organisations such as the WRVS and British Red Cross to improve the understanding of the needs of vulnerable customers. These partners work with WPD to improve the services that are provided and we will continue to work with them during RIIO-ED1.

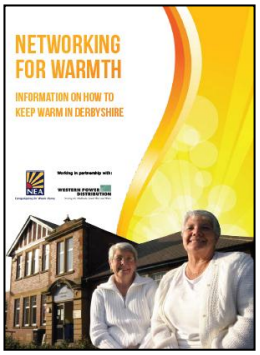
9.124 Help will be provided for vulnerable customers during power cuts and where possible advice will be provided to enable them to be prepared should a power cut occur.

9.125 In addition, 10,000 'crisis packs' containing a blanket, torch and other useful items will be made available to agencies and WPD staff to hand out to vulnerable customers during power cuts.

9.126 We will build on existing relationships with local resilience forums to share information on support for vulnerable customers when extreme events, such as widespread flooding, occur.

Address fuel poverty by supporting customers to access key information

9.127 Some customers on low incomes cannot afford to use electricity to effectively heat their properties. There is growing concern that customers will suffer as economic growth remains low and austerity measures affect fuel poor customers further. Whilst WPD does not have a direct obligation to provide energy efficiency advice we are already working with the charity National Energy Action (NEA) to provide information on the causes of and solutions for fuel poverty.



9.128 We will seek to establish more partnerships to build a referral framework and provide links to websites and information.

9.129 Front line staff will receive bespoke training to allow them to identify the key warning signs of fuel poverty and refer customers to appropriate organisations that can help.

Stakeholder views

9.130 Stakeholders state that WPD has a key responsibility to continue to support vulnerable people, by providing practical support during power cuts and more proactive preparation advice and information in advance of an interruption. Expanding our current support services and increasing the amount of information provided to customers, gained strong support.

9.131 Taking steps to improve the data held on the PSR was seen as fundamental step to enable WPD to expand the support services offered to vulnerable customers. As well as working with energy suppliers and other utility providers to improve data-sharing, stakeholders would like

WPD to take greater ownership for updating and cleansing the data on the PSR. Stakeholders strongly supported WPD's proposals to establish a team within our contact centre to proactively contact customers to update their records and gain a fuller understanding of their needs, including a commitment to contact PSR customers as a minimum once every two years.

9.132 Stakeholders supported WPD's proposals to contact known vulnerable customers every four hours during power cuts, but challenged WPD to shorten these timescale for customers with the most critical dependencies on electricity for medical reasons (e.g. heart and lung machine or kidney dialysis users), especially for power cuts occurring outside of daylight hours.

9.133 Stakeholders would like to see the continuation of partnership working and an increased number of trial initiatives and community-outreach projects, with the three-fold purpose of:

- making sure people are more prepared for the possibility of a power cut;
- improving and tailoring the support offered during power cuts;
- facilitating access to key information in order to combat the causes of fuel poverty and provide practical assistance to those customers in need.

9.134 The common consensus is that there is a role for WPD in helping to tackle fuel poverty and that we are uniquely placed to support customers through the types of interaction we have and the fact that we do not directly bill customers. Stakeholders stressed that WPD must not run the risk of duplicating the services already offered by specific support organisations and charities, and should not directly deliver energy efficiency measures. They stated that WPD should offer a referral service to help customers to access practical support and advice. The key actions for achieving this are the provision of specialist training to customer-facing staff to help them pick up on the warning signs of fuel poverty and building and maintaining a framework of regional support agencies that can handle referrals from WPD.

2015-2023

RIIO-ED1 Business Plan

Expenditure

WESTERN POWER DISTRIBUTION

Serving the Midlands, South West and Wales

10 Expenditure

10.1 This section describes the forecast expenditure which requires to be funded through DUoS. It includes:

- the core investment on the networks and business support activities that make this possible;
- other business costs such as business rates and licence fees.

10.2 Costs incurred on network related activities that are funded by third parties are excluded.

10.3 Summary expenditure is presented in tabular form (rounded to one decimal place). Descriptions for each investment area describe the main drivers of expenditure requirements.

Summary

10.4 In total £9.6bn will be required to be funded through DUoS. £6.6bn for core expenditure and £3.0bn on other costs funded through DUoS.

10.5 The costs in the following sections are presented at 2011/12 prices. Core investment costs are shown net of any customer contributions and exclude pensions, the effect of real price effects and the effect of efficiencies. The cost of pensions, real price effects (RPE) and benefits from efficiency savings are shown separately as 'Other expenditure within the Price Control'.

Core Expenditure within the Price Control (£m at 2011/12 prices)					
	West Midlands	**East Midlands**	**South Wales**	**South West**	**WPD Total**
Maintaining the network	1,177.4	1,068.6	605.4	951.5	**3,802.9**
Reinforcing the network	206.7	256.2	56.5	111.0	**630.4**
Engineering and corporate activities	532.5	547.6	304.9	508.7	**1,893.7**
Service improvement initiatives	39.7	35.1	30.1	29.9	**134.8**
Network innovation projects	41.9	41.6	20.8	28.0	**132.3**
Total	**1,998.2**	**1,949.1**	**1,017.7**	**1,629.1**	**6,594.1**

Other Expenditure within the Price Control (£m at 2011/12 prices)					
	West Midlands	**East Midlands**	**South Wales**	**South West**	**WPD Total**
RPEs less Efficiency	57.2	55.0	29.2	46.8	**188.2**
Smart Metering	41.8	44.7	20.3	28.3	**135.1**
Rates and Licence fees	275.4	359.1	150.4	154.2	**939.1**
Transmission Charges	104.1	89.7	74.3	68.4	**336.5**
Pension Costs	347.9	311.2	292.8	414.8	**1,366.7**
Total*	**826.4**	**859.7**	**567.0**	**712.5**	**2,965.6**

*Tax is not included

WPD Total - Core costs funded through DUoS											
Costs excluding RPEs, efficiency and pensions (£m at 2011/12 prices)	**Average per year in DPCR5 (2010-2015)**	**Average per year in RIIO-ED1 (2016-2023)**	**Spend profile in RIIO ED1 (2016-2023)**								**Total RIIO-ED1 (2016-2023)**
			2015/16	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**	**2021/22**	**2022/23**	
Maintaining the network											
Inspection, maintenance and routine tree cutting	77.7	67.1	67.1	67.1	67.1	67.1	67.1	67.1	67.1	67.1	536.8
Asset Replacement	205.1	227.9	223.9	226.0	225.5	227.2	228.6	229.2	230.7	231.7	1822.8
Real Time Control Systems and Telecommunications	14.7	12.4	32.4	13.3	11.3	11.4	6.7	16.7	3.8	3.8	99.4
Diversions	24.8	33.0	35.6	36.1	34.5	34.1	30.4	30.6	31.0	31.5	263.8
Responding to and repairing faults	66.2	69.1	69.0	69.0	69.1	69.1	69.1	69.1	69.1	69.1	552.6
Purchase of Vehicles, Engineering Equipment, IT & Property	36.0	42.0	44.1	49.2	32.0	43.6	44.4	43.0	44.0	35.4	335.7
Other	12.5	24.0	28.4	29.6	30.8	21.8	21.0	20.1	20.3	19.8	191.8
TOTAL MAINTAINING THE NETWORK	**437.0**	**475.4**	**500.5**	**490.3**	**470.3**	**474.3**	**467.3**	**475.8**	**466.0**	**458.4**	**3802.9**
Reinforcing the network											
General Network Reinforcement	60.2	50.5	53.3	53.7	52.4	48.7	51.2	44.7	48.6	51.3	403.9
Reinforcement for Low Carbon Technologies	0.0	28.3	0.0	0.0	11.3	22.6	33.9	45.3	56.7	56.7	226.5
TOTAL REINFORCEMENT OF THE NETWORK	**60.2**	**78.8**	**53.3**	**53.7**	**63.7**	**71.3**	**85.1**	**90.0**	**105.3**	**108.0**	**630.4**
Engineering and Corporate Activities											
Engineering management	154.4	126.5	122.6	120.3	121.2	122.3	127.8	130.5	133.6	133.6	1011.9
Corporate activities	114.0	88.2	87.9	87.8	87.6	87.6	88.4	88.8	88.9	88.8	705.8
Workforce renewal	17.9	22.0	22.0	24.8	24.3	23.4	23.2	21.2	19.2	17.9	176.0
TOTAL MANAGING THE BUSINESS	**286.2**	**236.7**	**232.5**	**232.9**	**233.1**	**233.3**	**239.4**	**240.5**	**241.7**	**240.3**	**1893.7**
Service improvement initiatives											
Reducing power cuts	11.7	3.9	5.2	5.2	5.2	5.2	5.2	5.2	0.0	0.0	31.2
Improving network resilience to severe weather	4.7	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	63.2
Protecting equipment from flooding risk	6.0	2.1	6.0	4.2	1.3	3.2	0.5	0.6	0.4	0.4	16.6
Reducing oil and gas leaks from equipment	2.7	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	16.8
Improving service for remote ("worst served") customers	0.3	0.2	0.0	0.7	0.7	0.0	0.0	0.0	0.0	0.0	1.4
Undergrounding in National Parks and AONBs	1.3	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	5.6
TOTAL SERVICE IMPROVEMENT INITIATIVES	**26.7**	**16.9**	**21.9**	**20.8**	**17.9**	**19.1**	**16.4**	**16.5**	**11.1**	**11.1**	**134.8**
Network Innovation Projects	10.2	16.5	18.2	16.3	16.3	16.3	16.3	16.3	16.3	16.3	132.3
TOTAL CORE COSTS	**820.4**	**824.3**	**826.4**	**814.0**	**801.3**	**814.3**	**824.5**	**839.1**	**840.4**	**834.1**	**6594.1**

West Midlands - Core costs funded through DUoS											
Costs excluding RPEs, efficiency and pensions (£m at 2011/12 prices)	**Average per year in DPCR5 (2010-2015)**	**Average per year in RIIO-ED1 (2016-2023)**	**Spend profile in RIIO ED1 (2016-2023)**								**Total RIIO-ED1 (2016-2023)**
			2015/16	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**	**2021/22**	**2022/23**	
Maintaining the network											
Inspection, maintenance and routine tree cutting	27.7	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	20.1	160.8
Asset Replacement	66.9	76.7	75.5	76.4	76.1	76.7	76.9	77.0	77.1	77.5	613.2
Real Time Control Systems and Telecommunications	4.6	3.1	8.7	4.0	4.0	1.2	1.7	3.9	0.8	0.8	25.1
Diversions	9.5	9.0	9.4	9.2	9.0	8.8	8.8	8.8	8.8	8.9	71.7
Responding to and repairing faults	19.0	18.8	18.8	18.8	18.8	18.8	18.8	18.8	18.8	18.8	150.4
Purchase of Vehicles, Engineering Equipment, IT & Property	11.3	12.1	13.2	13.7	7.3	10.6	13.6	14.7	13.5	9.9	96.5
Other	2.8	7.5	8.6	8.9	9.3	6.9	6.6	6.5	6.5	6.4	59.7
TOTAL MAINTAINING THE NETWORK	**141.8**	**147.2**	**154.3**	**151.1**	**144.6**	**143.1**	**146.5**	**149.8**	**145.6**	**142.4**	**1177.4**
Reinforcement of the Network											
General Network Reinforcement	27.5	19.2	19.7	25.7	22.3	18.3	17.9	17.3	15.3	16.7	153.2
Reinforcement for Low Carbon Technologies	0.0	6.7	0.0	0.0	2.7	5.3	8.0	10.7	13.4	13.4	53.5
TOTAL REINFORCEMENT OF THE NETWORK	**27.5**	**25.8**	**19.7**	**25.7**	**25.0**	**23.6**	**25.9**	**28.0**	**28.7**	**30.1**	**206.7**
Engineering and Corporate Activities											
Engineering management	51.5	36.3	35.6	35.3	34.7	34.1	37.3	37.8	37.6	37.8	290.2
Corporate activities	41.2	26.1	25.8	25.8	25.8	25.7	26.5	26.5	26.5	26.5	209.1
Workforce renewal	3.3	4.2	3.9	4.6	4.3	4.0	4.1	4.1	4.1	4.1	33.2
TOTAL MANAGING THE BUSINESS	**96.0**	**66.6**	**65.3**	**65.7**	**64.8**	**63.8**	**67.9**	**68.4**	**68.2**	**68.4**	**532.5**
Service Improvement Initiatives											
Reducing power cuts	3.5	2.0	2.6	2.6	2.6	2.6	2.6	2.6	0.0	0.0	15.6
Improving network resilience to severe weather	0.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	16.0
Protecting equipment from flooding risk	0.6	0.2	0.1	0.1	0.1	0.6	0.1	0.1	0.1	0.1	1.3
Reducing oil and gas leaks from equipment	0.3	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	4.8
Improving service for remote ("worst served") customers	0.0	0.1	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.4
Undergrounding in National Parks and AONBs	0.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	1.6
TOTAL SERVICE IMPROVEMENT INITIATIVES	**5.7**	**5.0**	**5.5**	**5.7**	**5.7**	**6.0**	**5.5**	**5.5**	**2.9**	**2.9**	**39.7**
Network Innovation Projects	3.8	5.2	6.9	5.0	5.0	5.0	5.0	5.0	5.0	5.0	41.9
TOTAL CORE COSTS	**274.8**	**249.8**	**251.7**	**253.2**	**245.1**	**241.5**	**250.8**	**256.7**	**250.4**	**248.8**	**1998.2**

East Midlands - Core costs funded through DUoS											
Costs excluding RPEs, efficiency and pensions (£m at 2011/12 prices)	**Average per year in DPCR5 (2010-2015)**	**Average per year in RIIO-ED1 (2016-2023)**	**Spend profile in RIIO ED1 (2016-2023)**								**Total RIIO-ED1 (2016-2023)**
			2015/16	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**	**2021/22**	**2022/23**	
Maintaining the network											
Inspection, maintenance and routine tree cutting	21.0	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7	18.7	149.6
Asset Replacement	59.1	59.3	57.8	59.1	58.4	59.5	58.8	59.7	60.4	60.4	474.1
Real Time Control Systems and Telecommunications	6.4	3.3	9.0	4.1	4.1	1.3	2.0	4.0	0.9	0.9	26.3
Diversions	8.3	11.0	13.1	14.0	12.8	12.7	8.8	8.8	8.9	9.0	88.1
Responding to and repairing faults	20.8	22.2	22.2	22.2	22.2	22.2	22.2	22.2	22.2	22.2	177.6
Purchase of Vehicles, Engineering Equipment, IT & Property	11.0	11.5	10.6	11.5	8.0	11.1	13.2	12.8	14.6	10.2	92.0
Other	-0.4	7.6	8.6	9.1	9.5	7.3	6.8	6.7	6.6	6.3	60.9
TOTAL MAINTAINING THE NETWORK	**126.2**	**133.6**	**140.0**	**138.7**	**133.7**	**132.8**	**130.5**	**132.9**	**132.3**	**127.7**	**1068.6**
Reinforcement of the Network											
General Network Reinforcement	24.5	21.4	26.1	21.6	22.3	22.1	25.1	17.9	17.4	19.0	171.5
Reinforcement for Low Carbon Technologies	0.0	10.6	0.0	0.0	4.2	8.5	12.7	16.9	21.2	21.2	84.7
TOTAL REINFORCEMENT OF THE NETWORK	**24.5**	**32.0**	**26.1**	**21.6**	**26.5**	**30.6**	**37.8**	**34.8**	**38.6**	**40.2**	**256.2**
Engineering and Corporate Activities											
Engineering management	49.0	36.1	36.4	35.4	35.3	35.2	36.6	36.4	36.8	37.0	289.1
Corporate activities	38.1	27.5	27.4	27.4	27.4	27.3	27.5	27.5	27.6	27.6	219.7
Workforce renewal	3.8	4.9	5.3	5.8	5.3	4.7	4.5	4.4	4.4	4.4	38.8
TOTAL MANAGING THE BUSINESS	**90.8**	**68.5**	**69.1**	**68.6**	**68.0**	**67.2**	**68.6**	**68.3**	**68.8**	**69.0**	**547.6**
Service Improvement Initiatives											
Reducing power cuts	3.7	1.1	1.5	1.5	1.5	1.5	1.5	1.5	0.0	0.0	9.0
Improving network resilience to severe weather	0.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	14.4
Protecting equipment from flooding risk	1.7	0.6	1.4	1.4	0.7	1.2	0.1	0.1	0.1	0.1	5.1
Reducing oil and gas leaks from equipment	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	5.6
Improving service for remote ("worst served") customers	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.2
Undergrounding in National Parks and AONBs	0.4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.8
TOTAL SERVICE IMPROVEMENT INITIATIVES	**7.2**	**4.4**	**5.5**	**5.6**	**4.9**	**5.3**	**4.2**	**4.2**	**2.7**	**2.7**	**35.1**
Network Innovation Projects	4.4	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	41.6
TOTAL CORE COSTS	**253.1**	**243.6**	**245.9**	**239.7**	**238.3**	**241.1**	**246.3**	**245.4**	**247.6**	**244.8**	**1949.1**

South Wales - Core costs funded through DUoS											
Costs excluding RPEs, efficiency and pensions (£m at 2011/12 prices)	**Average per year in DPCR5 (2010-2015)**	**Average per year in RIIO-ED1 (2016-2023)**	**Spend profile in RIIO ED1 (2016-2023)**								**Total RIIO-ED1 (2016-2023)**
			2015/16	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**	**2021/22**	**2022/23**	
Maintaining the network											
Inspection, maintenance and routine tree cutting	12.0	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	89.6
Asset Replacement	30.1	37.0	35.7	36.2	36.3	36.7	37.5	37.6	37.6	38.1	295.7
Real Time Control Systems and Telecommunications	1.4	3.0	7.3	2.8	2.0	4.5	1.3	4.1	0.9	0.9	23.8
Diversions	2.9	3.8	3.9	3.8	3.7	3.6	3.7	3.8	3.9	4.0	30.4
Responding to and repairing faults	10.5	11.1	11.0	11.0	11.1	11.1	11.1	11.1	11.1	11.1	88.6
Purchase of Vehicles, Engineering Equipment, IT & Property	5.8	6.8	6.6	8.4	6.4	8.9	6.9	6.0	5.6	5.4	54.2
Other	3.5	2.9	2.6	2.7	3.0	3.0	3.1	2.8	2.9	3.0	23.1
TOTAL MAINTAINING THE NETWORK	**66.2**	**75.7**	**78.3**	**76.1**	**73.7**	**79.0**	**74.8**	**76.6**	**73.2**	**73.7**	**605.4**
Reinforcement of the Network											
General Network Reinforcement	3.9	4.8	4.1	2.6	3.3	3.4	2.7	4.5	8.9	9.0	38.5
Reinforcement for Low Carbon Technologies	0.0	2.3	0.0	0.0	0.9	1.8	2.7	3.6	4.5	4.5	18.0
TOTAL REINFORCEMENT OF THE NETWORK	**3.9**	**7.1**	**4.1**	**2.6**	**4.2**	**5.2**	**5.4**	**8.1**	**13.4**	**13.5**	**56.5**
Engineering and Corporate Activities											
Engineering management	21.7	20.1	19.7	19.0	19.0	19.6	19.3	20.5	21.7	21.6	160.4
Corporate activities	13.5	13.0	13.0	13.0	12.8	13.0	12.8	13.1	13.1	13.0	103.8
Workforce renewal	4.3	5.1	4.9	5.6	5.7	5.7	5.6	5.0	4.4	3.8	40.7
TOTAL MANAGING THE BUSINESS	**39.5**	**38.1**	**37.6**	**37.6**	**37.5**	**38.3**	**37.7**	**38.6**	**39.2**	**38.4**	**304.9**
Service Improvement Initiatives											
Reducing power cuts	2.2	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.0	0.0	3.0
Improving network resilience to severe weather	1.6	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	13.6
Protecting equipment from flooding risk	2.4	1.1	4.4	2.6	0.5	0.8	0.3	0.3	0.1	0.1	9.1
Reducing oil and gas leaks from equipment	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	3.2
Improving service for remote ("worst served") customers	0.2	0.1	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.4
Undergrounding in National Parks and AONBs	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.8
TOTAL SERVICE IMPROVEMENT INITIATIVES	**6.9**	**3.8**	**7.1**	**5.5**	**3.4**	**3.5**	**3.0**	**3.0**	**2.3**	**2.3**	**30.1**
Network Innovation Projects	1.0	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	20.8
TOTAL CORE COSTS	**117.5**	**127.2**	**129.7**	**124.4**	**121.4**	**128.6**	**123.5**	**128.9**	**130.7**	**130.5**	**1017.7**

South West - Core costs funded through DUoS											
Costs excluding RPEs, efficiency and pensions (£m at 2011/12 prices)	**Average per year in DPCR5 (2010-2015)**	**Average per year in RIIO-ED1 (2016-2023)**	**Spend profile in RIIO ED1 (2016-2023)**								**Total RIIO-ED1 (2016-2023)**
			2015/16	**2016/17**	**2017/18**	**2018/19**	**2019/20**	**2020/21**	**2021/22**	**2022/23**	
Maintaining the network											
Inspection, maintenance and routine tree cutting	17.0	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	136.8
Asset Replacement	49.0	55.0	54.9	54.3	54.7	54.3	55.4	54.9	55.6	55.7	439.8
Real Time Control Systems and Telecommunications	2.3	3.0	7.4	2.4	1.2	4.4	1.7	4.7	1.2	1.2	24.2
Diversions	4.1	9.2	9.2	9.1	9.0	9.0	9.1	9.2	9.4	9.6	73.6
Responding to and repairing faults	15.9	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	17.0	136.0
Purchase of Vehicles, Engineering Equipment, IT & Property	7.9	11.6	13.7	15.6	10.3	13.0	10.7	9.5	10.3	9.9	93.0
Other	6.6	6.0	8.6	8.9	9.0	4.6	4.5	4.1	4.3	4.1	48.1
TOTAL MAINTAINING THE NETWORK	**102.8**	**118.9**	**127.9**	**124.4**	**118.3**	**119.4**	**115.5**	**116.5**	**114.9**	**114.6**	**951.5**
Reinforcement of the Network											
General Network Reinforcement	4.3	5.1	3.4	3.8	4.5	4.9	5.5	5.0	7.0	6.6	40.7
Reinforcement for Low Carbon Technologies	0.0	8.8	0.0	0.0	3.5	7.0	10.5	14.1	17.6	17.6	70.3
TOTAL REINFORCEMENT OF THE NETWORK	**4.3**	**13.9**	**3.4**	**3.8**	**8.0**	**11.9**	**16.0**	**19.1**	**24.6**	**24.2**	**111.0**
Engineering and Corporate Activities											
Engineering management	32.2	34.0	30.9	30.6	32.2	33.4	34.6	35.8	37.5	37.2	272.2
Corporate activities	21.2	21.7	21.7	21.6	21.6	21.6	21.6	21.7	21.7	21.7	173.2
Workforce renewal	6.5	7.9	7.9	8.8	9.0	9.0	9.0	7.7	6.3	5.6	63.3
TOTAL MANAGING THE BUSINESS	**59.9**	**63.6**	**60.5**	**61.0**	**62.8**	**64.0**	**65.2**	**65.2**	**65.5**	**64.5**	**508.7**
Service Improvement Initiatives											
Reducing power cuts	2.3	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.0	0.0	3.6
Improving network resilience to severe weather	1.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	19.2
Protecting equipment from flooding risk	1.3	0.1	0.1	0.1	0.0	0.6	0.0	0.1	0.1	0.1	1.1
Reducing oil and gas leaks from equipment	1.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	3.2
Improving service for remote ("worst served") customers	0.1	0.1	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.4
Undergrounding in National Parks and AONBs	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	2.4
TOTAL SERVICE IMPROVEMENT INITIATIVES	**6.9**	**3.7**	**3.8**	**4.0**	**3.9**	**4.3**	**3.7**	**3.8**	**3.2**	**3.2**	**29.9**
Network Innovation Projects	1.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	28.0
TOTAL CORE COSTS	**174.9**	**203.6**	**199.1**	**196.7**	**196.5**	**203.1**	**203.9**	**208.1**	**211.7**	**210.0**	**1629.1**

Inspection and maintenance

10.6 The equipment used on the network normally has a long working life, with many assets being operational for over 40 years. To ensure the assets remain in a good condition for the whole of their lifetime, inspection and maintenance is used to preserve their condition.

10.7 WPD's approach to inspection and maintenance is to use periodic inspections to determine the condition of assets that informs reactive maintenance, enhanced inspections and assessment of asset health for asset replacement considerations. Routine maintenance is scheduled to limit the impact of degradation.

10.8 The annual costs of the existing inspection and maintenance programmes have reduced as a result of business efficiencies and are expected to remain broadly the same for each year of RIIO-ED1.

Inspection and maintenance expenditure (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
DPCR5 Annual Average	12.6	9.6	5.5	6.6	34.3
RIIO-ED1 Annual Average	11.5	10.9	4.9	6.5	33.8
RIIO-ED1 Total (8 years)	**92.0**	**87.2**	**39.2**	**52.0**	**270.4**

10.9 The inspection of service positions and the identification of defects are currently undertaken by suppliers when they carry out meter readings. The move to smart meters will mean that every service position will be assessed during RIIO-ED1 resulting in the removal of defective service equipment. Once the roll-out of smart meters is complete, suppliers will rely on remote reading capability and inspect service positions less frequently. We will be developing an understanding of the impact of these changes to determine whether a service position inspection programme is required in RIIO-ED2.

Tree cutting

10.10 Overhead lines are susceptible to damage from growing trees, falling trees and windborne vegetation. Climbable trees near overhead lines also pose a danger where physical contact with conductors is possible. Tree clearance is therefore carried out to reduce the risk of injury to the public and to prevent damage causing interruptions to supply.

10.11 Routine clearance is carried out to maintain distances specified within Industry Standard ENA TS 43-8 which specifies a minimum of 3 metre clearance for climbable trees and 0.8m for all others. The majority of tree cutting is a cyclical activity that clears sufficient distance from trees to maintain minimum clearance distances between cuts. Tree cutting remains the most practical and cost effective option compared to the alternatives of replacing open wire LV lines with Aerial Bundled Covered Conductor, diverting lines (assuming alternative routes can be obtained) or undergrounding.

10.12 There are backlogs of clearance in West Midlands and East Midlands which will be resolved by the end of DPCR5. Consequently the expenditure in RIIO-ED1 will reduce once the programme is solely based upon routine 5-yearly tree clearance cycles.

Routine tree clearance expenditure (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
DPCR5 Annual Average	12.8	8.6	5.5	8.7	35.6
RIIO-ED1 Annual Average	6.1	4.8	5.2	8.8	24.9
RIIO-ED1 Total (8 years)	**48.8**	**38.4**	**41.6**	**70.4**	**199.2**

Substation electricity, remote generation and dismantlement

10.13 WPD has contracts in place for the purchase of unmetered electricity consumed at substations. Forecasts assume that expenditure will continue in line with current levels; approximately £6m per annum across the group.

10.14 There are two locations within WPD where the provision of permanent standby generation is needed to provide security of supply to remote networks. In the South West the generation provides security of supply support to the Isles of Scilly and in South Wales it provides security at Tregaron where there is limited 11kV interconnection.

10.15 In limited situations assets are dismantled, permanently removed and no alternative assets are installed. This can arise where there is no longer a need for an electricity supply or where the progressive development of the network renders other parts as being unnecessary. Expenditure within this category is low within South West and South Wales at around £0.1m per year, but within the East Midlands and West Midlands, where there is more change of land usage, cost are approximately £1m per annum.

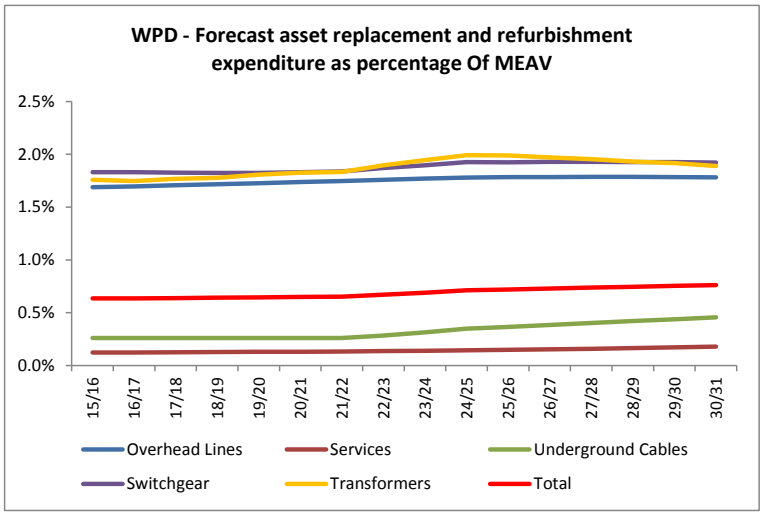
Substation electricity, remote generation and dismantlement (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
DPCR5 Annual Average	2.4	2.8	1.1	1.8	8.1
RIIO-ED1 Annual Average	2.5	3.0	1.1	1.8	8.4
RIIO-ED1 Total (8 years)	**20.0**	**24.0**	**8.8**	**14.4**	**67.2**

Asset replacement

10.16 The existing network has developed over many years with a large proportion being installed during the 1950s and 1960s. It contains many assets from different manufacturers that are designed to an evolving range of standards.

10.17 Network assets are subject to slow but progressive deterioration, influenced by atmospheric conditions, the construction of the assets, material ageing and the duty they are expected to perform. Defects can also arise, limiting their operational capability. The replacement of assets in poorest condition counteracts the effect of deterioration of the whole population and WPD replaces around 0.6% of the asset base per annum.

10.18 The chart below shows the asset replacement and refurbishment expenditure as a percentage of the modern equivalent asset value (MEAV) of the whole population. Approximately 2% of overhead lines, switchgear and transformers (which have an asset life in the order of 50 to 60 years), 0.2% of underground cables and 0.1% or services (which have asset lives in the order of 100 years) are replaced or refurbished each year during RIIO-ED1. From the start of RIIO-ED2 there is a progressive increase in cable replacement as more cable reaches the end of its life. Even so, the rate of replacement at the end of RIIO-ED2 will be equivalent to a life of 200 years because the majority would not have reached the end of life.



Replacement forecasting process

10.19 The volume of asset replacement activity is forecast using two techniques: age based survivor modelling to provide long term projections and condition based risk management (CBRM) that refines the requirements in the shorter term.

Survivor modelling

10.20 Since 2000, the industry and Ofgem have used survivor modelling to forecast future replacement volumes. Survivor modelling is a well-established statistical technique that uses the preposition that the older the asset, the greater likelihood that it is in poorer condition and hence the higher probability that the asset will need to be replaced.

10.21 It works by applying a life expectancy distribution to the age profile of the remaining (surviving) assets to determine how many assets require to be replaced. It is especially useful for providing a longer term view of how future requirements will change in relation to current activity.

10.22 It predicts that for the majority of asset categories replacement volumes will level off by the end of RIIO-ED1, except for cables where there will be an increased requirement compared to the very low current volumes of replacement.

Condition based risk management

10.23 Condition based risk management (CBRM) is an asset management approach that evaluates the risk associated with failure of assets due to their condition. It can be used to determine when the condition of an asset has deteriorated to a point that the risk associated with failure is no longer acceptable allowing a forecast of the timely replacement of assets to be developed.

10.24 CBRM uses asset health models, which make use of condition information. The condition information collected during inspection and maintenance of assets is used to define a health value for each asset. This health value is used to determine the probability of failure associated with the condition of each asset. Asset degradation assumptions within the CBRM model predict how the health value will change over time. The speed of degradation is determined by a number of different factors including the original construction of the asset, its environment and defect history. The probability of failure of an asset increases as the asset's health degrades.

10.25 The consequence of failure of each asset is different. It is determined by the number of connected customers, cost of repair and the asset's location which affects safety and environmental factors. Each asset within the CBRM model has been assessed and assigned a consequence score. This allows assets to be grouped into different consequence bands.

10.26 The risk associated with failure of assets is evaluated by combining the consequences of failure with the probability of failure relating to asset health.

10.27 Cost benefit analysis, that compares the cost of replacement against the benefit of removing future risk, defines the point at which replacement delivers optimal benefit. This process is repeated for different consequences of failure to determine a range of replacement trigger points that are translated into equivalent trigger health values. Assets with higher consequences of failure are replaced before those with lower consequence of failure.

10.28 The CBRM model applies degradation assumptions to individual assets and those reaching the appropriate trigger value for replacement form part of the replacement programme. Determining the number that reach the trigger value each year provides the overall profile of asset replacement requirements for the RIIO-ED1 period.

10.29 CBRM in combination with cost benefit analysis provides a more sophisticated assessment of replacement requirements and has enabled WPD to optimise every part of the asset replacement programme.

10.30 This modelling has been cross checked against inspection reports from site.

Replacement and refurbishment activity

Cables

10.31 The majority of underground cables continue to provide a reliable service, but there are certain problems that lead to replacement.

10.32 Consac cable, installed during the 1970s in West Midlands and South West, is an aluminium cable that is prone to faults where water ingress causes it to corrode. This low voltage cable, used to distribute power to homes and businesses, can cause repeat failures on the same piece of network creating a nuisance for customers. It is expected that volumes of replacement will remain broadly flat during RIIO-ED1.

10.33 Whilst older types of low voltage paper insulated cable provide a good service there are areas of the network where repetitive faults occur due to deterioration, historic overloading or ground disturbance. Water ingress can lead to intermittent interruptions that are difficult to locate. It is expected that volumes of replacement will remain broadly flat during RIIO-ED1.

10.34 Fluid filled cables, containing an insulating oil, pose an environmental risk when leaks occur. Whilst damage can normally be repaired, cables with deteriorated sheaths are prone to regular leaks and are replaced. Following stakeholder consultation, WPD has decided to replace the 1% of cables that have the highest leak rates.

Overhead lines

10.35 Most of the overhead network is built on wooden poles that have a finite life. Within WPD, a high priority is placed on the replacement of poor condition wooden poles to remove weak points reducing safety risks and the likelihood of failure. Overhead lines are inspected periodically and poles found in poor condition are removed from the network within a year.

10.36 Overhead towers (pylons) are prone to atmospheric corrosion (rusting) that affects the tower steelwork which is particularly aggressive near coastal regions. Routine tower painting prevents the majority of corrosion and in many instances towers can be refurbished by changing the sections of corroded steelwork. Where the corrosion is widespread or affects the main legs or cross arms the replacement of the whole tower is considered.

10.37 Overhead line conductor is susceptible to vibration and movement caused by the wind. This can lead to wear, especially at the points where it is supported. In addition corrosion occurs where aggressive atmospheric conditions exist such as salty air near the coast.

10.38 Vibration and movement can also affect the fittings used to support the conductor. Components can wear, especially when corrosion causes parts to seize.

Switchgear

10.39 Switchgear replacement programmes have been in place for a number of years and are targeted at equipment that is in poor condition, has defective components or a type that has been involved in an incident leading to an operational restriction.

10.40 Due to the significant risk of injury to staff and damage to premises should failure of switchgear occur, there is a national system, administered by the Electricity Networks Association, for reporting defects and dangerous situations. This allows sharing of knowledge so that companies can respond to issues found across the industry. This is especially

important when catastrophic failures are caused by the design of equipment or failure of a critical component, necessitating the replacement of the population.

Transformers

10.41 Ground mounted distribution transformers are robust items of plant that have limited moving parts and therefore the main problems encountered relate to external corrosion and insulation degradation caused by excessive loads or moisture ingress. Transformers will be replaced based upon condition assessments and oil test results.

10.42 The failure of higher voltage, larger transformers (supplying thousands of customers) can have a significant impact on network security. Degradation is driven by a combination of the demand placed upon transformers, the effect of moisture ingress and atmospheric corrosion of steelwork and seals. Oil testing is used to assess the internal condition and transformers are changed where tests suggest evidence of electrical discharge or significant insulation degradation.

Replacement and refurbishment expenditure

Total asset replacement expenditure (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
DPCR5 Annual Average	56.6	51.6	25.6	41.5	175.3
RIIO-ED1 Annual Average	68.9	52.6	32.4	47.3	201.2
RIIO-ED1 Total (8 years)	**551.2**	**420.5**	**259.0**	**378.4**	**1,609.1**

Total asset refurbishment expenditure (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
DPCR5 Annual Average	2.9	2.6	2.5	3.5	11.5
RIIO-ED1 Annual Average	2.9	2.4	2.2	3.0	10.5
RIIO-ED1 Total (8 years)	**23.5**	**19.5**	**17.4**	**23.8**	**84.2**

Summary volumes

Volumes of assets to be replaced in RIIO-ED1		
Asset Type	**Volume**	**Percentage of Population Removed (Average per Annum)**
Low Voltage Underground Cable	1,197	0.2%
High Voltage Underground Cables	675	0.2%
132 kV, 66 kV & 33 kV Underground Cable	268	0.8%
Overhead Line Conductor (All Voltages)	11,683	1.6%
Poles (All Voltages)	263,656	2.4%
Towers	92	0.1%
Low Voltage Switchgear	12,729	1.3%
HV Pole Mounted Switchgear	6,333	1.3%
HV Ground Mounted Switchgear	14,655	1.9%
132 kV, 66 kV & 33 kV Switchgear	3,962	2.8%
HV Pole Mounted Transformers	16,290	1.6%
HV Ground Mounted Transformers	5,998	1.3%
132 kV, 66 kV & 33 kV Transformers	387	1.9%
Low Voltage Services	194,898	0.3%

Buildings and civil structures

10.43 It is important that substation buildings, sites and fences remain in good condition and secure to protect network assets and provide a safe working environment for staff. Substations will be refurbished where defects are found.

10.44 Cable bridges are used to cross waterways, especially in the Midlands where there is an extensive network of canals in Birmingham and the Black Country. Many of these structures are constructed from lattice steelwork, with external cladding and they can carry several cables. Where necessary steelwork will be replaced or refurbished to ensure they remain secure.

Civil works expenditure (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
DPCR5 Annual Average	7.4	4.9	2.0	4.0	18.3
RIIO-ED1 Annual Average	4.8	4.3	2.4	4.7	16.2
RIIO-ED1 Total (8 years)	**38.5**	**34.1**	**19.3**	**37.6**	**129.5**

Real time control systems and telecommunications (Operational IT&T)

10.45 WPD uses a dedicated communication infrastructure to monitor the loads flowing through the electricity network, understand its operational state and remotely control devices. This operational IT&T system consists of three elements:

- the devices installed at substations that collect information locally and link to the communications network;
- the communication infrastructure that carries the data between the substations and central control rooms;
- the control centre hardware that collates the information and allows engineers to control the network in real-time.

10.46 The proposed expenditure will maintain the integrity of systems, whilst incorporating necessary network expansion and improving reliability and security.

Substation devices

10.47 The electronic devices used to connect remote sites to the communications network are collectively known as Remote Terminal Units (RTUs). They have a life expectancy of around 15 years and since an extensive replacement programme across West Midlands and East Midlands was completed in 2012 no further expenditure will be required until RIIO-ED2 in these areas. The replacement of RTUs in the South West and South Wales will be carried out over a five year period between 2014 and 2018, with the programme being completed by the third year of RIIO-ED1.

Communications infrastructure and 'Cyber-security'

10.48 WPD has developed its own internally managed telecommunications infrastructure for operational data communication. This approach is cost effective, reliable and more resilient when compared to third party providers.

10.49 The infrastructure comprises scanning radio that transmits data from radio transmitters located remotely on a range of network assets to base-stations located at major substations. Microwave and fibre optic communications then transfers the data between the base-stations and our control centres.

10.50 Within West Midlands and East Midlands, mobile phone GPRS technology is currently used to communicate with remote devices. GPRS communication does not provide sufficient reliability and is not fully secure, with the potential for third party interference.

10.51 GPRS devices will reach the end of their life through the RIIO-ED1 period and at this point they will be replaced with our standard scanning radio network to create a more secure common platform across the whole of the WPD network.

10.52 In addition many of the existing scanning radio system transmit data on unlicenced channels. Other users can broadcast on the same frequencies and cause interference leading to failures in the communication of data. Where this occurs licenced solutions will be installed to provide exclusive use of channels.

10.53 To further enhance security we will apply additional data signal encryption to limit the potential for third party interference in our network.

Control centre hardware and software

10.54 Due to its strategic importance, the hardware used for the WPD control system is upgraded every five years to take advantage of technological developments in processing speed and capability. It is anticipated that the next generation of hardware will allow continuous calculation of network parameters such as dynamic load flows and fault levels, which will set the foundation for smarter network operational control.

10.55 Software is regularly updated to take advantage of improvements to functionality. These advances are predominantly driven by WPD and each extension to functionality is subject to revised licencing charges. The cost forecasts are in line with previous developments carried out over the last 10 years.

Foundation for smart grids

10.56 In the 'General Network Reinforcement' section of our plan we refer to using a model (Transform) to assist in understanding the investment needs mainly driven by the expected growth in LCTs. As part of its output, this model assesses enabler technologies, such as data communication and analysis systems, needed to support the development of a smart grid.

10.57 The majority of communication technologies that the Transform model identifies are local monitoring and control systems. The costs of these local control systems are included in the load related expenditure.

10.58 The communication between these local control schemes and central control centres will require additional communications infrastructure which is forecast to cost around £5m over the RIIO-ED1 period.

Expenditure summary

Operational IT&T expenditure (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
DPCR5 Annual Average	4.6	6.4	1.4	2.3	14.7
RIIO-ED1 Annual Average	3.1	3.3	3.0	3.0	12.4
RIIO-ED1 Total (8 years)	**25.1**	**26.3**	**23.8**	**24.2**	**99.4**

Diversions and conversion of Wayleaves to Easements

10.59 WPD requires agreements with property owners when assets are installed on private land. Wayleave agreements are used in most cases due to the lower costs involved. Wayleaves are licences that pay landowners an annual rental, but they have the drawback that they can be terminated at the request of the landowner. Easements are permanent rights of way that remain in place even if the land is sold.

Diversions due to Wayleave terminations

10.60 Diversions arise when landowners request that assets are moved. This may be for reasons such as to facilitate a house extension or for the development of land. They can also arise when large infrastructure upgrades take place such as the electrification of the Paddington to Swansea railway.

Conversion of Wayleaves to Easements and injurious affections

10.61 In some cases, diversions can be very expensive and so WPD negotiates to keep the existing routes. When a permanent right of way is required, WPD will negotiate a payment in exchange for the conversion of a Wayleave to an Easement.

10.62 Whilst WPD aims to minimise expenditure, the value of compensation claims can be very high. In these cases statutory powers are used to establish a reasonable settlement.

10.63 Over the last 10 years, a number of compensation agents have established themselves, specialising in injurious affection compensation due to overhead electricity lines affecting property prices. Landowners or their agents submit a Wayleave termination together with an offer to negotiate a permanent Easement. Each claim is rigorously challenged but the settlement of cases across the industry has inevitably established a value for injurious affection payments.

10.64 The expenditure forecast and activity volumes reflect historic trends.

Summary expenditure

Diversions and conversion of Wayleaves to Easements (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
DPCR5 Annual Average	9.5	8.3	2.9	4.1	24.8
RIIO-ED1 Annual Average	9.0	11.0	3.8	9.2	33.0
RIIO-ED1 Total (8 years)	**71.7**	**88.1**	**30.4**	**73.6**	**263.8**

Responding to and repairing faults

10.65 Trouble call is the name used to describe the activity for the response to reported issues and resolution of faults. This includes incidents that cause customers to go off supply (and are incentivised under the Interruptions Incentive Scheme (IIS)) or occurrences not incentivised (ONIs) where customers are not off supply, such as reports of flashing requiring investigation, call outs to reports of potential break-ins to substations, falling trees that might be near our equipment, gates or access doors being damaged. Both IIS and ONI type faults require some form of urgent response.

10.66 When faults happen, the priority is the restoration of supply so that customers experience minimal inconvenience. Where appropriate, generators and temporary arrangements are provided to restore supplies when a quick repair is not possible.

10.67 The extensive nature of the network means that there are around 50,000 incidents each year affecting customer supplies and a further 80,000 ONIs where some form of site visit is required. The costs of this response and the associated repairs to the network are shown below.

Responding to and repairing faults expenditure (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
DPCR5 Annual Average	19.0	20.8	10.6	16.0	66.4
RIIO-ED1 Annual Average	18.8	22.2	11.1	17.0	69.1
RIIO-ED1 Total (8 years)	**150.4**	**177.6**	**88.6**	**136.0**	**552.6**

Purchase of vehicles, engineering equipment, IT and property

10.68 Non-operational capital relates to expenditure on new and replacement assets that are not network assets. During RIIO-ED1, WPD will refurbish some existing offices and purchase new operational vehicles, tools and IT systems.

Vehicle purchases

10.69 WPD requires a fleet of vehicles and plant to access and maintain the electricity distribution network. Historically in the West Midlands and East Midlands vehicles have been leased, but in South Wales and South West vehicles have been purchased. During DPCR5 and RIIO-ED1 vehicles in the Midlands will be progressively replaced with purchased items as the leases expire; this means that there will be a migration of costs from vehicle leases to vehicle purchase during RIIO-ED1.

10.70 The table below shows the cost of vehicle purchases. The cost of vehicle leasing is included within 'Vehicle leases, maintenance and servicing' in the 'Engineering Management' expenditure section.

Vehicle purchase expenditure (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
DPCR5 Annual Average	5.3	4.4	1.7	2.4	13.8
RIIO-ED1 Annual Average	4.0	3.4	2.5	4.4	14.3
RIIO-ED1 Total (8 years)	**31.6**	**26.9**	**20.1**	**35.4**	**114.0**

Tools and equipment

10.71 Craft and engineering staff require equipment to work on the network assets. Since these tools and equipment are used for work on the network the costs have been rolled forward in proportion to the changes in the work programme.

Tools and equipment expenditure (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
DPCR5 Annual Average	2.5	3.0	1.6	2.2	9.3
RIIO-ED1 Annual Average	3.1	3.1	1.7	2.6	10.5
RIIO-ED1 Total (8 years)	**24.7**	**24.8**	**13.2**	**20.8**	**83.5**

IT and telecoms

10.72 Reliable computer infrastructure is critical to allow staff to carry out their duties and during RIIO-ED1 we will be making improvements to both IT and Telecoms systems.

10.73 Computer systems continue to evolve providing improvements to functionality and faster processing of data. Servers, computers and printers are refreshed every 4-5 years to ensure devices remain reliable and take advantage of developments in technology.

10.74 The introduction of more mobile working throughout the company will lead to increased use of laptops and handheld devices for data collection and management of work.

10.75 The data communications network will be updated to meet the demand for an increasingly resilient, reliable, high bandwidth, low latency network to meet business needs for high volumes of data traffic - driven by smart metering, smart grids, mapping data, scanned images, graphics, pictures and video.

10.76 Modern telephony networks are predominantly operated using internet protocol allowing data and voice calls to use the same network. The system used in the South Wales and South West uses a more mature digital exchange platform and will therefore be converted to internet protocol in RIIO-ED1.

10.77 The implementation of in-house developed systems will be considered when "off the shelf solutions" are not available to meet business needs or where WPD can gain business advantage by building a tailor-made system. This allows systems to be quickly updated with additional functionality to cater for new outputs, measures and performance indicators.

10.78 The cost of the day-to-day operation of the IT and telecoms activity is included within 'Running costs for existing IT and telecoms' in the 'Corporate Activities' expenditure section.

IT & telecoms expenditure (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
DPCR5 Annual Average	2.7	2.7	1.8	2.4	9.6
RIIO-ED1 Annual Average	4.6	4.6	2.3	3.8	15.3
RIIO-ED1 Total (8 years)	**36.6**	**36.7**	**18.4**	**30.7**	**122.4**

Non-operational property

10.79 Non-operational property relates to premises used by people (e.g. depot and offices). There are no plans to purchase any new properties, but £2m per annum will be spent on improvements and refurbishments to some buildings. The majority of expenditure will be in the South West where there are many older properties that have not been refurbished.

10.80 The cost of routine management of non-operational property is included within 'Property management and maintenance' in the 'Corporate Activities' expenditure section.

Non-operational Property Expenditure (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
DPCR5 Annual Average	0.7	0.8	0.7	0.9	3.1
RIIO-ED1 Annual Average	0.5	0.5	0.3	0.8	2.1
RIIO-ED1 Total (8 years)	**3.6**	**3.6**	**2.5**	**6.1**	**15.8**

Black Start

10.81 Whilst extremely rare, over the last decade, a number of blackouts across the world (in the USA, Europe and across India) have highlighted that very widespread supply interruptions can occur. Events can be triggered by a coincidence of circumstances, which due to network running arrangements cause disconnection of customers to cascade as each alternative network reacts to the situation. Recovery from the blackout - a 'Black Start' - can take a number of days as generation stations return online and network loads are balanced with the output of generation.

10.82 The electricity industry has developed a standard which requires major substations to have the resilience to remain operational for 72 hours. The main consideration is the length of time that control, communication and protection batteries will last.

10.83 WPD proposes to make all substation battery systems at major substations resilient to 72 hours. This shall be achieved by increasing the capacity of telecommunications batteries and installing load disconnection schemes to manage the drain on batteries used for tripping of switchgear and protection.

Black Start expenditure (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
DPCR5 Annual Average	-	-	-	-	-
RIIO-ED1 Annual Average	0.4	0.7	0.3	0.5	1.9
RIIO-ED1 Total (8 years)	**3.4**	**5.8**	**2.1**	**3.8**	**15.1**

Critical National Infrastructure Security

10.84 WPD works with the security services and the Centre for the Protection of the National Infrastructure (CPNI) to take even more stringent security measures at sites which are key to the UK. The assessments consider the number of customers connected to a specific site, its criticality to the network in general or its role in supporting key installations or customers. When a site is defined as being part of the CPNI list, additional security works are undertaken to increase the protection of the site.

10.85 The measures include the installation of enhanced and electrified fences, alarm systems and CCTV systems. Expenditure expectations are forecast to be £5m with costs being recovered once work is completed.

Compliance with ESQCR Regulation 18

10.86 Regulation 18 of the Electricity Safety, Quality and Continuity Regulations (ESQCR) 2002 specifically deals with the clearance of overhead lines to structures. New overhead lines are designed to be clear of buildings and other obstacles to reduce the risk of inadvertent contact. Where existing lines are close to buildings, the regulations require that lines are modified to remove the risk.

10.87 WPD has identified the locations where work is required and the majority of the programme will be completed in DPCR5, but there will be part of the programme in the South West that will continue into RIIO-ED1.

ESQCR horizontal clearance expenditure (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
DPCR5 Annual Average	2.0	1.2	1.0	4.2	8.4
RIIO-ED1 Annual Average	-	-	-	1.8	1.8
RIIO-ED1 Total (8 years)	**-**	**-**	**-**	**14.1**	**14.1**

Overhead line clearance to ground

10.88 The ESQCR specifies ground clearance requirements for overhead lines that span across roads. This is to ensure that vehicles passing under the lines have sufficient clearance without the risk of snagging the lines.

10.89 Advances in line height measurements techniques now allow staff to measure the height of road crossings from the side of the road. These new instruments have identified that around 20% of road crossings, mainly overhead services, are non-compliant with clearance requirements.

10.90 Overhead lines that do not meet the requirements will be rebuilt to increase the height across roads. This will require taller poles and overhead line re-conductoring.

10.91 The work to correct any shortcomings will carry on throughout DPCR5, but there will be requirement to continue into RIIO-ED1. The following table shows the costs specifically for this activity. These costs are included in the overall legal and safety costs.

Legal and safety – overhead Line clearance to ground expenditure (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
DPCR5 Annual Average	1.0	0.6	0.5	1.0	3.1
RIIO-ED1 Annual Average	1.8	1.5	1.2	2.4	6.9
RIIO-ED1 Total (8 years)	**15.0**	**12.2**	**9.8**	**19.5**	**56.5**

Substation security

10.92 WPD has legal obligations to operate its distribution networks in a safe and reliable manner. In addition to the protection of the general public from dangers of electricity and the reduction of the risk of personal injury to staff there is also a heightened requirement to ensure sites and assets are secure to prevent third party trespassing, vandalism and theft.

10.93 Whilst it is virtually impossible to prevent access by a determined thief, improved deterrent measures are required to deter unauthorised access and to make it more difficult.

10.94 At larger substations, around £18m will be investment on intruder alarms and security specification doors, with CCTV being added to higher risk sites and electric fences being added to very high risk sites. In addition £0.8m will be invested on applying innovative tagging and identification systems allowing stolen equipment to be traced and help to distribution assets to deter theft.

Metal theft remedial actions

10.95 Significant increases in the prices of commodities such as copper and aluminium, have resulted in increased incidence of theft, especially that of copper low voltage overhead lines and earthing conductors located within primary and distribution substations.

10.96 WPD has been proactively working with police forces to assist in crime prevention. We have provided guidance to improve the identification of recovered stolen materials and facilitated meetings with neighbouring forces to ensure that intelligence is shared across police area boundaries. Whilst this has led to a number of arrests and prosecutions, theft continues to be a problem.

10.97 In addition to safety risks the consequences of theft are the need for remedial works to replace the stolen assets, repairs to damaged fences and doors, interruptions to supply and inconvenience for customers. It is forecast that £11m of expenditure will be required to deal with the remedial work as a result of theft.

Total legal and safety expenditure

10.98 In addition to ground clearance and security work there are a range of investments proposed for safety and legal reasons including dealing with asbestos and fire protection. The total expenditure is shown below.

Legal and safety expenditure (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
DPCR5 Annual Average	2.2	2.5	1.5	1.2	7.4
RIIO-ED1 Annual Average	3.7	3.7	1.5	2.7	11.6
RIIO-ED1 Total (8 years)	**29.9**	**29.8**	**12.0**	**21.6**	**93.3**

BT 21st Century (BT 21 CN)

10.99 WPD rents a number of telecommunication circuits from BT which are used for protection and SCADA. Dedicated circuits have been used to provide fast fault clearance times to maintain the stability of the transmission system, distribution networks and connected generators.

10.100 BT is in the process of converting its existing network to an internet protocol system known as BT 21st Century Network (BT 21 CN). Since the communication path is not determined, there could be time delays which may cause electricity distribution network protection systems to function incorrectly.

10.101 WPD proposes to replace all telecommunication circuits affected by BT 21 CN with circuits owned and operated by WPD's own telecommunication company, Surf Telecom. Three generic solutions have been proposed using fibre optic, microwave and UHF radio. It is proposed that all work will be completed in South Wales and South West by the end of DPCR5, with work on 75 protection and 200 SCADA circuits in West Midlands and East Midlands being carried out during RIIO-ED1.

BT 21 CN expenditure (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
DPCR5 Annual Average	1.1	2.3	0.8	0.2	4.4
RIIO-ED1 Annual Average	0.9	0.9	-	-	1.8
RIIO-ED1 Total (8 years)	**7.5**	**7.5**	**-**	**-**	**15.0**

Customer specific reinforcement

10.102 Customers who require an electricity supply to domestic or business properties or wish to export the power from a distributed generator, need to obtain a connection to the network.

10.103 Connection costs are subdivided into two categories that are treated differently. The assets installed exclusively for the connection are called 'sole user' assets and since the customer funds these they are treated as being outside the price control. In some cases there is a requirement to increase the capacity of the existing network to enable the connection to be made. This customer specific reinforcement is part funded by the customer and part funded through DUoS income and is therefore assessed under the price control process.

10.104 The expenditure described in this section relates to customer specific reinforcement.

Connection volumes

10.105 Data collected by Oxford Economics on housing stock projections by local authorities has been used to forecast future volumes of connections.

10.106 Whilst the projections show relatively consistent growth across all four areas, we have reduced the growth rates for most markets segments up to 2017 to represent slow recovery from recession.

10.107 WPD forecasts assume that the most buoyant market will be medium sized housing developments that generate cash flow quickly for developers. There will be some growth in larger schemes as market confidence returns, but this is assumed to be at half the rate of the Oxford Economics data up to 2017. Commercial and industrial developments will continue but volumes will be flat until 2017.

10.108 It is anticipated that distributed generation will continue to grow, influenced by the availability of financial incentives such as the Feed-in-Tariff. The only exception is onshore wind generation where volumes are predicted to fall away as the number of suitable locations reduces.

Market share changes

10.109 Third party connection providers are most active in market segments where there are larger domestic housing estates, commercial developments or distributed generators. This means that third parties carry out fewer projects, but provide a large proportion of connections to properties. It is anticipated that third parties will continue to grow their market share in the majority of market segments, but WPD expects to retain market share in West Midlands and gain back some market share in East Midlands for large schemes, as a consequence of lower prices due to efficiency savings resulting from the takeover by WPD.

10.110 As an example, within the forecast for the market segment for low voltage connections with high voltage work (LVHV) the following market share changes have been assumed.

Proportion of LVHV demand connection projects carried out by third parties (2012 to 2023)				
Market Segment	**West Midlands**	**East Midlands**	**South Wales**	**South West**
LVHV	Held at 15%	Reduction from 25% to 20%	Increase from 1% to 10%	Increase from 1% to 12%

Impact of Low Carbon Technology

10.111 As customers adopt more Low Carbon Technologies and the associated load growth uses up existing network capacity, more future connection projects will require the existing network to be reinforced. The cost forecasts assume that the percentage of projects requiring reinforcement grows by 0.25% per annum for low voltage connections with only low voltage work and 0.5% per annum for low voltage connections requiring high voltage work. It is assumed that there is no impact for higher voltage connections.

Extending the scope of contestable works

10.112 The promotion of competition in connections has led to customers having a choice for the provision of certain parts of a connection. WPD has been working with third party providers to extend the scope of what third parties can do and will continue to develop processes to allow further expansion of contestable works. This will include allowing third parties to work on the existing network to complete final connections and the customer specific reinforcement. It has been assumed that by the end of RIIO-ED1 the majority of reinforcement work at LV and HV will be contestable and third parties will have the opportunity to carry out the reinforcement in addition to installing assets specifically for the new connections.

Customer specific reinforcement expenditure forecast

10.113 The costs of customer specific reinforcement are subdivided into two main components:

- Customer funded reinforcement (where the customer pays for their proportion of any additional capacity provided upstream of the connection)
- DUoS funded reinforcement (where WPD receives an allowance through the price control mechanism to cover the costs of the remaining proportion of upstream reinforcement).

Customer specific reinforcement 2015/16 to 2022/23 (£m)					
	West Midlands	East Midlands	South Wales	South West	Total
Customer funded reinforcement	13.3	16.6	8.3	9.2	47.4
DUoS funded reinforcement	18.9	17.8	9.0	8.6	54.3

General network reinforcement

Introduction

10.114 The statutory requirements for the amount of capacity that must be provided to meet demand are driven by our Licence (requiring compliance with a National Standard on Security of Supply – P2/6) and the Electricity Supply, Quality and Continuity Regulations (ESQCR) which encompass requirements on adequacy of equipment, voltage levels, disturbing loads etc. Whilst temporary relief (derogations) from P2/6 can be applied for, our business processes are designed to avoid the need for these wherever possible.

10.115 The following sections provide an overview of the expenditure in these areas both under our 'best view' of the future and some alternative scenarios developed by the Department of Environment and Climate Change (DECC) which have been regionalised by the research company EA Technology.

Drivers

10.116 The UK targets for reducing carbon dioxide emissions require a reduction of 80% by 2050. This target will be met through the decarbonisation of heating and transport, improvements in energy efficiency and producing electricity from renewable sources. The Government has set out, in its Carbon Plan, potential pathways (scenarios) to put the UK on track to halve greenhouse gas emissions, on 1990 levels, by the mid-2020s and on a path towards the 80% reduction by 2050. The impact of this on our networks is significant.

10.117 The drivers of changes to the demand on the network and hence load related investment are:

- the impact of energy efficiency improvements and demand side response (enabled by the roll out of smart meters);
- the number of new connections (generally around 1% per annum);
- the potential impact of customers installing LCTs;
- continuing growth in larger scale generation (generally solar, wind, biomass and waste incineration but the potential for Combined Heat and Power).

Impact of Low Carbon Technologies

10.118 We have used a model called 'Transform', developed by EA Technology for the DECC/Ofgem led Smart Grid Forum, to forecast the level of expenditure required to accommodate LCTs.

10.119 DECC has produced national scenarios of the uptake of LCTs necessary to meet the Carbon Plan. EA Technology has regionalised these scenarios to determine the volumes in each distribution licence area. The EA Technology scenarios assume that installations of heat pumps and electric vehicles will group together 'cluster' in the same manner as the adoption of solar panels.

10.120 WPD's best view case is based on the results of work commission by WPD and undertaken with the CSE in Bristol. This work has derived the likely volume of LCTs and provided a more detailed view of the way LCTs will cluster on the network and drive investment. This data has been used within the Transform model to determine the level of investment.

10.121 The following tables compare the volumes of different LCTs in the Best View case against the EA Technology regionalised DECC forecasts.

CSE – 'On our wires project'

CSE have developed a Housing Assessment Model that analyses housing stock at individual property level, using data on the size of property, built form and wall type (solid or cavity).

From this, CSE have assessed the order in which we can expect groups of like property types to install heat pumps and PV.

Electric vehicle potential uptake has been assessed by CSE using socio-demographic groupings, urban/ not urban locations together with location in local authority areas which already have some electric vehicles.

Cumulative number of retro fit domestic heat pumps at the end of RIIO-ED1				
	WPD 'Best View' based on CSE data	**Regionalised DECC LOW case**	**Regionalised DECC MEDIUM case**	**Regionalised DECC HIGH case**
West Midlands	53,683	39,403	105,300	100,579
East Midlands	50,708	47,136	127,152	121,426
South Wales	19,492	78,596	158,996	152,895
South West	72,162	27,074	71,647	68,454

Cumulative number of retro fit PV installations at the end of RIIO-ED1				
	WPD 'Best View' based on CSE data	**Regionalised DECC LOW case**	**Regionalised DECC MEDIUM case**	**Regionalised DECC HIGH case**
West Midlands	135,909	120,608	268,268	467,825
East Midlands	191,506	129,028	291,320	510,403
South Wales	54,234	51,645	117,396	206,455
South West	225,281	106,608	221,373	372,558

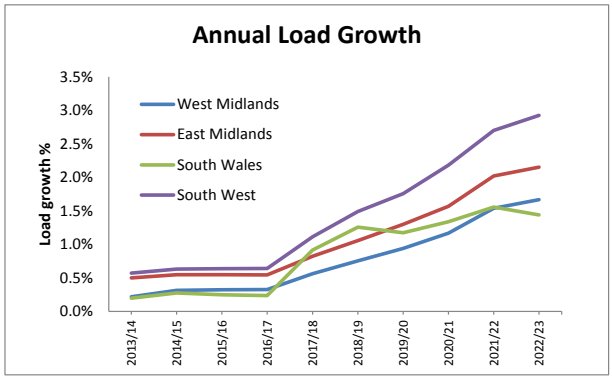
Cumulative number of electric vehicles charged at existing premises at the end of RIIO-ED1				
	WPD 'Best View' based on CSE data	**Regionalised DECC LOW case**	**Regionalised DECC MEDIUM case**	**Regionalised DECC HIGH case**
West Midlands	66,761	103,703	184,773	277,613
East Midlands	77,022	114,022	199,862	305,241
South Wales	28,887	35,420	62,084	94,819
South West	45,014	77,581	135,989	207,688

10.122 Where the LCTs will be connected and how close together the connections are has a major impact on the network. The 'clustering' assumption used in the Transform model is therefore important as the resulting investment need is very sensitive to this assumption. Knowledge of this sensitivity was a key driver to undertaking the detailed analysis with CSE. The results of the CSE work indicate that clustering will be very high.

10.123 There is significant uncertainty around the take up of LCTs. The uncertainty section of our plan contains further details of the overall load related reopener that we require to protect both shareholders and customers from either a significantly higher or lower level of investment in this area.

Forecasting overall load growth and expenditure

10.124 The Transform model has been used to derive annual load growth rates. The chart shows that the rate of load growth increases steadily during the RIIO-ED1 period.



10.125 This load growth incorporates LCTs in new properties, the retro-fitting of LCTs and energy efficiency as shown in the tables below:

West Midlands	Annual Load Growth %									
	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
Energy Efficiency	-0.49%	-0.42%	-0.42%	-0.42%	-0.43%	-0.43%	-0.43%	-0.43%	-0.20%	-0.20%
New Build with LCTs	0.58%	0.58%	0.58%	0.58%	0.65%	0.72%	0.74%	0.82%	0.87%	0.89%
Retro Fit LCTs	0.17%	0.17%	0.18%	0.18%	0.36%	0.51%	0.68%	0.85%	0.96%	1.09%
Combined Growth	**0.22%**	**0.31%**	**0.32%**	**0.32%**	**0.56%**	**0.75%**	**0.94%**	**1.17%**	**1.54%**	**1.67%**

East Midlands	Annual Load Growth %									
	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
Energy Efficiency	-0.57%	-0.52%	-0.52%	-0.53%	-0.53%	-0.53%	-0.54%	-0.50%	-0.22%	-0.23%
New Build with LCTs	0.86%	0.85%	0.85%	0.85%	0.96%	1.05%	1.08%	1.19%	1.27%	1.29%
Retro Fit LCTs	0.22%	0.23%	0.24%	0.24%	0.42%	0.56%	0.79%	0.96%	1.08%	1.21%
Combined Growth	**0.50%**	**0.55%**	**0.55%**	**0.54%**	**0.82%**	**1.06%**	**1.30%**	**1.57%**	**2.02%**	**2.15%**

South Wales	Annual Load Growth %									
	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
Energy Efficiency	-0.62%	-0.53%	-0.53%	-0.53%	-0.54%	-0.54%	-0.54%	-0.55%	-0.27%	-0.27%
New Build with LCTs	0.66%	0.64%	0.62%	0.60%	1.08%	1.30%	1.14%	1.24%	1.19%	1.08%
Retro Fit LCTs	0.15%	0.16%	0.16%	0.16%	0.36%	0.48%	0.56%	0.63%	0.64%	0.65%
Combined Growth	**0.20%**	**0.28%**	**0.25%**	**0.23%**	**0.92%**	**1.26%**	**1.17%**	**1.34%**	**1.56%**	**1.44%**

South West	Annual Load Growth %									
	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
Energy Efficiency	-0.54%	-0.48%	-0.45%	-0.43%	-0.43%	-0.43%	-0.44%	-0.44%	-0.21%	-0.21%
New Build with LCTs	0.89%	0.89%	0.89%	0.89%	1.00%	1.10%	1.16%	1.28%	1.37%	1.39%
Retro Fit LCTs	0.23%	0.24%	0.25%	0.25%	0.63%	0.93%	1.15%	1.49%	1.71%	1.95%
Combined Growth	**0.57%**	**0.63%**	**0.64%**	**0.64%**	**1.11%**	**1.49%**	**1.76%**	**2.18%**	**2.70%**	**2.93%**

Note that individual growth rates do not summate to give precise combined rate because of interaction of these within the Transform modelling.

10.126 The elements of load growth and their inputs have been cross-checked against other sources. For example the levels of energy efficiency have been checked against The Carbon Plan, and new housing additions against Oxford Economics dwelling stock forecasts and each regions recent historic connection rates.

10.127 The Transform model has been used to generate secondary network requirements and provide the underlying growth rates at the primary network level. Therefore consistent growth forecasts have been applied across all voltage levels. The primary network requirements have been further adjusted for significant localised impacts of known developments.

10.128 The generic networks and typical loading characteristics within the Transform model make it inappropriate for the identification of specific EHV network requirements. As such, only the LV and HV elements have been taken from this model, with EHV requirements identified from detailed network analysis. The requirements identified have been adjusted to account for the use of smart solutions at EHV.

Primary network reinforcement requirements

10.129 As described above, investment in the EHV network has been separately assessed to take account of the changes in demand from the growth in connection of LCTs, new connections, generation, and the impact of energy efficiency and expected demand side response.

10.130 This results in expected reinforcement investment at EHV as follows:

EHV reinforcement expenditure (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
DPCR5 Annual Average	20.8	18.7	2.2	2.3	44.0
RIIO-ED1 Annual Average	13.2	13.6	3.2	3.3	33.3
RIIO-ED1 Total (8 years)	**105.8**	**108.6**	**25.5**	**26.2**	**266.1**

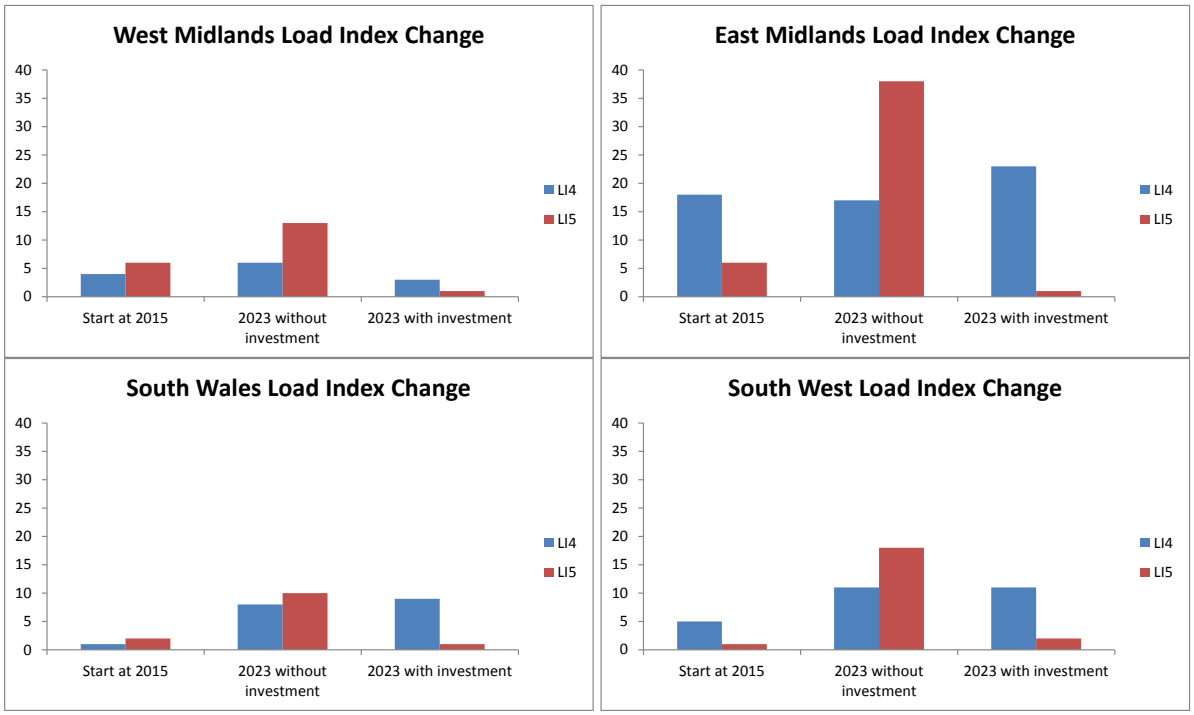
10.131 The difference in the amount of investment between our four licenced areas is partly due to the differing sizes of the networks and also due to the forecast starting loads on the networks (as highlighted by the differing starting Load Indices (LIs) – see below) and the higher volumes of specific development areas within the two Midlands areas.

10.132 Load Indices are a measure introduced in DPCR5 to provide an indication of the level of primary substation loading risk within the following general definitions:

LI rank	Definition
LI1	Significant spare capacity
LI2	Adequate spare capacity
LI3	Highly utilised
LI4	Fully utilised, mitigation requires consideration
LI5	Fully utilised, mitigation required

10.133 Using consistent LI thresholds, the starting LIs and expected movement during the RIIO-ED1 period is as follows:

Load Index change over the RIIO-ED1 period						
	Start 2015		2023 Without Investment		2023 With Investment	
	LI4	LI5	LI4	LI5	LI4	LI5
West Midlands	4	6	6	13	3	1
East Midlands	18	6	17	38	23	1
South Wales	1	2	8	10	9	1
South West	5	1	11	18	11	2



Secondary network reinforcement requirements

10.134 Historically, investment in the reinforcement of HV and LV networks has been low as they were generally built with sufficient capacity to accommodate the changing use of electricity. The main driver of reinforcement investment at these voltage levels during RIIO-ED1 and beyond is the expected growth in LCTs being 'retrofitted' in existing properties. A detailed assessment of the output from the Transform model together with assessment of the data provided as part of the CSE work and underlying trends has been used to derive our forecasts.

10.135 This results in expected reinforcement expenditure at LV and HV for traditional and LCT related reinforcement as follows:

Total LV reinforcement expenditure (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
DPCR5 Annual Average	0.8	0.9	0.4	0.5	2.6
RIIO-ED1 Annual Average	5.7	8.4	2.0	6.7	22.8
RIIO-ED1 Total (8 years)	**45.4**	**67.2**	**16.3**	**53.5**	**182.3**

Total HV reinforcement expenditure (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
DPCR5 Annual Average	2.6	3.2	1.0	1.1	7.9
RIIO-ED1 Annual Average	4.8	6.8	1.7	3.7	17.0
RIIO-ED1 Total (8 years)	**38.7**	**54.3**	**13.2**	**29.3**	**135.6**

10.136 We have also used the Transform model to assess the alternative levels of expenditure needed for LCT related reinforcement to deliver the different DECC Carbon Plan scenarios as regionalised by EA Technology. Comparison of the results, for LV and HV networks, is shown in the table below:

LV & HV LCT related reinforcement expenditure 2015/16 to 2022/23 – Comparison of WPD Best View and DECC scenarios (£m at 2011/12 prices)					
	WPD 'Best View' Forecast	**Scenario 1 – high emissions abatement in heat provision**	**Scenario 2 – high emission abatement in transport**	**Scenario 3 – high electrification of heat and transport provision**	**Scenario 4 – International Carbon Credit purchases needed to meet targets**
West Midlands	53.5	60.1	74.3	82.1	4.8
East Midlands	84.7	117.3	116.3	127.6	23.7
South Wales	18.0	95.5	92.7	97.9	11.9
South West	70.3	49.5	44.6	51.4	3.4
Total	**226.5**	**322.4**	**327.9**	**359.0**	**43.8**

(Note: the DECC forecasts are based on the clustering pattern currently seen from the uptake of small scale PV whereas the WPD Best View is based on a more clustered approach following the work undertaken by CSE. If the DECC forecast were to use the higher CSE clustering then the investment levels would be much higher):

10.137 The Transform model utilises 'smart' solutions for reinforcement wherever they are a lower cost than 'conventional' solutions which generally add additional assets or replace them with higher capacity ones.

10.138 The 'Uncertainty' section describes how both customers and shareholders are protected from significant errors in the assumptions about the volume or cost of reinforcement needed over the RIIO-ED1 period.

10.139 We will further develop the CSE data together with other information we have on system loads, including the data that will become available via smart meters to develop an LCT 'hotspot' indicator for our network designers.

Fault level capability

10.140 Certain faults that occur on the network can allow very high current to flow until the network is switched off automatically by circuit breakers. Whilst the network is designed to withstand these levels, the number of generators and large motors connected to the network can cause the fault current to exceed the rating of the circuit breakers. This introduces a risk of catastrophic failure when they operate.

10.141 WPD has a duty of care to its employees and members of the public to ensure that they are not at risk of injury due to the failure of the company's assets.

10.142 Since the situation can change depending on what is connected to the network, an annual fault level survey identifies the locations and situations where the current fault level potentially exceeds 95% of the switchgear rating.

10.143 Solutions are generated to eliminate the risk to safety and restore optimal running arrangements, with the main approach being the replacement of the switchgear for higher rated equipment.

10.144 The forecast expenditure during the RIIO-ED1 period is as follows:

Fault level capability expenditure (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
DPCR5 Annual Average	3.0	1.3	0.3	0.3	4.9
RIIO-ED1 Annual Average	2.1	3.3	0.2	0.3	5.9
RIIO-ED1 Total (8 years)	**16.8**	**26.1**	**1.5**	**2.0**	**46.4**

10.145 The difference between the underlying forecast in South West/South Wales and the two Midlands areas in due to a combination of there being a large number of large power stations located in the Midlands which generally raise fault levels and the anticipated impact of growth in combined heat and power plants in the large urban areas.

10.146 Our LCNF FlexDGrid project is seeking to develop better ways of assessing fault level by exploring the potential benefits of enhanced fault level assessment, real-time management of fault level and fault level mitigation techniques.

Engineering management

10.147 The expenditure on physically carrying out the work could not go ahead without the support of other 'indirect' activities such as planning, project management, system records, stores and transport. Many of the costs have reduced from DPCR5 due to synergy savings following acquisition of the Midlands businesses.

Network design and engineering

10.148 Network Design and Engineering activity includes high level planning and detailed project design up to the point of project approval. These costs are forecast to flex in line with work volumes.

Network design and engineering expenditure (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
DPCR5 Annual Average	6.7	6.8	3.3	4.5	21.3
RIIO-ED1 Annual Average	6.6	7.4	3.8	7.5	25.3
RIIO-ED1 Total (8 years)	**52.9**	**59.1**	**30.4**	**59.6**	**202.0**

Project management

10.149 Project Management follows on from project approval and relates to the activity of managing the delivery of network projects including work preparation, managing construction of the work and updating all records. Again the costs will flex in line with work volumes.

Project management expenditure (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
DPCR5 Annual Average	4.9	4.8	2.7	4.3	16.7
RIIO-ED1 Annual Average	4.6	4.2	2.9	4.8	16.5
RIIO-ED1 Total (8 years)	**36.9**	**33.3**	**23.1**	**38.4**	**131.7**

System mapping

10.150 System Mapping is the activity of updating network geographical records. Whilst the volume of record updating will change as a consequence of network investment many of the costs, such as payment of ordnance survey licence fees are fixed, so it is forecast that costs will remain flat with any increases in volumes being managed through efficiency savings.

System mapping expenditure (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
DPCR5 Annual Average	1.4	1.4	0.7	1.0	4.5
RIIO-ED1 Annual Average	1.3	1.4	0.7	1.0	4.4
RIIO-ED1 Total (8 years)	**10.0**	**11.1**	**5.6**	**8.0**	**34.7**

Vehicle leases, maintenance and servicing

10.151 Historically in the West Midlands and East Midlands vehicles have been leased and maintenance has been contracted out to third parties, but in South Wales and South West

vehicles have been purchased and maintained with in-house facilities, providing a dedicated, faster and more cost effective service. Vehicles in the Midlands will be progressively replaced with purchased items as the leases expire; this means that there will be a migration of costs from vehicle leases to vehicle purchase during RIIO-ED1.

Vehicle leases, maintenance and servicing expenditure (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
DPCR5 Annual Average	9.4	8.6	3.9	6.0	27.9
RIIO-ED1 Annual Average	4.1	3.5	2.1	3.5	13.2
RIIO-ED1 Total (8 years)	**32.8**	**27.7**	**16.8**	**28.0**	**105.3**

Engineering management and clerical support

10.152 Engineering management and clerical support relates to a wide range of office based activities managing or assisting employees undertaking direct activities, but not directly involved with either planning projects or project managing. It includes, engineering managers, work programmers, resource planners and clerical staff. Some slight increases will be incurred to reflect increases in Wayleaves payments where an additional £56m will be required over the RIIO-ED1 period.

Engineering management and clerical support expenditure (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
DPCR5 Annual Average	19.8	18.4	7.2	10.9	56.3
RIIO-ED1 Annual Average	13.0	12.7	6.8	11.4	43.9
RIIO-ED1 Total (8 years)	**103.6**	**101.6**	**54.3**	**91.2**	**350.7**

Control centre

10.153 Control centre activities include the real time operational control and monitoring of the network, outage planning and dispatching resources in response to network faults and safety issues. The number of control rooms will be reduced from three to two and this consolidation will take place during 2013. This will provide two control rooms, one serving the Midlands and once serving the South West and South Wales. No further changes are proposed during RIIO-ED1 and therefore once the new structure is established costs will remain fixed.

Control centre expenditure (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
DPCR5 Annual Average	3.9	3.8	2.0	2.7	12.4
RIIO-ED1 Annual Average	3.3	3.5	2.0	2.9	11.7
RIIO-ED1 Total (8 years)	**26.2**	**27.8**	**15.8**	**23.0**	**92.8**

Call centre

10.154 It is important for WPD's 7.7 million customers to have the means to contact the company. The call centre manages the main incoming telephone lines used by customers, taking the initial calls, recording details, providing information and forwarding customers on to the relevant parts of the organisation. There are no anticipated future savings from smart meters providing outage information, because staff will continue to contact customers to confirm that they are off supply. There will be an additional cost of around £0.5m per annum for the

provision of additional social obligation services, such as a dedicated team for the validation of Priority Services Register data.

Call centre expenditure (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
DPCR5 Annual Average	1.2	1.2	0.6	0.9	3.9
RIIO-ED1 Annual Average	1.1	1.1	0.5	0.9	3.6
RIIO-ED1 Total (8 years)	**8.4**	**8.6**	**4.0**	**7.2**	**28.2**

Stores

10.155 The WPD network investment programme requires a large throughput of materials that are held in local satellite stores supplied from two central warehouses. Supporting the stores activity are storekeepers, stock checkers and delivery drivers. Whilst there will be increased work activity, requiring more materials in RIIO-ED1, cost forecasts are assumed to be flat.

Stores expenditure (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
DPCR5 Annual Average	3.3	3.2	1.1	1.5	9.1
RIIO-ED1 Annual Average	1.8	1.9	1.0	1.6	6.3
RIIO-ED1 Total (8 years)	**14.6**	**15.1**	**8.0**	**12.8**	**50.5**

Network Policy

10.156 Network Policy relates to the development and review of environmental, technical and engineering policies that dictate what is done and the procedures to follow. During RIIO-ED1 there will be a need for the development of new policy resulting from the learning of the LCNF and Network Innovation Competition. It is anticipated that the research work and trails will provide the majority of the development of the details and therefore the impact on the Policy Team resources will be limited. It is therefore forecast that current levels of expenditure will continue.

Network policy expenditure (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
DPCR5 Annual Average	0.9	0.8	0.3	0.4	2.4
RIIO-ED1 Annual Average	0.6	0.6	0.3	0.5	2.0
RIIO-ED1 Total (8 years)	**4.8**	**4.8**	**2.4**	**4.0**	**16.0**

Corporate activities

10.157 Corporate activities (also referred to as business support indirects) include a number of central functions provided for all licence areas. Corporate costs are generally allocated on a 30:30:15:25 basis between West Midlands, East Midlands, South Wales and South West respectively based broadly upon network scale.

Human resources and non-operational training

10.158 Expenditure on the human resources function includes development of HR policy and procedures, employee relations, payroll management, and the costs for non-operational training include the preparation and provision of non-engineering training courses. There are no major changes to expenditure.

Human resources and non-operational training expenditure (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
DPCR5 Annual Average	1.3	1.2	0.6	0.8	3.9
RIIO-ED1 Annual Average	1.1	1.1	0.5	0.9	3.6
RIIO-ED1 Total (8 years)	**8.4**	**8.8**	**4.0**	**7.2**	**28.4**

Finance and regulation

10.159 Finance and regulation expenditure covers a wide range of activities including the statutory, regulatory and internal management of cost, procurement, insurance, taxation and auditing activities. Whilst the scale of regulatory reporting has grown, WPD has implemented data analysis software (Hyperion) to make the extraction of data and population of reporting templates less resource intensive and faster. This means that as the burden of regulatory reporting increases, the impact on resource requirements is minimised.

10.160 Ofgem is proposing to change licence conditions for illegal abstractions, introducing a new obligation for DNOs to investigate where a supplier is not registered at a property. When this is implemented, WPD will incur additional costs but these are not expected to be material.

Finance and regulation expenditure (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
DPCR5 Annual Average	7.1	6.9	4.1	6.6	24.7
RIIO-ED1 Annual Average	8.2	8.3	4.1	6.8	27.4
RIIO-ED1 Total (8 years)	**65.5**	**66.4**	**32.8**	**54.4**	**219.2**

CEO and corporate communications

10.161 The costs classed under CEO include the cost of directors, board meeting costs, corporate communications, community awareness, legal services and company secretarial. WPD will continue to raise awareness of its activities through an annual publication sent to all customers supported by a month long TV campaign. Additional activities will be carried out for communication of services for vulnerable customers costing an extra £0.5m per annum.

CEO and corporate communications expenditure (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
DPCR5 Annual Average	1.7	1.8	1.3	2.1	6.9
RIIO-ED1 Annual Average	1.9	2.0	1.1	1.7	6.7
RIIO-ED1 Total (8 years)	**15.2**	**15.9**	**8.4**	**13.6**	**53.1**

Running costs for existing IT and telecoms

10.162 WPD's business support costs for IT and telecoms cover costs of system maintenance and administration, software licence fees and communication costs. Whilst savings have been made as part of the acquisition of Midlands, IT systems continually evolve and technological developments enhance system capability. There will be on-going costs for software licences and forecasts assume that costs will rise as more flexible mobile working arrangements are implemented and use of business intelligence tools increases.

Existing IT and telecoms expenditure (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
DPCR5 Annual Average	10.3	9.7	4.8	7.5	32.3
RIIO-ED1 Annual Average	9.5	9.6	4.7	7.7	31.5
RIIO-ED1 Total (8 years)	**75.6**	**76.6**	**37.2**	**61.9**	**251.3**

Property management and maintenance

10.163 There are 59 non-operational properties throughout the region that are used to provide office space and parking for local teams. Having established more depots in the Midlands, there are no plans to significantly change the portfolio of property and therefore costs for rent, security, routine maintenance and cleaning are forecast in line with current levels of expenditure.

Property management and maintenance expenditure (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
DPCR5 Annual Average	5.2	5.7	2.4	3.9	17.2
RIIO-ED1 Annual Average	5.5	6.5	2.7	4.5	19.2
RIIO-ED1 Total (8 years)	**44.3**	**52.0**	**21.4**	**36.1**	**153.8**

Operational training (workforce renewal)

10.165 Operational training is the description given for the training of staff who are involved in direct (hands on) activities on the network such as a Craftsperson (Jointers, Linesperson or Fitters) and Technicians. It can be split into two distinct categories;

- workforce renewal – this is the recruitment and training undertaken with new starters to the company or with the 'upskill' training of existing staff in preparation for more complex roles (typically a Craftsperson to Technician);

- refresher training – this is the training undertaken to provide existing staff with training in existing activities (to ensure that their skills are current or compliance with a regulatory requirement for cyclical training).

Drivers of workforce renewal

10.166 Workforce renewal is required to replace staff who retire or staff that leave the employment of WPD for other reasons (commonly referred to as 'natural wastage'). In addition it includes the upskill training of existing operational staff for more complex roles.

10.167 WPD continually assesses a forward plan for recruitment and training to ensure that staff resource numbers are appropriate for the roles that the business requires. Early action is taken so that the business has the required number and mix of resources to deliver its plans now and into the future.

Current workforce renewal

10.168 WPD currently recruits on average 190 new engineering staff per year to ensure that we have the required resources needed in DPCR5. The staff are normally recruited as apprentices (100 per annum), students/graduates (10 per annum) or as new skills trainees (80 per annum).

10.169 In addition we undertake upskill training for around 80 staff per year.

Planning for RIIO-ED1

10.170 Our current planning looks through RIIO-ED1 and into RIIO-ED2 (2023 to 2031) to ensure that we recruit the right number of new staff and train them such that we have the right number and mix of technical skills for RIIO-ED1 and beyond.

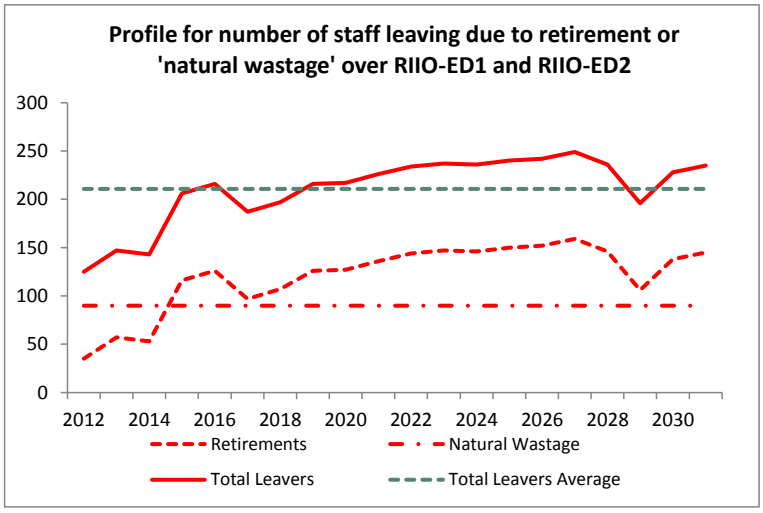
10.171 There are three key sources of data that are regularly reviewed;

- the forward age profile of staff across our business and the skill sets that they occupy allowing the future anticipated number of retirees to be calculated;

- the long run average number of staff that have left WPD through natural wastage with any forward adjustment for significant known events e.g. an "Olympic Park" type development;

- the forward Business Plan activity level and the impact on the resource planning model for changes to both the mix and overall numbers of staff required.

10.172 The results of the analysis for RIIO-ED1 and RIIO-ED2 are contained within the graph below (Note: all staff numbers are based on Full Time Equivalents (FTEs)):



10.173 At this stage we do not anticipate any major change in our natural wastage numbers going forward and the line is therefore a flat average.

10.174 The solid red line is the sum total of retirees and staff who leave through natural wastage.

10.175 The green dashed line is the average for the sum total of all leavers over the period representing a smoothing of the annual numbers.

10.176 From this we have assessed the need to recruit and train 210 people per annum on average through the RIIO-ED1 period and beyond.

10.177 By recruiting and training 210 staff on average per annum WPD will maintain its current staff numbers. These staff will be trained in the skills sets as appropriate for replacing those who have left WPD. By analysing the forward leavers we are able to ensure we can balance the specific skills required in line with our training resources. These will be recruited in each of the eight years through the following routes:

- 120 apprentices;
- 10 students/graduates;
- 80 skills trainees.

10.178 In addition to these requirements the increased asset replacement programme for RIIO-ED1 and the specific impact of LCT reinforcement works will require the recruitment and training of 480 technical field staff.

10.179 Our assessment of the nature and types of additional works allow us to determine that we require 190 additional overhead line staff, 100 additional plant fitters and 190 additional cable jointers.

10.180 The plan for the 480 new starters includes an allowance for the promotion of 260 existing staff who will upskill from Craftsperson roles into Technician, Planning or Project Management roles. To enable this to happen we have factored in the additional upskill training requirements for these staff within our operational training plans.

10.181 There will also be demands due to the ‘one off special’ activity of the smart metering roll out by electricity suppliers commencing in late 2014 with a completion target of 2019. This will create additional workload for us in respect of issues found at service positions in properties.

10.182 Analysis undertaken by the National Skills Academy concluded that WPD will need a further 120 cable jointers as a direct result of the smart metering roll out programme. This is based on an anticipated defect rate of 4% of all installations. However we forecast the defect rate will be 2% and therefore the impact on resources would be to require an additional 60 cable jointers only.

10.183 These forecasts are based on the activity being in isolation from the other requirements of RIIO-ED1 workload. We have concluded that rather than recruiting an additional 60 staff specifically for work that will be complete by 2019/20 it is more efficient to commence the first recruitment of the additional cable jointers required for other RIIO-ED1 programmes (e.g. increase in LCTs) earlier.

10.184 By pulling forward this recruitment we are able to increase our jointer numbers to coincide with the smart metering programme hitting its peak installation numbers (currently forecast for 2017/18).

10.185 As the smart metering programme is scheduled for completion in 2019 the decline in demand for the metering work will be coincident with the increased forecast level of RIIO-ED1 activities driven by the demands of the LCTs. This will allow a smooth transition from one activity to another for those jointers involved.

10.186 We have also considered the position should demand for the smart metering works increase ahead of those predictions e.g. 2015/16. We will manage any additional workload over and above that anticipated by the utilisation of short term flexible working arrangements and carefully managed overtime.

10.187 The recruitment of the overall new starters will therefore commence with two groups of jointers in 2014/15 totalling 60 new staff. The further 420 staff will be recruited over the following 5 years commencing 2016 with the last additional staff being recruited in 2020. This will provide sufficient time to ensure that resources are trained and available in line with forecast increase in the demands of the LCT growth.

Impact on training facilities

10.188 WPD owns and operates two main training centres, in Taunton and Tipton, supported by a number of satellite training facilities.

10.189 Plans are already in place to provide additional skills training capacity at both centres. Additional jointing training capacity will be provided at Tipton to train WPD Midlands staff in HV jointing techniques currently adopted in South Wales and South West. New buildings in Taunton will also help to increase the overall capacity for training to meet the anticipated requirements over the RIIO-ED1 period.

10.190 We currently employ 34 full time Trainers. In addition to undertaking new starter training these staff also conduct refresher training, course development, audits and other training activity. New staff recruited over the RIIO-ED1 period will not generally require refresher training and will not add to the course development or other training work load during the RIIO-ED1 period.

Summary

10.191 We have detailed the need to increase our annual recruitment from 190 staff per annum to 210 representing an increase of 160 in total over the 8 years of RIIO-ED1.

10.192 In addition we will recruit and train a further 480 staff for the increased work load requirements of RIIO-ED1.

10.193 We will upskill an additional 260 of our existing staff over and above our current average of 80 per annum.

10.194 Based on the existing workload demands WPD will require the addition of five Trainers to manage the additional demand.

10.195 Our new Trainers will be recruited and trained to start their new roles in 2014. This will allow us to commence our RIIO-ED1 recruitment and ensure that staff training is in line with the overall plan as we transition from DPCR5 into the RIIO-ED1 period.

Operational training expenditure (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
DPCR5 Annual Average	3.3	3.8	4.3	6.5	17.9
RIIO-ED1 Annual Average	4.2	4.9	5.1	7.9	22.1
RIIO-ED1 Total (8 years)	**33.2**	**38.8**	**40.7**	**63.3**	**176.0**

Reducing power cuts

10.196 WPD has the best track record of improving network performance.

10.197 Whilst stakeholders have indicated that current performance is good, they have stated that performance should remain the same or get better.

10.198 The proposed investment programme will increase the number of automated devices on the network, to enable computer controlled reconfiguration of the network when a fault occurs, reducing the number of customer affected by faults and speeding up the restoration of supplies.

Reducing power cuts expenditure (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
DPCR5 Annual Average	3.5	3.7	2.2	2.3	11.7
RIIO-ED1 Annual Average	2.0	1.1	0.4	0.5	4.0
RIIO-ED1 Total (8 years)	**15.6**	**9.0**	**3.0**	**3.6**	**31.2**

Improving network resilience to severe weather

10.199 Following the stormy weather in October 2002, where tree related network damage caused some customers in the UK to be without power for up to five days, the Government embarked on changing legislation to drive DNOs to prevent supply interruptions caused by trees. The changes required DNOs to operate progressive resilience tree cutting and felling programmes to improve network performance in abnormal weather conditions.

10.200 It was assumed, within the Government's Regulatory Impact Assessment, that clearance should be applied on a modest yet progressive basis, clearing 0.8% of the higher voltage networks per annum resulting in 20% being resilient after 25 years (by 2034).

10.201 Consultation with stakeholders has resulted in a view that this programme should be advanced and therefore WPD will aim to deliver the programme within 20 years, increasing the volume from 500km to 700km per annum.

Resilience tree clearance expenditure (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
DPCR5 Annual Average	0.9	0.8	1.6	1.4	4.7
RIIO-ED1 Annual Average	2.0	1.8	1.7	2.4	7.9
RIIO-ED1 Total (8 years)	**16.0**	**14.4**	**13.6**	**19.2**	**63.2**

Protecting equipment from flooding risk

10.202 Widespread flooding in 2007 affected network assets, interrupting electricity supplies to thousands of customers in Gloucestershire and Yorkshire, highlighting the potential vulnerability of electricity substations. Following a Government review and the publication of the Pitt Report, a programme of flood defences was instigated.

10.203 Climate change predictions suggest that flooding could become a more regular occurrence.

10.204 WPD has been working with the Environment Agency to identify the substations at greatest risk and during DPCR5 120 substations will be protected. Stakeholders have indicated that investment in flood defences is a high priority and consequently during RIIO-ED1 the WPD programme will be extended to approximately a further 75 sites, protecting customers from the risk of power cuts due to flooding.

10.205 Investment will be used to build protective walls around vulnerable equipment.

Flood defence expenditure (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
DPCR5 Annual Average	0.6	1.7	2.4	1.3	6.0
RIIO-ED1 Annual Average	0.2	0.6	1.1	0.1	2.0
RIIO-ED1 Total (8 years)	**1.3**	**5.1**	**9.1**	**1.1**	**16.6**

Reducing environmental leaks

Reducing oil leaks from equipment

10.206 The design of very high voltage underground cables has evolved over many years and our new cables use a solid plastic insulation. Old designs of 33kV and higher voltage cables used insulation oil inside the cable. Whilst these cables are normally very reliable, if they are damaged the oil may leak out. The oil is biodegradable in the long-term, but leaks can cause immediate environmental damage to land use and water courses.

10.207 Whilst the cables are monitored to allow quick response should a leak arise, traditional methods of leak location can be slow and expensive.

10.208 WPD has innovated to develop a technique to help pinpoint leaks more quickly, thereby reducing the amount of oil lost in the environment before a cable is repaired. We have been trialling a new techniques called PFT tagging. A tiny amount of tracer is added to the fluid in the cable and if a leak occurs it can be detected. This helps to locate a leak quickly and to within a few meters, reducing both the amount fluid leaking into the environment and extent of excavation. The programme of tagging will be extended to all cables that have a history of leaks.

10.209 In addition, the asset replacement programme will target the replacement of the 1% of cables that have the highest leak rates, especially where the leaks are due to the deterioration of the cables.

Reducing SF_6 gas leaks from equipment

10.210 Sulphur Hexafluoride (SF_6) is a gas which is used throughout the industry as an insulation medium in switchgear. It has very good electrical properties and has allowed switchgear to be designed into smaller packages, reducing the amount of materials used in the production of switchgear and reducing the physical space needed to build a substation. Whilst SF_6 has excellent insulating properties, it is a potent greenhouse gas. There is no suitable replacement for this gas so it remains in widespread use in the electricity industry.

10.211 Over half of stakeholders indicated that the reduction of SF_6 leaks should be a high priority and supported replacing the 1% of switchgear with highest leak rates.

Environmental expenditure (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
DPCR5 Annual Average	0.3	0.6	0.3	1.5	2.7
RIIO-ED1 Annual Average	0.6	0.7	0.4	0.4	2.1
RIIO-ED1 Total (8 years)	**4.8**	**5.6**	**3.2**	**3.2**	**16.8**

Worst served customers

10.212 There are a small number of customers that experience high numbers of faults. These customers are generally located on the end of long circuits or on remote parts of the network, with limited alternative networks to provide supplies when faults occur.

10.213 Stakeholders have indicated they support investment on worst served customers provided it yields an improvement. During RIIO-ED1 WPD will target reducing the number of worst served customers by 20% from 10,000 to 8,000.

10.214 Investment will provide additional protection equipment to prevent faults affecting worst served customers. Where low cost solutions can be found, network reconfiguration and interconnection will also be carried out to enable supplies to be re-routed quickly when faults occurs.

Worst served customer expenditure (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
DPCR5 Annual Average	-	-	0.2	0.1	0.3
RIIO-ED1 Annual Average	0.1	0.0	0.1	0.1	0.3
RIIO-ED1 Total (8 years)	**0.4**	**0.2**	**0.4**	**0.4**	**1.4**

Undergrounding in National Parks and AONBs

10.215 WPD's geographic area includes numerous National Parks and AONBs. The distributed nature of the network means that overhead lines are installed within these areas, sometimes near iconic sites. There are locations, especially at popular tourist sites, where the removal of selective overhead lines can enhance visual amenity.

10.216 The results of stakeholder engagement have suggested that the programme of undergrounding should continue at the current rate leading to 40km of line being replaced with cable. WPD will continue to work collaboratively with National Park and AONB representatives, to identify the areas that would benefit greatest from the undergrounding of overhead lines.

10.217 The unit costs used within the forecasts are lower than current levels to drive the selection of projects that provide visual amenity improvements for less expenditure.

Visual amenity expenditure (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
DPCR5 Annual Average	0.4	0.4	0.2	0.3	1.3
RIIO-ED1 Annual Average	0.2	0.1	0.1	0.3	0.7
RIIO-ED1 Total (8 years)	**1.6**	**0.8**	**0.8**	**2.4**	**5.6**

Real price effects

10.218 WPD has engaged First Economics to assess real price effects (i.e. above inflation costs) and the findings are shown in the table below:

Real price effects (%)						
	2013/14	**2014/15**	**2015/16**	**2016/17**	**2017/18**	**2018/19 to 2022/23**
Labour – general	(0.6)	0.2	0.7	0.5	0.2	0.9
Labour – specialist	0.7	1.5	2.0	1.8	1.5	2.1
Materials – general/civils	0.7	1.7	1.3	1.0	0.8	1.1
Materials – electrical	0.2	2.2	1.8	1.5	1.3	1.6
Plant and equipment	0.2	1.2	0.8	0.5	0.3	0.6
IT	(2.1)	(2.1)	(2.5)	(2.8)	(3.0)	(2.7)
Property rentals	(0.6)	0.2	0.7	0.5	0.2	0.9

10.219 The forecast has been derived from a number of data sources including the Office for National Statistics and the Office for Budget Responsibility.

10.220 The forecasts costs for specific activities in the Business Plan have not included the effects of these above inflation costs. Their impact is accounted separately and offset, in part, by efficiency savings.

Business efficiency improvements

10.221 We have sought to identify the scope for year on year efficiency improvements. We have considered efficiency improvements into three component parts, that is:

- efficiency catch up, which relates to the opportunity for an inefficient DNO to improve its efficiency to a level consistent with the most efficient DNO;
- merger efficiencies, which relate to the cost saving delivered as a consequence of merger and acquisition activity;
- frontier efficiency shift, which relates to the on-going efficiency improvements that can be delivered by a DNO already operating at the efficiency frontier.

10.222 WPD has been identified as one of the most efficient DNOs. Therefore there is negligible scope associated with catch up efficiency.

10.223 The synergy and efficiency savings that have been delivered following WPD's acquisition of the West and East Midlands DNOs have been identified in this Business Plan. Therefore, there is no further scope for additional merger efficiencies.

10.224 However, our review of available information indicates that there is scope for year on year improvements available to WPD as a frontier performing DNO. Our Business Plan assumes that efficiency savings of 1% per year will be achieved for controllable cost elements of labour, materials and contractor costs.

Business efficiency improvement (%)						
	2013/14	**2014/15**	**2015/16**	**2016/17**	**2017/18**	**2018/19 to 2022/23**
Labour	0.0	0.0	1.0	1.0	1.0	1.0
Materials	0.0	0.0	1.0	1.0	1.0	1.0
Contractors	0.0	0.0	1.0	1.0	1.0	1.0

10.225 This 1% per year efficiency saving does not relate to any specific initiatives. However, the generic initiatives that we seek to exploit include:

- improvements to business processes;
- improvements to operational working practices;
- new innovative techniques developed as part of LCNF projects;
- learning from other DNOs, utilities and large asset based organisations;
- reductions in the cost of procured goods and services;
- continued use of in-house resource to undertake core activities; and
- design of the right engineering solutions to network problems (i.e. no 'gold plating').

Smart meters

Introduction

10.226 Smart electricity and gas meters are due to be installed in all homes in a supplier led mass roll out planned to commence towards the end of 2014 and finish during 2019.

10.227 Although the smart meter programme is being managed by the Government in liaison with the main electricity Suppliers, Distribution Network Operators will play a key part in its successful delivery.

10.228 The accelerated nature of the roll out programme (approximately four times quicker than the current meter replacement programme) means that there will be an increase in the number of defects reported about DNO owned service equipment. WPD will require additional resources to rectify the defects to ensure that the roll-out programme is not delayed.

10.229 Smart meters are expected to provide benefits for WPD with improved business efficiency and customer service. This will require the development of new business processes and systems to support the smart meter environment and utilise the additional facilities and data that will be made available.

10.230 The transfer of data and instructions to and from the meter will be managed by a separate central Data and Communications Company (DCC), who will charge users such as WPD for the services provided.

Benefits for WPD

10.231 The smart meter programme has the potential to provide data to enhance existing core business activities such as fault management, network planning and asset management. There are also potential benefits which can lead to future applications that will help the deployment of low carbon technologies and move to actively managed networks.

Fault management

10.232 Smart metering will provide a number of functions to support fault restoration and reporting activities. On the occurrence of a supply interruption,' last gasp' functionality will allow a message to be sent notifying WPD of a loss of supply. This will provide a level of visibility down to the individual premise level that has not been available before.

Network planning

10.233 Smart metering will increase the data available about the low voltage network providing two major benefits:

- more detailed information about network loading and voltage, that will allow better prioritisation of reinforcement work;
- better information when designing for new connections, potentially reducing the time to connect as well as the cost of connection.

Future applications

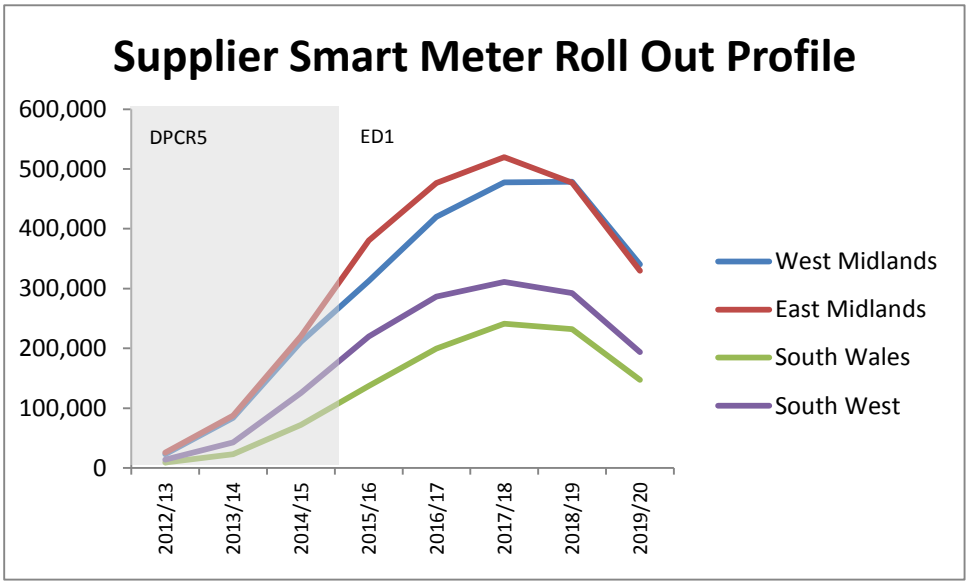
10.234 Smart metering functionality has the potential to support more sophisticated future network operations such as load shifting and scheduling, application of variable tariffs and other

demand side management techniques. It will also help to support a more active network management approach compared with the more passive approach applied today.

Service defect rectification

10.235 The installation programme for smart meters is being controlled by suppliers in liaison with their meter installers. Whilst in the majority of cases the meter operators will be able to proceed with the meter change, there will be situations where DNOs will need to carry out remedial work to service equipment to allow the installation of a smart meter to proceed.

10.236 The accelerated nature of the roll out programme means that there will be an increase in the number of defects reported. Whilst the programme is on average four times quicker than the current meter replacement rate, the timing of the roll out leads to a peak workload during 2017 and 2018 as illustrated in the following graph derived from supplier data in January 2013:



10.237 The actual number of defects is unknown, but for the purposes of forecasting work volumes and resource requirements it has been assumed that remedial work will be required for 2% of smart meter installations. Over the roll out programme this equates to 148,000 defects in total. It is assumed that 50,000 would have been identified under business as usual and so there will be an additional 98,000 defects that will cost £17.7m. £16.8m (95%) of these costs would occur within the RIIO-ED1 period.

10.238 At the peak of installation it is estimated that 30,000 visits will occur per annum based upon a defect rate of 2%. This will require an additional 60 staff that will be redeployed into the workforce to support the delivery of Low Carbon Technology related reinforcement work, once the smart meter roll out is complete.

DCC charging arrangements

10.239 A new regulated organisation called the Data and Communications Company will manage the systems for communications between the meters and users of smart meter services. The DCC will be responsible for all end to end communications from the meters at customer properties to users' processing centres.

10.240 In order to fund and support the operation of the national smart meter infrastructure the DCC will levy charges for use of their network. These charges will cover the full end to end process covering the costs of three discrete elements:

- the communication network from the smart meters to the DCC - provided by the Communication Service Provider (CSP);
- internal DCC processing provided by the Data Service Provider (DSP);
- the communication network from the DCC to user's processing centres.

10.241 As at January 2013 an indication of the Communication Service Provider (CSP) element of the charges has been published. This service is to be levied in two distinct categories. Firstly "Fixed" costs based upon the number of meters and secondly, "Variable" costs based upon the number of transactions processed per period by the user. These charges are:

- Fixed cost of £2.25 per electricity meter enrolled per year;
- Variable cost (£ per transaction sent/received) varying from £0.002 to £0.20.

10.242 Further information is awaited on the cost of all other elements of the DCC service, but the CSP element alone will result in costs of approximately £100m across the RIIO-ED1 period.

10.243 These charges are under review and are likely to change.

Development of WPD systems

10.244 WPD systems for communicating with the DCC and storing smart meter data will be developed by 2014.

10.245 Additional systems will need to be developed during RIIO-ED1 for the migration of supplier registration processing away from DNO systems to the DCC and for the ability to carry out load management.

10.246 The costs of these new systems as well as the refresh of technology for communication and storage will be £5.1m for hardware, software and licences with a further £3.8m for maintenance and support during RIIO-ED1.

Smart meter related expenditure (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
DPCR5 Annual Average	0.5	0.8	0.1	0.3	1.7
RIIO-ED1 Annual Average	5.3	5.6	2.5	3.7	17.1
RIIO-ED1 Total (8 years)	**41.8**	**44.7**	**20.3**	**28.3**	**135.1**

Rates: Uniform business rates

10.247 Rates are a tax on the occupation of property. They are based on the rental value of the property set by the Valuation Office, an executive agency of the Inland Revenue. Rates are calculated by rateable value multiplied by the uniform business rate, which is set by Central Government.

10.248 We have assumed that the next revaluation will take effect in England and Wales on 1 April 2017, and that rates will increase in line with projected RAV increases. We have also assumed that the same transitional relief mechanism (that only exists in England) will apply as for the 2010 revaluation i.e. first year cap of 12.5% increase, second year 17.5% and third year 20%.

10.249 The net impact of the assumptions above is to increase business rates by 50% (2011/12 prices); this represents an additional £43.7m for the WPD group in 2020/21 broken down by DNO as follows:

Business rates increases over current levels at 2020/21 (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	Total
Percentage increase	55%	53%	33%	53%	
Additional costs	13.8	17.6	4.9	7.4	43.7

10.250 WPD will make best endeavours, as in previous revaluations, to engage with Valuation Office ensure that business rate charges made on the four WPD DNOs are minimized.

Ofgem licence costs

10.251 Ofgem licence fees are calculated for the year ahead based upon an estimate of Ofgem's net costs plus an amount for Consumer Focus and Consumer Direct/The Office of Fair Trading. These are allocated across licence holders in proportion to the number of customers.

10.252 Fees are assumed to remain at the same level as in DPCR5. In 2012/13 licences fees for the four WPD licence areas were £2.9m.

Pensions

10.253 Pension costs are excluded from the various categories of costs in other parts of this plan because pension recovery rates can vary and so distort cost comparisons between years.

Background

10.254 There are two types of pension scheme:

- Final Salary Schemes that provide a pension to employees based on their salary at the time they retire (or leave employment if that is earlier) and their years of service;
- Defined Contribution Schemes that provide a pension that depends on how much was paid into the scheme by the employee and employer.

10.255 Final Salary Schemes need to be funded on the basis of estimates of the value of investments held by the scheme (the assets) and the projected pension costs (the liabilities). Both the assets and liabilities vary over time and full valuations are carried out every three years. If the assets are worth more than the estimate of the liabilities, there is a surplus. If the assets are worth less than the liabilities, there is a deficit.

10.256 When there is a deficit, companies have a legal obligation to pay in enough money over time to ensure that the deficit is eliminated. The period over which the deficit is eliminated is the deficit recovery period and is assumed to be over 10 years from 1st April 2014 in line with guidance from the Pensions Regulator.

10.257 By their nature, Defined Contribution Schemes can have neither a surplus nor a deficit.

10.258 Pensions matters are overseen by the Pensions Regulator who ensures that companies meet their obligations to the pensions schemes under both the pension scheme trust deeds and the Pensions Act.

WPD pension schemes

10.259 WPD operates two final salary schemes, the WPD Electricity Supply Pension Scheme (WPD ESPS) for employees and former employees of South West and South Wales; and the CN Electricity Supply Pension Scheme (CN ESPS) for employees and former employees of East Midlands and West Midlands.

10.260 Both of WPD's final salary schemes are closed to new members, but 72.5% of current employees are included within the final salary schemes.

10.261 WPD also operates a defined contribution (DC) scheme the Western Power Pension Scheme (WPPS) for employees that joined WPD after the final salary schemes were closed to new members. 27.5% of current employees are members of the DC scheme

Defined contribution scheme pension costs

10.262 Under Ofgem's pension funding principles that were reaffirmed in 2012, costs related to defined contribution schemes receive a separate allowance. The defined contribution pension costs included in our plan are set out below.

Defined contribution scheme pension expenditure (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
DPCR5 Annual Average	0.7	0.6	0.1	0.2	1.6
RIIO-ED1 Annual Average	1.6	1.4	0.6	0.9	4.5
RIIO-ED1 Total (8 years)	**12.9**	**11.6**	**4.7**	**7.3**	**36.5**

Final salary schemes - on-going costs

10.263 Employees accrue pension rights as they work, and they contribute to the costs of funding those pensions by paying a percentage of their salaries into the scheme.

10.264 WPD also funds the pension scheme. Following a valuation in 2011, for staff in the Midlands we currently pay an average standard contribution rate (SCR) of 22.4% of employees' salaries into the CN ESPS, while for South West and South Wales we pay an SCR of 24% of salaries into the WPD ESPS. These percentages (which exclude administrative costs and Pension Protection Fund levy costs) are in line with those paid by other DNOs and are less than those paid by GDNs as demonstrated by the table below.

Employer SCR (% of pay as at 31 March 2010) (Source GAD Report for Ofgem dated 16 May 2012)	
Scotia Gas Networks	43%
Scottish Hydro	42%
Northern Gas Networks	34%
National Grid Gas	32%
Electricity North West	29%
Central Networks East and West (pre 2011)	28%
Northern Power Grid	27%
UK Power Networks	26%
Scottish and Southern (Southern)	26%
SP Manweb	25%
Scottish Power	24%
National Grid Electricity	24%
WPD South West and South Wales	24%

10.265 The projected on-going pension costs from April 2015 onwards are included in our plan are set out below:

On-going final salary pension expenditure (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
DPCR5 Annual Average	13.9	12.3	8.5	13.3	48.0
RIIO-ED1 Annual Average	11.3	10.1	9.9	13.4	44.7
RIIO-ED1 Total (8 years)	**90.0**	**80.5**	**79.5**	**107.3**	**357.3**

Final salary schemes - deficit contributions

10.266 Both the CN ESPS and the WPD ESPS are anticipated to have deficits at the next valuation date (31 March 2013).

10.267 The amount of deficit contributions needed changes with the value of the deficit and is determined in negotiation with the pension schemes' trustees every three years. The deficit changes with movements in financial markets, the level of contributions, membership changes and other assumptions (e.g. future interest rates) made by the actuaries when they estimate future cost of paying the pensions.

10.268 Both the CN ESPS and the WPD ESPS include pensioners and former employees not yet drawing a pension that worked for parts of the wider WPD business outside of the main distribution business. Therefore, not all the pension deficit relates to the DNOs. Ofgem has therefore undertaken to provide an allowance for an estimated 76.4% (for WPD ESPS) and 80.1% (for CN ESPS) of the revalued 2010 deficit provided that the deficit costs are determined as not being inefficient. Whether or not such costs are efficient will be determined by Ofgem on the basis of the last Government Actuaries Department review.

10.269 In their restated pension principles, Ofgem have undertaken to give companies an allowance to pay the regulated 'distribution' portion of the deficits at 31 March 2010. No specific allowance is available for any deficit that is created after 31 March 2010 although the costs of any such incremental deficit relating to regulated activities will be allowed as part of overall employment costs. However, because of investment market changes, and changes in estimates of how long pensions are due to be paid, the March 2010 deficit is revalued from time to time.

10.270 Our forecast of pension costs for the defined benefit schemes is based on the most recent actuarial valuations (WPD Group 31st March 2010 and Central Networks Group 30th June 2011), projected forward to 31st March 2013 based on market conditions (including the latest mortality statistics) as at 31st January 2013.

10.271 The projected deficits based on independent actuaries' estimates for our two schemes at 31st March 2013 are:

- WPD Group £810m (of which £794m is 31 March 2010 deficit)
- Central Networks Group £700m (of which £690m is 31 March 2010 deficit).

10.272 The pension deficit allowances included in our plan relating to the deficits referred to above are set out in the table below:

Pension deficit repair expenditure funded through DUoS (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
DPCR5 Annual Average	18.8	17.4	12.8	22.7	71.7
RIIO-ED1 Annual Average	30.6	27.4	26.1	37.5	121.6
RIIO-ED1 Total (8 years)	**245.0**	**219.1**	**208.6**	**300.2**	**972.9**

Transmission exit charges

10.273 The WPD network is interconnected to the National Grid at Transmission Exit Points. National Grid provides infrastructure at these exit points to allow power to flow from the transmission system to the distribution network. National Grid recovers the cost of providing the exit points through annual charges.

10.274 The charges include the costs for new assets when additional capacity is requested by WPD and the costs of replacing existing assets determined by National Grid's replacement programme and are charged over a forty year period.

10.275 Where additional capacity is required, WPD's preference is to reinforce the distribution network as the costs are usually lower. Inevitably there are circumstances where it is necessary to request additional capacity from National Grid. WPD works closely with National Grid at Joint Technical Planning Meetings to determine which approach to reinforcement is the most economical.

10.276 Even though National Grid provide a quotation for the proposed work, the eventual charges are determined by the actual costs of the work. This means that if additional costs are incurred they are passed through to the charges levied on WPD. Hence there is little opportunity to influence the costs once projects are under way.

10.277 During RIIO-ED1 there will be limited requirement for new or reinforced transmission exit charges and this will add only £0.4m per annum to charges. The majority of costs cover previous requirements and National Grid's replacement programme. The total costs for RIIO-ED1 are shown below.

Transmission exit charges 2015/16 - 2022/23 (£m at 2011/12 prices)					
	West Midlands	East Midlands	South Wales	South West	Total
DPCR5 Annual Average	11.5	8.4	6.5	7.6	34.0
RIIO-ED1 Annual Average	13.0	11.2	9.3	8.6	42.1
RIIO-ED1 Total (8 years)	**104.1**	**89.7**	**74.3**	**68.4**	**336.5**

Reducing technical losses

10.278 An electricity network uses energy to facilitate the delivery of power to customers. Some of this energy is fixed and is related to the network (mainly transformers) being energised. The remainder is variable and related to the level of electrical load which is flowing through cables and wires causing a heating effect. The summation of this energy is referred to as Technical Losses.

10.279 At this stage, we are not seeking funding for the costs of reducing technical losses outlined below as these will be covered by efficiencies.

Addressing losses in transformers

10.280 To reduce the variable losses in a transformer the resistance of the wires needs to be decreased, which can be done by increasing the cross sectional area of the wires or using materials with a lower resistance. To reduce the fixed losses the efficiency of the magnetism needs to be improved, which can be done by using materials with better magnetic properties.

10.281 The additional costs of low loss transformers have long pay-back periods which normally make them uneconomic.

10.282 New legislation is anticipated to be passed in the EU during the RIIO-ED1 time period for the mandatory installation of low loss transformers. Whilst the implementation of this law is not expected for some time the impact would be in the order of £5m per annum based on manufacturer estimates and current price variance to non low loss transformers.

10.283 WPD believe that any obligation arising before the end of RIIO-ED1 will be minimal and we will absorb the higher costs through efficiency improvements elsewhere.

10.284 In the mean-time WPD will adopt a selective programme of oversizing transformers where we identify coincident LCT clustering that is anticipated to require re-sizing of the transformer at a later date. Data from the CSE informs us that 7% of the network will be subject to LCT hotspots and where this happens we will seek to install oversize transformers equating to 95 per annum at an incremental cost of £0.11m.

Addressing losses in cables

10.285 To reduce the variable losses in a cable the cross sectional area of the conductors needs to be increased. Once a cable is laid and the ground is reinstated, there is very little chance to make alterations to the cable. We will take the opportunity whilst installing cable to consider whether a larger size will provide a loss reduction. Data from the CSE informs us that 7% of the network will be subject to LCT hotspots and consequently we will use larger cable in these situations. This would equate to 75km per annum being installed with a higher rating and lower losses. The incremental cost would be £0.3m per annum.

Traffic Management Act – impact of Permit Schemes

10.286 Legislation requires WPD to inform Highways Authorities about work that will affect public roads. This helps the authorities to manage the road network and where possible co-ordinate work with other utilities to minimise disruption to traffic and the effect on economic growth.

10.287 There are three different types of notification scheme in operation:

- Notices describe the work location, when the work will take place and how long it will take. They are the main method for notification and do not require any payment. Unless the Highways Authority objects, the work can go ahead as notified.

- Permits are similar to Notices, with the main differences being that the Highways Authority will grant permission or refuse permission based upon assessment of the submitted permit and that charges can be levied. The Department for Transport is actively encouraging Highway Authorities to implement Permit Schemes, specifically for strategic traffic routes.

- Lane Rental is a scheme where Highway Authorities charge a daily fee for access to work in the highway. These can only be implemented once an Authority has operated a Permit Scheme for at least two years. Consequently only a limited number of authorities have currently either implemented or are seeking to implement a Lane Rental scheme. However, over the RIIO-ED1 period it is envisaged that more authorities will implement them and that there could be a significant impact on costs.

10.288 Whilst there are currently four Permit Schemes operating within the WPD area, consultation with all the Highways Authorities has identified that several of them (particularly in West Midlands and East Midlands) will be seeking to develop permit schemes some of which are at advanced stages of implementation.

10.289 The introduction of these schemes will lead to costs that WPD cannot avoid, but the impact is not certain, as the timing and scale of each scheme is determined by individual Highways Authorities. Additional annual costs have been forecast by considering the amount of work carried out on traffic sensitive roads and the typical costs of permits for different activities. These costs are normally incorporated within direct work activities but they are shown separately below to illustrate their impact on the business.

Licence area	Permit fee annual cost (£m)
West Midlands	0.37
East Midlands	0.45
South Wales	0.12*
South West	0.14

* South Wales permit costs would not be incurred until half way through RIIO-ED1, once the Welsh Assembly had determined their strategy.

10.290 The timing of Lane Rental schemes is unknown, but should they be introduced, WPD will incur additional multi-million pound costs each year. Due to the great uncertainty, WPD has not proposed any cost allowances in RIIO-ED1, but will require a price control re-opener mechanism to be in place should the introduction of Lane Rental schemes have a material impact on expenditure.

10.291 The costs indicated in this section have been incorporated into the costs of direct activities.

Regional drivers

10.292 WPD operates across a wide geographic are including large cities like Birmingham and Bristol, Cardiff and Nottingham and sparsely populated rural areas in Lincolnshire, Cornwall and South Wales.

10.293 Each location has its unique challenges but does not necessitate any specific locational or regional adjustments.

10.294 The only location where we agree there should be an allowance for regional effects is inner London.

2015-2023

RIIO-ED1 Business Plan

Uncertainty

WESTERN POWER DISTRIBUTION

Serving the Midlands, South West and Wales

11 Uncertainty

11.1 The proposals in this Business Plan have been derived by using the most up-to-date information that is available and therefore represents WPD's best view. Whilst we are best placed to manage the risk of delivery of our plan, there are some areas of uncertainty which need additional mechanisms due to the external nature of the uncertainty and its potential impact.

11.2 In assessing the need for uncertainty mechanisms we consider:

- the reason for introducing each one;
- the appropriate mechanism;
- the value and impact on customers and other stakeholders;
- whether the proposed mechanism works with other aspects of the plan.

11.3 We also consider whether there are any drawbacks in terms of :

- undermining efficient delivery;
- price volatility;
- unintended consequences;
- complexity;
- resource cost to manage (both internal and at Ofgem).

11.4 The areas of uncertainty that meet these criteria are:

- load related expenditure (including uptake of Low Carbon Technology);
- potential introduction of Lane Rental charges for works in the street;
- impact of the smart meter roll out.
- CNI security;
- innovation roll out;

Load related expenditure

11.5 The external drivers of investment due to changes in the demand on our network are:

- General economic conditions which has a significant influence on new connections
- Customer behaviour in terms of energy efficiency and their usage in response to overall prices and tariffs introduced by suppliers
- Rate of adoption of LCTs
- Connection of Distributed Generation (DG) which is heavily influenced by support mechanisms and planning policy

11.6 The UK targets for reducing carbon dioxide emissions require a reduction of 80% by 2050. This target will be met through the decarbonisation of heating and transport, improvements in energy efficiency and producing electricity from renewable sources. A number of low carbon technologies - such as electric vehicles, solar panels, wind farms and heat pumps - place new requirements on the network.

11.7 As part of its Carbon Plan, DECC has set out 4 illustrative scenarios all of which would meet the Government's carbon targets. These national scenarios, all of which require a significant adoption of LCTs, have been summarised by DECC as follows:

Scenario 1	**High emissions abatement in low carbon heat**
• Medium levels of fuel efficiency • High levels of low carbon heat • High levels of solid wall insulation	High level of emissions reductions from uptake of low carbon heat in buildings and industry (8 million installations) with significant emission reductions from transport (60g CO_2/km) and significant thermal insulation of buildings (5 million solid wall insulation).
Scenario 2	**High emissions abatement in transport**
• High levels of fuel efficiency • Medium levels of low carbon heat • High levels of solid wall insulation	High level of emissions reductions from transport (50g CO_2/km), with comparatively lower reductions from low carbon heat (7 million installations) and significant thermal insulation of buildings (5 million solid wall insulation).
Scenario 3	**High electrification of heat and transport**
• High levels of fuel efficiency • High levels of low carbon heat • Low levels of solid wall insulation	This reflects a future where there is high electrification in heat and transport, with significant uptake of EVs and heat pumps (as in scenario 1 and scenario 2) and lower comparative levels of insulation (2.5 million).
Scenario 4	**Credit purchase**
• Low levels of fuel efficiency • Low levels of low carbon heat • Medium levels of solid wall insulation	Reflects a future where more than one key technology under-delivers, and carbon credits are purchased. It assumes 1.6 million low carbon heat installations, medium levels of insulation (4.5 million) and fuel efficiency of 70g CO_2/km.

11.8 Whilst DECC has produced a number of scenarios for meeting the target, there is considerable uncertainty about the uptake of low carbon technology, how installations will cluster and the resultant impact on the network.

11.9 The rate of growth will be dependent on many factors such as development of these technologies by manufacturers, rate of fall of prices, relative cost of different fuels, availability of subsidies, building regulations and consumer attitudes.

11.10 Our expenditure forecasts are based upon pragmatic assumptions informed by data provided by the CSE. We have proposed to use information from more advanced monitoring of the network and data from smart meters to identify LCT hotspots so that reinforcement work can be targeted at the parts of the network where it is required. Tracking expenditure against forecasts will determine whether there is significant variance.

11.11 The need for network reinforcement is dependent on widespread changes in demand driven by general economic conditions and the specific location of the development of new load or generation connections. This is in addition to the effect of LCTs.

11.12 Assumptions about the amount of load growth are used to forecast which parts of the network will require reinforcement, but actual load growth can differ.

11.13 There is a need for a mechanism which adjusts allowances where the impact on the network is different than forecast. This should take the form of a price control re-opener where WPD can make a representation to Ofgem at the mid-point of RIIO-ED1 should there be significant change to expenditure.

11.14 During DPCR5, Ofgem introduced a re-opener mechanism that operates around a 20% dead band. This limits the risk of windfall gains for DNOs should the forecast be too high and provides a safety net for companies where load growth is significantly higher than forecast.

11.15 We proposed that this mechanism should apply during RIIO-ED1.

Traffic Management Act

11.16 Legislation requires WPD to inform Highways Authorities about work that will affect public roads. Most Highways Authorities currently operate a Notice process which does not incur fees, but the Department of Transport is encouraging them to implement Permit schemes for strategic roads introducing new charges. Highways Authorities also have the option of implementing Lane Rental schemes where utilities pay a daily charge for working in the road.

11.17 Current costs are relatively low, but these could increase significantly, especially where Lane Rental schemes are introduced.

11.18 There are no mandated timescales and each Highway Authority is free to choose which approach it prefers introducing uncertainty into cost forecasts.

11.19 We have assumed that Highway Authorities will adopt Permits schemes, but only apply these to traffic sensitive roads. This has introduced additional cost of £1m per annum across WPD. This approach balances the additional costs where Highways Authorities choose to apply Permit fees to all roads against situations where Notice schemes remain in place.

11.20 The main uncertainty relates to the adoption of Lane Rental schemes, which could introduce multi-million pound additional costs. We have not allowed for any Lane Rental scheme costs and therefore would require a price control re-opener at the mid-point of RIIO-ED1 to adjust allowances.

Smart meter rollout

11.21 The roll out of smart meters to domestic customers between the end of 2014 and 2019 has uncertainty in all three main impact areas:

- remedial work at the metering point;
- charges from the Data and Communications Company for the provision of data from smart meters;
- development of in-house systems for the receipt and storage of data, the potential for the DCC to start handling the change of supplier registration process and proactive load management system.

11.22 The volume and cost of the remedial work included within the Business Plan assumes that 2% of installations will require remedial action to allow the meter operator to install a smart meter. The National Skill Academy has provided forecasts that suggest 4% of installations will require a visit to enable a smart meter to be connected and therefore costs from remedial work could double. Due to the uncertainty of the actual volumes of remedial work it is proposed that a volume driver is required to adjust allowances once the work is completed.

11.23 Provisional charges for DCC services, published by DECC in January 2013, suggest that costs for WPD would be approximately £100m over the RIIO-ED1 period. These charges are subject to further review by DECC during 2013 and may change. Whilst these costs will be defined before the start of RIIO-ED1, there is uncertainty during the RIIO-ED1 price control submission

and assessment process. Ofgem should therefore allow resubmission of costs once they are finalised by DECC.

11.24 The in-house data systems for communication with the DCC and for the storage of smart meter data will be completed by the end of 2014, however the design baseline for these systems is yet to be defined. In addition, systems may also be required to enable the DCC to carry out the Change of Supplier Registration Service (a process currently carried out within DNO systems) and there will be a need for systems to carry out load management once the roll out of smart meters near completion. The exact nature of these systems is undefined and therefore there is uncertainty about the costs.

11.25 Allowances should be adjusted, using a re-opener mechanism, where the combined costs differences are materially different to forecasts.

Innovation rollout

11.26 New solutions to accommodate the changing requirements on the network that result from Low Carbon Network projects and other on-going work may be the lowest cost long term solution but not the lowest cost during the RIIO-ED1 period. A mechanism is required to reopen the allowance in such circumstance. This mechanism will only be needed where:

- We can prove that the proposed solution has been proven to benefit the low carbon energy sector
- The innovation facilitates the achievement of environmental outputs where we agree to enhanced outputs in return for the funding
- There are not sufficient benefits in the remainder of the RIIO-ED1 period to justify within period
- The net additional funding is material (i.e. greater than 1% of base revenue)

11.27 We propose a re-opener window at the mid-point of RIIO-ED1.

CNI security measures

11.28 The Centre for the Protection of Critical National Infrastructure works with the industry to identify where additional security measures are required. These depend on Government intelligence of future security risks and therefore the location and scale are uncertain.

11.29 A mechanism was introduced for DPCR5 where costs could either be logged up to be recovered at the start of the next price control or, if they were material, be recovered earlier at a defined re-opener window.

11.30 We propose that the same mechanism is used for RIIO-ED1, with a re-opener window at the mid-point in 2019.

2015-2023

RIIO-ED1 Business Plan

Financing the business plan

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12 Financing the Business Plan

12.1 The total expenditure means that during RIIO-ED1 WPD will have to raise £1.7bn of new debt as well as re-financing £900m debt as it falls due for repayment. In addition shareholders will re-invest £800m to maintain gearing at 65% (debt to RAV value).

12.2 In deriving these values we have made a number of assumptions about the cost of debt, cost of equity and other financing parameters.

Cost of equity - 6.7%

12.3 The lengthening of the price control period from five years in DPCR5 to eight years in RIIO-ED1 increases forecasting risk for WPD's shareholder. Forecasting the level of costs is less certain for eight years and this uncertainty is compounded by investment requirement uncertainty (for example for the range of scenarios for LCTs). However, Ofgem have indicated that they intend to put in sufficient cost re-opener mechanisms in RIIO-ED1 to off-set the increased forecasting risk.

12.4 If our risk profile is unchanged then our cost of equity assumption is the same as DPCR5 and remains at 6.7%. This is supported by work undertaken by NERA, CAPM, First Economics and others.

Cost of debt - 2.3%

12.5 Ofgem has determined that under RIIO-ED1 the cost of debt will be calculated from a 10 year rolling average of real rates that will be determined from the arithmetical average of the iBoxx A-rated and BBB-rated non-financial indices less the implied 10-year gilt inflation break evens published daily by the Bank of England.

12.6 We have used forecasts for the iBoxx index from RBS and Lloyds and used the average of the midpoints each year to forecast that the real cost of debt will be 2.3%.

RIIO-ED1 Cost of debt forecast									
	2015	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
RBS	2.33	2.19	2.04	1.93	1.86	1.87	1.93	2.07	2.25
Lloyds	2.69	2.63	2.61	2.57	2.47	2.26	2.26	2.28	2.31
Midpoint	**2.51**	**2.41**	**2.33**	**2.20**	**2.17**	**2.07**	**2.10**	**2.18**	**2.28**

Gearing - 65%

12.7 We have assumed that gearing remains at the same level as DPCR5 – 65%.

Vanilla WACC - 3.8%

12.8 The value of Vanilla WACC is derived from the cost of equity, cost of debt and gearing assumptions above.

Capitalisation rate - 80% of totex (total core costs)

12.9 In DPCR5, costs other than business support and non-operational capex were treated as 85% slow pot (i.e. capitalised into the RAV) and 15% fast pot, with business support and non-operational capex treated separately as 100% fast pot.

12.10 To avoid any remaining boundary issues in cost classification, we have included business support and non-operational capex in the total pot of costs (totex). Our modelling indicates that treating 80% of totex as slow pot produce the same capitalisation treatment in DPCR5.

Asset lives transitional arrangements - 35 years in RIIO-ED1

12.11 The RIIO-ED1 proposals indicate a 45 year life on assets acquired after 1st April 2015 with the possibility of a transitional arrangement in RIIO-ED1.

12.12 In RIIO-T1, the price control for transmission companies, transitional arrangements are in place whereby SHETL, SPTL and NGET respectively have 16, 16 and 8 year transitional periods on new assets, with all three having a gradual increase in asset lives from 20 to 45 years. The cash flow and credit ratios of our four DNOs show significant deterioration during RIIO-ED1 unless a transitional arrangement is put in place.

12.13 We have adopted the NGET transitional arrangement which has a gradual increase in asset lives from 20 to 45 years within one price control period. This equates to a 35 year average asset in RIIO-ED1. We require this transitional arrangement in order to ensure we achieve credit ratios that will maintain a minimum credit agency rating of BBB/Baa2 for our four DNOs.

12.14 We have employed NERA to assess our cash flow risk. Their Monte Carlo modelling concludes that a capitalisation totex rate of 80%, asset lives of 35 years and cost of equity of 6.7% give credit ratios for the RIIO-ED1 period that look consistent with a solid investment grade rating for all WPD entities. A higher capitalisation rate (85%) or a longer asset life assumption (45) years has a significantly negative impact on our credit ratios.

2015-2023

RIIO-ED1 Business Plan

Impact on customers' bills

WESTERN POWER DISTRIBUTION

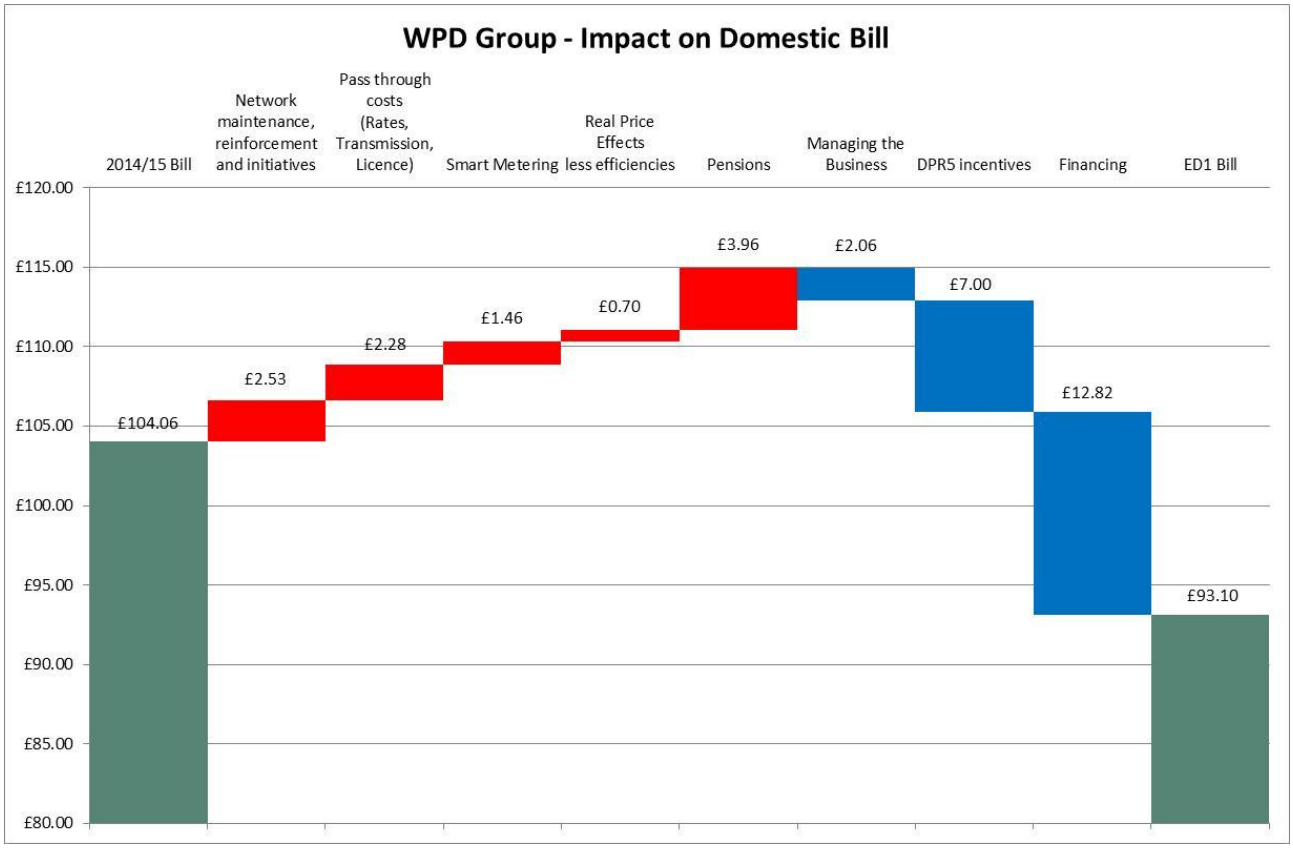
Serving the Midlands, South West and Wales

13 Impact on customers' bills

13.1 Within this Business Plan we set out detailed forecasts for the costs of carrying out the plan and the financing costs we incur to enable us to do so.

13.2 Over RIIO-ED1 our charges reduce by an average of 10% before inflation.

13.3 The change in bills is driven by a number of key areas of expenditure. This is shown in the chart below for our four DNOs combined:



2015-2023

RIIO-ED1 Business Plan

Glossary

WESTERN POWER DISTRIBUTION

Serving the Midlands, South West and Wales

14 Glossary

A

Accident Frequency Rate

The number of accidents that occur divided by the number of people employed (allowing a like for like comparison irrespective of the number of staff employed).

Alliance

A method of working with contractors, where resources from both the main business and the contractors are shared within a combined organisation.

B

Broad Measure of Customer Satisfaction (BMCS)

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

British Telecom 21st Century (BT 21 CN)

British Telecom is in the process of converting its existing telecommunications network to an internet protocol system known as BT 21st Century Network. This will move away from pre-determined hard wired routes for communication to a system that can route communications around the internet where communication paths are not determined.

Building Research Establishment Environmental Assessment Method (BREEAM)

A methodology used by the building industry to assess the environmental aspects of building construction and refurbishment.

Business Carbon Footprint (BCF)

The BCF scheme was introduced as a reputational incentive in DPCR5 to encourage DNOs to consider the direct carbon impact of conducting their operations and to be proactive in the reduction of emissions.

C

Capital expenditure (Capex)

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

Carbon Plan

First published in December 2011, the Carbon Plan sets out the government's plans for achieving the emissions reductions it committed to in the first 4 carbon budgets (5 year periods each). Emissions in the UK must, by law, be cut by at least 80% of 1990 levels by 2050. The UK was first to set its ambition in law and the Plan sets out progress to date and assesses cost-effective next steps. Within

the plan it states “This Carbon Plan sets out a vision of a changed Britain, powered by cleaner energy used more efficiently in our homes and business, with more secure energy supplies and more stable energy prices, and benefitting from the jobs and growth that a low carbon economy will bring”.

Centre for Sustainable Energy (CSE)

An independent national charity that helps people and organisation from the public, private and voluntary sectors meet the twin challenges of rising energy costs and climate change.

Closed Circuit Television (CCTV)

A video based security monitoring system that presents images on television screens in a monitoring centre from cameras installed at remote sites allowing activities to be recorded and intruders to be identified.

Condition Based Risk Management (CBRM)

This is an asset replacement modelling approach that makes use of condition information to forecast which assets require to be replaced and when.

Cost Benefit Analysis (CBA)

A methodology that compares the costs of carrying out an investment against the benefits (such as risk reduction or service improvement) to compare different options and demonstrate value for money.

Cost of Debt

The effective interest rate that a company pays for its loans.

Cost of Equity

The rate of return on investment required by a company’s shareholders.

Customers Interrupted (CIs)

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

Customer Minutes Lost (CMLs)

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

Customer Service Excellence

This is a Government scheme which recognises organisations that provide effective and excellent customer service. Similar assessments were previously awarded the Charter Mark.

D

DECC

The Government Department of Energy and Climate Change.

Distributed Generation (DG)

Generation connected to the distribution network. It includes wind turbines, domestic solar panels, large scale photo-voltaic farms, hydro-electric power and biomass generators.

Distribution Network Operators (DNOs)

A DNO is a holder of an electricity distribution licence. There are 14 DNOs which are owned by six different groups.

Distribution Price Control Review 5 (DPCR5)

The current price control period running from 1 April 2010 until 31 March 2015. It is the fifth using RPI-X regulation and will be replaced with the RIIO framework from 1 April 2015.

Distribution Use of System (DUoS)

These are the charges levied to suppliers for DNO costs that can be recovered from customers. The amount is determined through price control reviews.

E

EA Technology

EA Technology are a research company that have been contracted jointly by all DNOs to develop and maintain a model (registered name Transform) to assess the cost of the impact of low carbon technologies on the network.

Electricity, Safety, Quality and Continuity Regulations 2002 (ESQCR)

The ESQCR specify safety standards, which are aimed at protecting the general public and customers from danger. In addition, the regulations specify power quality and supply continuity requirements. The regulations were amended in 2006 to include a requirement for resilience tree clearance.

ENMAC™

ENMAC is the trade name for GE Network Solutions control room software used for managing real-time operation of the distribution network.

Extra High Voltage (EHV)

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

F

Fast pot

Fast pot is the revenue that is recovered in the year of expenditure.

G

Gearing

A ratio measuring the extent to which a company is financed through borrowing.

General Packnet Radio Service (GPRS)

GPRS is a technology that allows the transfer of data across the mobile phone network.

Guaranteed Standards of Performance (GSOPs)

Guaranteed Standards of Performance set minimum service levels to be met across a range of activities covering supply interruptions, appointments and connections. They are specified in a Statutory Instrument and where a licence holder fails to provide the level of service required, it must make a payment to the customer affected subject to certain exemptions.

H

Health and Safety Executive (HSE)

A Government organisation that has the responsibility of enforcing health and safety legislation.

Health Index (HI)

Framework for collating information on the health (or condition) of distribution assets and for tracking changes in their condition over time.

High voltage (HV)

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

I

Incentive on Connections Engagement (ICE)

This is a new incentive being introduced into RIIO-ED1 intended to drive DNOs to improve communication and interaction with major customers.

Information Quality Incentive (IQI)

A regulatory incentive mechanism that drives DNOs to provide accurate cost forecasts in their business plans and drive efficient expenditure

Information Technology and Telecoms (IT&T)

Computer and telecommunication systems.

Inspections and Maintenance (I&M)

The activities carried out on a routine basis for the visual checking of the external condition of assets and the invasive examination of plant and equipment.

Interruption incentive scheme (IIS)

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

ISO 14001

This is an international standard for environmental management systems.

L

Load Index (LI)

Framework, introduced as part of DPCR5, demonstrating the utilisation of individual substations or groups of interconnected substations. It is used as a secondary deliverable capturing the effects of load related investment.

Low Carbon Networks Fund (LCNF)

A funding mechanism introduced under DPCR5 to encourage DNOs to prepare for the role they will have to play as GB moves to a low carbon economy. £500m is available for DNOs and partners to innovate and trial new technologies, commercial arrangements and ways of operating networks. The last LCNF competition will run in 2014. It will be replaced by the Network Innovation Competition and Network Innovation Allowance during RIIO-ED1.

LCNF Tier 1

LCNF Tier 1 is a funding mechanism for small innovation projects. During DPCR5, Ofgem has allocated £80m between all DNOs.

LCNF Tier 2

LCNF Tier 2 is a funding mechanism for significant 'flagship' innovation projects. During DPCR5, £320m of will be provided centrally, with DNOs competing for funding.

Low Carbon Technology (LCT)

This is the collective term for devices that reduce the amount of carbon being used for heating, transport and generation. It includes electric vehicles, heat pumps and solar generation.

Low Voltage (LV)

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

N

National Grid

The 400kV and 275kV network used to transport electricity around the country from sources of large scale generation such as power stations and off-shore wind farms to substations that feed into DNO electricity networks.

O

Office of Gas and Electricity Markets (Ofgem)

Ofgem is responsible for regulating the gas and electricity markets in the UK to ensure customers' needs are protected.

P

Perflourocarbon Tracer (PFT)

A chemical that is injected into fluid filled cables, used to speed up the location of leaks.

Priority Service Register (PSR)

A database that records details about vulnerable customers so that additional support can be provided.

R

Real Price Effects (RPE)

Increase in prices, of materials, direct staff or contract labour, over and above increases in the Retail Price Index.

Referral Partners

There are independent organisations (e.g charities) that take an active role in dealing with social issues and have agreed to provide support to people referred to them by WPD.

Regulatory Asset Value (RAV)

The value ascribed by Ofgem to the capital employed in the licensee's regulated distribution business. The RAV is calculated by summing an estimate of the initial market value of each licensee's regulated asset base at privatisation and all subsequent allowed additions to it at historical cost, and deducting annual depreciation amounts calculated in accordance with established regulatory methods. The revenues licensees are allowed to earn under their price controls include allowances for the regulatory depreciation and also for the return investors are estimated to require to provide the capital.

Remote Terminal Unit (RTU)

Communications devices that transmit data about the status of the network back to the control centre.

Resilience Tree Cutting

This is the full removal or extensive cutting of trees that are found to be within the falling distance of overhead power lines. This ensures that they cannot cause damage to the power lines in the event of severe weather.

Revenue = incentives + innovation + outputs (RIIO)

Ofgem introduced a new regulatory framework in 2010 replacing previous RPI-X regime. It places more emphasis on incentives to drive the innovation needed to deliver a sustainable energy network at value for money to existing and future consumers.

RIIO Electricity Distribution 1 (RIIO-ED1)

The price control period that will run from 1 April 2015 to 31 March 2023. It is the first electricity distribution price control that will use the RIIO framework for setting allowances.

RIIO Electricity Distribution 2 (RIIO-ED2)

The electricity distribution price control period that will run from 1 April 2023 to 31 March 2031.

RPI-X

The form of price control currently applied to network monopolies. Each company is given a revenue allowance in the first year of each control period. The price control then specifies that in each subsequent year the allowance will move by 'X' per cent in real terms.

S

Slow pot

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

Smart Grid

A generic term for a range of measures that are used to operate electricity networks allowing more generation or demand (load) to be connected to a given electricity circuit without the need for traditional reinforcement (or upgrade) of that equipment.

Smart Grid Forum (SGF)

The Smart Grid Forum was established by Ofgem and DECC in early 2011 bringing together key opinion formers, experts and stakeholders involved in the development of smart grids, with the aim of providing strategic input to help shape Ofgem's and DECC's thinking and leadership in smart grid policy and deployment.

Sulphur Hexafluoride (SF_6)

A potent greenhouse gas widely used in transmission and distribution equipment.

Supervisory Control and Data Acquisition (SCADA)

This is the term used for the systems used to monitor and control distributed assets. It comprises the remote terminal units, communication infrastructure and human interface within central control rooms.

T

Totex

Total of capital expenditure (capex) for network investment plus operational expenditure (opex) for running the business.

Transform Model

The model – developed by EA Technology - which uses a representation of the network and calculates the investment needed to accommodate LCTs using either smart grid solutions or traditional network reinforcement. The smart solutions include 'demand side response' as well as additional technology to move load around the network and utilise the full capacity of assets.

Turnkey

This is a contractual arrangement where the design and construction of a project is handed over to a third party.

V

Vanilla Weighted Average Cost of Capital (Vanilla WACC)

This is the combined cost rate of funding calculated using a pre-tax cost of debt and post-tax cost of equity weighted by notional gearing.

Vulnerable Customers

Customers who are medically dependent upon electricity, have special communication requirements or have other special needs with a dependence upon electricity (e.g. stair lift).

W

Western Power Distribution (WPD)

The electricity distribution network operator that holds four distribution licences in West Midlands, East Midlands, South Wales and South West.

Worst Served Customers

Customers who experience 15 or more higher voltage interruptions over a three year period, with a minimum of three in any one year.