PARSONS BRINCKERHOFF

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Review of WPD Unit Costs

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ABBREVIATIONS

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CAPEX	Capital Expenditure
CB	Circuit Breaker
CONSAC	Concentric Neutral Solid Aluminium Conductor
CROWN	WPD's asset management system
DNO	Distribution Network Operator
ED1	Electricity Distribution 1
GM	Ground Mounted
HV	High Voltage
I&M	Inspection and Maintenance
kV	Kilovolts
LV	Low Voltage
OFGEM	Office of the Gas and Electricity Markets
OHL	Overhead Lines
PM	Pole Mounted
PB	Parsons Brinckerhoff
RIIO	Revenue = incentives + Innovation + Outputs
RMU	Ring Main Unit
SHOPS	WPD's procurement system
Totex	Total Expenditure
WPD	Western Power Distribution

1 EXECUTIVE SUMMARY

Parsons Brinckerhoff (PB) has undertaken a technical review of Western Power Distribution Ltd (WPD)'s unit costs for Asset Replacement, Inspection and Maintenance (I&M) and fault repair (Trouble Call) activities.

We took a sample of the 25 asset categories with the highest forecast expenditure over the RIIO ED1 period to test their efficiency across the four licensed distribution networks within WPD. WPD consists of four separately licensed DNO companies: South West Electricity, South Wales Electricity and the recently acquired West Midlands Electricity and East Midlands Electricity.

Our first task was to give a commentary on our understanding on the build up of the unit costs, with emphasis on those costs where there are differences between the four WPD licensed networks. We made a list of where we identified anomalies in the data and explored these details to seek a rationale for the justification of these differences in unit costs.

Secondly, we verified that the unit costs used by WPD in its RIIO ED1 calculations were built up using the WPD CROWN system (contracts) or their 'SHOPS' databases. We confirmed that these databases contain up-to-date cost information and that several quotes or potential suppliers have been used, thus inferring a market-based efficient cost price base.

Next, we reviewed two years of historical unit costs data using data submitted to Ofgem by all of the DNOs. This analysis allowed us to benchmark the WPD Companies' unit costs against those of its peers.

We undertook a similar exercise for I&M, including Tree Cutting, and Trouble Call unit costs. For these two activities WPD has based its RIIO ED1 forecasts on the actual costs of recently carrying out these activities, using a model to predict the most likely future costs.

Following our analysis we conclude that the unit costs proposed by WPD for the RIIO ED1 submission for these activities are efficient.

2 COST REVIEW METHODOLOGY

By July 2013, WPD must submit a business case to Ofgem detailing its proposed investment expenditure for the eight-year period commencing April 2015. Amongst other items, the business case will contain details on unit costs used to estimate the expenditure requirements for the forthcoming regulatory period.

Ofgem will review the business case, and will make a determination on an allowance for expenditure in November 2013 or 2014 (depending on its decision whether to fast-track some companies for assessment.)

2.1 Background

Having undertaken a comprehensive review of the price control system of regulation after 20 years of electricity privatisation in the UK, Ofgem adopted the RIIO methodology for assessing the revenue which regulated energy companies will be allowed to recover from customers in the future. The objectives of RIIO are ostensibly to set Revenue using Incentives to deliver Innovation and Outputs. As well as the traditional building block approach used previously to determine the allowed revenue, Ofgem will place more emphasis on (and the regulated companies need to demonstrate compliance with) the outputs resulting from their expenditure and innovative approaches. The new price control regime is focussed on the longer term and seeks to align with government policy to increase renewable and low-carbon penetration in the energy markets.

2.2 Scope

The aim of PB's engagement is to provide WPD with an expert view on the efficiency of the unit costs it has used in building up the proposed expenditure over the RIIO ED1 period. Our review of unit costs was in respect of Asset Replacement costs, I&M costs (including Tree Cutting) and Trouble Call unit cost.

2.3 Introduction

WPD's projected unit costs for Asset Replacement are derived from the most recent actual costs incurred when making purchases of materials, combined with the labour costs of undertaking specific jobs to replace existing assets.

The unit costs used for I&M and Trouble Call are derived from experience of actual costs incurred in undertaking these activities in the past three years. WPD makes an estimate of these unit costs generally by taking an average of the costs over the past three years, but for

some assets the methodology of calculation is different. These costs are examined in sections 5 and 6 of this report.

This report sets out the findings of our analysis.

Section 1 sets out an executive summary of our findings.

Section 2 comprises this introduction.

Section 3 reviews how the unit costs for Asset Replacement have been derived and confirm that the data to be used in the submission to Ofgem concurs with market-based quotes and purchasing costs contained in WPD's SHOPS databases.

Section 4 analyses the historic performance of the WPD companies' unit costs in comparison to other DNOs and explores how the projected unit costs represent efficiency improvements.

Section 5 examines the costs of I&M.

Section 6 is an analysis of Tree Cutting unit costs.

Section 7 analyses fault repair (trouble call) unit costs.

Section 8 sets out the conclusions of our analysis.

The appendix lists the meetings we have held with WPD and gives an overview of the materials we have reviewed.

3 ASSET REPLACEMENT COSTS AUDIT

As part of its preparation for its RIIO ED1 Business Case, WPD has developed a spreadsheet 'UNIT COST (ALL VOLTAGES) V3' (hereafter referred to as the Unit Cost Spreadsheet). This spreadsheet contains the unit costs, which WPD has calculated for the replacement of each of its asset categories. Categories range from high-volume - low-cost activities, such as pole replacement, to low-volume - high-cost activities, such as replacement of 132kV transformers.

The unit cost of each asset category is built-up by the summation of different sub-element tasks. The costs in the sub-elements include material and labour costs. For the most part WPD undertakes most of the Asset Replacement work using its own staff but it does outsource - mainly in respect of civil works such as cable trenching. The unit costs have been developed using the costs associated with new asset installations and not historical information.

The Unit Cost Spreadsheet is the basis for the data provided to Ofgem in the RIIO ED1 submissions and business case.

As part of our review of the efficiency of WPD's unit costs we have undertaken an audit trail of the materials purchased by WPD to confirm that purchase cost values from vendors are the same values as those quoted in the Unit Cost Spreadsheet. Our goal was to check that the values of material costs were current and were market-tested either through contracts reflecting competitive tendering or from quotes from a number of different suppliers.

The second part of our review was to test the efficiency of the labour costs contained in the Unit Cost Spreadsheet. This is discussed later in this chapter.

The audit of unit costs included detailed reviews of WPD's contracts and maintenance policies, as well as other available information relating to past performance, to form a view of whether the expected costs are efficient.

3.1 Sample of Costs

WPD consists of four licensed DNOs: WPD (South Wales), WPD (West Midlands) WPD (East Midlands) and WPD (South West). Our review examined the unit costs for all four. The West Midlands and East Midlands areas were formerly part of the Central Networks Company until 2011, when this was purchased and became part of the larger WPD. Each of the four regional areas is a separately licensed entity. In this report we refer to each of them as a separate DNO although WPD is the single owner of all four.

There are over 5000 costs in total contained in the Unit Cost spreadsheet (over 1000 unit costs for each DNO). Several Asset Replacement categories contain equivalent sub-tasks and therefore the 5000 costs contain repeats where the same cost identity is used in several categories, for example travel man-hours to sites. For expediency, we took a sample of asset categories for analysis. We chose the 25 asset categories with the highest forecast expenditure over the RIIO ED1 price control period representing some 40% of total asset replacement spend by category. In effect this meant that we examined the unit costs for all replacement assets valued at over 1% of the forecast budget spend.

3.2 Rationale of variance between WPD DNOs

Our initial review of the Unit Cost Spreadsheet indicated that, for the most part, there was little material difference in unit cost elements or sub-categories across the four DNOs. This reflects the fact that all four companies are now aligned in most of their operating practices. However, for some categories there are marked unit cost differences across the four DNOs. PB then explored the reasons for these differences. In some instances they reflect different asset configurations across the four areas reflecting different historical operating practices.

WPD has made some other minor adjustments to align unit costs across its four DNOs. For example, the delivery charge of a transformer to Bristol is different than to that in Cornwall because of transport costs. To avoid any undue distortion in forecasts, WPD used the average of delivery charges costs across DNOs.

Each of the five asset categories where unit cost differentials are evident across the four DNOs is discussed in more detail below. The table below lists the asset categories which we selected to analyse. The rows marked in blue show those assets that have different unit costs across the four DNOs. As discussed below, for these assets where WPD has deliberately included different unit costs, our conclusion is that the differences are justified. For underground cables the differences in unit costs generally reflect different practices with regard to proactive and reactive replacement and for transformers the different costs reflect current network configurations.

Table 3-1: Top 25 Most Critical Forecasted Asset Replacement Categories

Reference #	Asset Type	West Midlands	East Midlands	South Wales	South West	% of Total Unit Cost
5	Cable (LV Main (UG Plastic)	£93.0	£120.5	£69.3	£120.5	13.6%
22	Overhead Pole Line (LV Main (UG Plastic)	£1.6	£1.6	£1.6	£1.6	9.7%
3	Overhead Pole Line (LV Poles)	£1.5	£1.5	£1.5	£1.5	7.3%
18	Overhead Pole Line 6.6/11kV OHL (Conventior	£16.4	£16.4	£16.4	£16.4	5.3%
24	Cable (6.6/11kV UG Cable)	£102.5	£90.3	£90.3	£102.5	4.8%
78	Transformer (33kV Transformer (GM)	£334.5	£346.8	£303.6	£303.6	4.6%
88	Cable (132kV UG Cable (Oil)	£1,076.0	£1,076.0	£1,076.0	£1,076.0	4.5%
2	Overhead Pole Line (LV Service (OHL)	£0.4	£0.4	£0.4	£0.4	3.4%
96	Transformer (132kV Transformer)	£677.1	£805.3	£706.7	£706.7	3.2%
43	Transformer (6.6/11kV Transformer (GM)	£8.4	£8.4	£8.4	£8.4	3.1%
28	Switchgear (6.6/11kV CB (GM) Primary)	£23.1	£23.1	£23.1	£23.1	2.4%
42	Transformer (6.6/11kV Transformer (PM)	£2.7	£3.3	£2.0	£2.7	2.2%
1	Overhead Pole Line (LV Main (OHL) Conductor	£14.0	£14.0	£14.0	£14.0	2.1%
32	Switchgear (6.6/11kV Switch (GM)	£6.6	£6.6	£6.6	£6.6	1.8%
33	Switchgear (6.6/11kV RMU)	£10.0	£10.0	£10.0	£10.0	1.8%
48	Overhead Pole Line (33kV Pole)	£2.5	£2.5	£2.5	£2.5	1.7%
167	Civil Works Due to Condition of Civil Asset (HV	£4.9	£4.9	£4.9	£4.9	1.6%
12	Switchgear (LV Pillar (OD at Substation)	£7.7	£7.7	£7.7	£7.7	1.6%
84	Overhead Tower Line (132kV OHL (Tower Line	£49.7	£49.7	£49.7	£49.7	1.6%
168	Civil Works Due to Condition of Civil Asset (HV	£3.5	£3.5	£3.5	£3.5	1.3%
57	Cable (33kV UG Cable (Non Pressurised)	£191.3	£191.3	£191.3	£191.3	1.3%
104	6.6/11 kV Poles (Refurbishment - Poles)	£0.3	£0.3	£0.3	£0.3	1.3%
47	Overhead Pole Line (33kV OHL (Pole Line) Con	£30.2	£30.2	£30.2	£30.2	1.1%
14	Switchgear (LV UGB & LV Pillars (OD not at Sul	£4.2	£4.2	£4.2	£4.2	1.1%
92	Switchgear (132kV CB (Air Insulated Busbars)(	£137.0	£137.0	£137.0	£137.0	1.0%

Source: Extracted from the 'Total Forecast Asset Replacement Activity/Data' sheets

Our review of unit costs first sought to understand the rationale why some of these costs varied across the four different DNOs:

3.2.1 Cable LV Main (UG Plastic)

This asset category accounts for 13.6% of the total forecasted Asset Replacement activities across all four WPD networks during the RIIO ED1 regulatory period.

The total unit costs of £120.5k for replacement of both long and short overlays using 185mm^2 Wavecon cables in the East Midlands and South West operating networks are the same but are higher compared to those of the West Midlands (£93k) and South Wales networks (£69k).

The difference in unit costs across the four DNO areas is explained by different practices with regard to the length of the cable sections, which are replaced in the different areas.

Replacement unit costs are forecast to vary due to factors such as differences in the network layout of the low voltage plastic cables in all four districts and the varying volumes of 185mm^2

Wavecon cables to be proactively installed in these networks. Elements of labour and supply activities associated with intermittent jointing works along every 20 meters or more of cable installation also influences the resultant unit costs in each network. For example, the South Wales and West Midlands areas are more likely to have fewer intermittent jointing works due to the higher prospect of long section overlay and considerably lower volumes of short section installations being replaced in both networks, hence lower forecasted unit costs.

Table 3-2: Percentage Occurrence for LV Main UG Cable Replacement

Replacement of LV Main Underground Cables	S Wales	S West	E Mid	W Mid
	Percentage Occurrence			
185mm2 Wavecon	100%	100%	100%	100%
300mm2 Wavecon	0%	0%	0%	0%
Overlay of long Sections	100%	35%	35%	70%
Overlay of short sections	0%	65%	65%	30%

Source: Unit Cost All Voltages/Unit Cost Details *WPD Networks* (Reference #5)

In the South West and East Midlands, the above overlay volume and percentage occurrence scenario will be contrary to those obtained in the South Wales and West Midlands. The South West and East Midlands networks are predicted to have larger volumes of short section overlays hence accounting for more intermittent joints and associated civil works, which in turn lead on to higher costs for LV underground cable.

PB therefore concludes that WPD has justified the use of different unit costs for the different DNO areas.

3.2.2 Cable 6.6/11kV UG cable

This asset category accounts for 4.8% of the total forecasted Asset Replacement activities across all four WPD networks

Unit costs for 6.6/11kV High Voltage cables are higher in South West and West Midlands than in East Midlands and South Wales. Variations in these unit costs across the networks are mainly down to the varying volumes of cables to be replaced and the attributed short or long overlay cable installations predicted to occur in each of the networks over the ED1 period.

West Midlands and South West have a higher proportion of these HV rated underground cables, which, due to higher failure rates, need to be replaced on a reactive basis. It is understood that, particularly in the South West, high volumes of these underground cables are nearing the end of their economic and operational life. There is an observed historical increasing trend in faults along the cable routes, introducing high fault repairs and

maintenance interventions over time. In the bid to maintain the continuous reliability and availability of the distribution network, a reactive approach to the replacement of these cables with the overlay of new 300mm^2 or 185mm^2 triplex cables is considered appropriate. .

The high voltage cables replaced, in accordance with the reactive maintenance policy, requires a higher proportion of short overlay works. For example, the overlay of short sections of cable requires installations of intermittent joints every 20 meters or so compared to one joint per 200 meters for overlay of long cable sections. This results in higher unit costs. The table below shows the breakdown of short and long overlay costs, which reflect a proactive or reactive replacement approach:

Table 3-2: Total Unit Costs for Long and Short Overlay in all WPD Networks

	West Midlands	East Midlands	South Wales	South West
Unit cost for Long overlay (per km)	£32,618	£61,158	£61,158	£32,618
Unit cost for Short Overlay (per km)	£69,837	£29,099	£29,099	£69,837
Total	£102,454	£90,257	£90,257	£102,454

Source: Unit Cost All Voltages/Unit Cost Details *WPD Networks* (Reference #24)

PB concludes that the variation in the unit costs across the four DNOs is justified for this asset category based on the different nature of the work required, as described above.

In addition to this category we also discussed the replacement of Consac cables. With characteristics similar to those of 6.6/11kV Underground just described, West Midlands and South West have a higher proportion of Consac cables, which, due to higher failure rates, need to be replaced on a reactive basis, thus pushing the unit cost of Asset Replacement up. Most of the Asset Replacement of Consac cables is reactive. With these cables it is difficult to predict which ones need replacing based on fault history, and it is not cost effective to replace cables on a proactive basis.

Table 3-3: Percentage Volume of Consac Cable Replacement Scheme on WPD Networks

Licensed areas	% of Consac cables	Type of Asset Replacement
West Midlands	14%	Reactive
East Midlands	0%	Proactive
South Wales	0%	Proactive
South West	20%	Reactive

Source: Unit Cost All Voltages/Unit Cost Details *WPD Networks*

3.2.3 Transformer (33kV GM)

This asset category accounts for 4.6% of the total forecasted Asset Replacement activities across all four networks.

WPD explained that prior to the acquisition of the West Midlands and East Midlands networks from Central Networks, a sizeable number of transformers existed in these areas, which currently do not meet with existing WPD operational standards. WPD policies also hold that these transformers be reactively replaced as part of measures needed to harmonize network operations and standards across the four networks.

The forecasted total unit costs of £304k for the replacement of 5/6.25MVA, 7.5/15MVA, and 12/24MVA, 33kV ground mounted transformers in the South Wales and South West network areas are consistent. WPD does not plan to install 20/40MVA transformers on these networks and unit costs are therefore zero.

Cost forecasts for the supply and installation of 5/6.25MVA, 7.5/15MVA, 12/24MVA and 20/40MVA transformers in the West Midlands and East West Midlands are £335k and £347k respectively. These costs vary but are higher when compared to those predicted for the South Wales and South West networks.

PB's assessment of the variation in these unit costs shows that it is due to factors such as the varying percentage of each transformer type and rating installed - illustrated in the Table 3-5.

Table 3-5: Percentage Occurrences for Replacement of 33kV GM Transformers

Supply & Installation of 33KV GM Transformers	S Wales	S West	E Mid	W Mid
	Percentage Occurrence			
33kV Transformer (GM) (5/6.25 MVA)	2%	2%	0%	5%
33kV Transformer (GM)(7.5/15.0 MVA)	60%	60%	30%	15%
33kV Transformer (GM)(12/24 MVA)	38%	38%	50%	40%
33kV Transformer (GM)(20/40 MVA	0%	0%	20%	40%

Source: Unit Cost All Voltages/Unit Cost Details *WPD Networks* (Reference #78)

It is evident that where the South Wales and South West networks are of more rural type locations, the percentage occurrence of installing 20/40MVA rated transformers is 0%. On the contrary, 20% and 40% percentage occurrences are predicted for the procurement and installation of this rated transformer types in the East Midlands and West Midlands, which are of more urban type areas.

Replacement unit costs will therefore vary across the four DNO areas.

3.2.4 Transformer 132kV

This asset category accounts for 3.2% of the total forecasted unit costs for the Asset Replacement activities envisaged for the RIIO ED1 review period.

South Wales and South West have the same Total Costs (£706,655), but there are differences between West Midlands (£677,085) and East Midlands (£805,295). These unit cost variances are due to differing percentages of the type of transformers installed (see table below). These differences reflect the dissimilar characteristics of the networks - South Wales and South West being predominantly rural, while the two Midlands regions are more urban in nature, with West Midlands in particular containing a large urban conurbation. The differences also reflect previous planning policies in the Midlands prior to WPD's purchase of Central Networks.

The underlying unit costs of work elements are the same across all four, as are civil works (£35,000).

Table 3-4: Percentage Occurrences for Replacement if 132kV GM Transformers

Supply & Install Transformer (GM)	S Wales	S West	W Mid	E Mid
	Percentage Occurrence			
132/33 kV 22.5/45 MVA	50%	50%	0%	0%
132/33 kV 40.0/60.0MVA	10%	10%	10%	0%
132/33 kV 60.0/90.0MVA	20%	20%	25%	60%
132/66 kV 40.0/60.0MVA	10%	10%	5%	0%
132/11 kV 15.0/30.0MVA	10%	10%	45%	10%
132/11 kV 15.0/30.0MVA (Double HV Winding)	0%	0%	15%	30%

Source: Unit Cost All Voltages/Unit Cost Details *WPD Networks* (Reference #96)

Being large, expensive items, the costs of transformers are taken from recent tender prices rather than standard prices within WPD's procurement system.

PB concludes that the variance in unit costs is justified and reflects the different types of transformer installed at the 132 kV level across the four DNOs.

3.2.5 Transformer 6.6/11kV Pole mounted

This asset category accounts for 2.2% of the total forecasted Asset Replacement activities across all four networks.

South Wales has the lowest unit costs in this category at £2.0k. The South West and West Midlands networks have the same total unit cost (£2.7k), while East Midlands has the highest at £3.3k.

WPD explained that factors such as network electrical characteristics, customer load demand patterns, percentages of transformer type installed and the degree of urbanisation of the network can affect unit costs

The South West and West Midlands unit costs are the same and based on the installation of 25kV 3 phase units. The unit costs for South Wales and East Midlands are based on the installation of the 25kVA single phase and 50kVA three phase pole mounted transformers respectively. The volumes of plant replaced and the labour rates are independent of the transformer ratings.

Table 3-5: Percentage Occurrences for Replacement of 6.6kV PM Transformers

Supply & Installation of 6.6KV PM Transformers	S Wales	S West	E Mid	W Mid
	Percentage Occurrence			
Supply PMT 25kVA 1ph	100%	0%	0%	0%
Supply PMT 25kVA 3ph	0%	100%	0%	100%
Supply PMT 50kVA 3ph	0%	0%	100%	0%
Install PMT 1ph	100%	0%	0%	0%
Install PMT 3ph	0%	100%	100%	100%

Source: Unit Cost All Voltages/Unit Cost Details *WPD Networks* (Reference #27)

The East Midlands network accounts for the largest unit cost - reflecting the urban nature of the network area and requirement for 50kVA, 3 phase transformer supplies and installations. The South West and West Midlands networks with more 25kVA transformers closely follow this. The South Wales network is the most rural in location having the least customer load and hence accounting for lower unit costs for pole mounted transformer replacement category

PB concludes that the variance in the unit costs is justified given the different characteristics of the networks.

3.3 Cost Build Up Trace and Audit

Having selected the 25 asset categories, we then undertook an ‘audit trail’ to see how the costs were generated in the spreadsheet. The steps taken in the audit process are highlighted in the diagram below:

The Unit Cost Model contains the following Worksheets:

- Summary South Wales / Unit Cost detail South Wales
- Summary South West / Unit Cost detail South West
- Summary West Midland / Unit Cost detail West Midlands
- Summary East Midland / Unit Cost detail East Midlands

The breakdown of cost categories for all voltages in the Model is as follows:

- Overhead Pole / Tower lines
- Cables
- Switchgear
- Transformer
- Protection
- Civil works due to Asset Replacement
- Civil works due to Condition of Civil Asset

In practice, many additional items are often required in undertaking Asset Replacement such as route surveys, route selection, consultation with planners and other statutory bodies, dealing with planning permission and appeals, input into environmental reports, etc. These indirect costs are excluded from our assessment of direct replacement values.

In order to establish the integrity of data provided by WPD, PB undertook an 'audit' to establish the sources and the reliability of the data for the assets categories and associated elements in each category.

PB observes that the WPD procurement process has a framework of contracts in place with selected third parties. We were informed that contracts were signed after competitive bidding processes.

WPD undertakes the majority of its Asset Replacement activities using in-house staff. WPD stated that the aim of using in-house staff was to maintain effective control on operating costs and avoids paying profit margins to third parties.

By using an in-sourcing model, WPD's own labour (and associated pensions) and its own materials, costs could be proportionately higher than those for another DNO, which mostly out-source. However, conversely, contract labour and materials will be proportionately lower. WPD argues that its model is more cost efficient because closely associated indirect costs and business support costs will also be lower than in a predominantly outsourced model.

WPD also informed us that by having staff in-house, flexibility can be built in which should reduce costs compared to using an out-sourcing model. For example, jointers assigned to one network team can more easily be scheduled to work in another team area if necessary. Also, the centralisation of stores and 'just-in-time' ordering from vendors are practices that WPD employs to drive down unit costs.

3.3.1 WPD Procurement Database and Charging System

During the audit process, PB sought to verify that the source of the unit costs for the sample of 25 different Asset Replacement categories and the corresponding activities is held within WPDs' procurement catalogue system called 'SHOPS'. The SHOPS system holds data on different asset types as priced by a number of vendors and the resultant market rates issued by the vendors. We sought to verify that the costs in the Unit Cost spreadsheet were consistent with those in the SHOPS system.

The SHOPS procurement system populates the up-to-date costs for allied elements of individual work categories at varying voltage levels, tools and operational actives into an interfaced Oracle based estimating and charging system called 'The CROWN System'. Among its diverse functionalities, the CROWN System sits as a repository of unit costs for different works categories under varying voltage levels, operational activities and tools. PB's review sought to observe, through a cross-referencing process, that costs for identified and

selected work categories in the CROWN system stay consistent with those forecasted in the developed WPD Unit Cost Spreadsheet.

PB went further to clarify the consistency of cost values in the SHOPS system by comparing some asset costs in the Unit Cost Spreadsheet to those in the SHOPS system and the connection charging feature of the CROWN system. We sought to find a consistency in the values within the applications and WPD's forecasted unit costs for the RIIO submission to Ofgem.

We randomly selected three asset categories within the Unit Cost Spreadsheet and asked WPD to provide a trail back through the CROWN system to SHOPS purchasing data or to costs identified in contracts agreed between WPD and materials / labour providers:

3.3.2 Example 1: 6.6/11kV Underground Cable

The first category we reviewed was the 6.6/11kV UG Cables across the different DNOs. The table below is extracted from the Unit Cost Spreadsheet and provides a breakdown of standard work elements for typical Asset Replacement in South Wales. As mentioned above, the costs differ for the other DNOs.

Table 3-6: Unit Cost Spreadsheet Extract Replace 6.6/11kV UG Cable

Replace – 6.6/11kV UG Cable	DNO Labour, £	Contract Labour, £	Materials supplied by Contractor, £	Materials supplied by DNO, £
Unit cost for Long Overlay (per km)				
Supply 185mm2 triplex EPR	-	-	-	17
Supply plastic marker tape	-	-	-	0
Supply rigid 100mm2 duct	-	-	-	1
Supply straight joint- 185mm2 or 300mm2	-	-	-	411
Install straight joint	271	-	-	-
Excavation – footway flexible	-	42	-	-
Excavation – roadway type 2	-	83	-	-
Joint hole – footway JT3A	-	487	-	-
Switching / issuing safety documents / precommission tests	25	-	-	-
Travel	25	-	-	-
Unit cost for Overlay of short 20m sections				
Supply 185mm2 triplex EPR	-	-	-	17
Supply plastic marker tape	-	-	-	0
Supply rigid 100mm2 duct	-	-	-	1
Supply straight joint – 185mm2 or 300mm2	-	-	-	411
Install straight joint	271	-	-	-
Excavation – footway flexible	-	42	-	-
Excavation – roadway type 2	-	83	-	-
Joint hole – footway JT3A	-	487	-	-
Switching/issuing safety documents/precommissioning tests	25	-	--	-
Travel	25	-	-	-

Source: Unit Costs All Voltages / Unit Cost Detail South Wales (Reference #24)

We also cross-referenced some of these unit costs elements with data contained in contracts WPD has signed for replacing 6.6/11kV UG Cable. The cost estimate is produced from selected standard work elements and quantities. In this example this refers to works covered by the 'Bristol/Mendip/Somerset' dig & lay contract. The standard work elements refer to the items within the contract (e.g.'2.64 Roadway type 1...' in the CROWN Estimating system is equivalent to item 2.64 in the dig & lay contract)

The following table is extracted from the 'Schedule of rates for construction and installation of lay cable, roadway type 2'. This is a contract signed between WPD and Balfour Beatty Utility Solutions.1

Table 3-7: Extract From Schedule of Rates For Construction and Installation Of Cable

Item No	Item	Price (£m)
02.71	Install service cable 1ph or 3ph, earth wire, pilot cable or alkathene tube	80.06
02.72	Install HV or LV cable	84.81
02.74	Install 3 x single core cables 33kV	107.88
02.75	Addition to be applied to rates 02.71 to 02.73 for installing additional cable or tube or duct in the same trench where instructed	3.44

Source: Contract for Excavation, Cable Laying and Reinstatement for WPD South West and South Wales, page 20.

Similarly, the following table is a schedule of rates for construction of isolated joint holes.[2]

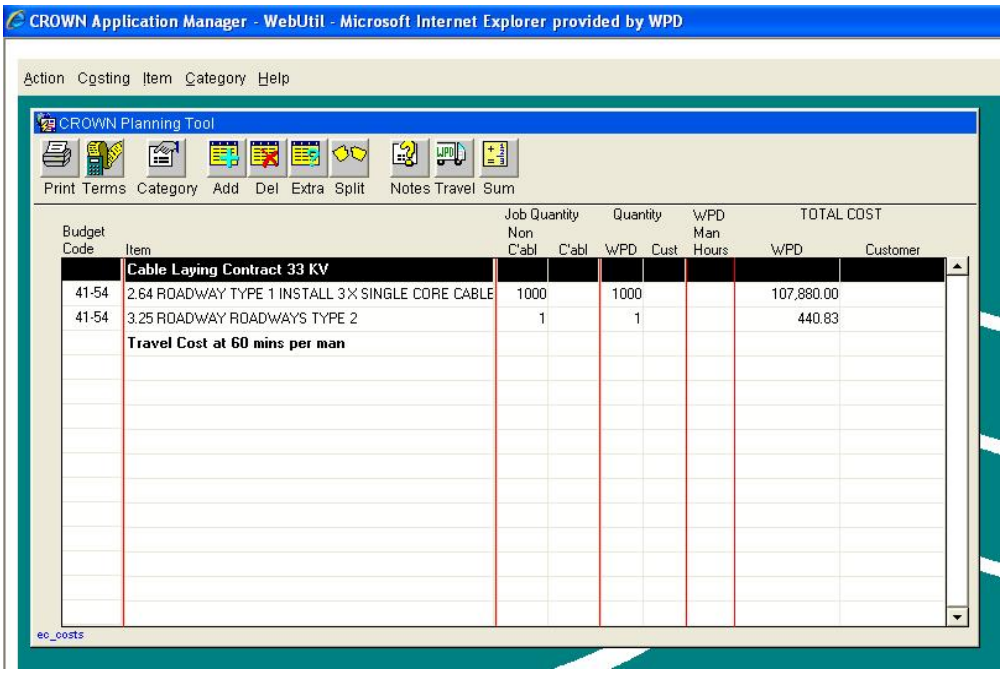
Table 3-8: Extract from Schedule of Rates for Construction and Installation of Cable

Item No	Item	Price (£m)
03.22	Agricultural land	88.05
03.23	Footways – all services	141.59
03.24	Roadways – Type 1	449.96
03.25	Roadways – Type 2	440.83
03.26	Roadways – type 3 and 4	425.17

Source: Contract for Excavation, Cable Laying and Reinstatement for WPD South West and South Wales, page 20.

As can be seen from the screenshot below, Unit costs for item 2.74 (£107.88) and item 3.25 (£440.83) in the contract correspond to the costs contained in the CROWN system.

[1] Measured Term Contract for Excavation, Cable Laying and Reinstatement 2008 (298370/RP)
[2] Measured Term Contract for Excavation, Cable Laying and Reinstatement 2008 (298370/RP)



PB therefore concludes that the sampled cost data used in the CROWN system is based on actual cost data contained in contracts signed with suppliers, which were established under competitive tender.

3.3.3 Example 2: 6.6/11kV Poles

For this asset category we tested that the data in the Unit Cost Spreadsheet was the same as the data in the SHOPS database.

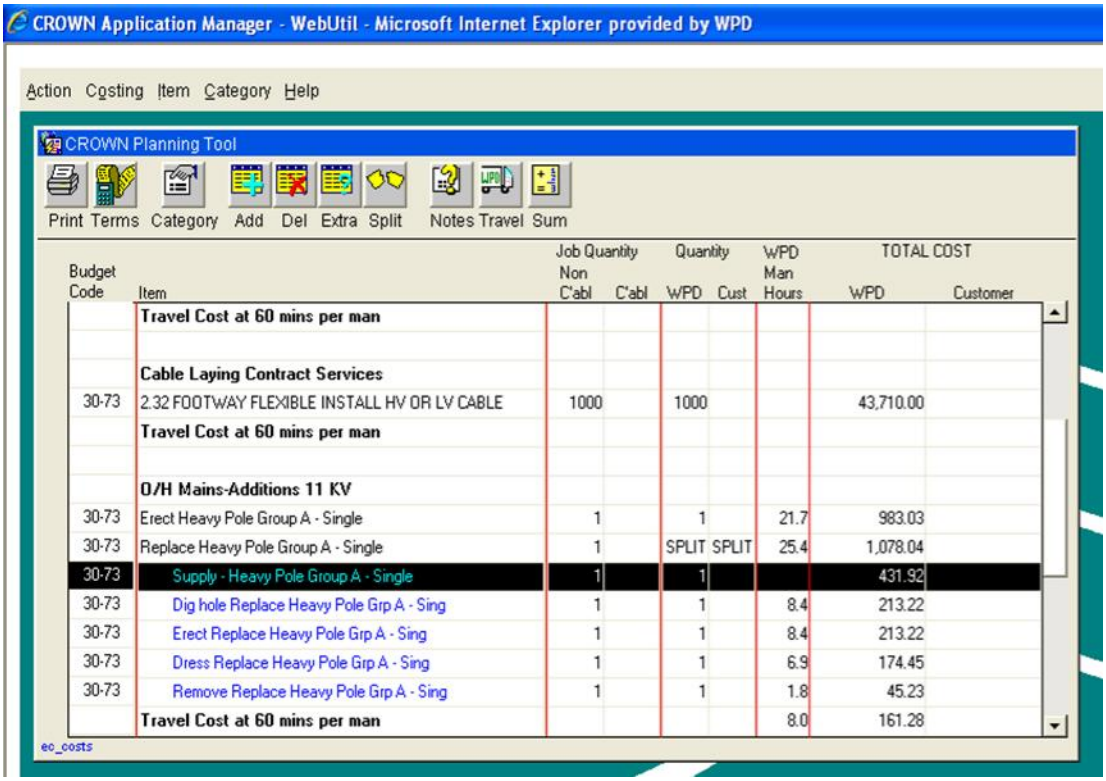
We checked samples of data derived from the 'SHOPS' in CROWN Planning System. In particular, we checked whether the costs entered into Unit Costs All Voltages are the same as costs in SHOPS.

Table 3-9: Unit Cost Spreadsheet Extract Replace 6.6/11kV Poles

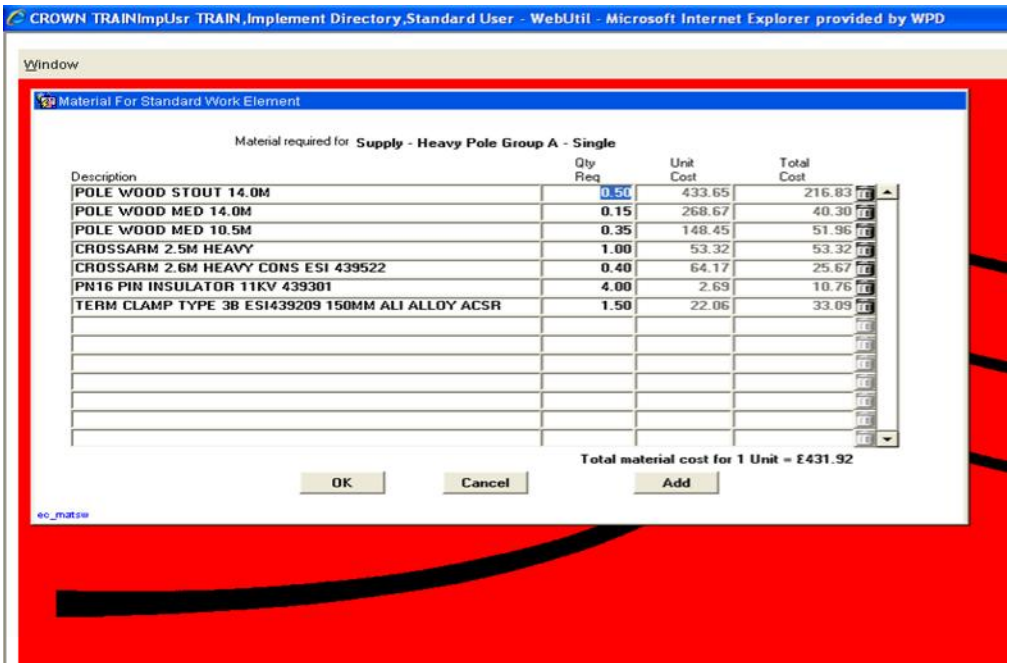
Replace – 6.6/11kV Poles	DNO Labour, £	Contract Labour, £	Materials supplied by Contractor, £	Materials supplied by DNO, £
Supply pole (Heavy Group A_				432
Dig hole (Heavy Group A)	213	-	-	
Dress Pole (Heavy Group A)	174	-	-	
Erect Pole (Heavy Group A)	213	-	-	
Remove pole (Heavy Group A)	45	-	-	
Supply pole (Heavy Group B)		-	-	584
Dress pole (Heavy Group B)			-	-
Dig hole (Heavy Group B)	319		-	-
Dress pole (Heavy Group B)	351		-	-
Erect pole (Heavy Group B)	319	-	-	-
Remove pole (Heavy Group B)	85	-	-	48
Supply – Heavy const stay				
Dress – Heavy const stay	219	-	-	17
Switching / issuing safety documents	25			
Travel	25			

Source: Unit Costs All Voltages/Unit Cost Detail South Wales (Reference #22)

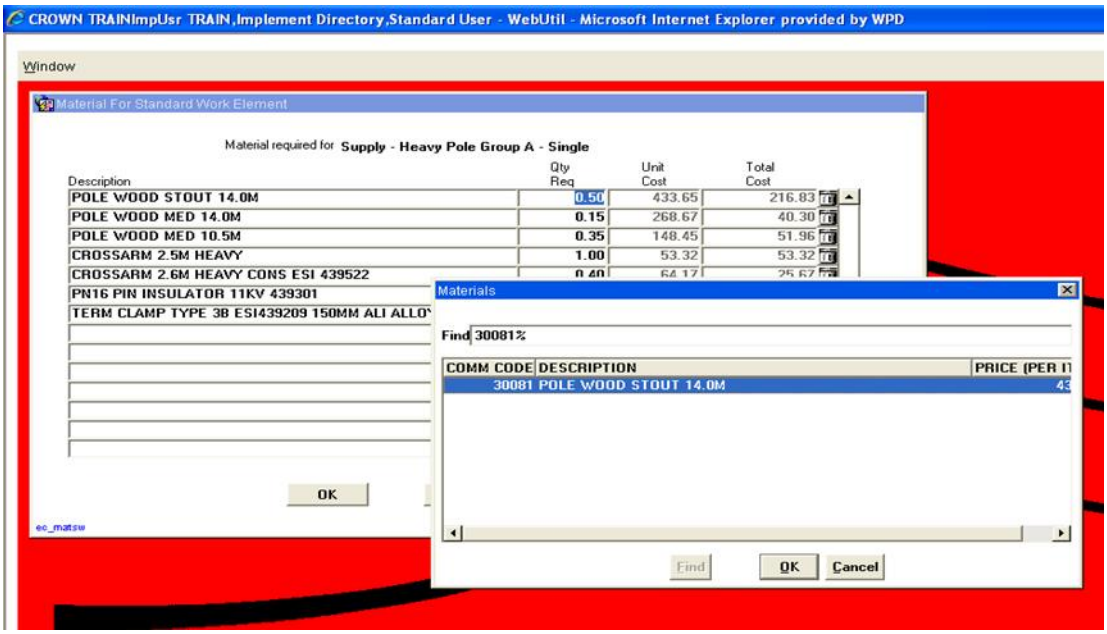
The screenshot below shows a selection of standard elements from the CROWN system ('Replace Heavy Pole Group A – Single'). Supply Heavy Pole is made up of a number of standard work elements e.g. supply the pole, dig a hole, erect and dress the pole etc.



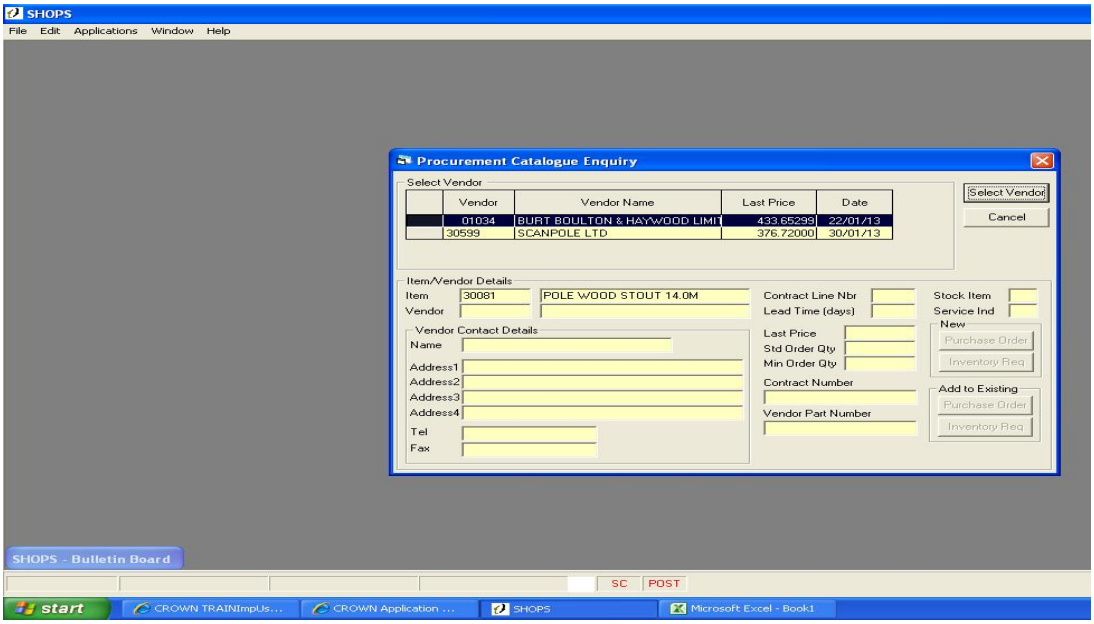
The cost of each Standard Work Element can be further broken down into individual cost elements and traced back through the CROWN system. For example 'Supply-Heavy Pole Group A – single' – is made up of a number of sub-elements of varying quantities as seen in the next screenshot:



The materials costs in Standard Work Elements part of the CROWN system are linked to the appropriate commodity code in the SHOPS procurement system (e.g. item 30081 (SHOPS code) is a 14m Stout pole) as shown below.



Tracing further back it can be shown that Item 30081 is the latest price for Pole Wood Stout quoted or purchased recently by a supplier called ‘Burt Boulton Haywood Ltd’.



This example has verified that the unit costs contained in the Unit Cost Spreadsheet can be traced back through WPD's internal systems and align with recent purchases from selected vendors.

3.3.4 Example 3: Replace 6.6/11kV Ring Main Unit

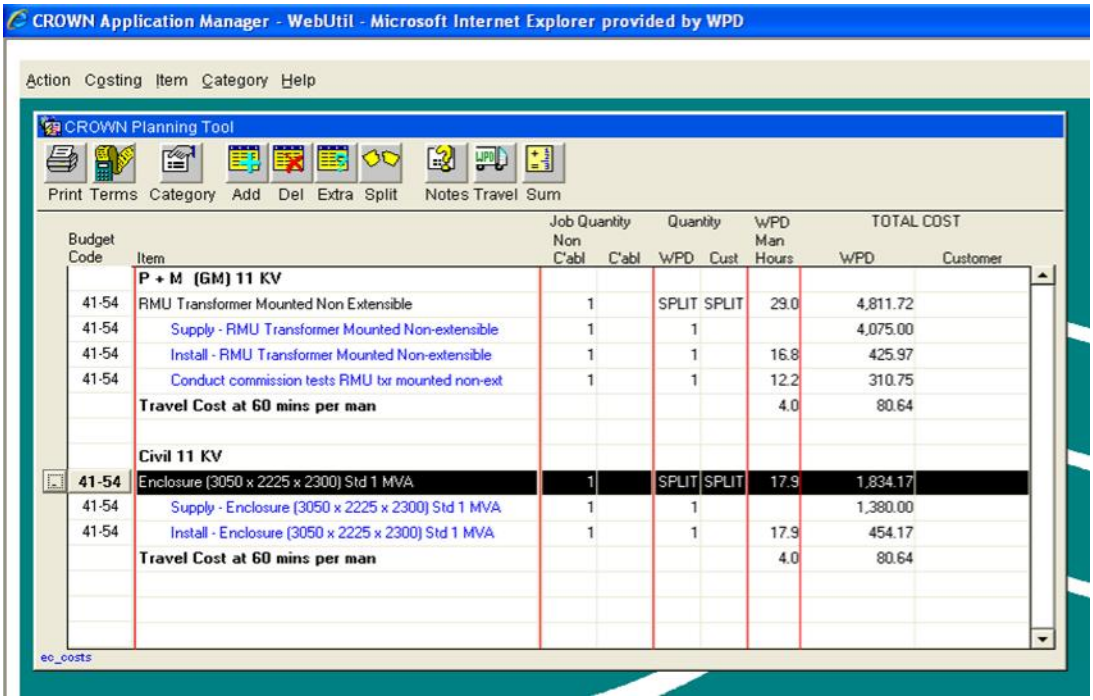
Again, we chose an asset category - replacing 6.6/11kV RMU selected from the Unit Cost Spreadsheet, as shown in the table below.

Table 3-10: Unit Cost Spreadsheet Extract - Replace 6.6/11kV RMU

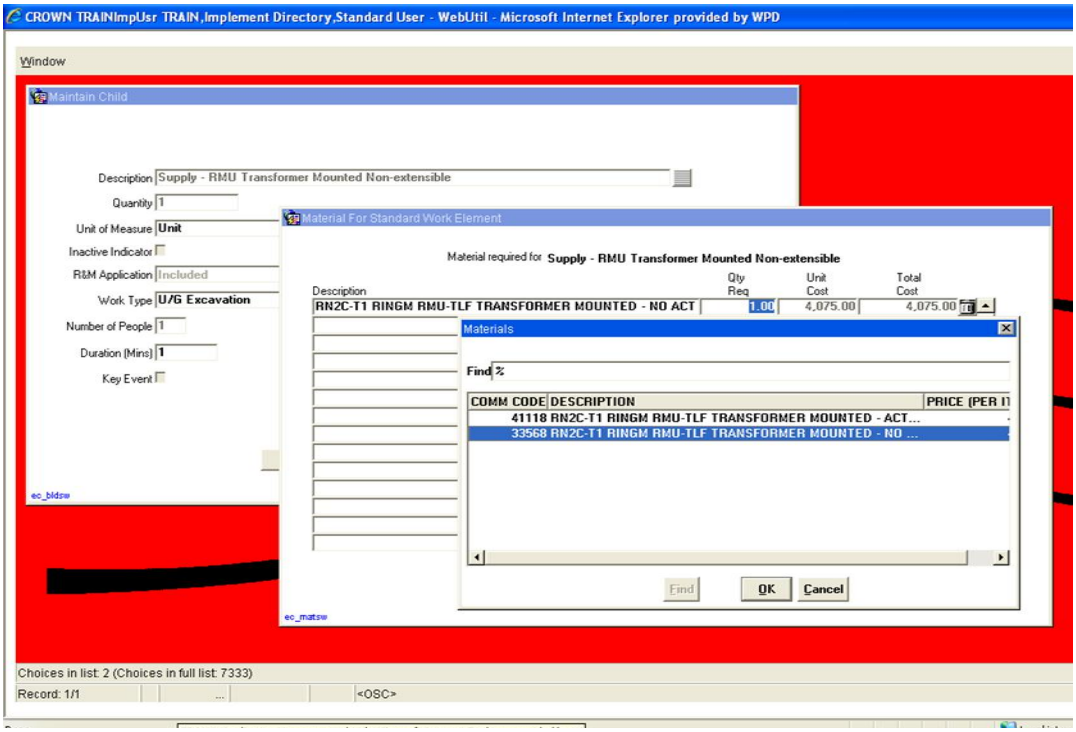
Replace – 6.6/11kV RMU	DNO Labour, £	Contract Labour, £	Materials supplied by Contractor, £	Materials supplied by DNO, £
Supply RMU – transformer mounted	-	-	-	17.45
Install RMU – transformer mounted	426	-	-	116.26
Commission test – RMU transformer mounted	311	-	-	-
Supply 185mm2 triplex EPR	-	-	-	411.41
Supply indoor cable termination	-	-	-	-
Install indoor cable termination	271	-	-	-
Supply straight joint	-	-	-	-
Install straight joint	281	-	-	-
Cable excavation (triplex)	-	62.82	-	-
Joint hole	-	486.73	-	-
Supply Enclosure	-	-	-	1380
Install Enclosure	454	-		-
Supply plinth	-	-	-	35
Make plinth	449	-	-	-
Clear site – plinth	50	-	-	-
Decommission & dispose of old RMU	25	-	-	-
Switching / issuing safety documents / precommission tests	25	-	-	-
Travel	25	-	-	-

Source: Unit Costs All Voltages/Unit Cost Detail South Wales (Reference #33)

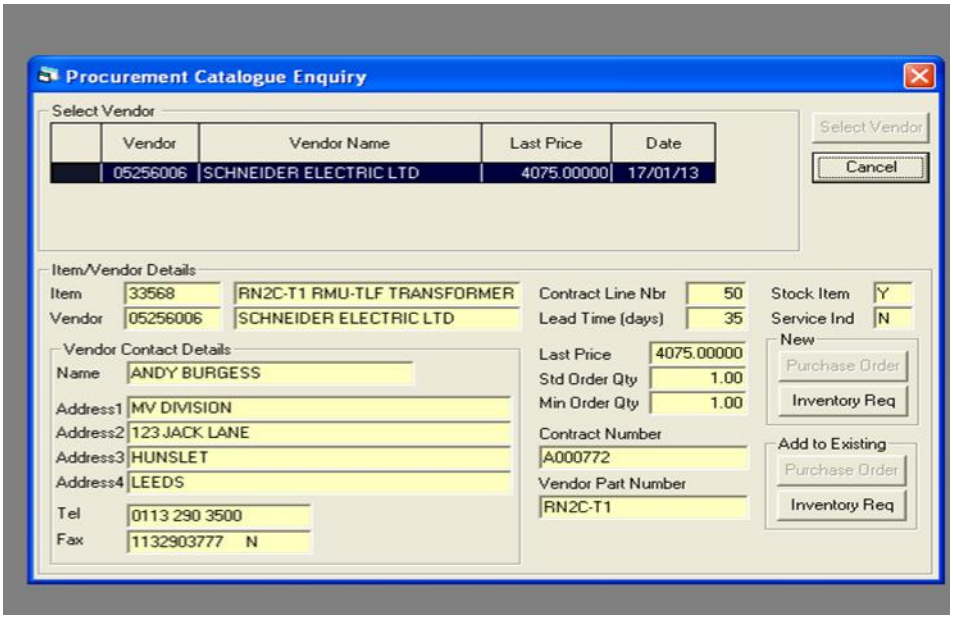
The unit costs in the above table for selected elements exactly match the unit costs in the CROWN system as demonstrated in the screenshot below. As shown below, enclosure price is £1,835. This is equivalent to adding two elements from the Unit Cost Spreadsheet, Supply enclosure (£1,380) plus Install enclosure (£454).



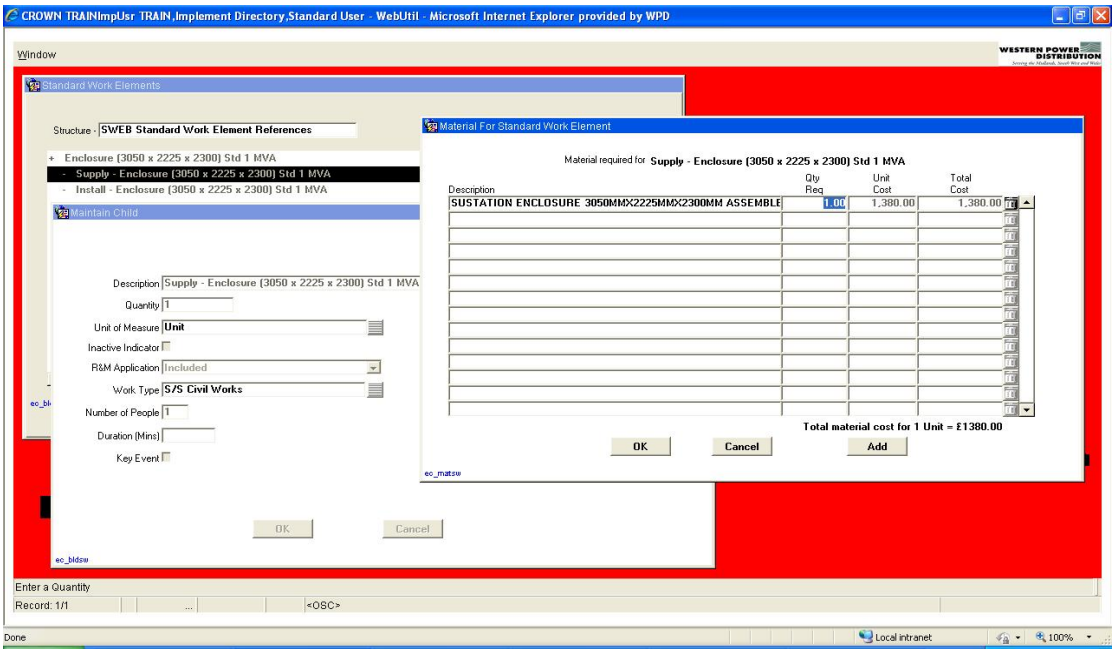
Similarly, the following screenshot shows materials required for supply of RMU Transformer Mounted Non-extensible and the Unit cost of £4,075 exactly matches the unit cost provided in the Unit Cost Spreadsheet:



The next screenshot shows an example from the Procurement Catalogue Enquiry. The vendor in this particular case that supplied the RMU to WPD is Schneider Electric. However, it must be noted that WPD has two existing framework agreements for the supply of LV assets: one with Schneider and another one with Siemens. We were informed that WPD uses both vendors to minimise the cost of Asset Replacement as Schneider is cheaper for some items and more expensive for others, and the same applies to Siemens.



The following screenshot tracks down the cost of installation of a substation enclosure, which is the same number as identified in Unit Cost Spreadsheet (£1,380):



From this analysis we can conclude that costs in the Unit Cost Spreadsheet correspond to those in the CROWN System and have been sourced from competitive tendered contracts.

3.4 Efficiency of Unit Labour Costs

As well as material costs, WPD's unit costs also contain elements of labour costs. The Unit Cost spreadsheet breaks down each Asset Replacement category into a number of sub-tasks. Labour costs are assigned to each activity by estimating the number of hours taken to perform certain tasks.

WPD has organised its fieldwork teams geographically into four areas with a network service manager responsible for each area. WPD employs between 30-40 teams in each area with approximately 30-40 people in each team. Technicians, who carry out routine activities such as Asset Replacement, fault repair, new connections, etc., support each of the team managers.

Labour costs that are included in Unit Costs are direct costs such as:

- DNO labour (these appear in hourly rate)
- Basic salary
- Pensions
- National insurance

- Holidays
- Sickness allowance
- Overtime

Indirect labour costs such as network design, project management, engineering management, related party costs, business support costs or pension impairment costs are not included.

The number of hours required to do a specific task is based on an estimating schedule, which we were informed is kept up-to-date, in line with actual job records.

We can confirm that WPD has used the same rates for staff irrespective of the DNO or regional team in which they work. One rate has also been used for contract labour.

As discussed earlier, WPD's in-house resources carry out most fieldwork. WPD uses contractors to do certain activities such as excavation works or other civil works.

3.5 Benchmarking of Unit Labour Costs

While we have not been able to benchmark labour unit costs with other DNOs due to lack of published information, we have been able to make the following judgement in regard to WPD's unit labour costs.

Labour costs are made up of the number of man hours taken to complete a job multiplied by the wage rate.

WPD operates within the competitive UK labour market. Many of the workers who undertake Asset Replacement work belong to Trades Unions and there are regionally agreed wage level agreements in place which are negotiated by each DNO. We have therefore no evidence to conclude that any of the WPD workers earns significantly more than workers in other DNOs within the UK.

We have also had reference to a report, which analyses the rates of pay in the UK Electricity Industry[3]. The findings of this independent report do not suggest that there is much disparity in pay levels for grades across the UK electricity DNOs.

WPD would be able to demonstrate efficiency in labour-unit costs if its workers systematically completed jobs faster than workers in other DNOs. Again, we do not have any information to

[3] Incomes Data Service; "Pay in the Electricity, Gas and water Industries"; 2006

compare against. However, we are able to conclude that if total unit costs are efficient and that material costs are efficient and that wage rates are fairly uniform on average across the UK industry, then it is highly unlikely that hours of work taken to complete a specific task should be significantly higher than for other DNOs. In the context of the overall cost comparison there is no evidence that WPD's unit labour costs are higher than other DNOs.

By inference we can conclude that if all of these factors hold true then WPD's labour costs could be considered efficient.

4 ASSET REPLACEMENT COSTS BENCHMARKING

4.1 Historical Benchmarking of Unit Costs

This section looks at how historical unit costs for the four WPD companies compare to those reported by other DNOs.

4.1.1 Benchmarking Using WPD's Cost Driver Model

WPD has developed a cost driver model in collaboration with Ofgem and other DNOs. This model is populated with cost data submitted to Ofgem by all DNOs for the years 2011 and 2012 in the Regulatory Reporting Packs. This model is a disaggregated or bottom-up model and will be used by Ofgem as part of its suite of cost assessment techniques for the RIIO ED1 review, including Total expenditure (Totex) and 'middle-up' assessments.

The model takes the data submitted by each DNO and compares them in a 'normalised' basis so that a more accurate comparison can be made across the different companies. The normalisation process seeks to removes anomalies in the way different companies report on their costs. Adjustments for differences in pension cost accounting, allocation of connection charging, allocation of vehicle costs and non-operating capex, along with a London weighting, are applied to the data so that a more like-for-like comparison can take place.

Because Asset Replacement expenditure can vary for large projects where the work is carried out over two or more calendar years, selecting just one year for comparison can give misleading results, as there may be big swings in calculated unit costs from one year to another. This is especially true if costs are recorded as total volume divided by total cost. We have taken an average of the two available years of data to account in some way for the variation.

The WPD Cost Driver model allows an assessment to be made of the efficiency of each of the DNO's reported unit costs. The model predicts efficient costs and each DNO's reported costs can be ranked against the predicted efficient benchmark.

The following table shows the normalised actual costs as a percentage of the normalised predicted costs for each DNO using average 2011 and 2012 data. A benchmark level of efficiency is calculated to be 100%, so a score below this indicates that the DNO's unit costs are efficient with regard to the industry as a whole. A score above 100% indicates that the DNO's unit costs are higher than the industry average.

Table 4-1: Actual costs as a Percentage of Predicted Costs

	LV Asset Replacement	6.6/11kV Asset Replacement Total	20kV Asset Replacement	33kV Asset Replacement	66kV Asset Replacement	132kV Asset Replacement	Refurbishment	Civil Works	Trouble Call	I&M	Tree cutting
ENWL	80.1%	98.2%	100.0%	140.2%	100.0%	138.9%	102.2%	119.1%	92.7%	87.4%	45.5%
NPG Northern	119.3%	125.7%	116.6%	434.4%	70.3%	61.7%	80.2%	65.8%	105.0%	71.3%	55.0%
NPG Yorkshire	92.5%	109.2%	100.0%	179.8%	70.0%	70.2%	72.7%	85.5%	86.7%	72.7%	94.6%
WPD West Mid	95.5%	113.6%	100.0%	206.0%	4884.9%	122.4%	80.8%	194.5%	113.3%	97.6%	156.8%
WPD East Mid	105.3%	119.2%	100.0%	110.3%	100.0%	154.6%	138.3%	145.1%	94.3%	114.5%	133.0%
WPD S Wales	85.1%	83.9%	100.0%	76.0%	92.2%	80.7%	71.0%	62.3%	94.5%	124.2%	106.4%
WPD S West	91.7%	80.8%	100.0%	81.4%	100.0%	51.4%	83.2%	81.1%	91.3%	97.5%	80.2%
UKPN London	117.3%	132.3%	100.0%	94.9%	100.0%	144.9%	1300.1%	237.6%	152.1%	153.6%	100.0%
UKPN South East	236.6%	122.8%	100.0%	51.9%	100.0%	60.9%	122.2%	263.0%	117.3%	95.5%	94.4%
UKPN Eastern	147.0%	131.4%	100.0%	91.2%	100.0%	130.9%	126.6%	214.1%	109.7%	152.8%	88.6%
SP Distribution	90.9%	125.3%	100.0%	181.1%	100.0%	2109.1%	88.9%	54.8%	104.1%	52.6%	47.8%
SP MANWEB	76.3%	88.0%	100.0%	117.2%	100.0%	29847.6%	93.9%	74.4%	101.1%	102.6%	165.2%
SSEHydro	105.3%	100.0%	100.0%	81.4%	100.0%	100.0%	71.1%	102.6%	71.4%	45.3%	88.1%
SSE S	75.1%	57.8%	100.0%	65.9%	111.9%	55.7%	154.4%	42.9%	75.6%	108.0%	183.1%

Source: Cost Driver Analysis Model PB Analysis

The table also includes benchmarked data for Trouble Call, I&M and Tree Cutting costs. Trouble Call is Ofgem's name for costs related to responses to faults on the system. All three of these cost categories are discussed in further detail in the next sections of this report.

The results of this analysis show that for most of the Asset Replacement activities (together with Trouble Call, I&M and Tree Cutting) South West and South Wales unit costs were efficient in 2011/ 2012 compared to the rest of the industry. Conversely WPD's Midlands companies were generally inefficient in these areas. In 2010/11 and 2011/12 the actual costs for the Midlands companies were made using delivery mechanisms which pre-existed WPD's methods of working.

It must be emphasised that while this analysis is useful in giving a general picture of unit cost efficiency for LV and HV assets where equipment installation projects do not generally last for longer than 2 years, caution should be used in reading too much into the results for EHV and large building projects where projects are spread out over longer durations. This might explain the probable anomaly of West Midlands 66kV assets being over 4884%.

4.1.2 Benchmarking Using DNOs Annual RRP Returns to Ofgem

The Cost Driver model enables efficiency comparisons to be made under the broad Asset Replacement categories (and others) outlined in the table above. PB has taken the cost data in the Regulatory Reporting Packs to break down this analysis further. This analysis enables us to estimate the efficiency of some of the historic costs broken down into the sample of asset categories chosen for analysis in section 3. We have sourced our data using the Modern Equivalent Asset Value information provided by WPD in the 'MEAV Calculation 2010-11 Asset Volumes (All DNO Unit Costs)' spreadsheet.

In section 3 we selected a sample of 25 asset categories with the largest forecast expenditure over the RIIO ED1 period. In this benchmarking analysis we have selected as a sample the top 5. These selected asset categories represent 40% of the total forecast Asset Replacement expenditure in RIIO ED1.

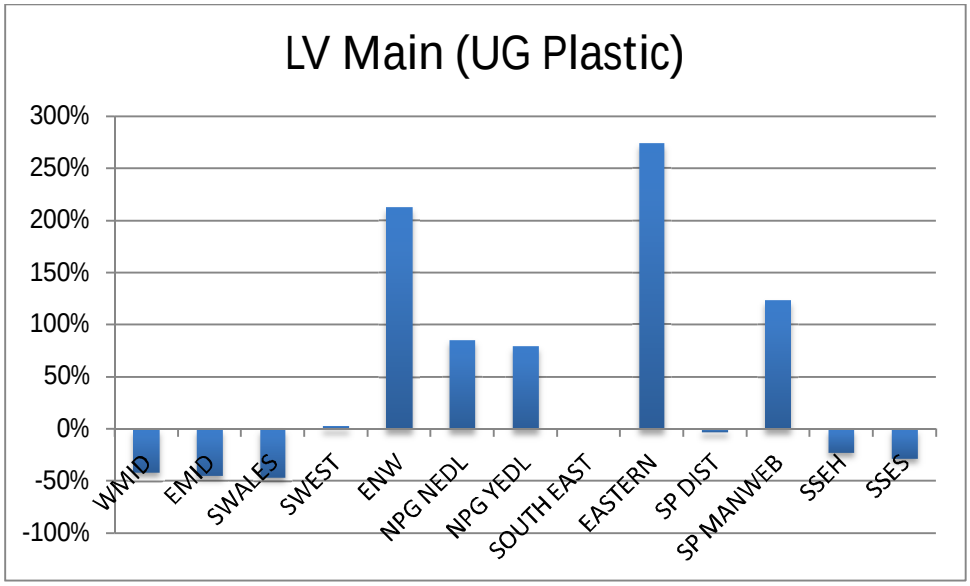
In the MEAV spreadsheet, for each asset category the median values across all the DNOs is calculated and a value is then selected. PB understands this value to be the baseline against which units costs are benchmarked in order to decide whether a DNO's costs can be considered efficient or not. (In a few cases the average value is used to set the benchmark. It should be noted that using median values means companies with large volumes of assets can influence the results).

In this section we have taken the unit cost values for 2011 and 2012 for the top Asset Replacement categories and adjusted them in relation to the benchmark. The variance of the unit costs with the benchmark has been calculated as a percentage above or below. We have assumed that costs with a variance below the benchmark to be efficient with regard to the industry average or median cost.

In this analysis we have adjusted the data to remove outliers or to remove DNOs where no data was recorded – any rankings discussed are after these adjustments.

LV Main (Underground Plastic) Replacement

The average unit cost for the replacement of low voltage underground cables in the West Midlands, East Midlands and, South Wales and South West network areas were £60k, £56k, £55k and £105k respectively. The baseline final unit cost was £105K.



When the output of the four WPD distribution networks are compared to those of the other licensed distribution networks on a league table for this category, the South Wales, East Midlands and West Midlands rank 1st, 2nd and 3rd respectively. The South West network is ranked 7th in this asset category but is only very marginally above the baseline.

Table 4-2: Historical League Table for LV Main Underground Plastic Replacement Category

LV Main UG plastic			
	Average unit cost (£k)	% Efficiency	Ranking
SWALES	55.27	52%	1
EMID	56.14	31%	2
WMID	60.49	32%	3
SSES	73.59	32%	4
SSEH	79.23	25%	5
SP DIST	99.14	26%	6
Benchmark	105.28	100%	-
SWEST	105.4	100%	7
NPG YEDL	183.16	174%	8
NPG NEDL	189.22	180%	9
SP MANWEB	228.56	217%	10
ENW	319.47	303%	11
EASTERN	382.27	363%	12
SOUTH EAST	1124.06	1068%	13

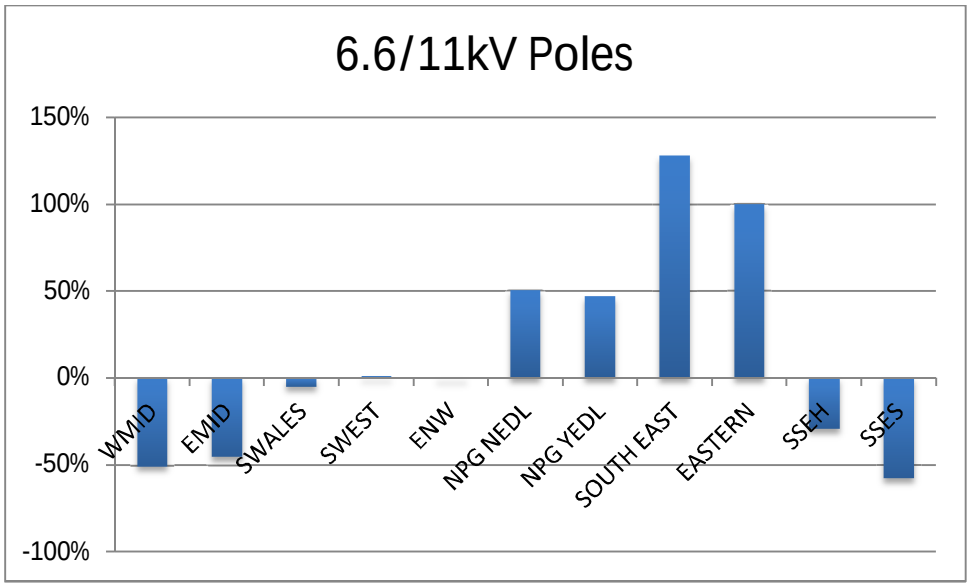
Source: MEAV Calculation 2010-11 Asset Volumes (All DNO Unit Costs)/Unit Cost Sheet

We conclude that historically these costs have been efficient based on the industry average benchmark.

WPD states that it has been able to optimise labour costs through the use of multi-functional geographically based teams..

6.6/11kV Poles Replacement

The average unit costs in the West Midlands, East Midlands, South Wales and South West networks were £840, £930, £1,610 and £1,710 respectively. The baseline unit cost is £1,700.



PBs' benchmarking of WPD network unit costs against the Ofgem baseline value show that all four WPD networks have been efficient in the unit costs for the replacement of 6.6/11kV poles.

WPD is also perceived to rank better on the league table when compared to other DNOs. The West Midlands, East Midlands, South Wales and South West networks are ranked 2nd, 3rd, 5th and 7th against the other DNOs with relevant data.

Table 4-3: Historical League Table for 6.6/11kV Poles Replacement Category

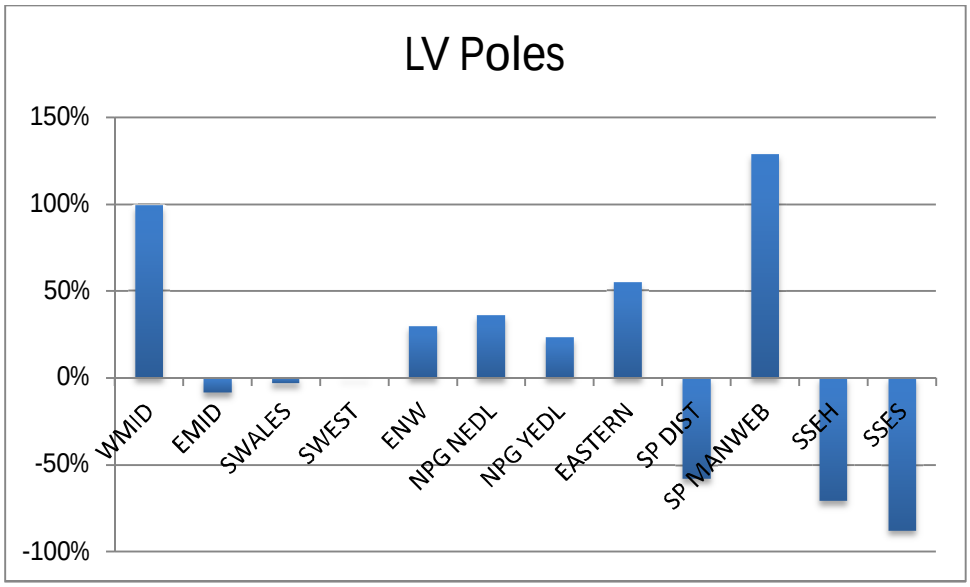
6.6/11kV Poles			
	Average unit cost (£k)	% Efficiency	Ranking
SSES	0.71	42%	1
WMID	0.84	49%	2
EMID	0.93	54%	3
SSEH	1.2	54%	4
SWALES	1.61	70%	5
ENW	1.68	94%	6
SWEST	1.71	100%	7
Benchmark	1.71	100%	-
NPG YEDL	2.49	146%	8
NPG NEDL	2.55	149%	9
EASTERN	3.38	198%	10
SOUTH EAST	3.86	226%	11
SP DIST	9.88	578%	12
SP MANWEB	17.92	1048%	13

Source: MEAV Calculation 2010-11 Asset Volumes (All DNO Unit Costs)/Unit Cost Sheet

LV Poles Replacement

In this category, the average unit costs for 2011 and 2012 in the West Midlands, East Midlands, South Wales and South West networks were £3,110, £1,430, £1,520 and £1,560 respectively. The baseline final unit cost was £1, 640.

On benchmarking of the unit costs against the baseline unit cost, it is inferred that all WPD DNOs, except the West Midlands network are efficient with regards to the cost of replacing LV poles.



When compared to the other ten licensed DNOs in terms of performance output for this asset category, the East Midlands, South Wales and South Wales networks in terms of performance are seen to rank 4th, 5th and 6th respectively. The West Midlands network does not enact the same high level of performance by ranking 12th on the league table, hence confirming cost inefficiencies in this network.

Table 4-4: Historical League Table for LV Poles Replacement Category

LV Poles			
	Average unit cost (£k)	% Efficiency	Ranking
SSES	0.20	12%	1
SSEH	0.46	28%	2
SP DIST	0.66	40%	3
EMID	1.43	87%	4
SWALES	1.52	92%	5
SWEST	1.56	95%	6
SOUTH EAST	1.57	96%	7
Benchmark	1.64	100%	-
NPG YEDL	1.92	117%	8
ENW	2.02	123%	9
NPG NEDL	2.13	130%	10
EASTERN	2.42	147%	11
WMID	3.11	129%	12
SP MANWEB	3.58	218%	13

Source: MEAV Calculation 2010-11 Asset Volumes (All DNO Unit Costs)/Unit Cost Sheet

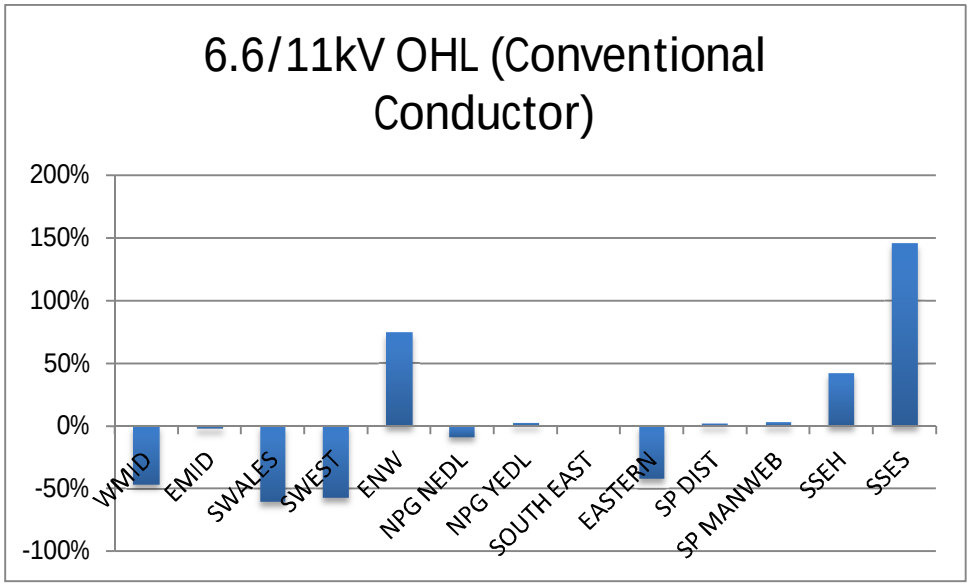
We were informed that West Midlands' lower ranking compared with other companies was due to delivery mechanisms which were pre-establishment of WPD practices. These would not be reflected in the projected costs, which will be influenced, by South Wales and South West working practices.

4. 6.6/11kV Overhead Line (OHL) Conventional Conductor

The average unit costs for 2011 and 2012 in the West Midlands, East Midlands, South Wales and South West networks were £21,540, £3,930, £15,900 and £17,180 respectively. The baseline final unit cost was £39,770.

On benchmarking of the unit costs for all WPD distribution networks against the Ofgem baseline unit cost, it is noticed that all of the networks achieved cost efficiencies in the replacement of 38mm^2 and 70mm^2 cables. The higher unit costs observed in the West

Midlands is believed to be related to the volume of overhead cables that was to be replaced reactively due to faults.



When output performances for all WPD networks in this category are compared to outputs from the other DNOs, South Wales, South West, West Midlands and East Midlands networks are ranked in the order of 1st, 2nd, 3rdand 6th respectively.

Table 4-5: Historical League Table for 6.6/11kV OHL Conductor Replacement Category

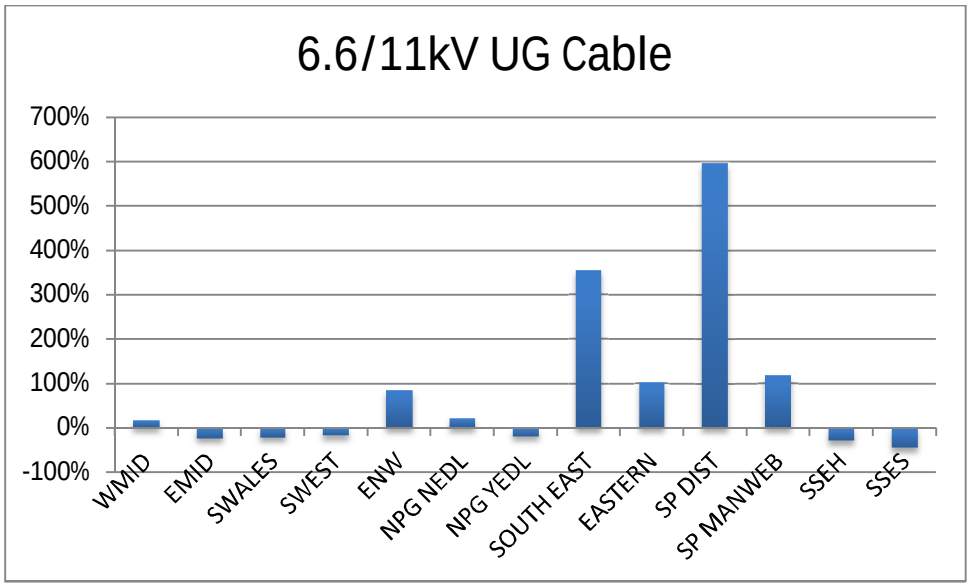
6.6/11kV Overhead Line conventional conductor			
	Average unit cost (£k)	% Efficiency	Ranking
SWALES	15.90	40%	1
SWEST	17.18	43%	2
WMID	21.54	54%	3
EASTERN	23.25	59%	4
NPG NEDL	36.33	92%	5
EMID	38.93	98%	6
Benchmark	39.70	100%	-
SP DIST	40.61	102%	7
NPG YEDL	40.76	103%	8
SP MANWEB	40.96	103%	9
SSEH	56.64	143%	10
ENW	69.41	175%	11
SSES	97.84	246%	12
SOUTH EAST	195.14	492%	13

Source: MEAV Calculation 2010-11 Asset Volumes (All DNO Unit Costs)/Unit Cost Sheet

6.6/11kV Underground Cable Replacement

The average unit costs for 2011 and 2012 in the West Midlands, East Midlands, South Wales and South West networks were £134,140; £87,230; £89,050 and £94,990 respectively. The baseline final unit cost was £114,960.

On benchmarking of the unit costs for all WPD distribution networks against the Ofgem baseline unit cost, it is noticed that all the networks except the West Midlands networks, have achieved cost efficiencies in the replacement of 185mm^2 triplex HV cables.



When WPD networked based unit costs for this category are compared to those from the ten other licensed DNOs, the East Midlands, South Wales and South West networks rank 3rd, 4th, and 6th respectively. The West Midlands had higher unit costs, which were 17% above the baseline figure.

Table 4-6: Historical League Table for 6.6/11kV Underground Replacement Category

6.6/11kV Underground Cable			
	Average unit cost (£k)	% Efficiency	Ranking
SSES	63.44	55%	1
SSEH	82.00	72%	2
EMID	87.23	76%	3
SWALES	89.05	78%	4
NPG YEDL	92.18	129%	5
SWEST	94.99	83%	6
Benchmark	114.56	100%	-
WMID	134.14	117%	7
NPG NEDL	138.00	120%	8
ENW	210.52	184%	9
EASTERN	231.66	202%	10
SP MANWEB	249.20	218%	11
SOUTH EAST	520.78	455%	12
SP DIST	797.42	696%	13

Source: MEAV Calculation 2010-11 Asset Volumes (All DNO Unit Costs)/Unit Cost Sheet

We were informed that West Midlands' lower ranking compared with other companies was due to delivery mechanisms which were pre-establishment of WPD practices. These would not be reflected in the projected costs, which will be influenced, by South Wales and South West working practices.

Conclusion

This has been a benchmarking exercise on those assets which will account for 40% of the RIIO ED1 projected spend on Asset Replacement. Our assessment has been limited to two years of actual data. Ofgem continues to update its guidelines in an attempt to ensure consistency in reporting.[4]

[4] Ofgem: Electricity Distribution (DPCR5): Glossary of Terms – Regulatory Instructions and guidance: Version 3, 27 April 2012

The main conclusion to be drawn from the analysis is that the WPD unit costs have historically been low when compared to their peers. This is especially the case for the South West and South Wales DNOs.

We were informed by WPD that they want to harmonise network procedures and operational standards across all of its DNOs and that when these new procedures are fully implemented in the West Midlands and East Midlands DNOs, they will bring downward pressure on their units costs.

4.2 Estimation of Future Efficiency of RIIO ED1 Costs

Our analysis has concluded that historically Asset Replacement unit costs have been low when benchmarked against other DNOs. This is especially the case for South West and South Wales. Since these unit costs have been demonstrated to have been deliverable we have no reason to believe that the company will not be able to deliver similar efficiencies going forward based on the present company-wide procurement principles and working practices.

5 INSPECTIONS AND MAINTENANCE

Inspections and Maintenance covers any costs incurred relating to the visual checking of the external condition of system assets and any repairs and maintenance work resulting from these inspections or otherwise.

WPD carries out on-going I&M across its four business areas.

5.1 Ofgem Categories

For RIIO ED1 submissions, Ofgem has identified 75 different items for the DNOs to provide information on. The items are based on combinations of Asset Category, Activity and Voltage (i.e. each item is made up of an Asset Category, an Activity and a Voltage level). These are illustrated in the following table:

Table 5-1: Ofgem Information Requirements

Asset Categories	
Batteries at 132 kV Substations	LV UGB & LV Pillars (OD Street Located)
Batteries at 33 kV Substations	Overhead Pole Line
Batteries at 66 kV Substations	Overhead Tower Line
Batteries at GM Substations	Protection Schemes
Cable Bridge	Rising and Lateral Mains (RLM)
Cable Tunnel	Substation
Circuit Breakers (GM) Primary	Substations - GM Indoor & Outdoor
Circuit Breakers (GM) Secondary	Substations - GM Third Party
GM Switchgear (Exc CBs and X Type RMU)	Switchgear All Types
GM Transformers	Transformers
HV Pole Mounted All Other	Underground Cable
HV Pole Mounted CB	Underground Cable and Services Other
LV Services Associated With RLM	X Type RMU

Activities	
Inspections	Repair & Maintenance
Inspections - Foot Patrol	Repair & Maintenance (Civil Works)
Inspections - Helicopter	Shrouding Temporary

Voltages	
LV	66 kV
HV	132 kV
33 kV	All voltages

5.2 WPD's Methodology for the Calculation of Unit Costs

WPD's forecast unit costs are based on the two-year average actual costs for 2010/11 to 2011/12, previously reported in Regulatory Reporting Packs.

One forecast unit cost is produced for each of the four DNOs.

Understanding that one approach may not best serve the different Ofgem items, WPD uses the following five approaches to forecast unit costs:

(i) Two-year average of the four DNOs

Where resourcing and operational practices are seen as consistent across the four DNOs, the average of the four is used.

(ii) Two-year average of South Wales and South West.

Where South Wales and South West are seen to more accurately reflect on-going working practices, the average of these two DNOs is used.

(iii) DNO specific

Where the work content of an item will vary across DNOs depending on historic practices and asset condition, WPD produce four different unit costs forecasts for the four DNOs.

(iv) Exclusion of an abnormal value

Where a value for one of the DNOs is seen to be abnormal, it is removed so that it does not skew the forecast unit cost. The reason for the abnormal value is investigated and appropriate action taken. (Examples of this are GM Switchgear (Excluding CBs and X Type RMU) / Repair & Maintenance / HV and LV UGB & LV Pillars (OD Street Located) / Inspections / LV below.)

(v) Other approaches

In rare cases where there isn't sufficient data available, WPD use a different value such as a percentage of the equivalent item at a different voltage level or engineering judgement.

5.3 PB's Review Approach

Of the 75 Ofgem categories, PB ranked the top 25 according to the RIIO ED1 total forecast I&M spend. PB's analysis focused on these 25. Of the £335.63M total spend forecast by WPD, these 25 activities account for £300.28M, or 89.47% of the total.

PB investigated differences between the four WPD companies and the efficiency of the unit costs when compared against the normalised values for other DNOs (calculated using WPD's normalisation model).

Where unit costs were found to be inefficient, this was discussed with WPD and the unit costs were updated.

In order to understand WPD's unit costs, PB spent time within WPD's offices and spoke to key people within the business. Further, PB worked through WPD's spreadsheets and calculations, and discussed with WPD any issues or anomalies.

The table below is a summary of the top 25 I&M items based on total forecast spend.

Table 5-2: Top 25 I&M Activities by Expenditure

Asset category	Activity	Voltage	RIIO ED1 Total Forecast I&M Spend (£M)					% of Total I&M Spend	Ranking
			E M	W M	S Wa	S We	Total		
Substations - GM Indoor & Outdoor	Repair & Maintenance (Civil Works)	HV	16.51	20.92	3.00	4.48	44.91	13.38%	1
GM Switchgear (Excl. CBs and X Type RMU)	Repair & Maintenance	HV	13.47	10.85	4.92	7.83	37.07	11.05%	2
Overhead Pole Line	Shrouding Temporary	LV	3.31	9.13	2.06	4.13	18.63	5.55%	3
Overhead Pole Line	Inspections - Foot Patrol	HV	3.81	5.19	4.12	5.49	18.61	5.54%	4
Substation	Repair & Maintenance (Civil Works)	33 kV	7.19	4.86	1.71	2.02	15.78	4.70%	5
Substations - GM Indoor & Outdoor	Inspections	HV	5.42	4.32	2.25	3.36	15.35	4.57%	6
Overhead Pole Line	Inspections - Helicopter	HV	3.33	3.89	3.29	4.47	14.97	4.46%	7
Switchgear All Types	Repair & Maintenance	132 kV	4.40	4.59	2.19	2.27	13.45	4.01%	8
Overhead Pole Line	Repair & Maintenance	LV	2.10	6.11	1.79	0.89	10.89	3.25%	9
Overhead Pole Line	Inspections	LV	2.10	2.72	1.79	3.57	10.18	3.03%	10
Transformers	Repair & Maintenance	33 kV	3.83	1.23	2.38	2.23	9.67	2.88%	11
HV Pole Mounted All Other	Repair & Maintenance	HV	2.65	2.90	0.99	1.99	8.53	2.54%	12
Substation	Repair & Maintenance (Civil Works)	132 kV	2.43	4.54	0.65	0.49	8.10	2.41%	13
LV UGB & LV Pillars (OD Street Located)	Repair & Maintenance	LV	2.59	3.88	0.38	1.10	7.96	2.37%	14
Circuit Breakers (GM) Primary	Repair & Maintenance	HV	2.58	2.17	1.38	1.79	7.91	2.36%	15
Overhead Tower Line	Inspections - Helicopter	33 kV	5.82	0.82	0.28	0.74	7.67	2.28%	16
Protection Schemes	Repair & Maintenance	HV	1.76	1.76	1.76	1.76	7.02	2.09%	17
GM Transformers	Repair & Maintenance	HV	2.28	1.81	0.96	1.52	6.57	1.96%	18
Overhead Pole Line	Inspections - Foot Patrol	132 kV	2.26	1.34	1.18	1.53	6.30	1.88%	19
Transformers	Repair & Maintenance	132 kV	1.89	2.47	1.28	0.41	6.05	1.80%	20
Switchgear All Types	Repair & Maintenance	33 kV	2.25	0.75	1.14	1.85	5.98	1.78%	21
Overhead Pole Line	Repair & Maintenance	HV	1.66	2.27	0.90	0.60	5.43	1.62%	22

Substation	Inspections	132 kV	1.42	1.58	1.16	0.87	5.02	1.50%	23
Substation	Inspections	33 kV	1.63	0.43	0.79	1.36	4.21	1.25%	24
LV UGB & LV Pillars (OD Street Located)	Inspections	LV	1.73	1.29	0.26	0.74	4.01	1.20%	25
							300.28	**89.47**	

5.4 Analysis of Top 25 items

This section of the report is an item-by-item analysis of the top 25 items.

For each of the 25 I&M activities we have considered the following:

- The cost driver;
- The basis for the projected unit costs – one of the five rationales, listed in section 5.2;
- The historic efficiency of the unit costs - we have calculated the level of efficiency for each of the unit costs against the average of the costs reported by all of the DNOs in Great Britain. The average GB DNO unit cost is set at 100% for comparison purposes. Therefore as an approximate measure of efficiency, WPD unit costs are more efficient the further they are below 100%, and less efficient the higher they are above 100%.
- A conclusion on forecast unit costs – Where we have identified forecast unit costs to be inefficient WPD has updated these for the RIIO ED1 submission

5.4.1 Substations - GM Indoor & Outdoor / Repair & Maintenance (Civil Works) / HV

Reported Two Year Average Actual (£k) (2010/11 to 2011/12)					Forecast Unit Cost for ED1 (£k)				
E M	W M	S Wa	S We	Ave	E M	W M	S Wa	S We	Ave
0.1577	0.0870	1.0970	1.2607	0.6506	1.1	1.4	1.1	1.1	1.175

Cost driver: Work content will vary across DNOs depending on historic practices and asset condition

Unit cost basis: DNO specific

Reported costs for the East and West Midlands are significantly lower than those for South Wales and South West. The reason for this, is because previously there was a reporting difference related to the counting of work volumes between West/East Midlands and South Wales/South West. Due to the invoicing and payment arrangement associated with the Alliance working arrangement, if three "Repairs & Maintenance" tasks were undertaken at a substation in West/East Midlands then this resulted in an activity count of three. In South

Wales/South West the activity count was based on the number of substations where "Repairs & Maintenance" tasks were undertaken.

Therefore, comparison of historic unit costs between West/East Midlands and South Wales/South West is not on a like-for-like basis.

The unit cost for the Repairs & Maintenance activity is determined by the extent of the work required. Historically, more work has been required on substations in West Midlands. Analysis of data relating to West and East Midlands has identified that in the two-year period 2010/11 to 2011/12; the average cost per year associated with Repairs and Maintenance per substation in service was £161 in West Midlands. The corresponding value for East Midlands was £115.

Therefore, WPD initially felt that the unit cost per substation where Repairs and Maintenance is undertaken for West Midlands needed to be higher to reflect higher work content.

Efficiency

	EMID	WMID	S WALES	S WEST
Efficiency	162%	86%	1068%	1198%

It became clear that reported unit costs for South Wales and South West - which were similar to the forecast unit costs - were not efficient. .

Conclusion:

As part of PB's review process, WPD reconsidered their forecast unit costs and lowered them, as below:

	EMID	WMID	S WALES	S WEST
Updated forecast unit cost	0.1	0.1	0.1	0.1

We conclude that the updated forecast unit costs for this item are now efficient.

5.4.2 GM Switchgear (Exc CBs and X Type RMU) / Repair & Maintenance / HV

Reported Two Year Average Actual (£k) (2010/11 to 2011/12)					Forecast Unit Cost for ED1 (£k)				
E M	W M	S Wa	S We	Ave	E M	W M	S Wa	S We	Ave
0.6944	0.7290	1.7207	0.8816	1.0064	0.8	0.8	0.8	0.8	0.8

Cost driver: Work content of activity is the same across all DNOs

Unit cost basis: Average (excluding South Wales)

Reported costs for this item are based on a large population and therefore reflect actual work practice.

Much of the ageing oil gear within this item is being replaced with gas RMUs which should reduce future maintenance costs.

The high cost in South Wales has been investigated by the Network Services Manager. It was identified that in the period 2010/11 to 2011/12, there was material over-manning of maintenance in South Wales. This was due to the extensive amount of on the job training that was being carried out for craft apprentices and adult trainees who were being up-skilled to electrical fitters.

The forecast average Unit Cost is lower than the reported.

Efficiency:

	EMID	WMID	S WALES	S WEST
Efficiency	112%	114%	261%	132%

South Wales was previously inefficient due to the training issues described above, but should now be going forward. The reported unit cost for South Wales is excluded from the calculation of the forecast unit costs.

Conclusion:

The forecast unit costs (average 0.8) are more efficient than the reported unit costs (average 1.0064).

The forecast unit costs for this item are efficient.

5.4.3 Overhead Pole Line / Shrouding Temporary / LV

Reported Two Year Average Actual (£k) (2010/11 to 2011/12)					Forecast Unit Cost for ED1 (£k)				
E M	W M	S Wa	S We	Ave	E M	W M	S Wa	S We	Ave
0.0750	0.1038	0.2140	0.2059	0.1497	0.21	0.21	0.21	0.21	0.21

Cost driver: Work content of activity is the same across all DNOs

Unit cost basis: South Wales and West average

This activity relates to the temporary shrouding of LV overhead lines so that third parties can work safely on buildings, etc.

Large differences between West/East Midlands and South Wales/South West are explained by previous differences in practices. The practice in West/East Midlands was to temporarily shroud LV overhead services only. Permanent solutions were sought for LV overhead lines. The cost of these permanent solutions was reported in Asset Replacement. The practice in South Wales/South West was to temporarily shroud both LV overhead services and LV overhead mains.

The South Wales/South West practice has now been adopted across the whole WPD operating area as it is more cost effective overall.

Efficiency:

	EMID	WMID	S WALES	S WEST
Efficiency	50%	66%	135%	127%

The efficiency figures for South Wales and South West are acceptable as WPD believe that this approach is more cost effective overall.

Conclusion:

The forecast unit costs for this item using the South Wales and South West average are efficient, as they represent a more cost effective approach (temporary shrouding rather than permanent).

5.4.4 Overhead Pole Line / Inspections - Foot Patrol / HV

Reported Two Year Average Actual (£k) (2010/11 to 2011/12)					Forecast Unit Cost for ED1 (£k)				
E M	W M	S Wa	S We	Ave	E M	W M	S Wa	S We	Ave
0.0108	0.0099	0.0078	0.0073	0.0090	0.01	0.01	0.01	0.01	0.01

Cost driver: Work content of activity is the same across all DNOs

Unit cost basis: Overall average, rounded

This is a high volume, low unit cost item.

The unit costs across the four business areas are similar and so the average of these has been used as the forecast.

The forecast average Unit Cost is the same as the reported (after rounding).

Efficiency:

	EMID	WMID	S WALES	S WEST
Efficiency	103%	91%	71%	65%

The reported unit costs were very efficient across three of the four business areas with East Midlands fairly efficient.

Conclusion:

The forecast unit costs for this item are efficient.

5.4.5 Substation / Repair & Maintenance (Civil Works) / 33 kV

Reported Two Year Average Actual (£k) (2010/11 to 2011/12)					Forecast Unit Cost for ED1 (£k)				
E M	W M	S Wa	S We	Ave	E M	W M	S Wa	S We	Ave
0.4074	0.5402	10.6887	6.5735	4.5524	6.6	10	10	6.6	8.3

Cost driver: Work content will vary across DNOs depending on historic practices and asset condition

Unit cost basis: DNO specific

Reported costs for the East and West Midlands are significantly lower than those for South Wales and South West. This is because of previous differences in reporting practices, which meant the Midlands reported higher volumes but lower unit costs.

The cost of this work is dependent on the type of buildings being repaired and maintained and this can vary across the four business areas.

WPD initially presented forecast unit costs that reflected these differences and brought the forecast unit costs for East Midlands and West Midlands in line with South Wales and South West.

Efficiency:

	EMID	WMID	S WALES	S WEST
Efficiency	79%	103%	1987%	1188%

However, it is clear that South Wales and South West reported unit costs were inefficient due to the reasons stated above.

Conclusion:

Following this analysis, WPD updated its forecast unit costs to more closely reflect the reported West Midland unit cost, as below:

	EMID	WMID	S WALES	S WEST
Updated forecast unit cost	0.55	0.55	0.55	0.55

The updated forecast unit costs for this item are now efficient.

5.4.6 Substations - GM Indoor & Outdoor / Inspections / HV

Reported Two Year Average Actual (£k) (2010/11 to 2011/12)					Forecast Unit Cost for ED1 (£k)				
E M	W M	S Wa	S We	Ave	E M	W M	S Wa	S We	Ave
0.0275	0.0423	0.0185	0.0213	0.0274	0.027	0.027	0.027	0.027	0.027

Cost driver: Work content of activity is the same across all DNOs

Unit cost basis: Overall average

Reported costs for the East and West Midlands are slightly higher than those for South Wales and South West due to the previous policy of outsourcing this work.

The Midlands companies now source this work in-house and so the overall average has been used as the forecast.

The forecast average Unit Cost is the same as the reported.

Efficiency:

	EMID	WMID	S WALES	S WEST
Efficiency	124%	184%	80%	90%

West Midlands was previously inefficient due to outsourcing. The forecast unit costs will bring this into line with the other business areas.

Conclusion:

The forecast unit costs for this item are efficient.

5.4.7 Overhead Pole Line / Inspections - Helicopter / HV

Reported Two Year Average Actual (£k) (2010/11 to 2011/12)					Forecast Unit Cost for ED1 (£k)				
E M	W M	S Wa	S We	Ave	E M	W M	S Wa	S We	Ave
0.0278	0.0117	0.0591	0.0729	0.0429	0.06	0.06	0.06	0.06	0.06

Cost driver: Work content of activity is the same across all DNOs

Unit cost basis: South Wales and West average

The cost reporting in both East Midlands and West Midlands was identified as being ineffective, with mis-allocations between foot patrol and helicopter patrol. Cost reporting for both South Wales and South West was more reliable as the basis of the unit costs.

Efficiency:

	EMID	WMID	S WALES	S WEST
Efficiency	64%	25%	128%	154%

When the efficiency of this activity and the Foot Patrols (5.4.4) activity were combined, the overall efficiency was good.

Conclusion:

The forecast unit costs for this item are efficient.

5.4.8 Switchgear All Types / Repair & Maintenance / 132 kV

Reported Two Year Average Actual (£k) (2010/11 to 2011/12)					Forecast Unit Cost for ED1 (£k)				
E M	W M	S Wa	S We	Ave	E M	W M	S Wa	S We	Ave
1.1533	0.8950	1.1117	0.6425	0.9506	1	1	1	1	1

Cost driver: Work content of activity is the same across all DNOs

Unit cost basis: Overall average

Differences in costs are due to this being a low-volume activity - costs can be volatile year on year. Actual costs within a year depend on as-found condition as this will determine the level of maintenance required.

Efficiency:

	EMID	WMID	S WALES	S WEST
Efficiency	154%	114%	139%	80%

Efficiency performance has previously been mixed but this is to be expected for a low-volume activity.

Conclusion:

The forecast unit costs for this item are efficient.

5.4.9 Overhead Pole Line / Repair & Maintenance / LV

Reported Two Year Average Actual (£k) (2010/11 to 2011/12)					Forecast Unit Cost for ED1 (£k)				
E M	W M	S Wa	S We	Ave	E M	W M	S Wa	S We	Ave
0.0384	0.0903	0.0419	0.0092	0.0449	0.04	0.09	0.04	0.01	0.045

Cost driver: Work content will vary across DNOs depending on historic practices and asset condition

Unit cost basis: DNO specific

This activity involves minor work - less than full refurbishment.

This repair and maintenance activity is dependent upon the condition found on site. The condition of poles differs across the business areas.and more work is now required in East Midlands and West Midlands as the poles are in poorer condition.

East Midlands and West Midlands have now adopted the practices of South Wales and South West and the Unit Costs should be in line for ED1.

Efficiency:

	EMID	WMID	S WALES	S WEST
Efficiency	126%	285%	126%	28%

The high inefficiency figures reflect the poor condition of the West Midlands poles.

Conclusion:

The forecast unit cost for South West is very efficient, the forecast unit costs for East Midlands and South Wales are somewhat inefficient and the forecast unit cost for West Midlands is very inefficient. These forecast unit costs reflect the condition of poles in the four WPD businesses.

5.4.10 Overhead Pole Line / Inspections / LV

Reported Two Year Average Actual (£k) (2010/11 to 2011/12)					Forecast Unit Cost for ED1 (£k)				
E M	W M	S Wa	S We	Ave	E M	W M	S Wa	S We	Ave
0.0240	0.0153	0.0134	0.0146	0.0168	0.014	0.014	0.014	0.014	0.014

Cost driver: Work content of activity is the same across all DNOs

Unit cost basis: South Wales and South West average

Reported costs for the East and West Midlands are slightly higher than those for South Wales and South West due to the previous policy of outsourcing this work.

The Midlands now sources this work in-house and the costs should lower to the level of South Wales and South West.

Efficiency:

	EMID	WMID	S WALES	S WEST
Efficiency	193%	117%	99%	107%

South Wales and South West are efficient and the forecast unit costs are based on the average of these.

Conclusion:

The forecast unit costs for this item are efficient.

5.4.11 Transformers / Repair & Maintenance / 33 kV

Reported Two Year Average Actual (£k) (2010/11 to 2011/12)					Forecast Unit Cost for ED1 (£k)				
E M	W M	S Wa	S We	Ave	E M	W M	S Wa	S We	Ave
0.8339	1.0467	1.6498	0.5147	1.0113	0.85	1	1.5	0.6	0.988

Cost driver: Work content will vary across DNOs depending on historic practices and asset condition

Unit cost basis: DNO specific

Maintenance routines have differed in the East and West Midlands and the types of transformers installed affects work done. In particular, the condition of tap changes has had an impact. Those in South Wales have not previously been maintained as well as those in South West, resulting in higher costs.

Work on transformers is unpredictable and there are relatively low volumes for this item (average of 216 per year per DNO).

Efficiency:

	EMID	WMID	S WALES	S WEST
Efficiency	146%	177%	274%	84%

It is clear that the unit costs are inefficient, with the exception of South West.

Conclusion:

WPD agreed that the forecast unit costs were too high and lowered them, based on the GB DNO average, as below:

	EMID	WMID	S WALES	S WEST
Updated forecast unit cost	0.64	0.64	0.64	0.64

The updated forecast unit costs for this item are now efficient.

5.4.12 HV Pole Mounted All Other / Repair & Maintenance / HV

Reported Two Year Average Actual (£k) (2010/11 to 2011/12)					Forecast Unit Cost for ED1 (£k)				
E M	W M	S Wa	S We	Ave	E M	W M	S Wa	S We	Ave
0.3187	0.8209	0.2481	0.2313	0.4048	0.25	0.25	0.25	0.25	0.25

Cost driver: Work content of activity is the same across all DNOs

Unit cost basis: South Wales and West average

Reported costs for the East Midlands and West Midlands are slightly higher than those for South Wales and South West due to the previous policy of outsourcing this work. West Midlands previously had a policy of solidly connecting pole mounted switchgear, such that expensive network outages were required to undertake maintenance. Use of hot glove working has been rolled out across both Midlands areas, so the expensive network outages will no longer be required.

The East Midlands and West Midlands now source this work in-house, so WPD used a forecast unit cost based on the South Wales and South West.

Efficiency:

	EMID	WMID	S WALES	S WEST
Efficiency	243%	614%	181%	164%

WPD has previously been inefficient in this activity, especially in the Midlands.

Conclusion:

WPD agreed that the forecast unit costs, based on South Wales and South West, were too high and lowered them, based on the GB DNO average, as below:

	EMID	WMID	S WALES	S WEST
Updated forecast unit cost	0.15	0.15	0.15	0.15

The updated forecast unit costs for this item are now efficient.

5.4.13 Substation / Repair & Maintenance (Civil Works) / 132 kV

Reported Two Year Average Actual (£k) (2010/11 to 2011/12)					Forecast Unit Cost for ED1 (£k)				
E M	W M	S Wa	S We	Ave	E M	W M	S Wa	S We	Ave
1.9245	1.7010	9.6477	9.0526	5.5815	9	9	9	9	9

Cost driver: Work content of activity is the same across all DNOs

Unit cost basis: South Wales and West average

Reported costs for the East Midlands and West Midlands are significantly lower than those for South Wales and South West. This is due to previous differences in reporting practices, which meant the East Midlands and West Midlands reported higher volumes but lower unit costs.

Efficiency:

	EMID	WMID	S WALES	S WEST
Efficiency	124%	104%	595%	538%

It is clear that South Wales and South West reported unit costs for this item, on which the forecast unit costs were based, are inefficient.

Conclusion:

WPD agreed that the forecast unit costs were too high and lowered them significantly, based on the all DNO average, as below:

	EMID	WMID	S WALES	S WEST
Updated forecast unit cost	1.7	1.7	1.7	1.7

The updated forecast unit costs for this item are now efficient.

5.4.14 LV UGB & LV Pillars (OD Street Located) / Repair & Maintenance / LV

Reported Two Year Average Actual (£k) (2010/11 to 2011/12)					Forecast Unit Cost for ED1 (£k)				
E M	W M	S Wa	S We	Ave	E M	W M	S Wa	S We	Ave
0.1626	1.2697	0.1819	0.2470	0.4653	0.2	0.4	0.2	0.2	0.25

Cost driver: Work content will vary across DNOs depending on historic practices and asset condition

Unit cost basis: South Wales and West average

The West Midlands reported unit cost is high. This is due to a historic problem of defective LV UG link boxes in the West Midlands. These defects were resolved by the completion of a modification (included in this activity) or the removal of the link box (reported as Asset Replacement).

Efficiency:

	EMID	WMID	S WALES	S WEST
Efficiency	95%	712%	102%	137%

The West Midlands figure is high due to the reasons given above. The forecast unit costs are based on the South Wales and South West reported unit costs, although West Midlands is still slightly higher.

Conclusion:

The forecast unit costs (average 0.25) are more efficient than the reported unit costs (average 0.4653).

5.4.15 Circuit Breakers (GM) Primary / Repair & Maintenance / HV

Reported Two Year Average Actual (£k) (2010/11 to 2011/12)					Forecast Unit Cost for ED1 (£k)				
E M	W M	S Wa	S We	Ave	E M	W M	S Wa	S We	Ave
0.2300	0.4440	0.0635	0.0975	0.2087	0.2	0.2	0.2	0.2	0.2

Cost driver: Work content of activity is the same across all DNOs

Unit cost basis: Overall average

The historic high unit costs in both West and East Midlands, has been caused by the as-found asset condition. Future lower costs are forecast in both West and East Midlands due to the undertaking of an Asset Replacement programme targeted at the assets in the poorest condition.

Efficiency:

	EMID	WMID	S WALES	S WEST
Efficiency	224%	413%	58%	87%

East Midlands and West Midlands have been inefficient. The forecast unit costs were based on the average of all four business areas.

Conclusion:

WPD agreed that the forecast unit costs were too high and lowered them based on the GB DNO average, as below:

	EMID	WMID	S WALES	S WEST
Updated forecast unit cost	0.1	0.1	0.1	0.1

The updated forecast unit costs for this item are now efficient.

5.4.16 Overhead Tower Line / Inspections - Helicopter / 33 kV

Reported Two Year Average Actual (£k) (2010/11 to 2011/12)					Forecast Unit Cost for ED1 (£k)				
E M	W M	S Wa	S We	Ave	E M	W M	S Wa	S We	Ave
0.1906	0.0910	2.1826	1.2731	0.9343	1.5	1.5	1.5	1.5	1.5

Cost driver: Work content of activity is the same across all DNOs

Unit cost basis: South Wales and South West average

Reported costs for the East and West Midlands are significantly lower than those for South Wales and South West. This is because of previous differences in reporting practices, which meant the East and West Midlands reported higher volumes but lower unit costs.

The work should now be the same across the four DNOs and the forecast Unit Costs reflect this.

Efficiency:

	EMID	WMID	S WALES	S WEST
Efficiency	75%	34%	847%	345%

South Wales and South West reported unit costs, on which the forecast unit costs were based, are very inefficient.

Conclusion:

WPD agreed that the forecast unit costs were too high and lowered them based on the GB DNO average, as below:

	EMID	WMID	S WALES	S WEST
Updated forecast unit cost	0.15	0.15	0.15	0.15

The updated forecast unit costs for this item are now efficient.

5.4.17 Protection Schemes / Repair & Maintenance / HV

Reported Two Year Average Actual (£k) (2010/11 to 2011/12)					Forecast Unit Cost for ED1 (£k)				
E M	W M	S Wa	S We	Ave	E M	W M	S Wa	S We	Ave
0.1770	0.2236	0.2033	0.0921	0.1740	0.15	0.15	0.15	0.15	0.15

Cost driver: Work content of activity is the same across all DNOs

Unit cost basis: South Wales and West average

Differences in reported unit costs are due to the number of electronic relays installed on the network. As circuit breakers are replaced, the old protection relays are also replaced with modern electronic relays. The work content of the maintenance of an electronic relay is less than that of the older relay. The forecast unit costs cater for a reduction in overall maintenance content, as increasing levels of electronic relays are installed on the network.

Efficiency:

	EMID	WMID	S WALES	S WEST
Efficiency	80%	98%	89%	39%

The reported unit costs are efficient across all four business areas. The forecast unit costs are based on the average of South Wales and South West.

Conclusion:

The forecast unit costs for this item are efficient.

5.4.18 GM Transformers / Repair & Maintenance / HV

Reported Two Year Average Actual (£k) (2010/11 to 2011/12)					Forecast Unit Cost for ED1 (£k)				
E M	W M	S Wa	S We	Ave	E M	W M	S Wa	S We	Ave
0.1971	0.2126	0.2598	0.1753	0.2112	0.2	0.2	0.2	0.2	0.2

Cost driver: Work content of activity is the same across all DNOs

Unit cost basis: Overall average

Reported costs are similar and the work content should be the same across the DNOs in the future, so the overall average has been used.

Efficiency:

	EMID	WMID	S WALES	S WEST
Efficiency	75%	34%	847%	345%

South Wales and South West reported costs are very inefficient and were skewing the forecast unit costs, which were based on the average of the four business areas.

Conclusion:

WPD agreed that the forecast unit costs were too high and lowered them based on the forecast South West unit cost, as below:

	EMID	WMID	S WALES	S WEST
Updated forecast unit cost	0.15	0.15	0.15	0.15

The updated forecast unit costs for this item are now efficient.

5.4.19 Overhead Pole Line / Inspections - Foot Patrol / 132 kV

Reported Two Year Average Actual (£k) (2010/11 to 2011/12)					Forecast Unit Cost for ED1 (£k)				
E M	W M	S Wa	S We	Ave	E M	W M	S Wa	S We	Ave
		0.0086	0.0197	0.0142	0.02	0.02	0.02	0.02	0.02

Cost driver: Work content of activity is the same across all DNOs

Unit cost basis: 33 kV cost

The Unit Cost for this item at the 33kV level is 0.3. WPD have used this to forecast the Unit Costs at the 132kV level.

Efficiency:

	EMID	WMID	S WALES	S WEST
Efficiency			22%	48%

South Wales and South West reported costs are very efficient.

Conclusion:

The forecast unit costs for this item are efficient.

5.4.20 Transformers / Repair & Maintenance / 132 kV

Reported Two Year Average Actual (£k) (2010/11 to 2011/12)					Forecast Unit Cost for ED1 (£k)				
E M	W M	S Wa	S We	Ave	E M	W M	S Wa	S We	Ave
1.1059	1.0448	1.3294	0.4847	0.9912	1.1	1.1	1.1	0.5	0.95

Cost driver: Work content will vary across DNOs depending on historic practices and asset condition

Unit cost basis: Overall average

Maintenance routines have differed in the East Midlands and West Midlands and the types of transformers installed affects work done. In particular, the condition of tap changes has had

an impact. Those in South Wales have not previously been maintained as well as those in South West resulting in higher costs.

Work on transformers is unpredictable and there are relatively low volumes for this item (average of 180 per year per DNO).

Efficiency:

	EMID	WMID	S WALES	S WEST
Efficiency	115%	104%	138%	46%

Due to differences caused by low volumes, the efficiency of the four business areas has been mixed. The forecast unit costs should increase efficiency in South Wales.

Conclusion:

The forecast unit costs for this item are efficient.

5.4.21 Switchgear All Types / Repair & Maintenance / 33 kV

Reported Two Year Average Actual (£k) (2010/11 to 2011/12)					Forecast Unit Cost for ED1 (£k)				
E M	W M	S Wa	S We	Ave	E M	W M	S Wa	S We	Ave
0.5372	0.3923	0.3033	0.2094	0.3606	0.3	0.3	0.3	0.3	0.3

Cost driver: Work content of activity is the same across all DNOs

Unit cost basis: South Wales and West average

Reported unit costs are similar across the four DNOs and the work content of the activity should be similar in the future, so the average of the four was used (rounded down).

Efficiency:

	EMID	WMID	S WALES	S WEST
Efficiency	254%	179%	137%	93%

East Midlands and West Midlands reported unit costs are inefficient. Reported unit costs for South Wales and South West, upon which the forecast unit costs were based, are inefficient.

Conclusion:

WPD agreed that the forecast unit costs were too high and lowered them based on the GB DNO average, as below:

	EMID	WMID	S WALES	S WEST
Updated forecast unit cost	0.23	0.23	0.23	0.23

The updated forecast unit costs for this item are now efficient.

5.4.22 Overhead Pole Line / Repair & Maintenance / HV

Reported Two Year Average Actual (£k) (2010/11 to 2011/12)					Forecast Unit Cost for ED1 (£k)				
E M	W M	S Wa	S We	Ave	E M	W M	S Wa	S We	Ave
0.3376	0.2679	0.0225	0.0125	0.1601	0.05	0.05	0.025	0.0125	0.034

Cost driver: Work content will vary across DNOs depending on historic practices and asset condition

Unit cost basis: DNO specific but reduced towards a South Wales and West target

The actual unit costs for East Midlands and West Midlands have been very high. This is due to there being a legacy issue of a large number of HV poles in both areas that are defective, (e.g. missing insulators from stays). The completion of the remedial works to address these defects was included with this activity. Going forward, in accordance with Ofgem's reporting requirements, such systematic remedial work is to be included as pole refurbishment.

Efficiency:

	EMID	WMID	S WALES	S WEST
Efficiency	843%	647%	54%	29%

East and West Midlands actual unit costs have been very inefficient, but the reasons for this are understood and the forecast unit costs are based on South Wales and South West reported costs.

Conclusion:

The forecast unit costs for this item are efficient.

5.4.23 Substation / Inspections / 132 kV

Reported Two Year Average Actual (£k) (2010/11 to 2011/12)					Forecast Unit Cost for ED1 (£k)				
E M	W M	S Wa	S We	Ave	E M	W M	S Wa	S We	Ave
0.9381	0.3822	0.4503	0.2316	0.5006	0.35	0.35	0.35	0.35	0.35

Cost driver: Work content of activity is the same across all DNOs

Unit cost basis: South Wales and South West average

Reported costs for the East and West Midlands are higher than those for South Wales and South West due to the previous policy of outsourcing this work.

The East and West Midlands now source this work in-house and so the South Wales and South West average has been used.

Efficiency:

	EMID	WMID	S WALES	S WEST
Efficiency	333%	130%	153%	76%

East Midlands actual unit costs have been very inefficient, but the forecast unit costs are based on South Wales and South West reported costs.

Conclusion:

The forecast unit costs for this item are efficient.

5.4.24 Substation / Inspections / 33 kV

Reported Two Year Average Actual (£k) (2010/11 to 2011/12)					Forecast Unit Cost for ED1 (£k)				
E M	W M	S Wa	S We	Ave	E M	W M	S Wa	S We	Ave
0.1514	0.9373	0.0653	0.0916	0.3114	0.09	0.09	0.09	0.09	0.09

Cost driver: Work content of activity is the same across all DNOs

Unit cost basis: South Wales and West average

Reported costs for the East and West Midlands are slightly higher than those for South Wales and South West due to the previous policy of outsourcing this work.

East Midlands and West Midlands now source this work in-house and so the South Wales and South West average has been used.

Efficiency:

	EMID	WMID	S WALES	S WEST
Efficiency	86%	498%	35%	48%

West Midlands' actual unit costs have been very inefficient, but the forecast unit costs are based on South Wales and South West reported costs.

Conclusion:

The forecast unit costs for this item are efficient.

5.4.25 LV UGB & LV Pillars (OD Street Located) / Inspections / LV

Reported Two Year Average Actual (£k) (2010/11 to 2011/12)					Forecast Unit Cost for ED1 (£k)				
E M	W M	S Wa	S We	Ave	E M	W M	S Wa	S We	Ave
0.0319	0.0535	0.0835		0.0563	0.08	0.08	0.08	0.08	0.08

Cost driver: Work content of activity is the same across all DNOs

Unit cost basis: South Wales and West average

There is no reported Unit Cost for South West as the figure has been included in another job.

It was felt that the South Wales figure best represented the future work content of the activity. Investigations by WPD identified that the historic unit cost for both West and East Midlands were artificially low. There is interdependency with the maintenance activity associated with the same asset (5.4.14).

Efficiency:

	EMID	WMID	S WALES	S WEST
Efficiency	125%	202%	313%	

Reported unit costs across WPD were inefficient. Forecast unit costs were based on South Wales, which was the least efficient business area for this item.

Conclusion:

WPD agreed that the forecast unit costs were too high and lowered them significantly, based on the GB DNO average, as below:

	EMID	WMID	S WALES	S WEST
Updated forecast unit cost	0.022	0.022	0.022	0.022

The updated forecast unit costs for this item are now efficient.

5.4.26 Summary

The table overleaf provides a summary of the Reported Two Year Average Actual Costs and the forecast Unit Costs (after updates) for WPD's ED1 submission for each of the top 25 items. (The average for the forecast unit costs is red, green or amber depending on whether it has increased, decreased or remained constant compared to the reported unit costs.)

Table 5-3: Summary of Historical and Forecast I&M Unit Costs

Asset category	Activity	Voltage	Reported Two Year Average Actual (£k) (2010/11 to 2011/12)					Forecast Unit Cost for ED1 (£k)				
			E M	W M	S Wa	S We	AVE	E M	W M	S Wa	S We	AVE
Substations - GM Indoor & Outdoor	Repair & Maintenance (Civil Works)	HV	0.16	0.09	1.10	1.26	**0.65**	0.1	0.1	0.1	0.1	**0.1**
GM Switchgear (Exc CBs and X Type RMU)	Repair & Maintenance	HV	0.69	0.73	1.72	0.88	**1.01**	0.8	0.8	0.8	0.8	**0.8**
Overhead Pole Line	Shrouding Temporary	LV	0.07	0.10	0.21	0.21	**0.15**	0.21	0.21	0.21	0.21	**0.21**
Overhead Pole Line	Inspections - Foot Patrol	HV	0.01	0.01	0.01	0.01	**0.01**	0.01	0.01	0.01	0.01	**0.01**
Substation	Repair & Maintenance (Civil Works)	33 kV	0.41	0.54	10.69	6.57	**4.55**	0.55	0.55	0.55	0.55	**0.55**
Substations - GM Indoor & Outdoor	Inspections	HV	0.03	0.04	0.02	0.02	**0.03**	0.027	0.027	0.027	0.027	**0.027**
Overhead Pole Line	Inspections - Helicopter	HV	0.03	0.01	0.06	0.07	**0.04**	0.06	0.06	0.06	0.06	**0.06**
Switchgear All Types	Repair & Maintenance	132 kV	1.15	0.89	1.11	0.64	**0.95**	1	1	1	1	**1**
Overhead Pole Line	Repair & Maintenance	LV	0.04	0.09	0.04	0.01	**0.04**	0.04	0.09	0.04	0.01	**0.045**
Overhead Pole Line	Inspections	LV	0.02	0.02	0.01	0.01	**0.02**	0.014	0.014	0.014	0.014	**0.014**
Transformers	Repair & Maintenance	33 kV	0.83	1.05	1.65	0.51	**1.01**	0.64	0.64	0.64	0.64	**0.64**
HV Pole Mounted All Other	Repair & Maintenance	HV	0.32	0.82	0.25	0.23	**0.40**	0.15	0.15	0.15	0.15	**0.15**
Substation	Repair & Maintenance (Civil Works)	132 kV	1.92	1.70	9.65	9.05	**5.58**	1.7	1.7	1.7	1.7	**1.7**
LV UGB & LV Pillars (OD Street Located)	Repair & Maintenance	LV	0.16	1.27	0.18	0.25	**0.47**	0.2	0.4	0.2	0.2	**0.25**
Circuit Breakers (GM) Primary	Repair & Maintenance	HV	0.23	0.44	0.06	0.10	**0.21**	0.1	0.1	0.1	0.1	**0.1**
Overhead Tower Line	Inspections - Helicopter	33 kV	0.19	0.09	2.18	1.27	**0.93**	0.15	0.15	0.15	0.15	**0.15**
Protection Schemes	Repair & Maintenance	HV	0.18	0.22	0.20	0.09	**0.17**	0.15	0.15	0.15	0.15	**0.15**
GM Transformers	Repair & Maintenance	HV	0.20	0.21	0.26	0.18	**0.21**	0.15	0.15	0.15	0.15	**0.15**

Overhead Pole Line	Inspections - Foot Patrol	132 kV			0.01	0.02	**0.01**	0.02	0.02	0.02	0.02	**0.02**
Transformers	Repair & Maintenance	132 kV	1.11	1.04	1.33	0.48	**0.99**	1.1	1.1	1.1	0.5	**0.95**
Switchgear All Types	Repair & Maintenance	33 kV	0.54	0.39	0.30	0.21	**0.36**	0.23	0.23	0.23	0.23	**0.23**
Overhead Pole Line	Repair & Maintenance	HV	0.34	0.27	0.02	0.01	**0.16**	0.05	0.05	0.025	0.013	**0.034**
Substation	Inspections	132 kV	0.94	0.38	0.45	0.23	**0.50**	0.35	0.35	0.35	0.35	**0.35**
Substation	Inspections	33 kV	0.15	0.94	0.07	0.09	**0.31**	0.09	0.09	0.09	0.09	**0.09**
LV UGB & LV Pillars (OD Street Located)	Inspections	LV	0.03	0.05	0.08		**0.06**	0.022	0.022	0.022	0.022	**0.022**

5.5 Efficiency

The following table shows the position of WPD's four DNOs compared to the other GB DNOs using the Cost Driver Normalisation Model Ofgem v3 spreadsheet based on actual costs for 2010/11 and 2011/12. . The DNOs are ranked on efficiency which is calculated as Normalised Total Costs as a percentage of Predicted Variable Cost.

Table 5-4: GB DNO Ranking for I&M Efficiency

I&M	Normalised Total Costs (£m)	Predicted Total Cost (£m)	Variance Predicted vs Normalised (£m)	% efficiency	Ranking
SSEH	3.59	7.92	4.33	45%	1
SPD	3.99	7.59	3.59	53%	2
NPg(N)	5.18	7.26	2.08	71%	3
NPg(Y)	7.54	10.37	2.83	73%	4
ENWL	9.86	11.29	1.42	87%	5
SPN	10.85	11.35	0.51	96%	6
S WEST	7.69	7.89	0.2	97%	7)
WMID	16.57	16.97	0.4	98%	8)
SPMW	7.91	7.71	-0.2	103%	9
SSES	12.78	11.83	-0.95	108%	10
EMID	15.18	13.25	-1.93	115%	11
S WALES	7.23	5.82	-1.41	124%	12
EPN	22.39	14.65	-7.74	153%	13
LPN	12.09	7.87	-4.22	154%	14

5.6 Conclusion

WPD has given significant thought and attention to forecasting I&M unit costs. The most appropriate cost driver has been selected, major issues investigated and resolved and the efficiency of individual items has been assessed.

As a result of the work carried out with PB, WPD have revised downwards a number of the forecasts.

The efficiency of WPD's unit costs is improving and each of WPD's four businesses will move towards a more consistent overall cost..

WPD have estimated that the impact of adopting the revised forecast unit costs will improve relative efficiency to below benchmark.

Following these revisions, PB considers WPD's forecast unit costs for I&M in RIIO-ED1 overall to be efficient.

6 TREE CUTTING

Tree Cutting expenditure covers all costs relating to the physical felling or trimming of vegetation around network assets. This includes any tree cutting as part of a capital scheme or undertaken to meet ESQCR requirements.

It also includes any costs related to the inspection of vegetation around network assets.

WPD carries out Tree Cutting across its four business areas.

6.1 Ofgem Categories

As with the I&M category, Ofgem has prescribed how tree cutting costs should be reported in the RIIO ED1 business case. Expenditure on Tree Cutting is divided into three:

1) Inspection (measured in spans)

   The inspection of vegetation around network assets, either to ensure tree cutting has been adequately carried out or to determine where tree cutting will be necessary.

2) Undertaking safety distance Tree Cutting (ENATS 43-8)

   Tree cutting is carried out to provide a safe area around existing Overhead Line circuits. Performance benefits also come for reduced customer interruptions due to removing close proximity trees.

   This is a large, on-going, programme based around a five-year cycle.

3) Undertaking storm resilience Tree Clearance (ETR 132)

   ETR 132 is a smaller, 25-year programme covering 20% of the network that is deemed to be strategically important. It involves the felling of trees which are within falling distance of existing Overhead Line circuits.

   Distribution companies are obligated to have an additional 20% of their network compliant by 2035.

There are eight items specified by Ofgem under ENATS 43-8 and four under ETR 132:

Table 6-1: Ofgem Tree Cutting Items

Programme	Activity	Voltage	Measurement
Tree cutting: ENATS 43-8	Spans Cut	LV	Spans
	Spans Inspected (Tree Cutting)	LV	
	Spans Cut	HV	
	Spans Inspected (Tree Cutting)	HV	
	Spans Cut	EHV	
	Spans Inspected (Tree Cutting)	EHV	
	Spans Cut	132kV	
	Spans Inspected (Tree Cutting)	132kV	
Tree cutting: ETR 132	ETR 132 Stand alone	HV	Overhead Network Length Cleared (km)
	Sub Total	HV	
	Sub Total	EHV	
	Sub Total	132kV	

6.2 WPD's Methodology for the Calculation of Unit Costs

WPD's forecast unit costs are taken directly from the three-year average of costs for 2009/10 to 2011/12, inflated to 2011/2012 prices.

One forecast unit cost is produced for the four DNOs.

Understanding that one approach may not best serve the different Ofgem items, WPD uses the following approaches to forecast unit costs:

(i) Three-year average of the four DNOs

Where resourcing and operational practices are seen as consistent across the four DNOs, the average of the four is used.

(ii) Three-year average of South Wales and South West.

At the LV and HV level, the East and West Midlands had a backlog to clear. Therefore, for these items, South Wales and South West are seen to more accurately reflect on-going working practices and their average is used.

(iii) Unit Cost assessed from review of contracts

For spans inspected at all voltage levels, contracts are in place, and so the forecast Unit Cost is based on these contracts.

(iv) Median

In the case of Spans Cut at 132kV level there is a wide range of unit costs and so it is felt that taking the median value offers the most appropriate approach.

6.3 PB's Review Approach

Tree Cutting is a subsection of I&M and PB looked at all 12 items.

In order to understand WPD's unit costs, PB spent time within WPD's offices and spoke to key people within the business. Further, PB worked through WPD's spreadsheets and calculations, and discussed with WPD any issues or anomalies.

Where appropriate, WPD updated forecast unit costs to ensure efficiency.

6.4 Analysis of ENATS 43-8 Unit Costs

This section of the report is an item-by-item analysis of the eight ENATS 43-8 items.

As with the review of I&M,we looked at the basis for the unit costs and the efficiency.

6.4.1 Spans Cut / LV

	Activity Volumes				Total Direct Costs £m				Unit Costs £			
	09/10	10/11	11/12	3-Yr Agg	09/10	10/11	11/12	3-Yr Agg	09/10	10/11	11/12	3-Yr Agg
WMID	6,995	7,503	6,422	20,920	3.355	2.925	3.671	9.951	480	390	572	476
EMID	5,314	8,667	6,135	20,116	2.373	3.842	3.263	9.478	447	443	532	471
SWALES	3,707	6,213	7,944	17,864	1.247	2.254	2.784	6.285	336	363	350	352
SWEST	16,290	19,857	20,139	56,286	3.909	4.254	4.205	12.369	240	214	209	220
WPD	32,306	42,240	40,640	115,186	10.885	13.276	13.922	38.082	337	314	343	331
SWA & SWE	19,997	26,070	28,083	74,150	5.156	6.509	6.989	18.654	258	250	249	252

Unit cost: 252

Cost basis: Three-year average across South Wales and South West

The high historic costs for the East and West Midlands are not appropriate as the activity includes backlog clearance.

The unit costs are similar across the years and across South Wales and South West and there are no abnormal values. The unit costs have decreased from 2009/10 to 2011/12 across South Wales and South West. The volumes are high enough to give confidence in the cost figures.

Where there are differences, these can be attributed to cyclical variations in the work required to keep trees clear from overhead lines - this is a characteristic of tree cutting.

Efficiency:

	EMID	WMID	S WALES	S WEST
Efficiency	352%	350%	271%	157%

The inefficiency of East Midlands and West Midlands is explained partly by the backlog clearance and these reported costs are excluded from the calculation of the forecast unit costs.

In general, efficiency figures are somewhat unreliable for tree cutting due to differences in the way DNOs divide costs between cutting and inspecting. Across all four business areas, WPD appears to be inefficient at cutting spans but very efficient at inspecting spans.

Conclusion:

There is no evidence to suggest the unit cost is inefficient.

6.4.2 Spans Inspected (Tree Cutting) / LV

	Activity Volumes				Total Direct Costs £m				Unit Costs £			
	09/10	10/11	11/12	3-Yr Agg	09/10	10/11	11/12	3-Yr Agg	09/10	10/11	11/12	3-Yr Agg
WMID	20,312	22,068	16,697	59,077	0.109	0.116	0.084	0.308	5	5	5	5
EMID	20,890	25,491	9,202	55,583	0.112	0.134	0.046	0.292	5	5	5	5
SWALES	9,295	18,347	19,862	47,504	0.050	0.096	0.099	0.245	5	5	5	5
SWEST	33,703	39,839	39,280	112,822	0.181	0.209	0.196	0.587	5	5	5	5
WPD	84,200	105,745	85,041	274,986	0.453	0.554	0.425	1.432	5	5	5	5
SWA & SWE	42,998	58,186	59,142	160,326	0.231	0.305	0.296	0.832	5	5	5	5

Unit cost: 5

Cost basis: Assessed from review of contracts

The unit cost for this item is taken from a breakdown of the successful contractor's tender. WPD use a cost per span inspected/surveyed as a representative value.

The breakdown of costs is below.

Span cost	Cost of survey	Data entry & Span M'gment	All costs of initial clearance	All costs of Revisits / Recutting	Overheads & profit
£89.53	**£5.00**	£0.64	£46.17	£12.16	£25.57

Efficiency:

	EMID	WMID	S WALES	S WEST
Efficiency	8%	8%	8%	8%

This highly efficient item balances out with the inefficient previous item.

Conclusion:

There is no evidence to suggest the unit cost is inefficient.

6.4.3 Spans Cut / HV

	Activity Volumes				Total Direct Costs £m				Unit Costs £			
	09/10	10/11	11/12	3-Yr Agg	09/10	10/11	11/12	3-Yr Agg	09/10	10/11	11/12	3-Yr Agg
WMID	8,319	11,060	9,272	28,651	4.843	5.740	4.872	15.454	582	519	525	539
EMID	7,766	6,863	7,515	22,144	4.248	2.582	4.336	11.166	547	376	577	504
SWALES	16,060	12,967	14,898	43,925	2.647	2.762	2.217	7.626	165	213	149	174
SWEST	14,296	15,109	15,856	45,261	1.877	2.194	3.038	7.109	131	145	192	157
WPD	46,441	45,999	47,541	139,981	13.615	13.277	14.464	41.355	293	289	304	295
SWA & SWE	30,356	28,076	30,754	89,186	4.524	4.956	5.255	14.735	149	177	171	165

Unit cost: 165

Cost basis: Three-year average across South Wales and South West

The high historic costs for the East and West Midlands are not appropriate as the activity includes backlog clearance.

The unit costs are similar across the years and across South Wales and South West and there are no abnormal values. The volumes are high enough to give confidence in the cost figures.

The outturn cost per span in any one year is influenced by the extent of tree cutting required to achieve the required clearance.

WPD attribute year on year differences to cyclical variations in the work required to keep trees clear from overhead lines

Efficiency:

	EMID	WMID	S WALES	S WEST
Efficiency	256%	281%	99%	91%

East Midlands and West Midlands are again inefficient due to backlog clearance, and they have again been excluded from the calculation of the forecast unit costs.

Conclusion:

There is no evidence to suggest the unit cost is inefficient.

6.4.4 Spans Inspected (Tree Cutting) / HV

	Activity Volumes				Total Direct Costs £m				Unit Costs £			
	09/10	10/11	11/12	3-Yr Agg	09/10	10/11	11/12	3-Yr Agg	09/10	10/11	11/12	3-Yr Agg
WMID	22,946	26,333	23,180	72,459	0.247	0.276	0.232	0.755	11	10	10	10
EMID	32,188	26,396	23,772	82,356	0.346	0.277	0.238	0.861	11	10	10	10
SWALES	35,182	32,252	37,330	104,764	0.379	0.338	0.373	1.090	11	10	10	10
SWEST	35,687	39,164	45,573	120,424	0.384	0.410	0.456	1.250	11	10	10	10
WPD	126,003	124,145	129,855	380,003	1.356	1.301	1.299	3.955	11	10	10	10
SWA & SWE	70,869	71,416	82,903	225,188	0.763	0.748	0.829	2.340	11	10	10	10

Unit cost: 10

Cost basis: Assessed from review of contracts

As with the previous span inspection item, the forecast unit cost is based on a breakdown of the agreed contract.

Efficiency:

	EMID	WMID	S WALES	S WEST
Efficiency	18%	19%	19%	19%

The costs across all four business areas are efficient.

Conclusion:

There is no evidence to suggest the unit cost is inefficient.

6.4.5 Spans Cut / EHV

	Activity Volumes				Total Direct Costs £m				Unit Costs £			
	09/10	10/11	11/12	3-Yr Agg	09/10	10/11	11/12	3-Yr Agg	09/10	10/11	11/12	3-Yr Agg
WMID	1,485	1,953	1,675	5,113	0.350	1.140	1.464	2.954	236	584	874	578
EMID	867	2,230	1,865	4,962	0.522	1.161	0.852	2.535	603	521	457	511
SWALES	753	1,005	585	2,343	0.190	0.145	0.249	0.584	252	145	425	249
SWEST	744	965	1,244	2,953	0.387	0.203	1.557	2.147	520	211	1,252	727
WPD	3,849	6,153	5,369	15,371	1.449	2.650	4.122	8.220	376	431	768	535
SWA & SWE	1,497	1,970	1,829	5,296	0.577	0.349	1.806	2.731	385	177	987	516

Unit cost: 535

Cost basis: Three-year average across all four DNOs (consistent resourcing and operational practices)

There is no backlog associated with EHV tree cutting. Therefore it is appropriate to use the average of the four DNOs.

There are year on year differences which WPD attribute to cyclical variations in the work required to keep trees clear from overhead lines.

Efficiency:

	EMID	WMID	S WALES	S WEST
Efficiency	169%	248%	88%	277%

The South West reported costs are inefficient due to a very high value in 2011/2012.

Conclusion:

WPD agreed that the forecast unit cost was too high and lowered it, based on the GB DNO average.

The updated forecast unit is 350.

There is no evidence to suggest the unit cost is inefficient.

6.4.6 Spans Inspected (Tree Cutting) / EHV

	Activity Volumes				Total Direct Costs £m				Unit Costs £			
	09/10	10/11	11/12	3-Yr Agg	09/10	10/11	11/12	3-Yr Agg	09/10	10/11	11/12	3-Yr Agg
WMID	4,469	5,278	4,355	14,102	0.048	0.055	0.044	0.147	11	10	10	10
EMID	4,448	7,194	4,662	16,304	0.048	0.075	0.047	0.170	11	10	10	10
SWALES	1,900	1,778	1,673	5,351	0.020	0.019	0.017	0.056	11	10	10	10
SWEST	1,984	2,719	4,037	8,740	0.021	0.029	0.040	0.090	11	10	10	10
WPD	12,801	16,969	14,727	44,497	0.138	0.178	0.147	0.463	11	10	10	10
SWA & SWE	3,884	4,497	5,710	14,091	0.042	0.047	0.057	0.146	11	10	10	10

Unit cost: 10

Cost basis: Assessed from review of contracts

As with previous span inspection items, the forecast unit cost is based on a breakdown of the agreed contract.

Efficiency:

	EMID	WMID	S WALES	S WEST
Efficiency	18%	18%	19%	18%

The costs across all four business areas are efficient.

Conclusion:

There is no evidence to suggest the unit cost is inefficient.

6.4.7 Spans Cut / 132kV

	Activity Volumes				Total Direct Costs £m				Unit Costs £			
	09/10	10/11	11/12	3-Yr Agg	09/10	10/11	11/12	3-Yr Agg	09/10	10/11	11/12	3-Yr Agg
WMID	477	429	486	1,392	0.523	0.196	0.540	1.260	1,097	457	1,112	905
EMID	475	943	458	1,876	0.430	0.454	0.304	1.189	906	482	665	634
SWALES	792	320	194	1,306	0.162	0.217	0.195	0.574	204	678	1,005	439
SWEST	228	327	582	1,137	0.096	0.141	0.146	0.382	419	430	251	336
WPD	1,972	2,019	1,720	5,711	1.211	1.008	1.185	3.404	614	499	689	596
SWA & SWE	1,020	647	776	2,443	0.257	0.358	0.341	0.956	252	553	439	391

Unit cost: 574

Cost basis: Median cost selected as the wide range of unit costs potentially invalidates the use of arithmetic average

Initially, WPD selected the median average (574) for the forecast unit cost.

Efficiency:

	EMID	WMID	S WALES	S WEST
Efficiency	241%	360%	370%	142%

The reported costs are inefficient due to a very high value in 2011/2012.

Conclusion:

WPD agreed that the forecast unit cost was too high and lowered it, based on the GB DNO average.

The updated forecast unit is 220.

There is no evidence to suggest the unit cost is inefficient.

6.4.8 Spans Inspected (Tree Cutting) / 132kV

	Activity Volumes				Total Direct Costs £m				Unit Costs £			
	09/10	10/11	11/12	3-Yr Agg	09/10	10/11	11/12	3-Yr Agg	09/10	10/11	11/12	3-Yr Agg
WMID	1,375	953	1,215	3,543	0.015	0.010	0.012	0.037	11	10	10	10
EMID	2,013	1,965	1,648	5,626	0.022	0.021	0.017	0.059	11	10	10	10
SWALES	861	864	488	2,213	0.009	0.009	0.005	0.023	11	11	10	11
SWEST	1,128	976	1,382	3,486	0.012	0.010	0.014	0.036	11	10	10	10
WPD	5,377	4,758	4,733	14,868	0.058	0.050	0.047	0.155	11	10	10	10
SWA & SWE	1,989	1,840	1,870	5,699	0.021	0.019	0.019	0.059	11	10	10	10

Unit cost: 10

Cost basis: Assessed from review of contracts

As with previous span inspection items, the forecast unit cost is based on a breakdown of the agreed contract.

Efficiency:

	EMID	WMID	S WALES	S WEST
Efficiency	20%	20%	21%	20%

The costs across all four business areas are efficient.

Conclusion:

There is no evidence to suggest the unit cost is inefficient.

6.5 Analysis of ETR 132 Unit Costs

The undertaking of resilience tree cutting to ETR 132 is a standalone activity. Cyclical tree cutting to meet the requirements of ENATS 43-8 is undertaken to achieve a clearance of up to 3 metres. Resilience tree cutting to meet the requirements of ETR 132 is undertaken to achieve falling distances of trees from lines.

WPD's unit cost for ETR 132 is £11,000.

When the requirement to undertake resilience tree cutting was introduced into the ESQC Regulations, the DTI used a value of £9,000 (2005/06 price levels) in their Regulatory Impact Assessment. The value of £11,000 is the £9,000 inflated to 2011/12 price levels.

The cost of £11,000 is the expected long run cost. As it is not possible to differentiate between the required work volumes and efficiency, WPD deem this to be the most appropriate cost to use.

PB is unable to comment on the efficiency of this forecast unit cost.

6.6 Efficiency

Table 6-2: GB DNO Ranking for Tree Cutting Efficiency

	Normalised Total costs (£m)	Predicted Variable Cost (£m)	Variance Predicted vs Actual (£m)	% efficiency cost	Ranking
ENWL	3.44	7.54	4.11	46%	1
SPD	3.26	6.82	3.56	48%	2
NPg(N)	4.6	8.35	3.76	55%	3
S WEST	9.77	12.19	2.41	80%	4
SSEH	6.31	7.17	0.86	88%	5
EPN	15.4	17.37	1.98	89%	6
SPN	7.51	7.96	0.45	94%	7
NPg(Y)	6.3	6.66	0.36	95%	8
LPN	0.01		-0.01	100%	9
S WALES	8.55	8.03	-0.51	106%	10
EMID	9.06	6.81	-2.25	133%	11
WMID	11.09	7.07	-4.02	157%	12
SPMW	11.41	6.91	-4.51	165%	13
SSES	13.64	7.45	-6.19	183%	14

The following table summarises the annual unit costs for cutting from 2009/10 to 2011/12 for each of the four Span Cutting items along with the forecast unit cost figure.

For LV and HV levels, the average has been used, whereas at EHV and 132kV levels, large values have been removed and the forecasts are significantly lower than the three-year average.

Table 6-3: Summary of Historical and Forecast Span Cutting Unit Costs

			09/10	10/11	11/12	Forecast
WPD SWA & SWE	Spans Cut	LV	258	250	249	252
WPD SWA & SWE	Spans Cut	HV	149	177	171	165
WPD TOTAL	Spans Cut	EHV	376	431	768	350
WPD TOTAL	Spans Cut	132kV	614	499	689	220

6.7 Conclusion

Due to the differences in how costs are divided by different DNOs, it is difficult to compare WPD's performance against other DNOs item by item.

Tree cutting contracts are awarded following competitive tendering processes in line with WPD Procurement practices.

Tree cutting activities are subject to continuous field audit with actions taken as appropriate to ensure consistency of delivery against contract specifications. Overall, we have seen no evidence that WPD's unit costs are not efficient.

7 TROUBLE CALL

Trouble Call is the term applied to the activity for the resolution of faults, which cause interruptions to customer supplies.

7.1 Ofgem Categories

There are 50 Trouble Call items identified by Ofgem for RIIO ED1 reporting.

These 50 items are split across three different types of incident:

1) Non-damage incidents (Items 1-4): Supplies to customers are interrupted but no failed asset has been identified and it is possible to restore supplies without undertaking any repair.

2) Damage incidents requiring minimum repair (Items 5-27): Supplies to customers are interrupted and it is necessary to undertake repairs in order to restore supplies. The repair work is classified as the minimum required to returning the asset affected back to service.

3) Damage incidents that require more extensive repair (Items 28-50): Supplies to customers are interrupted and it is necessary to undertake initial repairs in order to restore supplies, but the full repair work is extensive and classified as capital Asset Replacement in accordance with Ofgem's reporting rules.

   The costs included in these types of incident relate to the costs associated with initial repairs, supply restoration and making the network safe. The cost of the capital Asset Replacement (the full repair work) is not included here. (This report looks at Asset Replacement separately.)

7.2 WPD's Methodology for the Calculation of Unit Costs

WPD's forecast unit costs are taken directly from the three-year average of costs for 2009/10 to 2011/12, inflated to 2011/2012 prices.

One forecast unit cost is produced for the four DNOs.

WPD uses the following approaches to forecast unit costs:

(i) Three-year average of the four DNOs

Where resourcing and operational practices are seen as consistent across the four DNOs, the average of the four is used.

(ii) Three-year average of South Wales and South West.

Where South Wales and South West are seen to more accurately reflect ongoing working practices, the average of the two DNOs is used.

(iii) Exclusion of an abnormal value

Where a value for one of the DNOs for one of the years is seen to be abnormal, it is removed so that it does not skew the forecast unit cost.

(iv) Other approaches

In rare cases where, due to low volumes, there isn't sufficient data available, WPD use a different value such as the median value (rather than the average) or estimate a value based on a percentage of the asset value.

7.3 PB's Review Approach

Of the 50 Ofgem Item categories, PB ranked the top 10 according to the average total volumes across the four DNOs between 2009/10 and 2011/12 multiplied by the ED1 unit cost. PB's analysis focused on these 10.

Of the £65.26M total, these 10 account for £60.74M, or 93.47% of the total.

PB worked through WPD's spreadsheets and calculations, and discussed with WPD any issues or anomalies. Where appropriate, WPD revised their forecast unit costs.

The table overleaf summarises the items analysed by PB.

Table 7-1: Trouble Call Items Reviewed by PB Ranked by Total Forecast Spend

Ofgem Item			WPD Actual Volumes			Average Volume	ED1 Unit Cost	Av. Vol. * ED1 Unit Cost	% of Total	Rank
			2009/10	2010/11	2011/12					
7	LV Network	UG Cables (Non CONSAC) - Asset Repair	5,852	6,188	4,374	5,471	3.31	18.09	27.7%	**1**
11	HV Network (11 kV & 20 kV)	UG Cables - Asset Repair	1,491	1,743	1,434	1,556	6.34	9.86	15.1%	**2**
6	LV Services (excluding cut out incidents)	Underground Asset Repair	7,310	7,180	7,118	7,203	1.25	8.97	13.8%	**3**
8	LV Network	UG Cables (CONSAC) - Asset Repair	2,146	1,735	1,639	1,840	3.74	6.88	10.5%	**4**
12	HV Network (11 kV & 20 kV)	OH Lines - Asset Repair	2,385	2,569	2,641	2,532	1.88	4.77	7.3%	**5**
9	LV Network	OH Lines - Asset Repair	3,095	2,546	2,524	2,722	1.48	4.02	6.2%	**6**
1	LV Network	Supply Restoration by Switching Only (Non Damage Fault)	11,906	12,803	13,508	12,739	0.31	3.95	6.0%	**7**
5	LV Services (excluding cut out incidents)	Overhead Asset Repair	5,080	5,174	5,906	5,387	0.42	2.27	3.5%	**8**
2	HV Network (11 kV & 20 kV)	Supply Restoration by Switching Only (Non Damage Fault)	3,278	3,064	3,309	3,217	0.30	0.98	1.5%	**9**
17	EHV Network (22 kV, 33 kV & 66 kV)	UG Cables (Pressure Assisted) - Asset Repair	40	115	90	82	11.61	0.95	1.5%	10

7.4 Analysis of Top 10 Items

As with the previous reviews we have examined the basis for the forward looking unit cost and the level of historical efficiency.

7.4.1 LV Network / UG Cables (Non CONSAC) - Asset Repair

	Volumes			Operational Costs			Operational Unit Costs			
	09/10	10/11	11/12	09/10	10/11	11/12	09/10	10/11	11/12	3 Yr Ave
WEST MID	1,185	1,104	703	4.3347	3.8384	2.4129	3.6580	3.4768	3.4323	3.5381
EAST MID	2,920	3,215	2,062	10.0363	7.9497	4.5595	3.4371	2.4727	2.2112	2.7505
SWALES	890	836	787	3.0559	2.9586	2.6703	3.4336	3.5390	3.3930	3.4559
SWEST	857	1,033	822	3.3909	2.8701	2.5101	3.9567	2.7784	3.0536	3.2342
WPD	5,852	6,188	4,374	20.8178	17.6168	12.1528	3.5574	2.8469	2.7784	3.0820
SWA & SWE	1,747	1,869	1,609	6.4468	5.8287	5.1804	3.6902	3.1186	3.2196	3.3408

Unit cost: 3.3070

Cost basis: Three-year average across all four DNOs (consistent resourcing and operational practices)

The unit cost of 3.3070 includes 0.2250 for 'Incremental Cost for Change in Supply Restoration Standard'. This figure covers the cost of restoring supplies to customers, for example through the use of generators.

There are large volume differences between East and West Midlands and South Wales and South West due to past policies regarding the use of CONSAC and non CONSAC cable.

The unit costs are similar across the years and across the four DNOs and there are no abnormal values. The unit costs have decreased from 2009/10 to 2011/12 across all four DNOs. The volumes are high enough to give confidence in the cost figures.

Future practices should be consistent across the four DNOs.

Efficiency:

	EMID	WMID	S WALES	S WEST
Efficiency	80%	110%	109%	88%

The costs across all four business areas are efficient and the forecast unit cost is based upon these.

Conclusion:

The forecast unit costs for this item are efficient.

7.4.2 HV Network / UG Cables - Asset Repair

	Volumes			Operational Costs			Operational Unit Costs			
	09/10	10/11	11/12	09/10	10/11	11/12	09/10	10/11	11/12	3 Yr Ave
WEST MID	346	569	466	2.8824	3.5024	2.5837	8.3306	6.1554	5.5444	6.4942
EAST MID	510	532	425	3.4102	3.1983	2.2194	6.6867	6.0118	5.2221	6.0177
SWALES	355	356	311	2.1965	2.2196	1.6820	6.1873	6.2348	5.4084	5.9668
SWEST	280	286	232	2.1528	1.9606	1.5676	7.6886	6.8552	6.7569	7.1190
WPD	1,491	1,743	1,434	10.6419	10.8809	8.0527	7.1374	6.2426	5.6156	6.3358
SWA & SWE	635	642	543	4.3493	4.1802	3.2496	6.8493	6.5112	5.9845	6.4720

Unit cost: 6.3358

Cost basis: Three-year average across all four DNOs (consistent resourcing and operational practices)

The unit costs are similar across the years and across the four DNOs and there are no abnormal values. The unit costs have decreased from 2009/10 to 2011/12 across all four DNOs. The volumes are high enough to give confidence in the cost figures.

Future practices should be consistent across the four DNOs.

Efficiency:

	EMID	WMID	S WALES	S WEST
Efficiency	106%	104%	102%	115%

The costs are efficient and the forecast unit cost is based upon these.

Conclusion:

The forecast unit costs for this item are efficient.

7.4.3 LV Service / Underground Asset Repair

	Volumes			Operational Costs			Operational Unit Costs			
	09/10	10/11	11/12	09/10	10/11	11/12	09/10	10/11	11/12	3 Yr Ave
WEST MID	2,357	2,179	2,235	2.8406	4.3433	2.7447	1.2052	1.9933	1.2281	1.4663
EAST MID	2,345	2,338	2,370	3.1204	2.8234	2.2146	1.3307	1.2076	0.9344	1.1567
SWALES	954	1,023	980	1.4266	1.4643	1.2942	1.4954	1.4314	1.3206	1.4153
SWEST	1,654	1,640	1,533	1.5598	1.4774	1.6134	0.9430	0.9009	1.0524	0.9635
WPD	7,310	7,180	7,118	8.9474	10.1084	7.8669	1.2240	1.4079	1.1052	1.2460
SWA & SWE	2,608	2,663	2,513	2.9864	2.9417	2.9076	1.1451	1.1047	1.1570	1.1351

Unit cost: 1.2460

Cost basis: Three-year average across all four DNOs (consistent resourcing and operational practices)

The unit costs have decreased from 2009/10 to 2011/12 across WPD as a whole. The volumes are high enough to give confidence in the cost figures.

Future practices should be consistent across the four DNOs.

In 2010/11, West Midlands experienced a number of faults that required the installation of long lengths of cable.

Efficiency:

	EMID	WMID	S WALES	S WEST
Efficiency	91%	128%	108%	74%

The costs are efficient and the forecast unit cost is based upon these.

Conclusion:

The forecast unit costs for this item are efficient.

7.4.4 LV Network / UG Cables (CONSAC) - Asset Repair

	Volumes			Operational Costs			Operational Unit Costs			
	09/10	10/11	11/12	09/10	10/11	11/12	09/10	10/11	11/12	3 Yr Ave
WEST MID	1,439	1,059	953	2.9460	2.3625	1.8940	2.0473	2.2309	1.9874	2.0871
EAST MID	23	15	9	0.0785	0.0135	0.0385	3.4130	0.9000	4.2778	2.7766
SWALES	-	-	-	-	-	-	-	-	-	-
SWEST	684	661	677	2.5254	2.3239	2.2515	3.6921	3.5157	3.3257	3. 5118
WPD	2,146	1,735	1,639	5.5499	4.6999	4.1840	2.5862	2.7089	2.5528	2.6148
SWA & SWE	684	661	677	2.5254	2.3239	2.2515	3.6921	3.5157	3.3257	3.5118

*Unit cost: 3.7368 (*includes 0.2250 for 'Incremental Cost for Change in Supply Restoration Standard'. This figure covers the cost of restoring supply to customers, for example through the use of generators.)

Cost basis: Three-year average for South West

The three-year average for South West was used as South Wales has no CONSAC, East Midlands has only 11km and West Midlands used different cost allocation rules.

Efficiency:

	EMID	WMID	S WALES	S WEST
Efficiency	103%	94%		146%

The South West costs are inefficient and it was the average of these that was being used as the forecast unit cost.

Conclusion:

WPD agreed that the forecast unit cost was too high and lowered it, removing from the calculation the very high values and further lowering the value to ensure efficiency.

The updated forecast unit cost is 2.3000 (2.5250 including 0.2250 for change in supply restoration standard), which is based on the GB DNO average and more closely reflects the reported costs of East Midlands and West Midlands.

The updated forecast unit cost for this item is now efficient.

7.4.5 HV Network / OH Lines - Asset Repair

	Volumes			Operational Costs			Operational Unit Costs			
	09/10	10/11	11/12	09/10	10/11	11/12	09/10	10/11	11/12	3 Yr Ave
WEST MID	698	944	880	1.2263	1.5368	2.0371	1.7569	1.6280	2.3149	1.9033
EAST MID	523	551	544	1.1912	1.1600	1.4014	2.2776	2.1053	2.5761	2.3193
SWALES	425	424	445	0.7013	0.7403	0.6975	1.6501	1.7460	1.5674	1.6531
SWEST	739	650	772	1.2372	1.0286	1.3508	1.6742	1.5825	1.7497	1.6736
WPD	2,385	2,569	2,641	4.3560	4.4657	5.4868	1.8264	1.7383	2.0775	1.8839
SWA & SWE	1,164	1,074	1,217	1.9385	1.7689	2.0483	1.6654	1.6470	1.6831	1.6659

Unit cost: 1.8839

Cost basis: Three-year average across all four DNOs (consistent resourcing and operational practices)

The unit costs are similar across the years and across the four DNOs and there are no abnormal values. The volumes are high enough to give confidence in the cost figures.

Future practices should be consistent across the four DNOs.

Efficiency:

	EMID	WMID	S WALES	S WEST
Efficiency	116%	92%	76%	75%

The costs are efficient and the forecast unit cost is based upon the average of these.

Conclusion:

The forecast unit costs for this item are efficient.

7.4.6 LV Network / OH Lines - Asset Repair

	Volumes			Operational Costs			Operational Unit Costs			
	09/10	10/11	11/12	09/10	10/11	11/12	09/10	10/11	11/12	3 Yr Ave
WEST MID	964	716	544	0.9114	0.8523	1.5163	0.9454	1.1904	2.7873	1.4748
EAST MID	643	558	545	0.6300	0.5725	1.2474	0.9798	1.0260	2.2888	1.4032
SWALES	419	418	416	0.5576	0.6532	0.6913	1.3308	1.5627	1.6618	1.5180
SWEST	1,069	854	1,019	1.6315	1.1081	1.6748	1.5262	1.2975	1.6436	1.5005
WPD	3,095	2,546	2,524	3.7305	3.1861	5.1298	1.2053	1.2514	2.0324	1.4754
SWA & SWE	1,488	1,272	1,435	2.1891	1.7613	2.3661	1.4712	1.3847	1.6489	1.5057

Unit cost: 1.4754

Cost basis: Three-year average across all four DNOs (consistent resourcing and operational practices)

Future practices should be consistent across the four DNOs.

Outturn unit costs, are expected to vary year on year due the nature of the repairs undertaken, which can range from a simple jointing together of a conductor that is not in tension, to re-conductoring several spans of overhead spans.

Unit costs in East Midlands and West Midlands increased as a result of an increase in the theft of overhead line conductor, with the consequence that there has been a higher percentage of such faults requiring repair.

Efficiency:

	EMID	WMID	S WALES	S WEST
Efficiency	135%	145%	122%	109%

The unit costs, especially those for East Midlands and West Midlands, are inefficient and it was the average of these that was being used as the forecast unit cost.

Conclusion:

WPD agreed that the forecast unit cost was too high and lowered it.

The updated forecast unit is 1.4 which is based on the GB DNO average.

The updated forecast unit cost (1.4) is more efficient than the reported unit costs (average 1.4754) for this item.

7.4.7 LV Network / Supply Restoration by Switching Only (Non Damage Fault)

	Volumes			Operational Costs			Operational Unit Costs			
	09/10	10/11	11/12	09/10	10/11	11/12	09/10	10/11	11/12	3 Yr Ave
WEST MID	2,789	3,918	4,274	1.0222	0.9261	0.8090	0.3665	0.2364	0.1893	0.2511
EAST MID	4,057	4,173	4,797	0.8500	0.8145	0.7532	0.2095	0.1952	0.1570	0.1856
SWALES	1,163	1,215	1,109	0.3928	0.6420	0.4706	0.3377	0.5284	0.4243	0.4317
SWEST	3,897	3,497	3,328	0.7481	1.1951	0.9528	0.1920	0.3418	0.2863	0.2701
WPD TOTAL	11,906	12,803	13,508	3.0131	3.5777	2.9856	0.2531	0.2794	0.2210	0.2506
SWA & SWE	5,060	4,712	4,437	1.1409	1.8371	1.4234	0.2255	0.3899	0.3208	0.3098

Unit cost: 0.3098

Cost basis: Three-year average for South Wales and South West (more reflective of on-going working practices)

WPD felt that South Wales and South West best reflected their on-going working practices, which are based around their 'Target 60' policy. This working practice involves up to four people being dispatched to deal with a fault and restoration of supply. This approach has been extended to the East and West Midlands.

The unit costs have decreased from 2009/10 to 2011/12 across WPD as a whole. The volumes are high enough to give confidence in the cost figures.

Future practices should become more consistent across the four DNOs as the East and West Midlands continues to adopt Target 60 policies.

Further, WPD attribute the year on year variation in outturn unit costs, to variations in the factors that influence the outturn unit costs (number of staff deployed per incident, duration of incident, etc.).

Efficiency:

	EMID	WMID	S WALES	S WEST
Efficiency	76%	87%	193%	123%

Upon review, the unit costs for South Wales and South West are seen to be inefficient and it was the average of these that was being used as the forecast unit cost.

Conclusion:

WPD agreed that the forecast unit cost was too high and lowered it to reflect the WPD overall three-year average, which is consistent with the GB DNO average.

The updated forecast unit is 0.2506.

The updated forecast unit cost for this item is now efficient.

7.4.8 LV Service / Overhead Asset Repair

	Volumes			Operational Costs			Operational Unit Costs			
	09/10	10/11	11/12	09/10	10/11	11/12	09/10	10/11	11/12	3 Yr Ave
WEST MID	773	1,235	1,190	0.6241	0.5167	0.5557	0.8074	0.4184	0.4670	0.5305
EAST MID	660	691	838	0.3874	0.4110	0.5482	0.5870	0.5948	0.6542	0.6152
SWALES	1,323	1,318	1,408	0.5315	0.5342	0.5957	0.4017	0.4053	0.4231	0.4103
SWEST	2,324	1,930	2,470	0.7839	0.6049	0.7269	0.3373	0.3134	0.2943	0.3146
WPD	5,080	5,174	5,906	2.3269	2.0668	2.4265	0.4581	0.3995	0.4109	0.4220
SWA & SWE	3,647	3,248	3,878	1.3154	1.1391	1.3226	0.3607	0.3507	0.3411	0.3048

Unit cost: 0.4220

Cost basis: Three-year average across all four DNOs (consistent resourcing and operational practices)

The unit costs are similar across the years and across the four DNOs and there are no abnormal values. The unit costs have decreased from 2009/10 to 2011/12 across WPD as a whole. The volumes are high enough to give confidence in the cost figures.

Future practices should be consistent across the four DNOs.

A high outturn unit cost in West Midlands occurred in 2009/10. This was prior to the acquisition of West Midlands by WPD. WPD's investigations have indicated that the high unit cost was attributable to the nature and extent of the remedial works required.

Efficiency:

	EMID	WMID	S WALES	S WEST
Efficiency	119%	79%	73%	52%

The costs are efficient and the forecast unit cost is based upon the average of these.

Conclusion:

The forecast unit costs for this item are efficient.

7.4.9 HV Network / Supply Restoration by Switching Only (Non Damage Fault)

	Volumes			Operational Costs			Operational Unit Costs			
	09/10	10/11	11/12	09/10	10/11	11/12	09/10	10/11	11/12	3 Yr Ave
WEST MID	975	789	748	0.2733	0.2421	0.2545	0.2803	0.3068	0.3402	0.3065
EAST MID	814	837	832	0.2077	0.1921	0.2328	0.2552	0.2295	0.2798	0.2548
SWALES	553	527	667	0.1058	0.1860	0.1404	0.1913	0.3529	0.2105	0.2474
SWEST	936	911	1,062	0.2181	0.3830	0.3857	0.2330	0.4204	0.3632	0.3392
WPD	3,278	3,064	3,309	0.8049	1.0032	1.0134	0.2455	0.3274	0.3063	0.2924
SWA & SWE	1,489	1,438	1,729	0.3239	0.5690	0.5261	0.2175	0.3957	0.3043	0.3048

Unit cost: 3.3048

Cost basis: Three-year average for South Wales and South West (more reflective of on-going working practices)

WPD feel that South Wales and South West best reflect their on-going working practices, which are based around their 'Target 60' policy. This working practice involves up to four people being dispatched to deal with a fault and restoration of supply. This approach has been extended to the East and West Midlands.

The volumes are high enough to give confidence in the cost figures.

Future practices should become more consistent across the four DNOs as the East and West Midlands continues to adopt Target 60 policies.

Further, WPD attribute the year on year variation in outturn unit costs, to variations in the factors that influence the outturn unit costs (number of staff deployed per incident, duration of incident, etc.).

Efficiency:

	EMID	WMID	S WALES	S WEST
Efficiency	138%	82%	155%	206%

WPD checked the forecast unit cost for this item and identified that an error in the Cost Assessment model was under-stating the number of incidents. However, WPD's forecast unit cost is lower than the all GB DNO average.

Conclusion:

The forecast unit cost for this item is efficient.

7.4.10 EHV Network / UG Cables (Pressure Assisted) - Asset Repair

	Volumes			Operational Costs			Operational Unit Costs			
	09/10	10/11	11/12	09/10	10/11	11/12	09/10	10/11	11/12	3 Yr Ave
WEST MID	7	6	3	0.2556	0.2075	0.3067	36.5143	34.5833	102.2333	48.1125
EAST MID	23	98	73	0.1941	1.1550	0.7695	8.4391	11.7857	10.5411	10.9206
SWALES	5	4	2	0.0069	0.0036	0.0017	1.3800	0.9000	0.8500	1.1091
SWEST	5	7	12	0.0537	0.0414	0.1206	10.7400	5.9143	10.0500	8.9875
WPD	40	115	90	0.5103	1.4075	1.1985	12.7575	12.2391	13.3167	12.7196
SWA & SWE	10	11	14	0.0606	0.0450	0.1223	6.0600	4.0909	8.7357	6.5114

Unit cost: 11.6099

Cost basis: Three-year average across all four DNOs with one abnormal value for West Midlands removed (in red)

One abnormal value for West Midlands in 2011/12 has been removed. The value is affected by third-party damage to cabling.

The volumes for this item are low and unit costs can therefore be skewed by particularly costly jobs.

Efficiency:

	EMID	WMID	S WALES	S WEST
Efficiency	59%	285%	4%	41%

West Midlands reported unit costs are very inefficient but the high values have been excluded from the average.

Conclusion:

There is no evidence to suggest the unit cost is inefficient.

7.4.11 Summary

Table 7-2: Summary of Historical and Forecast Trouble Call Unit Costs

Ofgem item			09/10	10/11	11/12	Forecast
1	LV Network	Supply Restoration by Switching Only (Non Damage Fault)	0.2255	0.3899	0.3208	0.2506
2	HV Network (11 kV & 20 kV)	Supply Restoration by Switching Only (Non Damage Fault)	0.2175	0.3957	0.3043	0.3048
5	LV Services (excluding cut out incidents)	Overhead Asset Repair	0.4581	0.3995	0.4109	0.4220
6	LV Services (excluding cut out incidents)	Underground Asset Repair	1.2240	1.4079	1.1052	1.2460
7	LV Network	UG Cables (Non CONSAC) - Asset Repair	3.5574	2.8469	2.7784	3.3070*
8	LV Network	UG Cables (CONSAC) - Asset Repair	3.6921	3.5157	3.3257	2.5250*
9	LV Network	OH Lines - Asset Repair	1.2053	1.2514	2.0324	1.4000
11	HV Network (11 kV & 20 kV)	UG Cables - Asset Repair	7.1374	6.2426	5.6156	6.3358
12	HV Network (11 kV & 20 kV)	OH Lines - Asset Repair	1.8264	1.7383	2.0775	1.8839
17	EHV Network (22 kV, 33 kV & 66 kV)	UG Cables (Pressure Assisted) - Asset Repair	12.7575	12.2391	13.3167	11.6099

*Includes 0.2250 for change in supply restoration standard

7.5 Efficiency

Table 7-3: GB DNO Ranking for Trouble Call Efficiency

	Normalised Total costs (£m)	Predicted Variable Cost (£m)	Variance Predicted vs Actual (£m)	% efficiency cost	Ranking
SSEH	8.88	12.45	3.56	71%	1
SSES	28.63	37.88	9.24	76%	2
NPg(Y)	32.43	37.42	4.99	87%	3
S WEST	17.51	19.18	1.66	91%	4
ENWL	26.9	29.02	2.11	93%	5
EMID	25.37	26.9	1.53	94%	6
S WALES	11.94	12.64	0.7	94%	7
SPMW	22.34	22.09	-0.25	101%	8
SPD	28.84	27.71	-1.13	104%	9
NPg(N)	19.56	18.62	-0.94	105%	10
EPN	49.52	45.14	-4.38	110%	11
WMID	26.48	23.38	-3.1	113%	12
SPN	31.49	26.84	-4.65	117%	13
LPN	27.36	17.99	-9.36	152%	14

7.6 Conclusion

To calculate Trouble Call unit cost values for RIIO ED1, WPD uses actual costs and volumes recorded over a three-year period. Costs and volumes from all four DNOs are used where practices are consistent. Where the East and West Midlands differ, the average for South Wales and South West is used. Anomalies are excluded and investigated where appropriate.

The above table shows that overall efficiency is good at South West (4th), East Midlands (6th) and South Wales (7th), although West Midlands is 12th. However, West Midlands was affected by a large third-party cable claim and also a number of abnormally costly faults.

PB's analysis highlighted four items of concern which WPD looked at. For three of these, the forecast unit cost was lowered to be consistent with the GB DNO average, and for one it was found that a problem with the Cost Assessment model was affecting the figures.

Overall, PB believes WPD's forecast unit costs to be efficient.

8 CONCLUSION

We have undertaken a review of WPD's unit cost with the aim of identifying if they could be considered efficient. Our analysis examined unit costs for a range of Asset Replacement, I&M, tree cutting and 'Trouble Call' or fault repair categories. Our assessment of efficiency was undertaken using several different types of analysis.

For the Asset Replacement unit costs we undertook the following analysis:

Firstly, we reviewed the build up of the unit cost with emphasis on those costs where there are differences between the four WPD licensed companies. We identified anomalies in the data and examined these in more detail to establish the rationale for these differences and whether or not the differences could be justified.

Secondly, we examined the build-up of the unit costs using WPD's CROWN and SHOPS systems for asset management and procurement. Our aim was to verify that WPD's reported unit costs contained up-to-date cost information and that several quotes or potential suppliers have been used, thus inferring a market based efficient cost price base.

Finally, we made two benchmark comparisons of WPD's unit costs. We recognise, however, that benchmarking can be imprecise given inherent difficulties with limited historical data, differences in asset categorisation and definitions used by different companies.

Taking the different approaches in balance, our over-arching view is that the unit costs developed by WPD for the RIIO ED1 submission are efficient. Where there are differences in the unit costs between the four constituent DNOs, these have been adequately justified. We confirmed that the costs are based on genuine market-tested price quotes and contracts. Where historical costs appeared inefficient in our benchmarking analyses, these could be explained by former inefficient delivery mechanisms and practices, which have been superseded following the take-over of the Midlands companies and are not reflected in the projected costs.

For the I&M, Tree Cutting and Trouble Call unit costs, our assessment of efficiency used a different methodology. In the development of these three unit cost categories, WPD has used actual cost information based on recent experience with regard to carrying out these activities. In assessing the appropriate unit costs to submit for the RIIO ED1 price control period, it has made an assessment of which costs to use, using judgement on historical averages or median measures between its four DNO's or occasionally using a different assessment of judgement.

PB reviewed the proposed unit costs based on WPD's judgement and assessed them against an efficiency base of historically reported costs by all DNOs to Ofgem.

WPD reviewed some of its proposed unit costs where our benchmarking with the wider GB DNO historic costs appeared to show them to be less efficient or where the chosen cost appeared to be high when compared to the WPD four company historical average.

Where appropriate WPD amended some of its unit costs for the RIIO ED1 price control submission.

PB now considers that all of the unit costs for I&M, Tree- Cutting and Trouble Call are efficient.

9 INTERACTION - WESTERN POWER DISTRIBUTION & PARSONS BRINCKERHOFF

The following meetings have been held between Western Power Distribution and Parsons Brinckerhoff:

Table 9-1: Summary of Meetings between WPD and PB

Date	Topic	Present Western Power Distribution	Present Parsons Brinckerhoff
8 January	Kick off meeting	Bob Parker	John Taylor Alan Smith Tosin Abimbola Olga Butler
14-16January	Asset Replacement Unit Costs	Bob Parker Phil Mann	Alan Smith Olga Butler Tosin Abimbola James Stewart
30-31 January	Asset Replacement,	Bob Parker Phil Mann Sally McGeown	Alan Smith Olga Butler Tosin Abimbola James Stewart
11 February	I&M, Tree Cutting, Trouble Call,	Bob Parker David Tighe	Alan Smith James Stewart
19 April	Review of draft report	Bob Parker	Alan Smith James Stewart

In addition to the meetings held, we have also received the following documents and spreadsheets from Western Power Distribution:

We were provided with costs data including the following main databases and models;

I. MEAV Calculation 2010-11 Asset Volumes (WPD Unit Costs) and (All DNOs)- This model was prepared by WPD and designed to run cost analysis on the potential efficiencies predicted in Load Related Expenditure (LRE) for the RIIO –ED1 regulatory period. This model allows for the comparative analysis of WPD's projected 'Total Units Costs' as against annual reported unit costs reported to Ofgem by all other DNOs for the years 2011 and 2012 respectively. Data analysed included asset volumes, and unit costs for Asset Replacement types;

II. 'Unit Costs (All Voltages) V3' Datasheets – This main data spreadsheet contains WPD's assessment of unit costs for Asset Replacement for the different asset categories based on separate work activities in all of the four WPD distribution networks. It takes into account the build

up of unit costs from components including plant and material supply costs, and labour costs (both contracted and in-house). The resultant overall unit cost for each asset category is dependent on;

a. Volumes of the asset type
b. Percentage occurrence of the Asset Replacement activity.

Labour and supply rates have been provided in the data sheets for every element of activity within an Asset Replacement category.

III. Total Forecasted Replacement Activity Datasheets – This spreadsheet provides a summary of the total unit costs for all asset categories across for all four WPD DNOs. It also contains the volumes of the activity types per asset category within each individual network.

In addition to these main data sets we also had regard to the following information in undertaking our analysis:

a. WPD Overview presentation
b. Business Performance and KPIs presentation
c. Asset Replacement Model – SWest V2 July 2012
d. Central Networks DPCR5 Business plan – June 2009 Update
e. Central Networks DPCR5 Business Plan
f. CN East Final FBPQ
g. CN West Final FBPQ
h. SIEMENS SHOPS ITEMS 33kv Indoor CB
i. Cost Driver analysis model Ofgem
j. Cost and Volumes reporting packs
k. Dig & Lay BBUSL Bristol, Bath, Weston & Somerset Purch Cat Info 1012-13
l. IM Unit Costs
m. PAS55 Presentation CROWN and ENMAC
n. Trouble Call Unit Costs