2015-2023

RIIO-ED1 **BUSINESS PLAN**

SA-04 Supplementary Annex - Outputs

June 2013 (updated April 2014)

WESTERN POWER DISTRIBUTION

Serving the Midlands, South West and Wales

SA-04 Outputs
Contents

1 Introduction

1.1 This document is a supplementary annex to the Western Power Distribution (WPD) Business Plan for the eight year period from 1st April 2015 to 31st March 2023.

1.2 It sets out the outputs that will be delivered through investment and business processes.

1.3 It includes the outputs for the four WPD distribution licences of West Midlands, East Midlands, South Wales and South West.

1.4 The eight year period aligns with the next regulatory price control review period, known as RIIO-ED1; the first for electricity distribution to be determined using Ofgem's Revenue = Incentives, Innovation and Outputs framework. The Business Plan, supplementary annexes, detailed cost tables and financial models form the submission under RIIO-ED1 to the regulator Ofgem (Office for Gas and Electricity Markets), who will use the information to determine allowed revenues.

Structure of this document

1.5 We appreciate that the readers of the WPD Business Plan suite of documents will range from regulatory experts and well informed stakeholders through to new customers who may have had little previous knowledge of WPD.

1.6 This document is aimed at readers who require a more detailed understanding of the outputs that will be delivered. A less detailed description of the outputs can be found in the main Business Plan Overview document.

1.7 This document is subdivided into the following sections:

Chapter	Title	Content
2	**Overview of outputs**	A brief description of what outputs are and the regulatory framework that incentivises their delivery.
3	**Safety outputs**	The outputs that will be achieved in relation to health and safety and the indicators that will be used to measure our performance.
4	**Reliability outputs**	The outputs that will be achieved in relation to network performance and the service provided when faults occur and the indicators that will be used to measure our performance.
5	**Environmental outputs**	The outputs that will be achieved in relation to economically facilitating the growth of low carbon technology connecting to the network and reducing WPD's carbon footprint, along with the indicators that will be used to measure our performance.
6	**Connections outputs**	The actions that will improve service for customers connecting to the network and the indicators that will be used to measure our performance
7	**Customer satisfaction outputs**	The outputs that will be delivered to improve customer satisfaction and the indicators that will be used to measure our performance.
8	**Social obligation outputs**	The new and enhanced services that provide benefits for vulnerable customers and those that are fuel poor and the indicators that will be used to measure our performance.

2 Overview of outputs

Introduction

2.1 Outputs are delivered as a consequence of WPD's investment programmes, network management decisions and customer service initiatives.

2.2 The outputs are either primary outputs or secondary deliverables:

- primary outputs represent the service that customers receive such as network reliability.
- secondary deliverables contribute to the delivery of primary outputs and are generally associated with more detailed network management decisions. For example improving flood defences enhances the resilience of the network.

2.3 Extensive stakeholder engagement has provided useful feedback that has refined the outputs WPD has committed to deliver for the eight years of RIIO-ED1.

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

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

2.5 The following chapters cover each output category and provide:

- a description and explanation of the individual primary outputs and secondary deliverables for each of the six categories of outputs;
- a summary of stakeholder feedback on the output and an explanation of how this has been considered in setting future performance;
- future targets, where appropriate.

RIIO-ED1 regulatory outputs

2.6 Ofgem has prescribed a framework of outputs and incentives that it will use to monitor company performance. This provides the outline measures and requirements. In many instances WPD is proposing additional voluntary outputs and secondary deliverables.

2.7 The table below is an extract from Ofgem's Strategy Decision, published in March 2013.

Summary of the Ofgem RIIO-ED1 outputs framework	
Primary output category	**RIIO-ED1 outputs and incentives**
Safety	• Compliance with the legislative and regulatory framework regulated by the Health and Safety Executive (HSE).
Environmental impact	• Replace DPCR5 losses incentive with an obligation to reduce losses, ex ante funding for loss reduction activities and a discretionary reward for efficient and innovative loss reduction initiatives. • Maintain reputational incentive for business carbon footprint (BCF). • Maintain allowance for undergrounding overhead lines in areas of outstanding natural beauty and national parks. • Introduce a reputational reporting requirement on broad environmental impact.
Customer satisfaction	• Strengthen the Broad Measure of Customer Satisfaction (BMCS) introduced in DPCR5.

Social obligations	• Putting in place incentives to ensure DNOs play a full role in addressing consumer vulnerability, through:
	  • improving the information they hold on customers connected to their wires and identifying how they can improve the assistance they provide
	  • engaging with a wide range of other agencies to ensure customers get access to support that is available
	  • identifying opportunities to enable energy solutions for vulnerable households that might also reduce demands on the distribution network
	• The stakeholder engagement incentive rewards DNOs that demonstrate the delivery of benefits result from the above.

Connections	• For smaller connection types – increase in the incentive value associated with the customer satisfaction survey and introduce a new incentive relating to the average time taken to connect customers. • For larger connection types – introduce a new Incentive on Connections Engagement (ICE), requiring DNOs to engage with and understand the requirements of different customers. • Maintain underlying framework of licence conditions and guaranteed standards of performance to safeguard minimum levels of performance for all customers.
Reliability and availability	• Continue existing interruption incentive scheme (IIS) with small improvements. Improve the consistency of the asset health and loading indices secondary deliverables. • Reduced payment threshold under the guaranteed standards of reliability and uniform coverage. • Maintain the DPCR5 mechanism for worst served customers. • Introduce secondary deliverables on network resilience.

3 Outputs – safety

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

3.2 The objective of safety outputs is to minimise the safety risks to people. This includes staff, contractors and members of the public.

3.3 During RIIO-ED1, we will deliver the following outputs and secondary deliverables:

Compliance with health and safety law

- Target zero improvement notices, prohibition notices and prosecutions from the Health and Safety Executive.
- Complete work programmes to achieve compliance with ESQCR statutory clearance to structures or the ground.
- Complete inspection and maintenance programmes every year.

Reducing accidents

- Reduce our overall 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.

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 educational sessions to provide safety information to over 400,000 school children.
- Continue to publish literature on maintaining safety around electricity apparatus and send more than 500,000 copies of this literature to targeted landowners, businesses or leisure operators.

Regulatory framework

3.4 Ofgem has decided that the appropriate primary output for health and safety is the compliance with the safety requirements set out in legislation and enforced by the Health and Safety Executive (HSE).

Compliance with health and safety law

3.5 The Government seeks to ensure the right safety behaviour of organisations and people through an extensive range of health and safety law. The HSE has the responsibility of enforcing health and safety legislation and its inspectors work with the industry to prevent incidents.

3.6 Compliance with health and safety law is dependent upon preventing accidents by developing and ensuring the application of safe working practices and by completing programmes of work that reduce safety risks.

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

Secondary deliverable: Improvement notices, prohibition notices and prosecutions from the HSE

3.8 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.

3.9 Where there is a breach of the law, the HSE has the power to issue a formal Improvement Notice. If the HSE believes that there is a serious risk of harm it has the option to stop activities immediately using a Prohibition Notice. Where the conditions of any such notices are not met, the HSE can prosecute organisations or individuals.

3.10 The HSE is also allowed to levy a 'Fee for Intervention'. This fee is a charge to cover the cost of inspection visits, if a 'Material Breach' of health and safety legislation is discovered. Whilst these fees are not fines, they lead to additional costs for the business.

3.11 During RIIO-ED1 WPD will ensure that its working practices and work programmes comply with health and safety legislation and will adopt appropriate working practices where new or revised legislation is introduced.

☑ RIIO-ED1 measure – number of improvement notices, prohibition notices and prosecutions

3.12 The RIIO-ED1 target will be to have zero improvement notices, prohibition notices and prosecutions.

Secondary deliverable: Completed inspection and maintenance programmes

3.13 The requirement to carry out inspection and maintenance is prescribed in health and safety law, but DNOs have the choice to determine what actions are appropriate.

3.14 The main method of ensuring that the network remains safe is through regular and thorough inspection, defect rectification and maintenance.

3.15 WPD has evolved its inspection and maintenance standards and policies over time, refining them, and applying best practice, as new techniques are introduced.

3.16 WPD ensures that work programmes are completed through a number of key performance indicators. These are used by local teams and senior management to ensure the timely delivery of programmes and the avoidance of backlogs.

3.17 During RIIO-ED1, we will ensure that assets are regularly inspected and maintained in line with good asset management practice, carrying out appropriate remedial actions.

☑ RIIO-ED1 measure – completion of inspection and maintenance activity

3.18 Completion of work programmes will be demonstrated through a range of key performance indicators for each inspection and maintenance activity allowing easy review and management action as appropriate.

Secondary deliverable: Complete work programmes to meet the requirements for increased clearance to structures or the ground;

3.19 The Electricity Safety, Quality and Continuity Regulations 2002 (ESQCR) specify a wide range of obligations on DNOs.

3.20 Regulation 17 deals with the height of overhead lines and specifies the clearances to ground for roads and other situations. This allows safe operation of activities under the lines. Following the proactive measurement survey of the height of overhead lines, it has been found that approximately 20% of service lines to properties that cross roads are too low. The work to increase ground clearance will carry on during DPCR5, but some will need to be carried out in RIIO-ED1.

3.21 Regulation 18 requires that overhead lines are positioned away from buildings and structures to reduce the risk of inadvertent contact. This was a new obligation introduced in 2002 that required DNOs to identify locations where overhead lines were close to structures and remove the hazard by modifying, diverting or undergrounding the lines. WPD has been working on a programme that will remove the majority of these situations by the end of DPCR5. During RIIO-ED1 we will complete the original work programmes to provide sufficient clearance between overhead lines and structures.

☑ RIIO-ED1 measure – Completion of ESQCR regulation 17 programme

3.22 The completion of the ESQCR regulation 17 programme will be demonstrated by key performance indicators showing that identified height issues have been resolved.

☑ RIIO-ED1 measure – Completion of ESQCR regulation 18 programme

3.23 The completion of the ESQCR regulation 18 programme will be demonstrated by key performance indicators showing that identified proximity issues have been resolved.

Stakeholder views

3.24 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.

3.25 Feedback confirms that 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.

Reducing accidents

3.26 Although 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.

3.27 In addition to specific skills training, staff are trained in identifying risk and application of risk control and mitigation.

3.28 Staff are encouraged to take personal responsibility for the safety of themselves, colleagues and others who could be affected by their works and are given absolute authority to stop work where they cannot adequately control risks to an acceptable level.

3.29 Team Managers carry out regular site visits to inspect general site safety and working practices. Examining Officers periodically assess operational capability to ensure that every operational member of staff and contractor is competent to carry out their duties.

3.30 Contractors working on behalf of WPD on the distribution network are required to comply with WPD's operational safety policy and monitoring requirements. Contractors are required to establish and operate their own general safety monitoring processes as appropriate to their work activity but are still required to report to WPD any safety related incidents or issues that occur. This extends the culture of safety and enables additional learning to be shared.

3.31 The systems for managing safety are annually audited against the requirements of the international specification Occupational Health and Safety Assessment Series 18001.

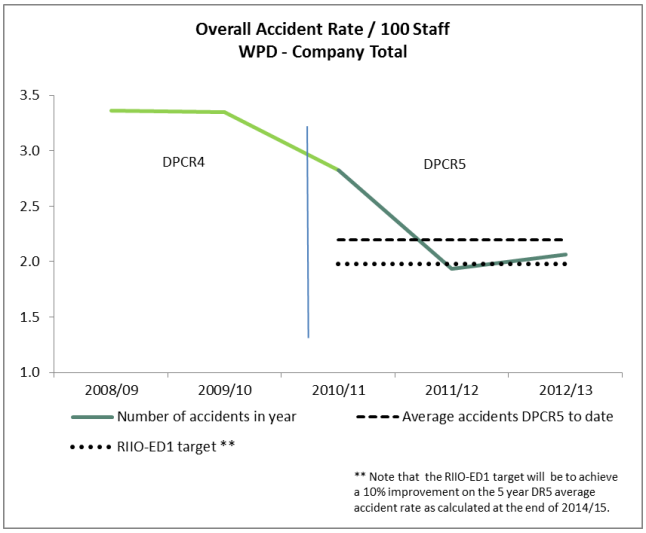
3.32 Although accidents are rare, when they do occur investigations are carried out quickly and learning is shared across all relevant teams and other DNOs if appropriate.

3.33 During RIIO-ED1 safe working will remain a high priority. We will seek to reduce the overall 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.

☑ RIIO-ED1 measure - Reduce our accident frequency rate by 10%;

3.34 The accident frequency rate is derived from the number of annual accidents and the number of staff, and is expressed as Accidents per 100 members of staff. This allows performance to be compared across differently sized teams and organisations.

3.35 Historical performance demonstrates that progressive improvements have been achieved overall through DPCR4 and DPCR5.



3.36 During RIIO-ED1 we will seek to continue this improvement by reducing the overall accident frequency rate achieved during DPCR5 by a further 10%.

Secondary deliverable: Maintain active participation in the 'Powering Improvement' health and safety strategy

3.37 Powering Improvement is the five-year industry strategy to bring about continuous improvement in safety and occupational health in the energy generation and networks sectors. It is supported by member companies of both the Energy Networks Association (the industry body for UK electricity transmission and distribution), member companies of the Association of Electricity Producers (the trade association for the UK generators), trade unions and the HSE.

3.38 The Powering Improvement initiative started in 2010 and each year has a specific theme, with the final year being dedicated to reviewing progress and lessons learned in order to set the health and safety priorities for the following five years to 2020.

3.39 WPD has been actively involved with the strategy and will continue to support the initiative throughout RIIO-ED1. This will allow learning from across the electricity sector to be shared and best practice to be adopted.

☑ RIIO-ED1 measure – active participation of Powering Improvement strategy

3.40 WPD will actively participate in the strategy and formally commit to the aims of the strategy.

Secondary deliverable: Working with trade unions and implementing the principles of 'Behavioural Safety'

3.41 Trade unions play an important role in working with WPD to improve the health and safety of staff. By working together, new procedures can be implemented, hazards can be highlighted and risks reduced.

3.42 Behavioural safety goes beyond setting rules and enforcing compliance. It seeks to change attitudes, so that staff assume responsibility for their own safety and the safety of others by acting on their training, following instructions and challenging others when they see safety rules about to be broken. This enhances safety culture with everyone being more vigilant and involved.

3.43 During RIIO-ED1 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 additional training in the understanding of behavioural safety.

☑ RIIO-ED1 measure – Working with trade unions to improve safety performance

3.44 Meetings will be held with trade union representatives to identify safety issues and resolve them. The principles of behavioural safety will be implemented across the company.

Secondary deliverable: Investigating accidents to members of the public

3.45 Although incidents or accidents involving members of the public and the electricity network are rare, the majority of cases arise as a result of actions beyond the direct control of WPD (e.g. excavating near cables, erecting ladders near overhead lines, accidents involving vehicles and WPD assets such as poles).

3.46 The ESQCR require accidents involving the public to be reported to the HSE.

3.47 When accidents do occur we will continue to quickly investigate the causes and ensure any appropriate action is undertaken without delay.

☑ RIIO-ED1 measure – Investigation of accidents involving the public

3.48 We will monitor the number of accidents involving the public and the electricity network to determine whether additional safety literature and education are required to communicate the dangers of the distribution network.

3.49 We will report all accidents in line with legal requirements and provide assistance to the HSE in any investigations they carry out.

Substation security and theft of equipment

3.50 Increases in the value of metal have led to high levels of theft from the network. This has the potential for electricity supplies to be interrupted and intruders to substations often leave sites in a hazardous state potentially exposing WPD employees and members of the public to increased risks.

3.51 Financial forecasts indicate that the value of metal prices will remain high and so WPD will carry out actions to deter theft and help the police to catch thieves.

3.52 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. Furthermore we have facilitated meetings with neighbouring forces to ensure that intelligence is shared across police area boundaries. WPD will continue this work.

3.53 Enhanced substation security measures will be installed at locations where thieves are regularly attempting to break-in. This will reduce the potential for theft, by making access more difficult.

3.54 Wider use will be made of tagging systems that use unique codes that allow the identification of where equipment has been stolen from. This acts as a deterrent because thieves can be more easily linked to the locations of theft.

Secondary deliverable: Increasing substation security

3.55 During RIIO-ED1 WPD will upgrade security measures at all sites in the West Midlands and East Midlands to bring them up to the level of protection provided in the South West and South Wales. All primary and grid sites will get an intruder system as a minimum. Depending on risk some sites will also be fitted with CCTV, electric fences or both at high risk sites.

☑ RIIO-ED1 measure – Monitoring the number of break-ins to substations.

3.56 We will monitor the number of break-ins and the how access was gained to identify at-risk locations and install enhanced security measures. We forecast that we will enhance security measures at 50 substations sites to reduce the number of repeat break-ins.

Educating the public on electricity safety matters

3.57 Children and other members of the public may not always be aware of the potential dangers from the electricity distribution network. This lack of awareness can lead to them becoming exposed to more risk during certain play, leisure or work activities.

Secondary deliverable: Educating children about electricity

3.58 For many years we have developed and provided safety information to children. This has predominantly been delivered through practical demonstrations and explanations in schools of what our equipment looks like, what it does and how to stay safe around it.

3.59 School 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.

3.60 School visits are provided by dedicated community education safety advisers as part of WPD's corporate communications activity.

3.61 These visits supplement the resources available on WPD's Power Discovery Zone – an interactive, curriculum-linked website for schools that relates to electricity and safety. It was launched in September 2012 and provides resources for teachers and educational games for children. The site contains over 35 curriculum-based resources, enabling teachers to easily plan lessons that incorporate WPD's important safety messages.

☑ RIIO-ED1 measure – The number of children educated on electricity safety matters.

3.62 During RIIO-ED1 we will provide education sessions to 400,000 school children about the potential dangers of electricity through our on-going programme. These sessions will take place through school visits and our crucial crew / lifeskills initiatives where WPD team up with the emergency services to provide safety information for children.

Secondary deliverable: Providing safety information

3.63 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.

3.64 WPD produces a range of information leaflets describing the dangers from overhead lines, electricity substations and underground cables. We have also identified those work or leisure activities that are more likely to give rise to potential risks when occurring in the vicinity of our assets.

3.65 Since the introduction of the ESQCR in 2003 we have sent our safety literature to over 500,000 relevant businesses and landowners. This information provides an explanation of our equipment and how safety can be ensured for those involved in the work or leisure activities taking place around it.

☑ RIIO-ED1 measure – Production and communication of safety literature.

3.66 During RIIO-ED1 we will continue to develop and improve our safety literature and develop and update our knowledge of those organisations conducting activities that we believe to be most at risk if taking place around our equipment.

3.67 We will continue our practice of targeted mailshots of our safety literature. We will send out a further 500,000 copies to specific landowners, businesses or leisure activity providers whose activities could be higher risk if undertaken near to our equipment.

4 Outputs – reliability

4.1 Customers have indicated that network reliability is a high priority.

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

4.3 During RIIO-ED1, we will deliver the following outputs and secondary deliverables:

Network performance

- Improve network performance by the end of RIIO-ED1 so that on average customers will have 16% fewer power cuts and have their electricity supplies restored 23% quicker.
- Ensure that a minimum of 85% of customers have their power restored within an hour of an HV fault occurring.

Guaranteed Standards of Performance (GSOPs)

- 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 lines per annum.
- Enhance substation battery life to be resilient for 72 hours in the event of major power losses.

Regulatory framework

4.4 Ofgem has decided to continue with the DPCR5 package of outputs and incentives for network reliability. This package consists of:

- Interruptions Incentive Scheme (IIS) – DNOs are incentivised on the number and duration of network supply interruptions versus a target derived from benchmark industry performance;
- guaranteed standards of performance – customers are eligible for direct payment of specific fixed amounts where a DNO fails to deliver specified minimum levels of performance;
- worst served customers – DNOs have access to funding to improve the reliability performance experienced by a small number of customers who endure a level of interruptions over and above a determined threshold. This funding is given on the condition that the those customers experience a specified improvement in service following the improvement works undertaken;
- health and load indices – these are secondary deliverables designed to tie specific network investment to specific risk reduction associated with the condition and loading of assets. These metrics encourage longer-term strategies by linking the reliability benefits of having assets in a better condition and having less highly-loaded assets to a measurable deliverable within the price control;

- resilience – this refers to the ability of the electricity distribution networks to continue to supply electricity to customers during disruptive events, such as severe storms or floods. DNOs are required to design and operate their networks in accordance with relevant statutes, codes and standards (such as Engineering Recommendation P2/6). For RIIO-ED1 Ofgem will monitor and publish each DNO's performance for each of the areas of flooding, Black Start (which refers to actions necessary to restore electricity supplies following total or widespread shutdown of the transmission system) and overhead line reliability under the overall banner of 'Network Resilience'.

4.5 The following sections describe the outputs that WPD will deliver and the targets that are being proposed. Some of the activities go beyond the framework specified by Ofgem, so we explain the justification for the target level in terms of benefits to network users.

Improving network performance

4.6 Customers expect power to be available all of the time because many household activities and business processes rely 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 ever more important.

4.7 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).

4.8 The introduction of the IIS has influenced WPD to identify a mix of initiatives that together provide performance improvements for least cost.

4.9 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.

4.10 A reduction in 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 where the assessment of condition and the assessment of the consequence of failure creates the highest overall risk;
- reinforce the network using both smart and traditional solutions to provide enough network capacity to prevent assets overloading and failing;
- remove defective poles from the network within one year of being assessed as being defective so as to prevent in-service failures (particularly during high winds, snow or icy conditions);
- complete 100% of the tree clearance programmes to reduce the likelihood of branches and windborne debris affecting overhead lines;
- complete maintenance programmes to ensure equipment will last for its expected life.

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

4.12 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.

RIIO-ED1 measure – Reduction in Customer Interruptions (CIs) and Customer Minutes Lost (CMLs)

4.13 As a result of these actions we will improve network performance for unplanned interruptions so that customers across the whole of WPD on average experience no more than 6 electricity supply interruptions in ten years and on average are interrupted for no more than 38 minutes a year.

4.14 The table below shows the performance improvements proposed by WPD for each of the four WPD Licenced areas for the remainder of DPCR5 and for each year of RIIO-ED1. The current underlying performance figure is based on results up to 2011/12 in line with our stakeholder engagement. Figures for 2012/13 have been used in the Business Plan data tables and cost benefit analyses.

WPD proposed Customer Interruptions improvements												
	Current underlying performance	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	Percentage improvement
West Midlands	93.7	89.9	88.5	86.7	85.0	83.3	81.7	80.0	78.3	76.7	75.1	20%
East Midlands	58.8	56.0	55.7	55.3	54.9	54.6	54.2	53.8	53.5	53.1	52.7	10%
South Wales	55.5	52.6	52.5	52.3	52.2	52.1	52.0	51.8	51.7	51.6	51.5	7%
South West	57.4	57.1	56.8	56.4	56.0	55.6	55.2	54.9	54.5	54.1	53.7	6%
WPD Total	69.1	66.5	65.9	65.1	64.3	63.6	62.8	62.1	61.3	60.6	59.9	13%

WPD proposed Customer Minutes Lost improvements												
	Current underlying performance	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	Percentage improvement
West Midlands	66.7	52.5	51.9	51.1	50.3	49.5	48.7	47.9	47.1	46.4	45.6	32%
East Midlands	45.2	38.2	38.0	37.8	37.6	37.4	37.2	37.0	36.8	36.6	36.4	19%
South Wales	28.7	27.6	27.6	27.5	27.5	27.4	27.4	27.3	27.3	27.2	27.1	6%
South West	35.1	36.1	35.9	35.8	35.6	35.4	35.2	35.0	34.8	34.6	34.4	2%
WPD Total	47.7	40.8	40.5	40.1	39.8	39.4	39.0	38.7	38.3	37.9	37.6	20%

4.15 During the supplementary question process for fast track assessment, WPD confirmed to Ofgem that the proposed CI and CML targets (above) represented WPDs view of targets for RIIO-ED1 and where these were tighter than the Ofgem targets, then the tighter of the two targets would form the agreed targets for RIIO-ED1.

4.16 Ofgem calculated the following values using an established disaggregated benchmarking process.

Ofgem CI targets								
	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
West Midlands	87.0	85.7	84.4	83.2	81.9	80.7	79.5	78.3
East Midlands	51.9	51.1	50.4	50.1	49.9	49.6	49.4	49.1
South Wales	50.1	49.9	49.6	49.4	49.1	48.9	48.6	48.4
South West	55.7	55.4	55.1	54.8	54.6	54.3	54.0	53.8

Ofgem CML targets								
	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
West Midlands	58.0	56.7	55.5	54.3	53.1	51.9	50.8	49.7
East Midlands	39.0	38.2	37.3	36.5	35.7	34.9	34.2	33.5
South Wales	38.4	38.4	38.4	37.6	36.8	35.9	35.1	34.3
South West	46.8	46.8	46.6	45.6	44.6	43.7	42.7	41.8

4.17 In a number of instances the proposed WPD targets are tighter than the Ofgem targets. The final agreed targets for RIIO-ED1 are based on the lower of the WPD or the Ofgem targets. These are shown below (the shaded values represent those that are lower than Ofgem's).

Agreed RIIO-ED1 CI targets								
	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
West Midlands	86.7	85.0	83.3	81.7	80.0	78.3	76.7	75.1
East Midlands	51.9	51.1	50.4	50.1	49.9	49.6	49.4	49.1
South Wales	50.1	49.9	49.6	49.4	49.1	48.9	48.6	48.4
South West	55.7	55.4	55.1	54.8	54.6	54.3	54.0	53.7

Agreed RIIO-ED1 CML targets								
	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
West Midlands	51.1	50.3	49.5	48.7	47.9	47.1	46.4	45.6
East Midlands	37.8	37.6	37.3	36.5	35.7	34.9	34.2	33.5
South Wales	27.5	27.5	27.4	27.4	27.3	27.3	27.2	27.1
South West	35.8	35.6	35.4	35.2	35.0	34.8	34.6	34.4

4.18 These tougher targets will lead to an overall improvement of 16% in CIs and 23% improvement in CMLs.

4.19 The opportunity to outperform these targets will provide rewards that generate a return on investing in performance improvement.

Secondary deliverable – Asset health, criticality and risk

4.20 WPD has a comprehensive and extensive programme of asset replacement and refurbishment that renews approximately 2% of the overhead lines, switchgear and transformers, 0.2% of underground cables and 0.1% of services every year.

4.21 This work is primarily carried out to maintain the reliability of the network but it also delivers safety and environmental benefits.

4.22 The volume of work is determined by the condition of assets, the risks that they pose to network reliability, safety and the environment and the longer term forecasts of replacement need.

4.23 The programmes developed for RIIO-ED1 are established by using condition based risk assessment and cost benefit analysis. The risk assessment considers both the health of assets and the consequences of failure.

Health Indices (HIs)

4.24 Asset condition degrades over time eventually, at the end of their predicted life, leading to situations where the likelihood of failure increases.

4.25 The condition information collected during inspection and maintenance of assets is used to define a health value for each asset.

4.26 WPD uses the following health index definitions to categorise the condition of assets:

- HI1 – new or as new
- HI2 – good or serviceable condition
- HI3 – deterioration requires assessment and monitoring
- HI4 – material deterioration, intervention requires consideration
- HI5 – end of serviceable life, intervention required

4.27 The Health Indices determined by WPD can be directly related to the probability of failure of each asset. Therefore the Health Indices, themselves, can be considered as a proxy for probability of failure.

Criticality Indices (CIs)

4.28 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.

4.29 WPD has contributed to the development of an industry wide Criticality Index that enables the different consequences of failure to be categorised. It uses the average consequences of failure as a reference as shown below:

- C1 – lower than average consequence of failure (less than 75%)
- C2 – average consequences of failure (75% to 125%)
- C3 – higher than average consequences of failure (125% to 200%)
- C4 – very high consequences of failure (greater than 200%)

Risk Indices (RIs)

4.30 The risk associated with failure of assets is evaluated by combining the consequences of failure (criticality index) with the probability of failure (health index).

4.31 These can be represented in a matrix as shown in the table below. This is consistent with proposals in Ofgem's Strategy Decision.

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

4.32 The risk index is highest for poorest condition assets with greatest consequences of failure. The risk index values correspond to the following definitions:

- R1 – very low risk
- R2 – low risk
- R3 – medium risk
- R4 – high risk
- R5 – very high risk.

4.33 Ofgem has indicated that it would like to continue to develop this concept to be able to create an overall risk score for the network. This work will be carried out after the submission of RIIO-ED1 Business Plans.

☑ RIIO-ED1 measure – Impact of intervention on the risk matrix

4.34 We have used the risk matrix to define the position of each health index category for five situations:

- the start of RIIO-ED1;
- the end of RIIO-ED1 without any intervention (showing the impact on future asset degradation);
- the end of RIIO-ED1 with the WPD proposed intervention (illustrating the change achieved by the planned work programmes);
- the midpoint of RIIO-ED1 without any intervention (to enable midpoint review of degradation);
- the midpoint of RIIO-ED1 with the WPD proposed intervention (to enable midpoint review of progress).

4.35 The outputs we will deliver over the RIIO-ED1 period are the net positions between the end of RIIO-ED1 with intervention and the end of RIIO-ED1 without intervention.

4.36 An illustrative matrix is shown below. It shows that the replacement programme changes 125 assets. Thirty of these are C4, five of which are HI5, 23 are HI4 and 2 are HI3. All thirty C4 assets are replaced with new assets that are HI1.

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	+13	0	0	-1	-12
	C2	+37	0	0	-3	-34
	C3	+45	0	-5	-20	-20
	C4	+30	0	-2	-23	-5

4.37 All the net output matrices for all relevant asset categories are shown in Appendix A1.

Secondary deliverable – Primary network capacity

4.38 The capacity of the network is limited by the size (rating) and configuration of existing assets. As more connections are made to the network or customers use more electricity (for example to charge electric vehicles) spare capacity is used up and intervention is required to prevent assets overloading and failing. This intervention can be by the reinforcement of the network or load management to reduce the maximum demand on the network.

4.39 Reinforcement of the network has traditionally involved installing additional assets or larger assets. The extensive innovation programme being carried out by WPD and learning from other DNOs is expected to yield a range of new cheaper smart alternatives. WPD will use the most appropriate and cost effective interventions to provide additional network capacity.

4.40 The delivery of the primary network reinforcement programme will be assessed using the load indices introduced in DPCR5. These indices subdivide substations into defined bands of utilisation calculated by comparing the maximum demand to the firm capacity (load rating of the asset). Load forecasts predict future utilisation and identify the heavily loaded sites.

4.41 As RIIO-ED1 progresses actual load will be assessed in more detail and where appropriate intervention will take the form of the provision of additional capacity or greater control of the demand.

☑ RIIO-ED1 measure – Primary network loading risk

4.42 The utilisation at each substation has been used to derive a load index for each site. This is based upon the common load index bandings proposed by Ofgem and shown in the table below.

LI rank	Definition	Loading
LI1	Significant spare capacity	0-80%
LI2	Adequate spare capacity	80%-95%
LI3	Highly utilised	95%-99%
LI4	Fully utilised, mitigation requires consideration	100% for <9 hours per year
LI5	Fully utilised, mitigation required	100% for >9 hours per year

4.43 The load indices for all sites in each licence area have been combined to generate an overall loading risk score.

4.44 The following tables illustrate how the load indices will change over the RIIO-ED1 period with and without intervention.

West Midlands – Load Index Positions			
Load Index ranking	**Start of RIIO-ED1**	**End of RIIO-ED1 without intervention**	**End of RIIO-ED1 with intervention**
LI1	166	153	180
LI2	42	43	42
LI3	7	4	2
LI4	7	13	4
LI5	6	15	0

East Midlands – Load Index Positions			
Load Index ranking	**Start of RIIO-ED1**	**End of RIIO-ED1 without intervention**	**End of RIIO-ED1 with intervention**
LI1	309	258	281
LI2	108	112	119
LI3	11	31	33
LI4	13	19	14
LI5	8	29	2

South Wales – Load Index Positions			
Load Index ranking	**Start of RIIO-ED1**	**End of RIIO-ED1 without intervention**	**End of RIIO-ED1 with intervention**
LI1	150	129	129
LI2	32	45	45
LI3	0	7	7
LI4	1	2	2
LI5	0	0	0

South West – Load Index Positions			
Load Index ranking	**Start of RIIO-ED1**	**End of RIIO-ED1 without intervention**	**End of RIIO-ED1 with intervention**
LI1	267	233	243
LI2	54	67	69
LI3	9	12	13
LI4	2	9	7
LI5	0	11	0

4.45 The load index data has been converted to a risk score using weighting proposed by Ofgem within Business Plan Data Tables. A second risk score is provided using an alternative weighting proposed by WPD which reduces the difference between LI4 and LI5 to reduce the dominance of LI5 substations within the risk measure.

4.46 The different weightings used are shown in the table below.

Weighting of LIs for conversion to loading risk					
	LI1	LI2	LI3	LI4	LI5
Ofgem weighting	1	1	1	20	100
Alternative WPD weighting	1	1	1	20	50

4.47 Applying these weightings to the LIs and multiplying by the number of customers at each substation gives the following risk positions.

Loading risk – using Ofgem weightings			
Licence Area	**Start of RIIO-ED1**	**End of RIIO-ED1 without intervention**	**End of RIIO-ED1 with intervention**
West Midlands	8,338,896	25,115,535	3,452,548
East Midlands	11,503,853	37,680,797	11,150,822
South Wales	1,589,608	1,676,286	1,676,286
South West	3,061,322	22,514,386	4,302,630

Loading risk – using alternative WPD weightings			
Licence Area	**Start of RIIO-ED1**	**End of RIIO-ED1 without intervention**	**End of RIIO-ED1 with intervention**
West Midlands	6,843,442	15,745,861	3,488,204
East Midlands	9,921,677	25,565,255	11,897,058
South Wales	1,589,608	2,145,902	2,145,902
South West	3,569,310	14,466,438	5,524,186

4.48 An interpretation of these risk positions is given in the 'General Reinforcement' section of supplementary annex (SA-05) Expenditure .

Secondary deliverable – Removal of defective poles

4.49 Within WPD, a very high priority is placed on the replacement of poor condition wooden poles. Overhead lines are regularly inspected and poles found in poor condition are removed from the network within a year.

4.50 This activity provides safety, reliability and resilience benefits. It removes weak points from overhead line networks; reducing the likelihood of failure, especially during severe weather conditions.

☑ RIIO-ED1 measure – Number of poor condition poles remaining on the network

4.51 During RIIO-ED1 WPD will continue to replace poor condition poles within one year of being identified. The targets will continue to be zero failures against the measure.

Secondary deliverable – Reducing tree related incidents

4.52 Trees can cause interruptions by falling into overhead lines or by branches coming into contact with conductors. Routine cyclical tree clearance is carried out to provide sufficient clearance to prevent faults and keep the public safe.

4.53 During the current price control we propose to move to proactive programmes across all network voltages. This practice will continue into RIIO-ED1 and will lead to improved network performance as clearance cycles are established at all voltages and clearance is completed.

☑ RIIO-ED1 measure – Number of tree related faults

4.54 During RIIO-ED1 WPD will continue to routinely clear trees, seeking methods to improve effectiveness. The target will be to reduce the number of faults (across LV and HV networks) in line with the tables below.

HV Tree related faults					
	West Midlands	East Midlands	South Wales	South West	WPD Total
Underlying performance (4 year average from 2009/10 to 2012/13)	266	55	46	78	445
Target - end RIIO-ED1	168	55	46	78	347
Percentage improvement	37%	0%	0%	0%	22%

LV Tree related faults					
	West Midlands	East Midlands	South Wales	South West	WPD Total
Underlying performance (4 year average from 2009/10 to 2012/13)	270	229	94	369	962
Target - end RIIO-ED1	218	184	94	297	793
Percentage improvement	19%	20%	0%	20%	18%

Secondary deliverable: Completing inspection and maintenance programmes

4.55 Whilst primarily providing a safety output, inspection and maintenance work programmes also provide benefits for network reliability by enabling assets to last for their expected lives.

4.56 Maintenance limits degradation and replaces worn components that would otherwise lead to premature failures.

4.57 WPD has been routinely carrying out maintenance and therefore this activity is not anticipated to lead to any further improvements in reliability. The completion of programmes will assist in preventing an increase in failures.

☑ RIIO-ED1 measure – Completion of inspection and maintenance activity

4.58 Ensuring that programmes are completed will assist in limiting the number of faults. The completion of work programmes will be demonstrated through a range of key performance indicators for each inspection and maintenance activity.

Secondary deliverable – Increasing the amount of network automation

4.59 Remotely controlled devices provide the benefit of being able to quickly reconfigure network running arrangements, allowing supplies to be rerouted without the need to send a person to site. In addition, automatic reclosers enable circuits to be subdivided into smaller protection zones reducing the number of customers that are affected by a fault.

4.60 The installation of these devices has improved network performance and it is proposed to continue to install further devices on the network.

4.61 Furthermore, WPD has developed automatic switching algorithms that carry out switching actions without the intervention of a Control Engineer. The algorithms use information provided by fault passage sensors to indicate which section of the network contains the fault and then communicate with remotely controlled devices to confirm the existing running arrangement. The algorithms then work out a sequence of switching to restore supplies to the maximum number of customers possible. These algorithms allow restoration to the majority of supplies very quickly limiting the duration of power cuts and minimising the impact on customers.

4.62 The algorithms require network status data to be very reliable and we have therefore proposed enhancements to our operational IT and telecoms systems.

☑ RIIO-ED1 measure – Average number of customer interrupted on unplanned HV incidents

4.63 Both additional protection stages and rerouting supplies have the effect of reducing the number of customers affected per fault. The overall impact of installing additional devices can be demonstrated by the reduction in average number of customers interrupted per HV fault.

4.64 The current performance (based upon the average of the last four years) and our target performance for RIIO-ED1 are shown in the table below:

Average number of customers interrupted per unplanned HV incident				
	West Midlands	East Midlands	South Wales	South West
Current performance (four year average)	617	531	304	253
Target performance - end of RIIO-ED1	480	487	295	228
% reduction (rounded)	22%	8%	3%	10%

Secondary deliverable – Improving response to faults ('Target 60')

4.65 Significant performance improvements have been achieved by providing managerial focus on speedy restoration of electricity supplies in the event of a fault.

4.66 Target 60 is a WPD initiative that measures the percentage of customers who are restored within one hour when a HV fault occurs. Challenging targets have led to many process refinements such as improvements to response from control centres, better procedures for dispatching staff and more interactive communication with field teams.

4.67 Most importantly it has changed the attitude and culture of staff to one where 'getting customers back on supply' is a clear priority.

☑ RIIO-ED1 measure – Percentage of customers restored in an hour

4.68 During RIIO-ED1 WPD will continue to target restoration performance to ensure our 'Target 60' restoration performance exceeds 85%.

Guaranteed Standards of Performance (GSOPs)

4.69 The Electricity (Standards of Performance) Regulations 2010 define the guaranteed standards. These cover a range of different network reliability circumstances, where customers are entitled to payments where DNOs fail to meet the standards.

4.70 These are established measures of performance that will be continued into RIIO-ED1, but some changes will be made:

- the standard for restoration of supplies under normal weather conditions will be reduced from 18 to 12 hours;
- payments for failures will be increased in line with inflation forecasts.

4.71 WPD has an excellent track record against the existing standards, but the change to the supply restoration standard will pose a new challenge.

4.72 We will voluntarily double the value of payments for failures against guaranteed standards. Although we do not anticipate that the provision of these enhanced compensation levels will have a significant financial impact on WPD, we feel there is a need to ensure customers feel adequately recompensed should our service standards fail to meet minimum expectations.

Secondary deliverable - Improving performance for supply restoration under normal weather conditions (EGS2)

4.73 GSOP EGS2 currently requires supplies to be restored within 18 hours and power cuts that last longer are subject to penalty payments to customers. WPD has virtually eliminated failures against the 18 hour standard across all licence areas.

4.74 The most significant change to the GSOPs for RIIO-ED1 will require a payment to customers when they have been off supply for more than 12 hours.

4.75 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 allow the business to develop processes, procedures and creative solutions to work towards meeting the new requirements by the start of RIIO-ED1.

4.76 WPD proposes to reduce by 20% on average the number of customers experiencing interruptions lasting 12 hours or more when compared to performance in 2012/13. This proposal has been supported by our stakeholders and will be achieved through further improvements to fault management processes, the increased use of mobile generation and the development of more flexible and bespoke generation solutions.

☑ RIIO-ED1 measure – Number of ESG2 failures

4.77 During RIIO-ED1 WPD will reduce the number of customers not restored within 12 hours by 20% on 2012/13 levels. The table below specifies the reference performance (based upon performance in 2012/13) and RIIO-ED1 targets. The reference excludes exceptional events because different GSOPs and time durations apply.

Performance against GSOP ESG2 (Customers off supply for over 12 hours)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
Reference performance in 2012/13	5,080	3,367	272	2,029	10,748
Target performance – end of RIIO-ED1	4,064	2,694	218	1,623	8,599

Secondary deliverable - Meeting other network performance GSOPs

4.78 We target zero failures against other network performance GSOPs.

☑ RIIO-ED1 measure – ESG1 Responding to failure of a distribution fuse

4.79 Standard ESG1 aims to drive DNOs to respond quickly to loss of supply caused by failure of a distributor's fuse installed at the incoming supply to a property. On a working day attendance is required within 3 hours during the hours of 7am and 7pm, and within 4 hours on other days between 9am and 5pm.

☑ RIIO-ED1 measure – ESG2A Supply restoration multiple interruptions

4.80 This standard recognises the inconvenience of going off supply frequently and for a substantive amount of time. Customers are entitled to claim a compensation payment where four or more interruptions occur, each lasting three hours or longer, within a twelve month period (April to March).

☑ RIIO-ED1 measure – ESG2B Supply restoration more than 5000 customers

4.81 There are rare occasions when a single fault can have a large scale impact. Guaranteed Standard ESG2B recognises that under these circumstances, DNOs may require additional time to restore supplies and therefore extends the time before a payment is due to 24 hours when more than 5,000 customers are affected by a single incident.

☑ RIIO-ED1 measure – ESG2C Supply restoration rota disconnections

4.82 Under extremely rare circumstances, such as an incident occurring at a large grid supply point affecting supplies into a large part of a city, it may be necessary to share the remaining available supply across different customers by rota disconnections. Where customers are left without power for 24 hours or longer, in aggregate, they would be entitled to a payment.

☑ RIIO-ED1 measure – ESG4 Notice of planned interruption to supply

4.83 When planned work is undertaken on the network, customers must be given at least two days' notice, otherwise the customer is entitled to a payment.

☑ RIIO-ED1 measure – ESG5 Investigation of voltage complaints

4.84 When customers raise concerns about the voltage of their supply, DNOs must visit the customer's premises within seven days or dispatch an explanation of the probable reason within five working days.

☑ RIIO-ED1 measure – ESG8 Making and keeping appointments

4.85 Certain issues are dealt with best by having direct contact with customers. DNOs must offer and keep timed appointments to minimise the inconvenience for customers.

☑ RIIO-ED1 measure – ESG9 Making GSOP failure payments

4.86 When the conditions of GSOPs are not met, the payments to customers should be made within ten working days. Further payments are due if DNOs fail to make prompt payments.

☑ RIIO-ED1 measure – ESG11 Supply restoration during severe weather

4.87 Severe winds or heavy snowfall can cause widespread disruption to electricity supplies. There are rare occasions when a single event can have a large scale impact. Guaranteed Standard ESG11 recognises that under these circumstances, DNOs may require additional time to restore supplies and therefore extends the time before a payment is due to 24 hours, 48 hours or longer depending on the impact of the severe weather conditions.

Making improvements for worst served customers

4.88 The worst served customer mechanism is designed to reduce the number of interruptions for customers who experienced an unusually poor level of service. Often these customers are connected to remote parts of the network that are predominantly overhead.

4.89 The mechanism was introduced in DPCR5 and recovery of expenditure is conditional upon delivering a 25% performance improvement and is capped at £1,000 per worst served customer benefitting from the improvement.

4.90 For RIIO-ED1, Ofgem has decided to change the definition of worst served customers to those that experience 12 or more higher voltage interruptions over a three year period. This redefinition, from the current criteria of 15 or more, widens the scope of who is defined as a worst served customer.

4.91 Stakeholders recognise that some customers receive a poorer level of service and that living in remote areas can make power cuts more likely. WPD's stakeholder consultation was primarily carried out using the existing definition and suggested that the number of worst served customers should be reduced by 20% from 10,000 to 8,000. Engagement on WPD's draft Business Plan during April 2013 provided an opportunity to review the proposals with the new definition. This concluded that the same percentage improvement should be sought, where the number of worst served customers is reduced from 20,000 to 16,000.

4.92 For RIIO-ED1, Ofgem has also removed the prescribed 25% improvement criteria and cost recovery cap of £1,000 per customer, expecting DNOs to use stakeholder engagement to define appropriate levels. Stakeholders have indicated that the improvement should be 20% and the amount that can be spent per customer is £800. The change in the definition of a worst served customer has widened the scope for improvements and therefore there will be a greater opportunity to apply lower cost solutions, so a limit of £800 per customer should be adequate.

4.93 Improvements to performance will be achieved by using additional protection devices, remote control or traditional refurbishment as appropriate.

☑ RIIO-ED1 measure – Reduction in the number of faults affecting specific WSC

4.94 WPD has invested to make improvements for worst served customers. Improvements will be made during RIIO-ED1 to reduce the number of worst served customers by 20%.

Worst served customer numbers					
	West Midlands	East Midlands	South Wales	South West	WPD Total
Reference performance in 2012/13	6,000	6,000	2,000	6,000	20,000
Target performance – end of RIIO-ED1	4,800	4,800	1,600	4,800	16,000

Enhancing network resilience

4.95 Resilience refers to the ability of the network to continue to supply electricity during severe weather and to have the capacity to recover from widespread system shutdowns.

4.96 Ofgem has decided that it will monitor network resilience in three areas:

- flooding;
- black start;
- overhead lines.

4.97 Regulatory measures will assess the amount of risk reduction achieved compared to the amount proposed by DNO Business Plans.

Secondary deliverable - Reduction in flooding risk at substations

4.98 Climate change predictions suggest that widespread flooding will become a more regular occurrence.

4.99 Although flooding can often be limited to relatively small areas of ground, substations often supply customers across much wider areas. Inconvenience can therefore be caused for customers who may not be directly affected by flood water themselves.

4.100 Stakeholders are fully aware of the disturbance flooding can cause and flood defences are becoming increasingly important for them. They have indicated that the installation of flood defences is a high priority and they support our proposals.

4.101 The risk of power cuts 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.

4.102 WPD has been working with the Environment Agency to identify the substations at greatest risk and during DPCR5 120 substations will be protected. This includes bringing forward some projects that were previously planned to be carried out after DPCR5. As a result, there are approximately 75 sites that will require flood defences to be constructed in RIIO-ED1.

☑ RIIO-ED1 measure – Number of sites with flood defences installed

4.103 Flooding risk is derived from the probability that flooding will affect electricity supplies and the number of customers impacted. Data for the probability of pluvial flooding (known as 'flash' flooding) is not available and therefore the output can only be assessed by monitoring the number of sites where flood defences have been installed.

4.104 The table below shows the number of sites to be protected.

Number of sites where flood defences are to be installed during RIIO-ED1					
	West Midlands	East Midlands	South Wales	South West	WPD Total
Number of sites to be protected - fluvial	0	14	12	1	27
Number of sites to be protected - pluvial	13	16	8	11	48
Total	**13**	**30**	**20**	**12**	**75**

Secondary deliverable - Enhancing Black Start capability

4.105 Although they are extremely rare, 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.

4.106 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.

4.107 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/or installing load disconnection schemes to manage the drain on batteries used for tripping of switchgear and protection.

☑ RIIO-ED1 measure – Compliance with the industry standard

4.108 The recovery from a black start will take place in stages. For the process of balancing load with generation to be effective, the whole chain from grid supply point, bulk supply substations to primary substation need to be resilient.

4.109 During RIIO-ED1, WPD proposes to make the whole network compliant with the electricity industry standard. These works shall be undertaken to address the substation resilience needs of grid groups, in sequence. This shall maximise the benefits achieved as the works progress.

4.110 The delivery of outputs shall be assessed by measuring the volume of activity against the required program of works.

Secondary deliverable – Overhead line resilience

4.111 Ofgem has introduced a new measure of resilience for overhead lines, proposing that risk reduction will be based upon fault rates.

4.112 Overhead line fault rates are influenced by a number of factors including:

- the condition of overhead lines;
- the design strength of overhead lines;
- routine tree clearance;
- resilience tree clearance.

Condition of overhead lines

4.113 The condition of overhead lines will be addressed through inspection, refurbishment and replacement programmes (including a focus on poor condition pole replacement).

4.114 These programmes contribute to safety and general network reliability outputs, as well as providing a resilience benefit. RIIO-ED1 plans are a continuation of DPCR5 programmes and they will broadly keep fault rates at the same level as the replacement activity removes deteriorated assets.

Design strength of overhead lines

4.115 Overhead lines are designed to support the conductors and withstand certain wind loading.

4.116 Although constructing lines to more robust standards would provide resilience benefits, there are more cost effective ways of making overhead lines resilient. WPD does not propose to introduce a programme to rebuild lines with a stronger design.

Routine tree clearance

4.117 Routine tree clearance is carried out to maintain safety clearance distances and prevent interruptions under normal weather conditions.

4.118 WPD proposes to have proactive tree clearance programmes across all voltage levels that will reduce the number of tree related faults during RIIO-ED1. The programme will deliver 20% improvement on LV networks in West Midlands, East Midlands and South West and 37% improvement on HV faults in West Midlands.

Resilience tree clearance

4.119 Severe storms can cause network faults and lead to interruptions in supply for large numbers of customers. In particular strong winds can lead to overhead lines being damaged by trees.

4.120 Following storms in 2002 new legislation was introduced that requires DNOs to clear trees from overhead lines to a resilient standard that prevents damage should a tree be blown over. Regulatory documentation supporting the legislation changes indicated that programmes should seek to progressively clear trees to make 20% of the network resilient within 25 years. The industry has therefore adopted a clearance rate of 0.8% per annum during DPCR5.

4.121 Following stakeholder engagement, where there was strong support for more clearance work, the rate of resilience tree clearance will be accelerated by 40% to complete the programme five years earlier than had been planned in DPCR5.

☑ RIIO-ED1 measure – Overhead line fault volumes

4.122 The main contributor to reducing overhead line fault rates will be tree clearance. It is anticipated that the routine tree clearance programmes will lead to an overall reduction of 7% in LV overhead line fault rates in West Midlands, East Midlands and South West and a reduction of 11% of HV overhead line faults in West Midlands.

4.123 The following table compares current and forecast overhead line fault volume.

LV overhead line faults					
	West Midlands	East Midlands	South Wales	South West	WPD Total
Underlying performance (4 year average from 2009/10 to 2012/13)	777	654	471	1,055	2,957
Target - end RIIO-ED1	723	609	471	983	2,786
Percentage improvement	7%	7%	0%	7%	6%

HV overhead line faults					
	West Midlands	East Midlands	South Wales	South West	WPD Total
Underlying performance (4 year average from 2009/10 to 2012/13)	888	553	102	783	2,326
Target - end RIIO-ED1	790	553	102	783	2,228
Percentage improvement	11%	0%	0%	0%	4%

5 Outputs – environment

5.1 Outputs for the environment can be subdivided into two broad categories: those that help broader environmental objectives by increasing the amount of low carbon technology (LCT) connected to our network and those that reduce WPD's environmental impact.

Regulatory framework

5.2 Ofgem has separated outputs for wider environmental objectives and the impact of DNO's activities on the environment by capturing wider objectives under 'driving sustainable networks' and the impact of DNO activities under 'environmental impacts'.

Driving sustainable networks

5.3 Ofgem recognises that a key challenge for RIIO-ED1 is how DNOs accommodate and facilitate the increase in low carbon technologies.

5.4 Even so, Ofgem has concluded that a specific output is not required, citing that other proposed outputs and incentives (for reliability, connection, efficiency and innovation) are sufficient to drive the behaviours required to facilitate a transition to a low carbon economy.

5.5 Ofgem state that the delivery of other outputs at an efficient cost drives DNOs to develop smarter solutions and develop plans for smart grids using data available from smart meters and new techniques established through innovation projects.

Environmental Impacts

5.6 The environmental impacts of DNO activities broadly covers four areas: network losses, business carbon footprint, leakage from equipment and visual amenity.

5.7 Difficulties in accurately measuring network losses have led Ofgem to move away from providing financial incentives for loss reduction. As an alternative Ofgem will introduce a new licence obligation for DNOs to reduce losses that will operate alongside the existing obligation to develop an efficient, co-ordinated and economical network. This will ensure that the most cost effective approach to reducing losses is followed. Ofgem will also provide a discretionary financial reward where DNOs adopt innovative ways of reducing losses.

5.8 A reputational system will continue to be used to demonstrate the management of business carbon footprint. League tables of reported data will show relative positions of DNOs along with narratives describing the actions being taken to reduce emissions.

5.9 The leakage of SF_6 (a potent greenhouse gas) from switchgear and oil from fluid filled cables will continue to be included in business carbon footprint reporting, but the scope of reporting will be expanded.

5.10 Undergrounding of overhead lines in Areas of Outstanding Natural Beauty (AONBs) and National Parks will remain non-compulsory. DNOs will be expected to work with representatives of the AONBs and National Parks to determine which lines should be undergrounded.

Helping to increase the volume of low carbon technologies

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

5.12 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 domestic heat pump heating systems.

5.13 Although Ofgem does not propose to use an output for driving sustainable networks, WPD sees value in using a range of secondary deliverables to demonstrate the actions being taken to facilitate the increase in LCTs.

5.14 LCT related secondary deliverables 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%.
- 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.
- Reduce costs for future customers by developing smart solutions to provide alternative and innovative techniques for network management.
- Provide additional network capacity through utilising traditional methods or smart intervention.

Secondary deliverable - Providing a faster response to customers

5.15 Customers wanting to install LCTs should provide technical details of their installations to DNOs so that the impact on the network and other customers can be assessed. Depending on the circumstances, this assessment process can result in simply granting permission for the installation or restricting the connection of the device until the network is reinforced.

5.16 The volume of LCTs connecting to the network is expected to grow significantly. This will lead to a corresponding increase in the number of assessments. As more devices are installed, the ability to easily accommodate others will reduce and the assessments will grow in complexity and detail. Nevertheless, customers will expect a timely response to their enquiries.

☑ RIIO-ED1 measure – Time to provide a response to customers

5.17 We will improve the processing of requests during RIIO-ED1 to ensure a 20% reduction in response time. This level of improvement was supported by stakeholder because it will be delivered without adding significant costs. As current volumes are low we propose to establish a benchmark based upon the response provided in the last year of DPCR5.

Secondary deliverable - Identifying LCTs hotspots

5.18 DECC has published forecasts for the 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.

5.19 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.

5.20 We will integrate this knowledge into WPD network planning tools to ensure that the information is readily available for team planners dealing with customer load enquiries or developing replacement projects. This will ensure that planners are presented with timely information about hotspots rather than having to access and interrogate separate data systems.

☑ RIIO-ED1 measure – Integrating LCT hotspot data into planning systems

5.21 The development of these systems will enable planners to design projects that more effectively accommodate LCTs. Since these systems do not exist, their development can be viewed as a secondary deliverable. Progress towards their development will be reported annually.

Secondary deliverable - Using larger capacity equipment when replacing assets

5.22 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.

5.23 We will use the information about LCT hotspots to selectively install larger assets during asset replacement work.

☑ RIIO-ED1 measure – Replacing assets with larger capacity equipment

5.24 Forecasts suggest that approximately 7% of the asset replacement activity will occur in LCT hotspot areas. Although this provides a guide for high level cost forecasting, it is not appropriate to use this value as a target. Using a target could create a perverse incentive to install larger capacity equipment where it was not needed (should the number of LCT hotspots be lower than forecast).

5.25 It is therefore proposed to report the proportion of asset replacement projects that use larger capacity assets. This will provide stakeholders will an indication of the coincidence of LCT hotspots with asset replacement and will demonstrate that accommodating LCTs is being considered as part of routine replacement work.

Secondary deliverable - Developing smart solutions

5.26 Where increases in load cause the maximum demand to exceed the capacity of the equipment, the traditional approach to reinforcement has been to either increase the size of equipment or install additional equipment.

5.27 Smart solutions is a generic term used for techniques that can utilise existing networks more effectively or actively manage the load on the networks by constraining demand or generation.

5.28 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'.

☑ RIIO-ED1 measure – The availability of smart solutions

5.29 Success in the development of smart solutions will be demonstrated by the number and range of options available to network planners as part of their planning 'tool box'.

5.30 By the end of RIIO-ED1 we will have a range of solutions adopted as business as usual. Our Innovation Annex describes the projects that we are undertaking and typical applications derived from early LCNF projects will be:

- using dynamic line ratings for EHV lines;
- providing more accurate estimates of the load profile of customers and the effect on the LV network from results of the LV Templates project;
- providing voltage control and commercial arrangements for load management to better accommodate generation onto the 33kV network using techniques developed in the Lincolnshire Low Carbon Hub project;
- managing network fault level in a more innovative way using the techniques developed in the Birmingham FlexDgrid project;
- managing 11kV and LV networks using active techniques developed in Project FALCON.

Secondary deliverable - Reinforcing the network using smart solutions

5.31 Future network development will incorporate both traditional and smart network reinforcement. The solution used will be dependent upon the rate of load growth and the local circumstances. It will be chosen to ensure that adequate network capacity is provided whilst minimising costs for future customers.

☑ RIIO-ED1 measure – Demonstrating the use of smart solutions

5.32 Cost effective reinforcement of the network requires the use of smart solutions where appropriate. The actual amount of reinforcement will be determined by many factors outside of the control of WPD and so it is not appropriate to specify a target.

5.33 WPD will demonstrate the adoption of smart solutions by reporting the proportion of reinforcement projects where they are used. It is anticipated that this proportion will be low at the start of RIIO-ED1 and grow as more smart solutions are developed into cost effective alternatives to traditional reinforcement.

Reducing the overall impact of WPD operations on the environment

5.34 The second area of WPD's Environmental Outputs has the objective to reduce the impact of business operations on the environment.

5.35 Our business can 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.

5.36 During RIIO-ED1 WPD will:

Reduce technical network losses

- Install oversize transformers when replacing assets at highly loaded locations.
- Use larger sized cables when installing new network in LCT hotspots.

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 20% over the first two years of RIIO-ED1 and 5% per annum thereafter.
- Reduce the carbon footprint of the business by 5%.

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 (AONBs)

- Underground 55km of overhead lines in National Parks and AONBs.

Reducing technical network losses

5.37 The process of distributing electricity results in approximately 5% of the electricity entering the network being lost in 'technical network losses'.

5.38 Some of the losses relate to transformers requiring electrical energy to produce the magnetic fields to operate. The majority of losses result from the heating effect of energy passing through cables and wires.

5.39 Losses can be reduced by using lower loss transformers, installing lower resistance cables or reducing the load, but the extensive nature of the network means that uprating equipment to reduce losses is a long term objective.

5.40 We have worked with the Centre for Sustainable Energy to identify that LCT hotspots will develop on 7% of the WPD network. The volumes of loss reduction investment are derived from this work.

Secondary deliverable – Installing oversize transformers

5.41 The losses in a transformer are much lower when the unit is partially loaded and increase greatly as a unit becomes fully loaded. It is therefore possible to reduce the overall losses by oversizing transformers.

5.42 Applying this approach in all cases is not efficient and therefore will only be adopted where there is a strong indication of likely load growth.

5.43 Data derived from the Centre for Sustainable Energy (CSE) forecasts that there is around 7% of our network where the up-take of LCTs will lead to LCT hotspots. When work is carried out to replace assets or reinforce the network in these locations, the transformers used will be oversized to provide a losses benefit and also provide greater headroom for future load growth.

☑ RIIO-ED1 measure – Demonstrating the use of oversized transformers

5.44 It is forecast that on average 109 oversized transformers will be installed each year dependent upon the development of LCT hotspots.

5.45 Progress will be monitored through the reporting of the number of oversized transformers being installed.

Average number of oversized transformers to be installed per annum					
	West Midlands	East Midlands	South Wales	South West	WPD Total
Number of oversized transformers to be installed per annum	27	35	23	24	109

Secondary deliverable – Using larger sized cables

5.46 To reduce the losses in cable requires the cross sectional area of the conductors to be increased (which reduce the resistance to current flowing through them). Once a cable is laid and the ground is reinstated, there is very little opportunity to make changes. The most cost effective opportunity to reduce losses exists at the time that the cable is initially installed.

5.47 The incremental cost of increasing the size of cables is small when compared to the cost of excavation and reinstatement.

5.48 In a similar way to oversizing transformers, larger cables will be used where LCT hotspots develop.

☑ RIIO-ED1 measure – Demonstrating the use of oversized cables

5.49 It is forecast that on average 75km of oversized cable will be installed each year dependent upon the development of LCT hotspots.

5.50 Progress will be monitored through the reporting of the length of oversized cable installed.

Average length of oversized cable to be installed per annum					
	West Midlands	East Midlands	South Wales	South West	WPD Total
Length of oversized cable to be installed per annum	19	24	16	16	75

Reducing business carbon footprint

5.51 Business Carbon Footprint (BCF) represents the impact on the environment from operational activities and is measured and reported using equivalent tonnes of carbon dioxide. It takes account of the energy usage from offices, emissions from vehicles and release of greenhouse gases.

5.52 Ofgem uses reported information to publish league tables that aim to provide reputational incentives to make improvements.

5.53 Within WPD there are a range of activities that will be carried out to reduce the carbon footprint of the business. These secondary deliverables will contribute to the overall reduction of BCF.

☑ RIIO-ED1 measure – Measurement of business carbon footprint

5.54 Reduction in BCF will be demonstrated through the regulatory reporting framework. As well as showing performance against the measures, the reports will describe the actions taken to make improvements.

5.55 During RIIO-ED1 we propose to reduce the business carbon footprint by 5% compared to the 2012/13 position.

Secondary deliverable - Reducing emissions from vehicles

5.56 Our network is spread over an area of 55,500 km^2 and consequently we need to operate a significant fleet of vehicles to allow our staff to serve this territory effectively.

5.57 When our vehicles reach the end of their useful lives they are replaced with modern vehicles. We always ensure that the opportunity is taken to replace them with more fuel efficient engines.

5.58 As an alternative we have also been trialling the use of electric commercial vehicles for some years and we will consider adopting them where they are commercially available and can be deployed effectively.

5.59 The cumulative effect of this fleet replacement is a progressive reduction in greenhouse gas emissions and carbon footprint.

5.60 In addition WPD will provide additional driver training to staff to teach them how to use driving techniques that will reduce fuel consumption with a consequent lowering of carbon emissions and noxious exhaust gases.

☑ RIIO-ED1 measure – Monitor emissions from vehicles

5.61 Our target is to ensure that every new vehicle utilised on our fleet will have lower CO_2 emissions than the like for like vehicle it replaced. This applies equally to using approved Government measures for the 'equivalent tailpipe CO_2 emissions' for any electric vehicles adopted.

5.62 During RIIO-ED1 WPD proposes to monitor the emissions from vehicles to demonstrate the progressive reduction arising from vehicle renewal.

Secondary deliverable – Saving energy following redevelopment of offices

5.63 WPD operates from 59 offices that vary in age and construction. There are opportunities to refurbish some buildings and improve their energy efficiency coincident with when building refurbishment takes place.

5.64 In the West Midlands and East Midlands, many offices were refurbished when facilities were being developed for the WPD local team based operational structure. This work was carried out to the Building Research Establishment Environmental Assessment Method (BREEAM) "good" or "excellent" standards and there is only limited scope to provide further energy savings.

5.65 In the South West and South Wales the properties are older, with more scope to implement energy savings measures. Whenever refurbishment work is planned we will ensure, where appropriate, that it will be carried out to the 'excellent' standard under the BREEAM to reduce energy consumption.

☑ RIIO-ED1 measure – Redevelopment of buildings to 'excellent' standard under BREEAM

5.66 WPD will demonstrate through regulatory reporting that any building refurbishment undertaken will have met the 'excellent' standard under BREEAM.

5.67 This redevelopment will lead to energy saved that will be evident in electricity usage in overall BCF reporting. We propose to save around 5% of electricity used in offices and depot over the RIIO-ED1 period.

Secondary deliverable – Improved management of residual waste

5.68 WPD's business activities create waste. This includes metal from overhead lines, cables and redundant switchgear, wood from wooden poles, packaging from new components, paper from offices and various forms of plastic.

5.69 Many of the items can be recycled and therefore WPD has, for a number of years, segregated and recycled waste to limit the amount being sent to landfill. Whilst we will continue to do this we will also investigate the opportunities to reduce the waste being produced in the first place.

☑ RIIO-ED1 measure – Reduce residual waste sent to landfill

5.70 During RIIO-ED1 further efforts will be made to reduce the amount of residual waste being sent to landfill by 20% over the first two years and 5% per annum thereafter.

Reducing leakage from electrical equipment

5.71 Electrical equipment may contain oil or gas that is used to improve insulation properties or enhance cooling. Under normal conditions the oils and gases are contained within the equipment, but leaks can occur from time to time when equipment is damaged or seals deteriorate.

5.72 The main options available to reduce the environmental impact of any leaks are quick repairs when damage occurs and replacement of the equipment in poorest condition with the highest leakage rates. The environmental impact of leaks from equipment containing high volumes of oil can also be limited by building walls around equipment to contain any leaks within a small designated area allowing the contained oil to be cleaned up in a controlled and effective manner.

☑ RIIO-ED1 measure – Reducing leakage from electrical equipment

5.73 Leakage will be reported for each secondary deliverable with information being reported under the regulatory BCF reporting requirements and included in relevant reputational league tables.

Secondary deliverable - Reducing oil leakage from fluid filled cables

5.74 Older types of higher voltage cables (33kV and above) contain oil based fluids to assist in the insulation and cooling of the cables. These cables sometimes leak, as a result of third party damage or age related degradation. New cable designs do not use this technology, so the problems associated with these cables will reduce over time.

5.75 Fluid levels in all our cables are monitored remotely and loss of pressure triggers alarms within control centres. This allows us to react quickly to a leak event.

5.76 Traditional leak location methods require numerous points of excavation and the use of liquid nitrogen to freeze the fluid to determine which part of the cable is leaking. This process can be lengthy whilst the exact location of the leak is being found. Furthermore, during the leak location process the cable requires to be “topped up” to retain its integrity and consequently where leaks take a long time to locate more fluid is lost to the environment.

5.77 As an alternative, we have begun using a tagging system which uses a small amount of Perflurocarbon tracer (PFT) chemical that can be readily detected above ground that helps to pinpoint leaks quickly and speeds up the repair process. This reduces costs, inconvenience to customers and the volume of oil lost to the environment.

5.78 PFT tagging will be introduced into cables across the WPD area. It will be applied to cables which have a history of leakage.

5.79 Stakeholder engagement sought to identify the scale of replacement programmes, with options for 1%, 5% or 10% being considered. There was strong support for action being taken and stakeholders favoured the extension of the use of chemical tracers for leak location and the replacement of 1% of the poorest condition cables which have the highest leak rates.

☑ RIIO-ED1 measure – Reduction in cable fluid lost to the environment

5.80 During RIIO-ED1 the cables with the highest leak rates, caused by poor condition, will be replaced. In addition, the chemical tracer tagging system will be applied to speed up the location of leaks due to damage or degradation. Together this will reduce the volume of oil escaping and affecting the environment by 75%.

5.81 Data on the volume of oil lost to the environment will be reported under regulatory BCF reporting.

Secondary deliverable – Installing oil containment 'bunds'

5.82 Large transformers and some items of switchgear contain large volumes of oil. This poses a risk of contamination should a leak arise, especially where the equipment is near water courses, water tables or drainage ditches.

5.83 Containment walls or 'bunds' can be constructed around the equipment to prevent oil leaking into the environment. These are designed to be able to contain the full volume of oil that is in the equipment. Bund pumps are installed to keep the bunds clear of water. These pumps can discriminate between oil and water and stop pumping when oil is detected.

☑ RIIO-ED1 measure – Avoiding large scale oil contamination from switchgear and transformers

5.84 During RIIO-ED1 we will ensure that all 33kV transformers and above and any bulk storage sites (those with equipment containing oil 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.

5.85 This will prevent large scale oil contamination from switchgear and transformers, avoiding action by the Environment Agency.

Secondary deliverable – Reducing the leakage of SF_6

5.86 SF_6 gas is used throughout the industry as an insulating medium in switchgear. Although it provides many benefits, it is a potent greenhouse gas. There are no current alternatives to SF_6 equipment and so it is replaced when necessary on a 'like-for-like' basis. When switchgear containing SF_6 is retired from the network, the gas is recovered in a similar way to the recovery of gas from old fridges, limiting the amount released to the environment.

5.87 When replacing switchgear, priority is given to switchgear with the highest leak rates.

5.88 During DPCR5 we have been replacing items of switchgear which have proven to be prone to leaks. This includes specific types of pole mounted switchgear with small amounts of gas and larger 132kV substation equipment with large volumes of gas. As this type-specific replacement programme comes to an end, there is currently no next make or model of switchgear that requires a specific targeted replacement programme. In RIIO-ED1 we plan to replace any 11kV distribution assets that leak and for higher voltage assets they will be replaced if they have leaked 3 times.

☑ RIIO-ED1 measure – SF_6 leak reduction

5.89 During RIIO-ED1 WPD will target the replacement of 1% of switchgear with the highest leak rates to reduce the volume of SF_6 lost by 17%.

5.90 Data on the volume of SF_6 lost to the environment will be reported under regulatory BCF reporting.

Improving visual amenity

5.91 WPD operates 92,000km of overhead lines predominantly in rural locations. Whilst overhead lines are widely accepted as being part of the countryside, 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.

Secondary deliverable - Undergrounding in AONBs and National Parks

5.92 The main method of improving visual amenity whilst maintaining supplies is to replace the overhead lines with underground cables.

5.93 Within WPD the undergrounding of overhead lines is co-ordinated with established steering groups. These are made up from representatives from AONBs and National Parks who assist in identifying and prioritising where the work will take place. We intend to adopt the same approach in RIIO-ED1.

5.94 Stakeholder opinion on this work has been divided and throughout the engagement process some stakeholders have wanted more activity and others less. AONB representatives have also informed WPD that they have limited resources to assist in the process. Having considered the range of views we are proposing to increase the amount of undergrounding carried out.

☑ RIIO-ED1 measure – Length of line undergrounded in National Parks and AONBs

5.95 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.

5.96 The length of overhead line to be undergrounded has been informed by stakeholder engagement. It is proposed to underground 55km which equates to an annual volume that is around 35% more than current levels.

Undergrounding in National Parks and AONBs (km)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
RIIO-ED1 Total (8 years)	**14.0**	**10.0**	**10.0**	**21.0**	**55.0**

6 Outputs - connections

6.1 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)

6.2 The objective of connections outputs is to provide an excellent service for customers connecting to the network whilst facilitating competition in the connections market.

6.3 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 continue to 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

- Develop and enhance online connections processing and progress tracking.
- Ensure information provided in documentation and online is effective.

Enhance engagement with major customers

- Host quarterly 'surgeries' for connection customers to better understand processes.
- 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.

Regulatory framework

6.4 Ofgem remains concerned about the service provided by the industry for customers requiring connections. As a result it is strengthening the obligations during RIIO-ED1.

6.5 There will be a package of incentives to promote improvements in the connections service. This package includes:

- a customer satisfaction survey (for minor connection customers);
- a new 'Time to Connect' incentive (for minor connection customers);
- a new 'Incentive on Connection Engagement' (ICE) (for major connection customers).

6.6 In addition, the majority of existing licence condition obligations will be retained. This will include:

- Connections Guaranteed Standards of Performance;
- publication of a Long Term Development Statement;
- publication of a Distributed Generation Connections Guide.

6.7 The range of outputs and secondary deliverables being proposed by WPD shall address all of these areas and in many cases will exceed the requirements.

Providing a faster and more efficient connections service

6.8 WPD already has high levels of customer satisfaction for the provision of connections, but we recognise that further improvements can be made.

6.9 This includes providing a faster response, delivering excellent customer service and understanding customer satisfaction in areas not covered by regulatory measures.

Secondary deliverable - Improve the overall time to deliver a connection

6.10 The overall time to deliver a connection is a combination of the time to provide a quotation and, once the offer is accepted, the time taken to complete the necessary connection works.

6.11 The 'time to quote' covers the process from the customer first requesting a connection to the date on which the quotation is sent to the customer.

6.12 The 'time to connect' covers the process from the customer accepting the quote to the point when the work is completed on site.

6.13 WPD produces over 16,000 quotations and completes connection work to around 10,000 schemes each year connecting some 30,000 new premises.

6.14 Although we endeavour to keep timescales as short as possible for the customer to receive our quotation and for us to complete our works there are a number of factors that can influence the timescale;

- fluctuations in volumes of requests received;
- the need to undertake site visits in a number of cases to fully understand the works required;
- making sure we have been provided with all of the necessary information;
- understanding third party issues such as the costs of permissions for land access and consents;
- the degree of complexity and requirements for detailed network analysis or modelling;
- processing legal documentation for consents;
- arranging resources and materials;
- co-ordinating with on-site construction;
- co-ordinating with highways authorities for street-works notices and permissions;
- outage requests and shut downs (for HV work).

6.15 Some of these factors are outside of our direct control but we accept that customers hold us fully accountable for the end to end delivery. We will therefore complete regular reviews and analysis to understand where improvements can be made. As part of this review we will consult with our customers and continue to refine our processes, incorporating where possible the feedback and suggestions.

☑ RIIO-ED1 measure – Improving the overall time to connect

6.16 Within its strategy document, Ofgem proposes that targets for time to connect will be set and these will decrease as RIIO-ED1 progresses. Ofgem has not yet specified what these targets will be.

6.17 WPD proposes to improve the overall time to connect by 20%. This improvement will be derived from reference performance in 2014/15 once IT systems have been changed to monitor the timescales in line with new regulatory requirements that differ from the data currently being collected.

6.18 Although the Ofgem decision document states that the new overall time to deliver a connection will only apply to certain categories of connection (small developments of typically 1-4 properties), WPD will apply this measure across all market segments, so that all connection customers benefit from process improvements.

6.19 Furthermore, at the mid-point of RIIO-ED1, we will review the progress made and determine whether further improvement can be achieved.

Secondary deliverable – Providing excellent customer service

6.20 WPD recognises that customer satisfaction is very important to the success of the business.

6.21 This applies to the whole connections process, from initial application processing through to final work on site. During the process customers interact with different WPD staff and all interactions should be of an equally excellent standard.

6.22 This requires a strong culture of customer service to be embedded throughout the organisation.

☑ RIIO-ED1 measure – Broad Measure of Customer Satisfaction (BMCS)

6.23 Part of the BMCS assesses customer satisfaction specifically for connection customers. Ofgem is proposing to increase the financial reward and penalty in this area to strengthen the incentive on companies to seek improvements. It will also set targets based upon industry performance in DPCR5.

6.24 WPD will seek to improve all of the interactions with its customers so that customers continue to rank WPD as the top performing DNO group and so that we continue to exceed regulatory targets.

Secondary deliverable – Extending satisfaction surveys to distributed generation customers

6.25 During DPCR5 the BMCS has surveyed mainly demand customers. Because increasing volumes of distributed generation are being connected to the network there is a growing number of customers who do not contribute to the satisfaction surveys.

6.26 WPD wants to understand better how these customers view the service that they receive. We will therefore extend the customer survey principles to include more distributed generation customers. This will allow us to monitor our performance in this area and ensure that we deliver high levels of customer satisfaction.

☑ RIIO-ED1 measure – Extended BMCS for generation customers

6.27 We will carry out surveys with generation connection customers, replicating the questions asked to demand connection customers. This will provide information that we will use to identify areas for improvement.

6.28 Each year, we will publish the results in our stakeholder report.

Improve communication with customers

6.29 In the majority of cases good customer satisfaction is only possible with good communication.

6.30 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 via our website, by customers making telephone contact with contact centre staff or by direct contact with locally based planners. The amount of information required by customers differs depending on the complexity of the connection and the knowledge of the customer. It can range from simplified process explanations to provision of detailed network parameters.

Secondary deliverable – Provision of information

6.31 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.

6.32 Recent improvements to the WPD website www.westernpower.co.uk already make it easier for connection customers to find, understand and download relevant information. A dedicated connections area can now be accessed directly from the main screen. However we can always improve and feedback from customers will be used to continue to refine the website to improve ease of use and information availability.

6.33 Third party connection providers have on-line access to relevant WPD policies and specifications which are required for the design and construction of connection assets that will subsequently be adopted by WPD. This provision will be continued and enhanced based on feedback from those providers.

6.34 We will continue to provide network information. This is currently obtained either on request (via an online map) or through a subscription service for customers who require regular access to our data.

6.35 Assistance is provided for distributed generation customers in the West Midlands and East Midlands through a 'Generation Capacity Map' that gives an indication of the potential capacity for large generators connecting to the 11kV network. This will be extended across the whole of WPD.

6.36 A range of leaflets are available on connections processes, competition in connection or legal permissions. We will seek feedback from users to allow us to simplify or clarify the literature which will be regularly reviewed and updated.

6.37 The Long Term Development Statement will be produced annually for each licence area and made available via the website.

6.38 WPD will contribute to updating the industry wide Distributed Generation Connection Guide, coordinated through the ENA.

6.39 Contact centre staff will be provided with on-going training and up to date information to allow them to answer key questions that customers may ask.

6.40 In summary, WPD will continue to listen and respond to the requirements of customers, developing new information resources that make it easier and clearer for customers to connect to the network.

☑ RIIO-ED1 measure – Review of available information sources

6.41 Each year, WPD will report on the changes made to information systems for connecting customers. This will allow customers and stakeholder to see what information sources have changed and identify any new systems that have been introduced.

6.42 Each year, we will publish the results in our stakeholder report.

Secondary deliverable –Online tracking

6.43 Some customers have indicated they prefer to carry out transactions and track progress online. This includes facilities for applications, payments and tracking of progress.

6.44 On-line progress tracking (called CIRT) has already been introduced for third party connection providers. The next development will allow this to be extended to larger developers and finally to all customers.

6.45 The scope of online tracking will be enhanced and new facilities provided in response to customer feedback.

☑ RIIO-ED1 measure – Review of available information sources

6.46 The facilities available for on-line connection application and tracking will be published in the annual stakeholder report.

Engagement with 'Major Connection' customers

6.47 Major Connection customers (generally large developers, Distributed Generation (DG) customers and multiple site developers) 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.

6.48 WPD will build on the existing engagement that has been established with DG connection customers where feedback has already led to the implementation of improvements. Typical examples are:

- an internal standard where customers are contacted within two days of initial application to discuss requirements;
- re-launch of a distributed generation map in the Midlands and extension to coverage of South West and South Wales in 2013;
- development of the CIRT online tracking system for independent connection providers (ICPs) and independent distribution network operators (IDNOs) which is to be extended to the wider customer base;
- improved and more detailed breakdown of connection charges in quotations to provide more transparency of prices.

6.49 Future engagement will seek to understand better the requirements of Major Connection customers so that information provision, communication processes and work delivery can be improved.

6.50 To achieve this we will implement an annual programme of stakeholder engagement for Major Connection customers across all non-competitive market segments.

6.51 We propose to extend 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. Each year there will be four local surgeries across the company and they will be held at different offices in successive years to allow different local customers to attend.

6.52 In addition there will be two Major Connection customer workshops: one for the Midlands and another for South West and South Wales. These will look at the issues facing the wide range of Major Connection customers and identify potential solutions or improvements.

6.53 Following the workshops a work plan will be developed defining proposed improvements, timescales and targets.

6.54 The WPD Customer Panel will be used to sign off on the work plan and progress will be reported to the panel members every quarter.

6.55 Where appropriate, we will work with individual customers on trials of any initiatives to ensure that the 'business-as-usual' rollout is successful for both the end customers and WPD. An example of this is the testing of a new online applications system with a selection of volunteers across the range of customer types.

6.56 To keep Major Connections customers informed, we will publish an agreed plan of action and any changes resulting from the engagement.

6.57 We propose to implement some of these changes prior to the start of RIIO-ED1 so that we can gain a better understanding of the issues and start to work on solutions.

☑ RIIO-ED1 measure – ICE Incentive

6.58 Every two years WPD will submit to Ofgem evidence of Major Customer engagement for each market segment. This will identify how we have identified, engaged with and responded to the needs of customers.

6.59 Ofgem will assess the submissions against minimum requirements. There are no rewards available, but Ofgem can apply penalties where engagement is deemed to be inadequate.

6.60 We will ensure that the engagement we carry out meets all the criteria, thus avoiding any penalties.

Meeting connections Guaranteed Standards of Performance

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

6.62 There are thirty guaranteed standards of performance covering all the aspects of connection provision including:

- providing budget estimates;
- providing quotations for connections;
- contacting customers to schedule work;
- commencing works on site;
- completing work on site;
- completing energisation;
- repairing faults on unmetered connections;
- providing quotations for unmetered supplies;
- quotation accuracy;
- failure to make a payment against one of the standards.

6.63 Each failure of a standard results in a payment to the customer with the majority of connections standards having a per day cumulative penalty.

6.64 We will voluntarily double the value of payments for failures against guaranteed standards. The provision of these enhanced compensation levels will not have a significant financial impact on WPD but we feel there is a need to ensure customers are adequately recompensed should our service standards fail to meet minimum expectations.

☑ RIIO-ED1 measure – Number of Guaranteed Standard failures

6.65 WPD will continue to target zero failures against all the standards throughout RIIO-ED1.

Facilitation of competition

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

6.67 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 alternatives: Independent Connection Providers (ICPs) (who construct the network and pass on ownership of that network to WPD) or Independent Distribution Network Operators (IDNOs) (who construct the network and retain ownership and operation of that network).

6.68 Competition has developed in the WPD area and was recognised by Ofgem in their assessment of WPD's first Competition Test submission. Ofgem's determination in February 2013 concluded that 12 market segments are competitive. These are:

- Unmetered connections, Private Finance Initiative work – in all 4 licence areas;
- Unmetered connections, local authority work – in all 4 licence areas;
- Metered demand connections HV and EHV work – in East Midlands and West Midlands;
- Metered demand connections EHV and above work – in East Midlands and West Midlands.

6.69 We will continue to promote competition and identify opportunities to inform customers that they have a choice. An annual survey will be used to gauge the level of customer awareness.

6.70 Although 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. In 2011, live LV jointing trails were conducted. As a result, agreements have been developed that allow third parties to have access to the LV networks which makes the majority of LV work open to competition. Many third party connection providers have signed up to these agreements and are now making their own connections to the WPD network.

6.71 During 2013, the scope of these agreements is being extended to HV jointing although facilitation of competition will not stop there and we anticipate that this will soon include interconnection to the HV network and reinforcement work. Further extension will be considered in response to the requests from third party connection providers.

6.72 We are proposing to provide faster response to connection requests, improve the data we provide and improve connection processes. We will ensure that all general improvements made to connections processes and timescales apply equally to the service provided to third party connection providers.

Secondary deliverable – Customer awareness of alternative providers

6.73 Competition in connections is still evolving and so it is important that connection customers are made aware that alternative providers exist.

6.74 We provide clear links to competition in connection information on the main connections page of the WPD website and our connection process flowcharts include the option of using third party connection providers. We also include information about the availability of alternative connection providers in connection packs sent to customers.

6.75 One way of demonstrating awareness of alternative providers is to measure the market share lost. This may not give a true reflection of awareness because connection customers, who are aware they have a choice, may still elect to obtain connections from WPD.

6.76 For this reason, we propose to carry out a survey each year asking connection customers who have obtained a connection from WPD whether they were aware that they could have asked a

third party to provide the connection. This survey will be supplemented with feedback from the engagement with major customers on how awareness can be improved.

☑ RIIO-ED1 measure – Annual survey of customers awareness of alternative providers

6.77 The results of the annual survey will be published in the WPD stakeholder report and the information will be used for future competition test submissions.

Secondary deliverable – Extension of contestable work to HV

6.78 Existing developments to extend contestable work to HV has allowed third party jointers to carry out the physical connection work on site under the operational control and instruction of WPD authorised staff.

6.79 This will be extended to allow third parties to carry out their own switching, testing and commissioning. Should third parties require it, work on overhead lines will also be considered.

6.80 All these extensions will require careful consideration of the operational safety rules, the interactions with WPD authorised staff and WPD control, consideration of network security for customers and appropriate testing of new installations before energisation.

☑ RIIO-ED1 measure – Extension of contestable HV work

6.81 During RIIO-ED1 WPD proposes to work with third party service providers to extend the scope of HV work that can be carried out by third parties and incorporate these into Common Connections Charging Statements.

Secondary deliverable –Extension of contestable work to reinforcement

6.82 In the majority of cases, new connections can be made without the need to reinforce the existing network. The evolution of contestable work has therefore concentrated on the larger aspects of connections provision, starting with the assets on the new development and progressing onto the points of connection with the existing network.

6.83 Network reinforcement is required where there is limited capacity on the existing network to accommodate the load of new connections. It may result in upstream assets being increased in size or additional circuits being provided.

6.84 Part of assessing a connection application includes network analysis to determine whether reinforcement is necessary. We anticipate that WPD will continue to assess this need, but that the work may be delivered by a third party.

6.85 Third parties do not currently carry out reinforcement work. In limited situations they may lay cables, but do not make any interconnections.

6.86 During RIIO-ED1 the scope of contestable work will be extended to allow third parties to carry out network reinforcement. This will require changes to technical processes, interaction between WPD and third parties and financial transactions. For example processes will be required to provide funds (from DUoS) to the third party to pay for the part of the reinforcement not funded by the customer.

☑ RIIO-ED1 measure – Extension of contestable work to reinforcement

6.87 During RIIO-ED1 WPD proposes to allow third parties to carry out reinforcement work and the scope of this work will be incorporated into Common Connections Charging Statements.

7 Outputs - customer satisfaction

7.1 The provision of excellent customer service for WPD's 7.8 million customers is a core business objective.

7.2 WPD will deliver the following customer satisfaction outputs and secondary deliverables during RIIO-ED1:

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 an annual round of at least 6 stakeholder workshops.
- Continue to produce a stakeholder report every year providing an update of actions taken as a result of stakeholder engagement.

Complaints

- Resolve at least 70% of complaints within one day.
- Continue to have a target of zero complaints where the Ombudsman has to get involved.

Guaranteed Standards of Performance (GSOPs) awareness

- Continue to send the 'Power for Life' publication to all 7.8 million customers which will include promotion of the GSOPs.

Regulatory framework

7.3 Ofgem wants to ensure that DNOs are focussed on providing a good service to customers.

7.4 Ofgem will assess customer service by using the Broad Measure of Customer Satisfaction (BMCS) that was introduced in DPCR5, but some of the elements and weightings will be revised.

7.5 The BMCS is an incentive mechanism that provides rewards or penalties in three areas of customer service: customer satisfaction, complaints and stakeholder engagement.

7.6 Customer satisfaction is assessed through a survey and deals separately with three types of interaction:

- customers requesting a connection (minor connections only);
- customers experiencing a supply interruption;
- customers making a general enquiry.

7.7 The complaints part of the BMCS results in penalties where DNOs do not meet specified target performance. The measure is subdivided into four components with greater weighting applied to repeat complaints and complaints that take longer than 31 days to resolve.

7.8 The final part of the BMCS considers stakeholder engagement with rewards available for DNOs that engage well and use the information obtained to improve the service provided to customers. This incentive has been strengthened to encourage DNOs to focus more on issues relating to vulnerable customers.

7.9 The range of outputs and secondary deliverables being proposed by WPD address all these areas and describe a number of different approaches we will use to continue to provide excellent customer service.

Customer service

7.10 WPD consistently achieves excellent levels of customer service that are reflected across all elements of the Broad Measure of Customer Satisfaction. Our reputation for customer service has generated a lot of interest from other customer service organisations with many visiting us to learn how they can improve.

7.11 During RIIO-ED1, we will continue to refine and improve the processes and practices for customer service to maintain industry leading performance. We will use feedback from our stakeholders and learning from best practice in other organisations to make improvements to what we do and how we do it.

☑ RIIO-ED1 Measure – Broad Measure of Customer Satisfaction

7.12 The regulatory Broad Measure of Customer Satisfaction covers the majority of customer service considerations and, during RIIO-ED1, our target will be to remain a top performer within the Broad Measure.

Customer Service Excellence standard

7.13 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).

7.14 Every year, Customer Service Excellence assessors review customer service against five criteria:

- customer insight;
- culture of the organisation;
- information and access;
- delivery;
- timeliness and quality of service.

7.15 WPD proudly achieves 'Compliance Plus' ratings against the standard in a number of areas. A copy of the 2013 assessment can be found at the following link: http://www.westernpower.co.uk/docs/About-us/Stakeholder-information/Our-future-business-plan/Supporting-Outputs-information/2013-Customer-service-excellence-report.aspx

7.16 Since the Customer Service Excellence standard provides an independent view of WPD's customer service, we will continue to be assessed against it.

☑ RIIO-ED1 measure – Assessment against Customer Service Excellence standard

7.17 WPD will continue to target to exceed the compliance requirements of the Customer Service Excellence assessment criteria, demonstrated by achieving 'Compliance Plus' ratings.

Telephone response

7.18 Allowing customers to speak to someone is an essential part of good customer service and we are proud of the telephone response that we already provide.

7.19 We will continue to operate highly efficient Contact Centres using the latest technology to provide automated messaging for power loss in addition to well trained staff to talk to customers who wish to speak to us in person.

7.20 Where circumstances lead to exceptionally high call volumes, we expand the number of call takers by using trained staff across our business to maintain service levels and provide customers with information.

7.21 We also provide facilities for contact centre and other trained staff to take calls at home, should bad weather prevent them from travelling to work.

Answering calls quickly

7.22 Whilst there are no incentives in this area, we recognise that customers can be frustrated when their calls are not answered quickly.

☑ RIIO-ED1 measure – Answering calls quickly

7.23 During RIIO-ED1, we will target to answer calls within two seconds.

Low rates of abandoned calls

7.24 Abandoned calls arise when customers decide to hang up before they speak to a call taker. This is normally as a result of being kept on hold for a long time. WPD's approach of answering call quickly results in very few abandoned calls.

☑ RIIO-ED1 measure – Keep abandoned calls at a low level

7.25 During RIIO-ED1, we will target to have less than 1% of our inbound calls being abandoned.

Speaking to a call taker

7.26 Whilst messaging is adequate for some customers, many prefer to speak to a call taker to find out further information or get reassurance about when supplies will be restored.

☑ RIIO-ED1 measure – Provide an option to talk to a call taker

7.27 We will ensure that telephony systems will continue to provide customers with the option to talk to a call taker.

Communicating with customers

7.28 Customers want to be kept informed and updated when they have an enquiry, require a service or are off supply. These are simple requirements and we will continue to build on the service initiatives we have introduced in DPCR5.

7.29 We will develop new channels of communication beyond the traditional telephone and written methods. Advances in technology mean that customers want to be able to communicate online, via e-mail, text, smart phone or social networks.

7.30 Part of our stakeholder engagement has been used to explore which communication methods should be considered. Stakeholders suggested that many organisations, including local authorities, are using alternative technology and that multi-media communications should be available.

7.31 Stakeholders also stressed that changes should be implemented quickly and at no extra cost to customers. We have already started the development of systems and processes and we will continue to develop these and other new technologies during RIIO-ED1.

Provide a restoration time for every outage

7.32 When supplies are interrupted, customers welcome good information about when they will be back on supply.

7.33 Currently information on estimated time of restoration is provided for the majority of the outages but for a number the restoration times are still uncertain.

☑ RIIO-ED1 measure – Provide a restoration time for every outage

7.34 During RIIO-ED1, we will obtain regular progress updates from field staff to provide a restoration time for every outage.

Call back customers who have been in contact about a fault

7.35 When customers contact WPD because they are off supply the main thing they want to know is when the power will be restored. In some situations it is difficult to accurately predict the duration of an outage initially and as the fault progresses it may become necessary to revise the estimated time of restoration.

7.36 For some time WPD has been calling customers back and has carried this out for 40% of customers who call about faults.

7.37 During RIIO-ED1 all customers contacting WPD about a fault will be offered a call back to provide progress updates or check that supplies are restored. During the call backs, the opportunity will be taken to gain feedback on the service provided to obtain useful information for further service improvements.

☑ RIIO-ED1 measure – Call backs

7.38 All customers who have been in contact about a fault will be offered a call back.

Contact customers within two days for non-fault enquiries

7.39 Feedback from connection customers has led to the development of an internal standard for contacting customers for non-fault enquiries. When customers make an application for a new connection or make any other general enquiry, their details are logged on WPD systems by central administrative staff. This creates a prompt for local teams to contact the customers.

7.40 This approach means that customers asking for action from us will be contacted by a local team member who will be directly involved with addressing the customer's requirements. The internal standard requires that contact is made within two days of receiving the request.

☑ RIIO-ED1 measure – Contact customers within two days for non-fault enquiries

7.41 During RIIO-ED1, all customers with non-fault enquiries will be contacted within two days.

Provide on-demand messaging

7.42 Some customers want to be kept informed about what is happening on the network through communication methods other than the telephone. Advances in communication technology have changed the way some people access information. Texting and the use of social media are used widely and some customers want the option to receive on-demand services.

7.43 We will develop systems to provide messaging via text and social media to send information to customers who have asked to be kept informed.

☑ RIIO-ED1 measure – Provide on demand messaging

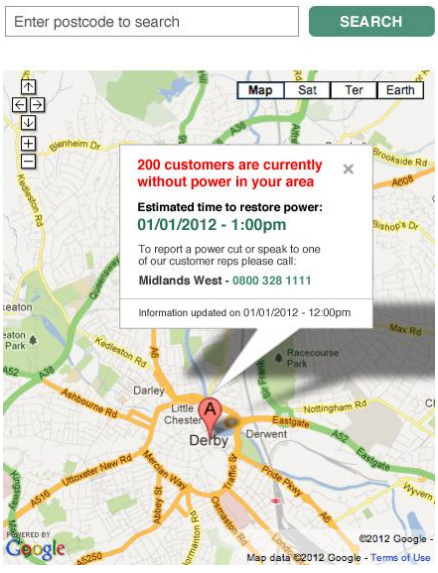
7.44 During RIIO-ED1, we will develop systems to provide on-demand messaging via text and social media, evolving the systems as communication media change. When developed and tested, the on-demand options will be publicised on the WPD website.

Develop 'self-service' online information

7.45 In addition to providing on demand services 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.

7.46 Some customers and public service organisations would like the facility to access information on faults affecting them via laptop, tablets or smart phone technology.

7.47 Ahead of RIIO-ED1 we will introduce a revised map-based online information system that enables customers to get real time up to date incident information. It will provide information specific to postcodes and includes contact information should customers then wish to speak to us.



☑ RIIO-ED1 measures – Develop 'self-service' online outage information

7.48 We will develop 'self-service' options for customers to find outage information online, providing a quick link to the service from the homepage of the WPD website.

Engaging with stakeholders

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

7.50 Every quarter, WPD's CEO meets with an expert Customer Panel to shape our thinking and future priorities. This group is made up of 20 permanent members with at least one member for each customer segment to ensure views are balanced and representative of all stakeholders.

7.51 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. These are facilitated by WPD staff, alongsideprofessional event organisers who encourage contribution and objectively record responses.

7.52 Periodically market research is used, accessing a large number of stakeholders, to carry out in-depth surveys that provide views on investment priorities.

7.53 An annual awareness campaign is used to make customers aware of WPD. This includes the distribution of the 'Power for Life' publication to every household and television adverts shown at different times on a variety of stations. This provides information for customers and invites them to contact WPD to ask further questions.

7.54 Together these events provide very useful feedback and will continue during RIIO-ED1.

☑ RIIO-ED1 measure – Customer Panel

7.55 We will continue to host a Customer Panel where the CEO will meet with WPD's expert stakeholders four times a year.

☑ RIIO-ED1 measure – Stakeholder workshops

7.56 We will continue to host an annual round of at least 6 stakeholder workshops across the area.

☑ RIIO-ED1 measure – Stakeholder report

7.57 We will continue to produce a stakeholder report every year providing an update of actions taken as a result of stakeholder engagement and an update of progress towards delivering RIIO-ED1 output measures.

Resolution of complaints

7.58 WPD endeavours to get things right first time but sometimes things can go wrong. When complaints are received they are treated with urgency and with an aim to resolve them to the customer's satisfaction quickly. Local team managers are responsible for dealing with complaints visiting customers where necessary to understand what can be done to put things right.

7.59 Performance is measured within the BMCS in four categories:

- complaints resolved in day 1;
- complaints remaining unresolved after 31 days;
- repeat complaints;
- Ombudsman referrals.

7.60 WPD will target to have leading performance in each element in the overall measure, avoiding penalties from Ofgem.

☑ RIIO-ED1 measure – Resolving complaints within one day

7.61 WPD will aim to resolve at least 70% of complaints within one day although the overall performance will be determined by the regulatory BMCS measure.

7.62 Consistent reporting has been available for 2011/12 and 2012/13 and WPD's average performance over the two-year period is shown in the table below.

Percentage of complaints resolved in day one (two year average)					
	West Midlands	East Midlands	South Wales	South West	WPD Total
Percentage of complaints resolved in day 1	64%	62%	54%	53%	59%

☑ RIIO-ED1 measure – Ombudsman investigations

7.63 If they are dissatisfied with a DNO's response customers have the option to raise their complaint with the industry Ombudsman. WPD will ensure that every complaint is adequately dealt with by WPD staff and have a target of having zero complaints needing to be investigated by the Ombudsman.

7.64 We have achieved zero Ombudsman complaints in WPD South Wales since 2003 and in WPD South West since 2005. We had zero Ombudsman complaints in both WPD East Midlands and WPD West Midlands in 2012/13.

Increasing awareness of Guaranteed Standards of Performance

7.65 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.

7.66 Ofgem are concerned that some customers may not be sufficiently informed about guaranteed standards and are therefore potentially missing out on some payments, particularly where standards require customers to claim following failures.

7.67 Where WPD is aware of a failure, a payment will be made without the need for a customer to claim.

7.68 Every year, we will publicise the Guaranteed Standards of Performance (GSOPs) in WPD's 'Power for Life' publication that is posted to all WPD customers. GSOPs will be a permanent article in the publication so that customers are continually reminded of the standards that apply to our service.

☑ RIIO-ED1 measures – Annual communication to all customers

7.69 We will continue to send the 'Power for Life' publication to all 7.8 million customers to raise awareness of WPD, which will include information about GSOPs and links to more detailed information.

8 Outputs - social obligations

8.1 WPD's vulnerable customer strategy is designed to deliver the following social obligations outputs and secondary deliverables during RIIO-ED1:

Improving understanding of vulnerability

- Work with expert partners to improve understanding of the needs of vulnerable customers.
- Train staff to recognise the signs of vulnerability.

Improve the data held on the Priority Services Register

- Proactively contact vulnerable customers at least once every two years to check the details on the priority service register.
- Improve the quality of Priority Services Register data by working with other agencies and sharing information.
- Co-ordinate meetings with suppliers to agree criteria for vulnerability.

Improve the services provided for vulnerable customers

- Raise awareness of the Priority Service Register.
- Make 10,000 crisis packs available.
- Contact all medically dependent customers every three hours during power cuts.
- Continue to provide practical support via the RVS and British Red Cross.
- 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-ordinate assistance with partners.
- Provide bespoke training to WPD front line staff.
- Use data analysis to help identify localities with high concentration of vulnerable households.
- Develop local outreach services.

WPD's vulnerable customer strategy (VCS)

8.2 Since 2005, WPD's partnership approach to vulnerable customers has been recognised as best practice by Ofgem's Customer Service Reward and the Government's Customer Service Excellence accreditation.

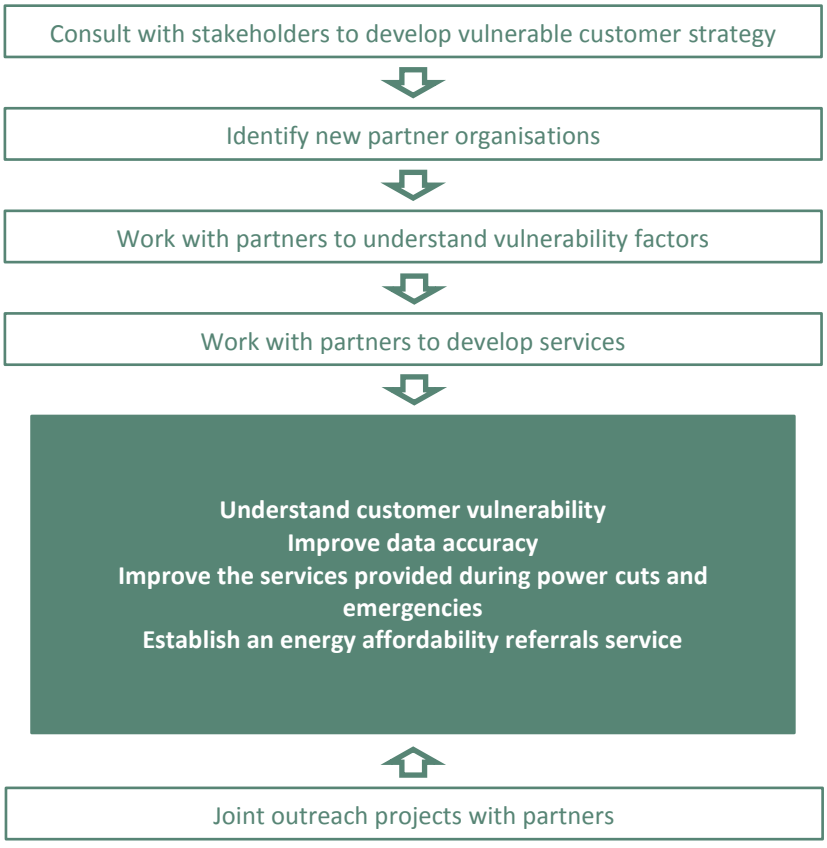
8.3 During this time, WPD's approach to service provision has been focused on customers on the Priority Services Register (PSR) who are registered as being dependent on electricity due to age, disability or chronic illness.

8.4 Going forward, WPD will focus on social obligations in relation to a broader group of customers who are defined as vulnerable for a range of reasons including energy affordability. In order to respond to the needs of these customers, WPD has consulted stakeholders on new approaches to vulnerability.

8.5 Our VCS will achieve the following objectives;

- understand the nature of vulnerability and customer need;
- improve the accuracy of our records with respect to vulnerable customers;
- improve the services provided to vulnerable customers during power cuts and emergencies;
- refer customers to partners that can assist with energy affordability matters.

8.6 The diagram below shows the main elements of the WPD VCS.



Stakeholder engagement

8.7 Stakeholders have played an important role in the development of the WPD VCS.

8.8 We attended Ofgem's workshops on customer vulnerability to hear initial stakeholder views.

8.9 We asked the Centre for Sustainable Energy (CSE) to develop a brief on the issues around a DNO's response to vulnerability and energy affordability and also conduct workshops with WPD. This formed the basis of our consultation.

8.10 We consulted with our Customer Panel on the appropriate response of WPD to social obligations, and worked with one particular member from the British Red Cross to develop a proposed delivery strategy.

8.11 We presented our draft social obligations proposals on vulnerability at the National Energy Action Conference in Cardiff on 31 January 2013. Specific interest groups were invited to participate in social obligations workshops held in Bristol and Birmingham, where we consulted on our proposed social obligations outputs. These workshops also provided an opportunity to identify future community partners.

8.12 We included social obligations within our Business Plan workshops attended by a wide range of stakeholders (see Stakeholder sections for further details).

8.13 We held a further session with our Customer Panel to consult on our proposed social obligations outputs and costs within the draft Business Plan.

Stakeholder views

8.14 Our stakeholders agreed that WPD should have a role in supporting vulnerable customers and told us that we should:

- develop new ways to maintain up-to-date PSR records;
- focus on enhancing our existing core services in conjunction with partner organisations (such as the British Red Cross, RVS and Local Resilience Forums) and embed them further into routine business operations;
- engage with customers, where the opportunity arises, to provide access to information and advice about energy affordability issues;
- avoid duplicating assistance available from other organisations by building referral networks with community organisations.

8.15 We have used this stakeholder feedback to develop our Vulnerable Customer Strategy and specific actions proposed for RIIO-ED1.

Building on existing partnership working

Working in partnership

8.16 WPD already leads the industry in the provision of services to priority needs customers through partnership working. Our partners have a good understanding of the needs of vulnerable customers and by working together we improve how we deal with those customers. During RIIO-ED1 we will enhance the services we provide with our existing partnerships. We will also look to develop links with additional community organisations that can provide assistance for different types of vulnerable customers.

Providing support during power cuts

8.17 During prolonged power cuts we operate partnership initiatives with the British Red Cross, RVS and oxygen providers.

8.18 We also work closely with Local Resilience Forums to co-ordinate services during severe weather and other emergencies.

8.19 These organisations and others such as Age UK work with us to help vulnerable customers prepare for power cuts and we will continue to work with these partners to provide assistance relating to power cuts.

Using partnerships to improve the accuracy of the Priority Services Register

8.20 WPD holds a Priority Services Register (PSR) that records details about vulnerable customers so that additional support can be provided when any of these customers contact WPD or when their supply is interrupted. Approximately 715,000 customers are on the PSR across our four licenced areas which equates to almost 10% of our customer base. Over 165,000 customers are registered for medical dependency on power or for special communication needs.

8.21 It is important that the register is accurate so that resources are deployed effectively. Partnership organisations can hold information that helps us to keep the register up-to-date. For example we have worked with oxygen providers to share data about medically dependent customers. Where data protection requirements can be met, we will work with suppliers and community partners to find solutions to enable sharing and improving data.

Working with partners to develop services

8.22 We work with partners to develop and provide services for vulnerable customers. Some of the existing approaches include:

- ‘Louder Than Words’ services accredited by Action on Hearing (formerly RNID);
- ‘Language Line’ service to provide translation for customers;
- advice leaflets written by Mencap in easy read format;
- partnership with the disability theatre group High Jinx to understand the communication needs of disabled or other vulnerable customers.

8.23 We will continue to work with a range of third parties to provide accessible services and make use of new technology.

Working with partners to tackle fuel poverty

8.24 Although as a DNO we have no direct obligations to deal with fuel poverty, we do have a social responsibility to play a role in addressing fuel poverty and cold homes.

8.25 We have begun to act through partnerships with Warmfront/Home Energy Efficiency Scheme and National Energy Action to facilitate initiatives to tackle fuel poverty in relation to priority needs customers.

8.26 Going forward, we will develop a network of partners to help establish an energy affordability referrals service.

Improving our understanding of vulnerability

8.27 WPD will adopt the British Standard on Inclusive Service Provision (BS 18477:2010) to provide a framework for developing our understanding of vulnerable customers. This standard states: "*Consumer vulnerability is relative and dynamic, and a consumer's needs and abilities can change with time or circumstance*".

8.28 We will build a network of partners who can provide a better understanding of vulnerability factors to help us to determine the needs of these customers and work with us on new initiatives.

8.29 It is important that staff are trained to recognise vulnerable customers so that they can provide the appropriate services.

8.30 We will work with partners to develop bespoke communication and listening skills training for front line Contact Centre staff to enable them to identify key warning signs of vulnerability. This will include recognising signs of disability, illness, age and fuel poverty.

☑ RIIO-ED1 measure – Partnerships

8.31 The scope of our understanding of vulnerability will be demonstrated by the range of partners we have engaged with and initiatives we are undertaking with them.

☑ RIIO-ED1 measure – Staff training

8.32 During RIIO-ED1 we will develop training material and describe the scope of the training in regulatory submissions for stakeholder engagement for vulnerable customers.

Improving the data held on the Priority Services Register

8.33 Customers are added to the PSR mainly via notification from electricity suppliers. Over time, circumstances may change: sick people may recover following surgery, elderly people may move to residential homes or people may simply relocate. Customers often forget to notify their supplier of changes that affect the PSR and as a result records can become out of date.

Contacting PSR customers

8.34 At present WPD uses several approaches to validate data on the PSR. When customers with a medical dependency or special communication need join the PSR, we write to them to provide power cut advice and a direct dial number. This provides an opportunity to check that the details received from suppliers are correct. In addition when power cuts affect customers on the PSR the accuracy of existing records can be verified. We have also run a programme of writing to customers to confirm their details. This needs to be handled sensitively as receiving such a letter can be upsetting for customers who may have lost that relative.

8.35 To ensure that PSR records are regularly checked, WPD will set up a dedicated team of staff trained to contact customers and validate the details held about them. By working through the list progressively, the accuracy of the data will be improved. The process will be repeated every two years. We will pilot this in advance of RIIO-ED1 to ensure that we develop the best approach to carrying this out efficiently.

☑ RIIO-ED1 measure – Contacting PSR customers every two years

8.36 The number of PSR records that are validated each year will be published in the annual stakeholder report. This will be shown relative to the total number of records to illustrate that the two year cycle of contact is being achieved.

Working with other agencies to identify vulnerable customers

8.37 Other public service centred organisations such as utilities, local authorities, housing associations and the health service all collect data about vulnerable customers. In many instances data protection regulations prohibit the sharing of data without consent. Where data protection allows, WPD will work with these organisations to identify additional customers that should be on the PSR.

8.38 We will also make use of independent data models that identify types of customers. For example the Centre for Sustainable Energy has undertaken a project 'Who's on the Wires' which identifies likely areas of fuel poverty. This will allow us to direct information and resources to the right areas.

☑ RIIO-ED1 measure – Using data from other agencies

8.39 We will describe the activities that we have carried out with other agencies to identify additional vulnerable customers in submissions to Ofgem for the stakeholder engagement part of the BMCS.

☑ RIIO-ED1 measure – Working with suppliers to agree criteria for vulnerability

8.40 We will work with suppliers to agree the criteria for identifying and describing vulnerable customers so that the services the industry provides are more co-ordinated. Progress will be reported in submissions to Ofgem for the stakeholder engagement part of the BMCS.

Providing additional services for vulnerable customers

8.41 Electricity is an essential part of modern life and customers have become increasingly reliant on an uninterrupted supply. It is vital that vulnerable customers are prepared for a power cut and know how to cope. Customers, especially those dependent on electricity, are advised to have alternative arrangements such as battery powered back-up and to know how to contact WPD for information.

Publicising the PSR

8.42 We will continue to work with a range of partners including Age UK/Age Cymru, the British Red Cross and local authorities to distribute our information leaflets andpublicise the PSR and WPD's emergency telephone Contact Centre numbers.

☑ RIIO-ED1 measure – publicising the PSR

8.43 We will describe the activities that we have carried out to publicise the PSR in submissions to Ofgem for the stakeholder engagement part of the BMCS.

Assisting vulnerable customers to be prepared for a power cut

8.44 All new PSR customers who rely on power for medical equipment or who have special communication needs will receive an advice letter, a leaflet about power cuts and a direct dial telephone number.

8.45 We will also provide power cut advice online.

8.46 In addition to providing advice on how customers can be prepared for power interruptions, we will offer more direct assistance by distributing 10,000 crisis packs (including items such as an analogue phone, torch, gloves, gel hand-warmer, blanket and information leaflets) via our own staff and our partners. We will work with members of the Customer Panel to review the contents of the packs so that we can provide useful items that vulnerable customers will use.

☑ RIIO-ED1 measure – Distribute 10,000 crisis packs

8.47 We will aim to distribute 10,000 crisis packs to those most in need of them. The number distributed each year will be shown in the annual stakeholder report.

Providing additional services for vulnerable customers during power cuts

8.48 The PSR identifies which customers may need assistance during a power cut. Those who are dependent on power for medical equipment are prioritised as being more at risk during a loss of supply. Medically dependant customers and those with communication needs are provided with direct dial telephone numbers to contact WPD.

8.49 We will continue to telephone medically dependent and blind customers prior to a planned outage, in addition to the normal notification by letter. If necessary we will visit the customer to explain what will happen and identify additional requirements. If the customer cannot manage without their supply then we will consider providing a generator.

8.50 The PSR data will be used to contact medically dependent customers within the first three hours of a prolonged power cut to provide updates on power restoration times and identify if additional support or further contact is required.

8.51 We will make greater use of our crisis packs developed with the British Red Cross, by providing stocks to local teams for distribution to vulnerable customers during outages lasting longer than six hours.

8.52 All vulnerable customers are eligible for assistance from the RVS or the British Red Cross, whether they are on the PSR or not. Contact Centre staff can arrange for the partner organisations to attend and provide hot food, drinks, advice and support. The RVS will respond to requests for individual customers whilst we make proactive use of the British Red Cross for prolonged outages affecting a local community. We will continue to develop the services we provide with our existing partnerships with the RVS and Red Cross and look to develop further services with other organisations.

8.53 Where customers are reliant upon oxygen supplies WPD will continue to liaise with oxygen providers so that they can ensure customers have sufficient breathing apparatus and provide any advice or support needed.

☑ RIIO-ED1 measure – Contact PSR customers within three hours of a prolonged power cut

8.54 We will develop our incident management system so that it has the capability to record when a vulnerable customer receives a call from us about a power cut. This information will be used to demonstrate how we are performing against this measure.

☑ RIIO-ED1 measure – Services provided for PSR customers

8.55 We will describe the range of services that we provide in annual submissions to Ofgem for the stakeholder engagement part of the BMCS. This will illustrate the range of services we provide and which partner organisations assist in delivering them.

Providing assistance during emergencies

8.56 Emergencies such as damage caused by severe weather can leave vulnerable customers without power for prolonged periods of time.

8.57 When emergencies occur we will provide support to vulnerable customers. This includes providing hot drinks and distributing our crisis packs. We have a range of vehicles suitable for operating in severe weather conditions, such as 4x4s, that can be used to reach vulnerable customers to provide this support. In addition, flying conditions permitting, we will also make use of the WPD helicopter fleet to provide supplies to vulnerable customers who are cut off from other means of access.

8.58 We will also use arrangements with our existing partners including the British Red Cross, VRS to provide assistance such as hot meals, blankets and torches. We will work within the Local Resilience Forums to develop new links with local community organisations to extend the coverage of external partnerships that can provide assistance during emergencies.

8.59 Our staff play a major role during emergencies. We will look at ways to prepare them for the physical challenges of dealing with severe weather. For example as part of WPD's flood defence measures, we have already trained staff who might play a part in a flooding incident in water rescue. This training was provided by the Mid and West Wales Fire and Rescue Service based in Carmarthenshire and is the same as that received by Lifeboat and Environment Agency staff.

8.60 During an emergency it is important that the media, local authorities and other emergency resilience partners are kept informed about the number of customers off supply and the progress in restoring supplies. To enhance our existing communication processes we will develop facilities on our website to provide online updates.

8.61 In particularly severe weather conditions WPD is part of the Gold Command arrangements working with other emergency services. We will continue to be actively involved in Strategic Gold Command (prior to event) and Active Gold Command (during the event). This will involve regularly communicating with Government, emergency services, the Environment Agency and other Category 1 and 2 responders during events.

8.62 Senior staff from the Control Centre will provide updates on the number of customers affected, advise on risks to the electricity network and gather information that can assist operational teams across the business. This is very much a two-way process, where mutual support is regularly provided e.g. we offer the use of our specialist vehicles to support the emergency services and fire services to assist in dealing with flooded substations.

☑ RIIO-ED1 measure – Emergency resilience plans

8.63 An overview of our plans for emergencies will be provided in the annual regulatory submissions on stakeholder engagement for vulnerable customers.

Addressing fuel poverty and cold homes

8.64 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. WPD does not have a direct obligation to provide energy efficiency advice but we are already working with other agencies (such as the charity National Energy Action) to provide information on the causes of and solutions for fuel poverty.

8.65 We will work with existing and new partners to develop a referral framework of regional agencies such as local authorities, Citizens Advice, voluntary agencies and energy charities that can be contacted for assistance on fuel poverty issues.

8.66 Links will be established on the WPD website to direct customers to partner organisation websites. We will also look for opportunities to develop other joint information such as customer mailings.

8.67 Front line staff will receive training, developed with our partners, to allow them to identify the key warning signs of fuel poverty and refer customers to appropriate organisations that can help.

☑ RIIO-ED1 measure – Fuel poverty initiatives

8.68 The initiatives developed for tackling fuel poverty will be described in the annual regulatory submissions on stakeholder engagement for vulnerable customers.

Outreach work

8.69 We recently trialled a project in Derbyshire in conjunction with National Energy Action, which targeted vulnerable customers and assisted them in a number of energy related areas to improve their quality of life. These customers were given advice on energy efficiency, fuel poverty and power cuts.

8.70 We will seek opportunities to participate in other outreach projects across our region where there is a focus on energy or vulnerable customers.

8.71 More use will be made of social indicator data to identify where customers are likely to be vulnerable or fuel poor so that we can target outreach initiatives.

☑ RIIO-ED1 measure – Identification of fuel poor customers

8.72 The analysis we have used to identify fuel poor customers for targeted outreach work will be described in annual regulatory submissions on stakeholder engagement for vulnerable customers.

☑ RIIO-ED1 measure – Outreach projects

8.73 The outreach projects that we participate in will be described in annual regulatory submissions on stakeholder engagement for vulnerable customers.

Research, reporting and monitoring

8.74 WPD will undertake annual research to measure customer satisfaction levels of PSR customers and seek feedback on service improvements.

8.75 We will report on our activities in our annual Stakeholder Report, our annual customer mailing and through Ofgem's BMCS Stakeholder Engagement Incentive submission.

8.76 Many of the social obligations outputs and deliverables are qualitative rather than quantitative and so we have commissioned the Centre for Sustainable Energy to develop a method for performance measurement based on a balanced scorecard.

☑ RIIO-ED1 measure – Social obligations balanced scorecard

8.77 The Social Obligations Balanced Scorecard is designed to enable us to benchmark:

- the services we provide;
- the customer contacts we make and the customer relationships we have;
- the information we have about our customers;
- the relationships we have or establish with other agencies;
- our broader ambitions to be a socially responsible.

8.78 The results that we obtain will be summarised in the annual stakeholder report.

Social obligations balanced scorecard

Strategic understanding and commitment

Aspect of performance	Weighting *	Weak	Fair	Good	Excellent
1. **Strategic understanding and commitment** to role DNO can play in tackling relevant social issues	High	Recognition of social role confined to generalised statements and limited integration into strategy or business planning	References to social role within strategy but tendency to treat as 'add on' aspects of business strategy and practices rather than integral aspect of service development and delivery	Fully integrated understanding of social role with clear plans for developing systems and customer-facing services to reflect role with targets for improved performance and increased impact	Delivering on social role a key business driver underpinning design, planning and delivery of all services with core objective to 'make the most of what DNO does' to tackle relevant social issues
Source of evidence	Ofgem assessment of company regulatory reporting PLUS company submission to DR process		**Questions for DNO submission template**	a. How is your company responding to the opportunities to develop its role in tackling relevant social issues? b. Where do you feel your company is falling short and could improve its performance? c. What plans do you have to improve performance?	

Use of data and customer insight

Aspect of performance	Weighting*	Weak	Fair	Good	Excellent
2. **Use of data and customer insight**, to underpin design, planning and delivery of services for **vulnerable households**	High	Limited use of data or customer insight, largely based on existing PSR and associated PSR 'recruitment' systems	Ad hoc use of data, mainly provided by others, to enhance insight but no strategic approach to customer insight to enable targeted work to address vulnerability and support social role	Strategic approach to acquisition, management and use of data relating to customer vulnerability, with clear evidence of how its use is influencing and improving service development and delivery	As 'good' plus using data to assess future risk of vulnerability and sharing analysis (and definitions) with other relevant parties to develop shared picture of challenge and underpin own and joint initiatives
Source of evidence	Company submission to DR process		**Questions for DNO submission template**	a. How does your company collect, analyse and use data regarding households connected to your network? b. What do you see as the key barriers to progress on building a picture of the risk of household vulnerability across your network? c. What steps is your company taking to address these barriers?	

Priority service register

Aspect of performance	Weighting*	Weak	Fair	Good	Excellent
3. Approach taken to management and use of **Priority Service Register** and associated services	High	Broad-brush approach to recruitment of people onto PSR with limited understanding of vulnerabilities across network area and needs for support in event of power failure or planned outage.	Well- managed PSR list with evidence of strategic approach to who's on it and careful differentiation between needs of different customers which is well-reflected in services and support offered to customer when needed	PSR approach informed by good data analysis and embedded as a key driver of tailored customer service provision, with effective data-sharing with referral network partners and energy suppliers	As 'good' plus PSR used to drive range of proactive tailored interventions to increase resilience and capacity of PSR customers to manage power outage, based on detailed understanding of customer vulnerabilities and needs
Source of evidence	Subset of questions on customer survey PLUS DR process submission		**Questions for DNO submission template**	a. How do you decide who should be on your PSR and what support they need? b. How is your PSR informing your customer service practices and systems? c. What are you planning to improve about this aspect of your company's work – and why?	

Affordable warmth initiatives

Aspect of performance	Weighting*	Weak	Fair	Good	Excellent
4. **Affordable warmth initiatives,** including off-gas activities, integration with others' schemes	High	Activity limited to ad hoc and largely opportunistic range of initiatives, led by others, with little attempt to establish a strategic approach or understand nature and scale of affordable warmth challenge in network area	Signs of a strategic approach to involvement in affordable warmth initiatives, based on basic analysis of nature and scale of problem in area and development of partnerships, with DNO role focused principally on making referrals	Evidence of well-developed strategy with clear objectives based on thorough analysis of need, effective partnerships at local and area-wide levels and well-defined role in targeted interventions.	As 'good' with extensive training of customer-facing staff to identify and support fuel poor customers, constructive participation in development of interventions with relevant partners, and strategic engagement in local and regional fora working on community resilience to cold weather.
Source of evidence	Company submissions to DR process		**Questions for DNO submission template**	a. What impact have the affordable warmth initiatives in which you've been involved had, and what contribution do you make to their success? b. What did you learn this year from your activity to support action in your network areas on affordable warmth? c. How has this learning changed your approach in future?	

Referral networks

Aspect of performance	Weighting*	Weak	Fair	Good	Excellent
5. Development of, and participation in **referral networks for services for vulnerable households** and quality of associated systems and processes	Medium	Some examples of linking up with other services for vulnerable household and partnerships to improve cross-referrals, but generally ad hoc and localised	Willing participant in referral networks across area when invited, though missing more localised services and limited integration into customer management systems	Active participation in range of referral networks to ensure coverage across area with clear data management protocols established and mechanisms for tracking customers and responding to referral partner requests for input.	As 'good' but leading partner in referral networks across area, using range of DNO services and capabilities to support networks.
Source of evidence	Company submission to DR process		**Questions for DNO submission template**	a. What steps has your company taken to ensure that vulnerable customers with whom you have contact are referred on to other relevant agencies to secure other forms of support they need? b. What role do you play in referral networks across you areas? c. What improvements do you think could still be made?	

Integration into business processes

Aspect of performance	Weighting*	Weak	Fair	Good	Excellent
6. Level of integration of social role into **customer-facing services** and associated processes	Medium	Customer-facing services show little attention to capturing customer information to identify vulnerabilities beyond basic PSR recruitment	Customer-facing services routinely capturing information on customer needs and vulnerabilities to support tailoring of PSR services and to trigger referrals for further support to limited range of services delivered by others	Customer service staff trained in identifying and responding to customer vulnerabilities with a range of services and referral mechanisms, selected to meet wide range of customer needs and circumstances. Services routinely monitored and evaluated to test extent to which they are meeting customer needs.	As 'good' with social role a key aspect of customer services and front-line staff training and service design with <u>all</u> front-line staff trained to identify and record customer vulnerability with access to a wide range of responses developed and available to support customer. A degree of flexibility available to staff to 'do right thing' for any customer to meet evident need (with feedback to improve services).
Source of evidence	Specific questions on customer survey plus company submission to DR process		**Questions for DNO submission template**	a. What are you doing to make sure your front-line staff are making the most of their contacts with customer to identify and address their vulnerabilities? b. What challenges is your company facing in achieving these goals? c. How is your company addressing these challenges and what will change if you succeed?	

Costs of providing additional services for vulnerable customers

8.79 The costs of providing additional services for vulnerable customers are relative small when compared to the overall expenditure. The various costs are collated into the table below.

Activity	Annual Cost	Output/Benefit delivered
A dedicated team to carry out a 2-year rolling programme data cleanse and maintenance of PSR records, by contacting PSR customers, and liaising with suppliers and partners.	£0.2m	Improve the Data Held on the Priority Services Register
Information and Support to PSR/vulnerable customers during power cuts. Includes contracts with RVS and British Red Cross, liaison with other community based/emergency organisations, awareness training/information to network services staff - and the development and maintenance of web-based information.	£0.1m	Improve the Services Provided for Vulnerable Customers
Referral Service for vulnerable customers - liaison with partners to build and maintain a database of contact organisations (vulnerability, energy efficiency and fuel poverty) and provision of bespoke training to Contact Centre staff.	£0.1m	Address Fuel Poverty by Supporting Customers to Access Key Information
Production and distribution of resources including 10,000 crisis packs and power cut advice leaflets for use internally and by external partners.	£0.01m	Improve the Services Provided for Vulnerable Customers
Support for specific outreach projects/events and joint information campaigns with identified partners to provide power cut advice, promote PSR services and signpost energy efficiency/fuel poverty advice to vulnerable/fuel poor customers. Customer research.	£0.5m	Address Fuel Poverty by Supporting Customers to Access Key Information/Improve the services provided for vulnerable customers/improve PSR data
Total costs per annum for 4 DNO areas	**£1.0m**	

9 Appendix A1 – Health and criticality risk matrix outputs

9.1 The following matrices show the net result of WPD's asset replacement and asset refurbishment interventions. They are derived from the difference between the matrices for the end of RIIO-ED1 position with intervention and the end of RIIO-ED1 position without intervention.

9.2 The net positions are provided for all the following asset categories:

- LV UGB and LV pillars (not at substations)
- LV switchgear at substations
- LV OHL support
- HV switchgear ground mounted at Primary substations
- HV switchgear ground mounted at Distribution substations
- HV transformers ground mounted
- HV OHL support – poles
- EHV switchgear ground mounted
- EHV transformer
- EHV UG cable (gas)
- EHV UG cable (oil)
- EHV OHL support –towers
- EHV OHL support –poles
- EHV OHL fittings and conductor on tower lines
- 132kV circuit breakers
- 132kV transformer
- 132kV UG cable (gas)
- 132kV UG cable (oil)
- 132kV OHL support –towers
- 132kV OHL fittings and conductor on tower lines

LV UGB and LV Pillars (outdoors not at substations)

West Midlands

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	0	0	0	0	0
	C2	2,448	0	0	-239	-2,209
	C3	0	0	0	0	0
	C4	0	0	0	0	0

East Midlands

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	0	0	0	0	0
	C2	1,456	0	0	0	-1,456
	C3	48	0	0	0	48
	C4	0	0	0	0	0

South Wales

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	0	0	0	0	0
	C2	250	0	0	0	-250
	C3	6	0	0	0	-6
	C4	0	0	0	0	0

South West

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	1	0	0	0	-1
	C2	703	0	0	0	-703
	C3	24	0	0	0	-24
	C4	0	0	0	0	0

LV switchgear (at substations)

West Midlands

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	0	0	0	0	0
	C2	1,500	-222	-23	-136	-1,119
	C3	272	-9	-1	-17	-245
	C4	0	0	0	0	0

East Midlands

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	0	0	0	0	0
	C2	1,190	-207	-96	-619	-268
	C3	161	-17	-21	-74	-49
	C4	0	0	0	0	0

South Wales

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	0	0	0	0	0
	C2	736	-52	-94	-47	-543
	C3	12	-2	-3	-1	-6
	C4	0	0	0	0	0

South West

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	7	0	0	0	-7
	C2	954	-56	-82	-122	-694
	C3	32	0	-2	-6	-24
	C4	0	0	0	0	0

LV OHL support

West Midlands

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	0	0	0	0	0
	C2	34,736	0	-4,343	-6,079	-24,314
	C3	0	0	0	0	0
	C4	0	0	0	0	0

East Midlands

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	0	0	0	0	0
	C2	22,524	0	-1,126	-3,379	-18,019
	C3	0	0	0	0	0
	C4	0	0	0	0	0

South Wales

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	0	0	0	0	0
	C2	17,457	0	0	-8,170	-9,287
	C3	0	0	0	0	0
	C4	0	0	0	0	0

South West

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	0	0	0	0	0
	C2	28,834	0	-4,614	-6,343	-17,877
	C3	0	0	0	0	0
	C4	0	0	0	0	0

HV switchgear ground mounted at Primary substations

West Midlands

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	140	-11	-14	0	-115
	C2	457	-22	-66	-102	-267
	C3	98	-13	-13	-55	-17
	C4	35	0	0	-25	-10

East Midlands

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	91	-18	0	0	-73
	C2	397	-85	0	0	-312
	C3	181	-25	0	-11	-145
	C4	4	0	0	-2	-2

South Wales

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	31	0	0	-1	-30
	C2	117	0	-2	-14	-101
	C3	5	0	0	-1	-4
	C4	24	0	0	-1	-23

South West

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	127	0	-28	-5	-94
	C2	386	0	-73	-19	-294
	C3	127	0	-9	-19	-99
	C4	5	0	0	-4	-1

HV switchgear ground mounted at Distribution substations

West Midlands

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	865	-70	-134	-195	-551
	C2	1035	-68	-105	-262	-702
	C3	587	-36	-45	-229	-335
	C4	139	-2	-12	-31	-107

East Midlands

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	795	-330	0	-119	-481
	C2	1,288	-146	0	-411	-951
	C3	860	-18	0	-616	-372
	C4	18	-18	0	-3	0

South Wales

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	0	0	0	0	0
	C2	788	-112	-25	-47	-668
	C3	190	-11	-1	-2	-192
	C4	0	0	0	0	0

South West

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	19	-18	-1	0	-3
	C2	1,806	-107	-185	-43	-1,819
	C3	404	0	-17	-6	-458
	C4	20	0	0	0	-24

HV transformers ground mounted

West Midlands

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	400	0	0	-91	-309
	C2	1,155	0	-1	-377	-777
	C3	425	0	-1	-178	-246
	C4	31	0	0	-13	-18

East Midlands

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	286	0	0	-20	-266
	C2	895	0	0	-213	-682
	C3	461	0	0	-123	-338
	C4	33	0	0	-7	-26

South Wales

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	207	0	0	-15	-192
	C2	594	0	0	-224	-370
	C3	69	0	0	-31	-38
	C4	0	0	0	0	0

South West

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	275	0	-1	0	-274
	C2	1,057	0	-2	-172	-883
	C3	195	0	0	-74	-121
	C4	2	0	0	0	-2

HV OHL support – poles

West Midlands

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	0	0	0	0	0
	C2	34,545	0	-1,727	-5,182	-27,636
	C3	4,081	0	-204	-612	-3,265
	C4	95	0	-5	-14	-76

East Midlands

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	0	0	0	0	0
	C2	24,132	0	-1,207	-3,620	-19,305
	C3	3,394	0	-170	-509	-2,715
	C4	47	0	-2	-7	-38

South Wales

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	0	0	0	0	0
	C2	25,798	0	0	-9,850	-15,948
	C3	1,886	0	0	-712	-1,154
	C4	26	0	0	-10	-16

South West

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	0	0	0	0	0
	C2	31,473	0	-5,037	-6,922	-19,514
	C3	341	0	-54	-76	-211
	C4	0	0	0	0	0

EHV switchgear ground mounted

West Midlands

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	44	0	0	0	-44
	C2	48	0	0	0	-48
	C3	10	0	0	0	-10
	C4	0	0	0	0	0

East Midlands

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	81	0	0	0	-81
	C2	125	0	0	-20	-105
	C3	37	0	0	-4	-33
	C4	40	0	0	-11	-29

South Wales

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	22	0	0	0	-22
	C2	77	0	0	-8	-69
	C3	23	0	0	-2	-21
	C4	10	0	0	-3	-7

South West

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	30	-2	-2	-1	-25
	C2	85	-1	0	-3	-81
	C3	41	0	0	-6	-35
	C4	14	0	0	-4	-10

EHV transformer

West Midlands

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	22	0	0	0	-22
	C2	15	0	0	0	-15
	C3	12	0	0	-2	-10
	C4	6	0	0	0	-6

East Midlands

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	28	0	0	0	-28
	C2	38	0	0	0	-38
	C3	28	0	0	-4	-24
	C4	2	0	0	0	-2

South Wales

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	9	0	0	0	-9
	C2	28	0	0	0	-28
	C3	13	0	0	0	-13
	C4	0	0	0	0	0

South West

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	34	0	0	0	-34
	C2	38	0	0	0	-38
	C3	19	0	0	0	-19
	C4	3	0	0	0	-3

EHV UG cable (gas)

West Midlands

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	0	0	0	0	0
	C2	0	0	0	0	0
	C3	0	0	0	0	0
	C4	0	0	0	0	0

East Midlands

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	n/a	n/a	n/a	n/a	n/a
	C2	n/a	n/a	n/a	n/a	n/a
	C3	n/a	n/a	n/a	n/a	n/a
	C4	n/a	n/a	n/a	n/a	n/a

South Wales

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	0	0	0	0	0
	C2	0	0	0	0	-4.3
	C3	0	0	0	0	0
	C4	0	0	0	0	0

South West

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	0	0	0	0	0
	C2	0	0	0	0	-34
	C3	0	0	0	0	0
	C4	0	0	0	0	0

EHV UG cable (oil)

West Midlands

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	0	0	0	0	0
	C2	0	0	0	0	-0.6
	C3	0	0	0	0	0
	C4	0	0	0	0	0

East Midlands

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	0	0	0	0	0
	C2	0	0	0	0	0
	C3	0	0	0	0	0
	C4	0	0	0	0	0

South Wales

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	0	0	0	0	0
	C2	0	0	0	0	0
	C3	0	0	0	0	0
	C4	0	0	0	0	0

South West

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	0	0	0	0	0
	C2	0	0	0	0	-14.4
	C3	0	0	0	0	0
	C4	0	0	0	0	0

EHV OHL support –towers

West Midlands

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	0	4	0	-2	-2
	C2	0	14	0	-8	-6
	C3	0	30	0	-30	0
	C4	0	0	0	0	0

East Midlands

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	4	4	0	-4	-4
	C2	10	20	0	-20	-10
	C3	5	24	0	-24	-5
	C4	0	0	0	0	0

South Wales

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	0	14	0	-14	0
	C2	0	2	0	-2	0
	C3	0	0	0	0	0
	C4	0	0	0	0	0

South West

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	4	7	0	-7	-4
	C2	4	10	0	-10	-4
	C3	1	3	0	-3	-1
	C4	0	0	0	0	0

EHV OHL support –poles

West Midlands

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	458	0	-86	-115	-257
	C2	3,764	0	-694	-951	-2,119
	C3	280	0	-50	-72	-158
	C4	180	0	-35	-44	-101

East Midlands

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	631	0	-116	-116	-399
	C2	3,69	0	-696	-697	-2,376
	C3	415	0	-78	-77	-260
	C4	3	0	0	-2	-1

South Wales

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	451	0	0	-159	-292
	C2	3,191	0	0	-1,123	-2,068
	C3	48	0	0	-17	-31
	C4	0	0	0	0	0

South West

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	739	0	-104	-147	-488
	C2	3,440	0	-482	-687	-2,271
	C3	293	0	-41	-59	-193
	C4	0	0	0	0	0

EHV OHL fittings

West Midlands

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	205	0	0	0	-205
	C2	521	0	0	0	-521
	C3	221	0	0	0	-221
	C4	0	0	0	0	0

East Midlands

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	77	0	0	0	-77
	C2	807	0	0	0	-807
	C3	0	0	0	0	0
	C4	0	0	0	0	0

South Wales

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	55	0	0	0	-55
	C2	117	0	0	-97	-20
	C3	57	0	0	-22	-35
	C4	0	0	0	0	0

South West

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	137	0	0	0	-137
	C2	172	0	0	0	-172
	C3	54	0	0	0	-54
	C4	56	0	0	0	-56

EHV OHL conductor on tower lines

West Midlands

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	0	0	0	0	0
	C2	19	0	0	0	-19
	C3	0	0	0	0	0
	C4	0	0	0	0	0

East Midlands

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	23	0	0	0	-23
	C2	0	0	0	0	0
	C3	0	0	0	0	0
	C4	0	0	0	0	0

South Wales

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	0	0	0	0	0
	C2	0	0	0	0	0
	C3	0	0	0	0	0
	C4	0	0	0	0	0

South West

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	0	0	0	0	0
	C2	0	0	0	0	0
	C3	0	0	0	0	0
	C4	0	0	0	0	0

132kV circuit breakers

West Midlands

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	32	0	0	0	-32
	C2	17	0	0	0	-17
	C3	9	0	0	0	-9
	C4	1	0	0	0	-1

East Midlands

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	11	0	0	0	-11
	C2	16	0	0	0	-16
	C3	17	0	0	0	-17
	C4	3	0	0	0	-3

South Wales

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	1	0	0	0	-1
	C2	3	0	0	0	-3
	C3	2	0	0	0	-2
	C4	0	0	0	0	0

South West

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	7	0	0	-1	-6
	C2	6	0	0	-1	-5
	C3	9	0	0	0	-9
	C4	0	0	0	0	0

132kV transformer

West Midlands

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	3	0	0	0	-3
	C2	18	0	0	-5	-13
	C3	11	0	0	-1	-10
	C4	6	0	0	0	-6

East Midlands

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	7	0	0	0	-7
	C2	23	0	0	-11	-12
	C3	5	0	0	-1	-4
	C4	0	0	0	0	0

South Wales

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	4	0	0	0	-4
	C2	8	0	0	0	-8
	C3	3	0	0	0	-3
	C4	3	0	0	0	-3

South West

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	1	0	0	0	-1
	C2	6	0	0	-3	-3
	C3	3	0	0	-1	-2
	C4	2	0	0	-1	-1

132kV UG cable (gas)

West Midlands

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	0	0	0	0	0
	C2	0	0	-2.4	0	-6.3
	C3	0	0	0	0	0
	C4	0	0	0	0	0

East Midlands

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	n/a	n/a	n/a	n/a	n/a
	C2	n/a	n/a	n/a	n/a	n/a
	C3	n/a	n/a	n/a	n/a	n/a
	C4	n/a	n/a	n/a	n/a	n/a

South Wales

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	n/a	n/a	n/a	n/a	n/a
	C2	n/a	n/a	n/a	n/a	n/a
	C3	n/a	n/a	n/a	n/a	n/a
	C4	n/a	n/a	n/a	n/a	n/a

South West

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	n/a	n/a	n/a	n/a	n/a
	C2	n/a	n/a	n/a	n/a	n/a
	C3	n/a	n/a	n/a	n/a	n/a
	C4	n/a	n/a	n/a	n/a	n/a

132kV UG cable (oil)

West Midlands

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	0	0	0	0	0
	C2	0	0	0	0	-23.4
	C3	0	0	0	0	0
	C4	0	0	0	0	0

East Midlands

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	0	0	0	0	0
	C2	0	0	0	0	0
	C3	0	0	0	0	0
	C4	0	0	0	0	0

South Wales

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	0	0	0	0	0
	C2	0	0	0	0	0
	C3	0	0	0	0	0
	C4	0	0	0	0	0

South West

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	0	0	0	0	0
	C2	0	0	0	0	0
	C3	0.4	0	0	0	-0.4
	C4	0	0	0	0	0

132kV OHL support –towers

West Midlands

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	0	28	0	-28	0
	C2	0	40	0	-40	0
	C3	0	28	0	-28	0
	C4	0	16	0	-16	0

East Midlands

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	6	48	0	-48	-6
	C2	2	62	0	-62	-2
	C3	7	66	0	-66	-7
	C4	0	8	0	-8	0

South Wales

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	5	10	0	-10	-5
	C2	23	55	0	-55	-23
	C3	5	31	0	-31	-5
	C4	0	0	0	0	0

South West

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	3	43	0	-43	-3
	C2	12	69	0	-69	-12
	C3	2	12	0	-12	-2
	C4	0	0	0	0	0

132kV OHL fittings

West Midlands

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	866	0	0	0	-866
	C2	538	0	0	0	-538
	C3	245	0	0	0	-245
	C4	87	0	0	0	-87

East Midlands

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	1,093	0	0	0	-1,093
	C2	713	0	0	0	-713
	C3	767	0	0	0	-767
	C4	88	0	0	0	-88

South Wales

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	135	0	0	0	-135
	C2	333	0	0	0	-333
	C3	223	0	0	0	-223
	C4	0	0	0	0	0

South West

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	459	0	0	0	-459
	C2	264	0	0	0	-264
	C3	175	0	0	0	-175
	C4	26	0	0	0	-26

132kV OHL conductor on tower lines

West Midlands

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	112.3	0	0	0	-112.3
	C2	62.5	0	0	0	-62.5
	C3	26.5	0	0	0	-26.5
	C4	14.1	0	0	0	-14.1

East Midlands

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	111.1	0	0	-16.9	-94.2
	C2	114.7	0	0	-20	-94.7
	C3	19.2	0	0	-0.7	-18.5
	C4	23	0	0	-23	0

South Wales

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	22.6	0	0	-8.7	-13.9
	C2	35.3	0	0	-8.8	-26.5
	C3	42.8	0	0	-1.7	-41.1
	C4	0	0	0	0	0

South West

		Heath Index (Probability of failure)				
		HI1	HI2	HI3	HI4	HI5
Criticality	C1	66.9	0	0	0	-66.9
	C2	28	0	0	0	-28
	C3	3.7	0	0	-3	-0.7
	C4	0	0	0	0	0

10 Appendix A2 – Mapping of outputs to areas of expenditure

Expenditure	Outputs					
	Safety	Reliability	Environment	Connections	Customer Satisfaction	Social Obligations
LOAD RELATED						
Connections			✓	✓	✓	
General reinforcement		✓	✓	✓		
Fault level	✓	✓				
Transmission exit points		✓				
Diversions		✓				
NON-LOAD RELATED						
Asset replacement		✓				
Quality of supply		✓			✓	
Worst served customers		✓			✓	
Operational IT&T	✓	✓			✓	
Flood defences		✓				
Black Start		✓				
Substation and network security	✓	✓				
Security of critical national infrastructure		✓				
ESQCR overhead line height and proximity	✓					
Visual amenity			✓			
Oil pollution mitigation			✓			
SF_6 losses			✓			
Technical losses			✓			
Noise reduction			✓			
NETWORK OPERATING COSTS						
Inspection and maintenance	✓	✓				
Tree cutting to maintain clearance from lines	✓	✓				
Tree clearance for resilience		✓				
Trouble call (faults)		✓			✓	
Responding to 1 in 20 year storms		✓			✓	
Smart meter related cut-out call outs			✓			
Substation electricity		✓				
Remote generation		✓				
Dismantlement		✓				
CLOSELY ASSOCIATED INDIRECTS	✓	✓	✓	✓	✓	
BUSINESS SUPPORT COSTS	✓	✓	✓	✓	✓	✓