# OFGEM

# GAS DISTRIBUTION PRICE CONTROL REVIEW

# FIVE YEAR CONTROL

## (CAPEX/REPEX)

## REPORT 1

## WALES & WEST NETWORK

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# 1 EXECUTIVE SUMMARY

## 1.1 CAPEX

PB Power has reviewed the submission by Wales & West Utilities (WWU) for the Capex allowances for the Wales & West (WW) network for the period 2008/09 to 2012/13, and set out in this report its proposed cost projections, and the reason for any changes to the Wales & West submission.

Capex costs are the total (net) costs of :

- LTS & Storage Capex
- Connections Capex
- Mains and Governors Capex
- Other Operational Capex
- Non-operational Capex

For each activity, we have, where possible, identified the frontier activity costs by examining the unit costs in the base year (2005/06). Setting the level of the frontier unit costs has also been informed by WWU's forecast costs for 2006/07. When the actual operating costs for 2006/07 are known, we will review our proposals and make adjustments if appropriate.

This report makes proposals for WWU's Capex allowances for the next price control period (2008/09 to 2012/13). In this report we have made adjustments to bring the Network's forecast expenditure towards the frontier. Our proposals and WWU's normalised submission are summarised in the following table and chart.

**Wales & West Network Capex Submission v Proposed**

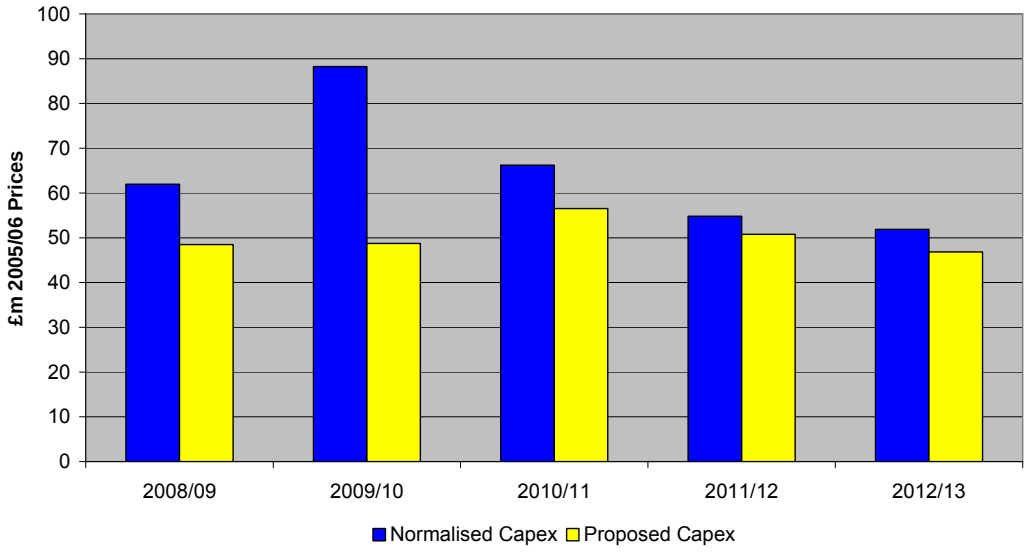


***Figure 1-1***

| Wales & West Network Net Capex £m (2005/06 prices) | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 | Total |
|---|---|---|---|---|---|---|
| **BPQ Submission** | | | | | | |
| LTS & Storage Capital Expenditure | 16.0 | 44.2 | 29.3 | 11.9 | 9.6 | **111.0** |
| Connections | 8.7 | 9.1 | 9.4 | 9.7 | 9.8 | **46.7** |
| Mains Reinforcement | 5.5 | 10.2 | 6.0 | 6.3 | 6.5 | **34.5** |
| Governors | 3.8 | 3.9 | 2.7 | 2.7 | 2.2 | **15.3** |
| Other Operational | 6.3 | 5.5 | 4.5 | 4.2 | 3.1 | **23.5** |
| Non Operational | 20.1 | 9.8 | 9.7 | 17.8 | 18.4 | **75.9** |
| **Total** | **60.5** | **82.7** | **61.6** | **52.5** | **49.7** | **306.9** |
| **Normalisation Adjustments** | | | | | | |
| LTS & Storage Capital Expenditure | 1.5 | 5.6 | 4.7 | 2.3 | 2.2 | **16.3** |
| Governors | -1.9 | -1.9 | -0.8 | -0.8 | -0.6 | **-5.9** |
| Other Operational | 1.9 | 1.9 | 0.8 | 0.8 | 0.6 | **5.9** |
| **Total** | **1.5** | **5.6** | **4.7** | **2.3** | **2.2** | **16.3** |
| **Normalised Capex** | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| LTS & Storage Capital Expenditure | 17.5 | 49.8 | 34.0 | 14.2 | 11.8 | **127.3** |
| Connections | 8.7 | 9.1 | 9.4 | 9.7 | 9.8 | **46.7** |
| Mains Reinforcement | 5.5 | 10.2 | 6.0 | 6.3 | 6.5 | **34.5** |
| Governors | 1.9 | 2.0 | 1.9 | 2.0 | 1.6 | **9.4** |
| Other Operational | 8.3 | 7.4 | 5.2 | 4.9 | 3.7 | **29.5** |
| Non Operational | 20.1 | 9.8 | 9.7 | 17.8 | 18.4 | **75.9** |
| **Total** | **62.0** | **88.3** | **66.3** | **54.8** | **51.9** | **323.2** |
| **Adjustments** | | | | | | |
| LTS & Storage Capital Expenditure | -2.3 | -31.7 | -5.1 | 1.2 | 1.1 | **-36.7** |
| Connections | -2.5 | -2.8 | -3.2 | -3.6 | -3.8 | **-16.0** |
| Mains Reinforcement | 0.3 | 0.1 | -0.2 | -0.4 | -0.7 | **-0.9** |
| Governors | 0.0 | -0.1 | -0.1 | -0.1 | -0.1 | **-0.4** |
| Other Operational | -3.7 | -3.7 | -1.4 | -1.4 | -1.0 | **-11.1** |
| Non Operational | -5.2 | -1.3 | 0.3 | 0.3 | -0.6 | **-6.6** |
| **Total** | **-13.4** | **-39.5** | **-9.7** | **-4.0** | **-5.0** | **-71.7** |
| **Proposed Capex** | | | | | | |
| LTS & Storage Capital Expenditure | 15.2 | 18.1 | 28.9 | 15.5 | 12.9 | **90.5** |
| Connections | 6.2 | 6.3 | 6.2 | 6.1 | 6.0 | **30.7** |
| Mains Reinforcement | 5.8 | 10.3 | 5.8 | 5.9 | 5.9 | **33.6** |
| Governors | 1.9 | 1.9 | 1.8 | 1.8 | 1.5 | **8.9** |
| Other Operational | 4.6 | 3.7 | 3.9 | 3.5 | 2.7 | **18.3** |
| Non Operational | 14.9 | 8.5 | 10.0 | 18.1 | 17.8 | **69.3** |
| **Total** | **48.5** | **48.7** | **56.6** | **50.8** | **46.8** | **251.5** |

***Table 1-1***

## 1.2 REPEX

PB Power have similarly reviewed the submission by Wales & West Utilities (WWU) for replacement expenditure for the period 2008/09 to 2012/13.

Repex costs are the total (net) costs of :

- Replacement Mains
- Replacement Services
- Replacement LTS Pipelines

Our approach to replacement expenditure has been similar to Capex and our proposals and WWU's submission are summarised in the following table and chart.

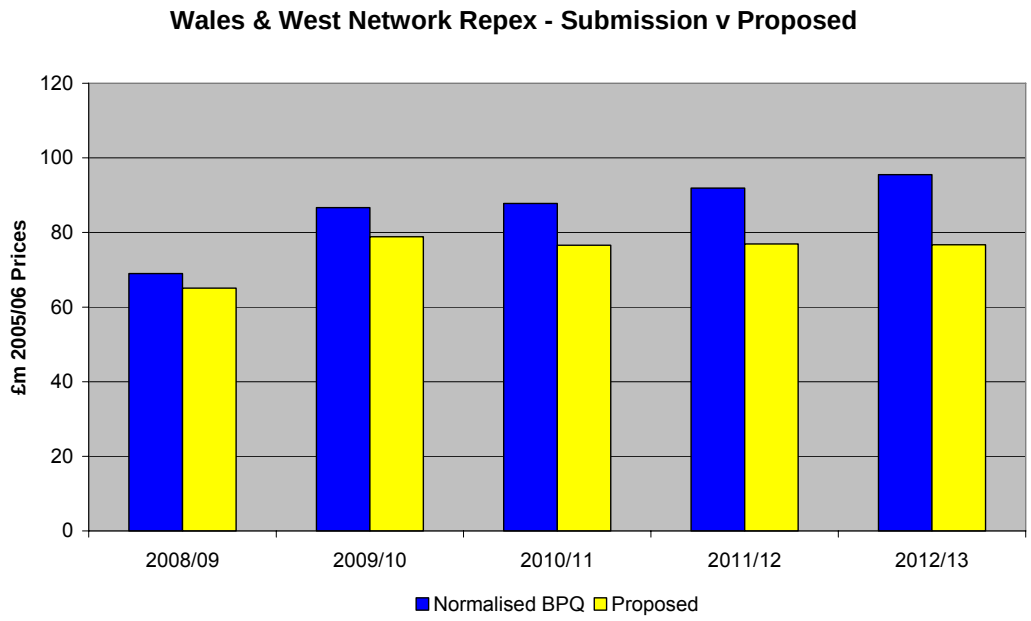


***Figure 1-2***

| Wales & West Network Net Repex £m (2005/06 prices) | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 | Total |
|---|---|---|---|---|---|---|
| **BPQ Submission** | | | | | | |
| Mains | 40.1 | 45.8 | 50.1 | 53.8 | 57.8 | **247.7** |
| Services | 27.2 | 28.2 | 29.3 | 30.4 | 31.5 | **146.7** |
| LTS | 1.6 | 12.6 | 8.4 | 7.7 | 6.2 | **36.4** |
| **Total** | **68.9** | **86.7** | **87.8** | **91.9** | **95.5** | **430.8** |
| **Normalisation Adjustments** | | | | | | |
| **Total** | **0.0** | **0.0** | **0.0** | **0.0** | **0.0** | **0.0** |
| **Normalised BPQ** | | | | | | |
| Mains | 40.1 | 45.8 | 50.1 | 53.8 | 57.8 | **247.7** |
| Services | 27.2 | 28.2 | 29.3 | 30.4 | 31.5 | **146.7** |
| LTS | 1.6 | 12.6 | 8.4 | 7.7 | 6.2 | **36.4** |
| **Total** | **68.9** | **86.7** | **87.8** | **91.9** | **95.5** | **430.8** |
| **Adjustments** | | | | | | |
| Mains | 0.7 | -1.5 | -3.8 | -6.2 | -8.8 | **-19.7** |
| Services | -4.5 | -5.7 | -6.9 | -8.1 | -9.4 | **-34.6** |
| LTS | -0.1 | -0.6 | -0.5 | -0.6 | -0.6 | **-2.4** |
| **Total** | **-3.9** | **-7.8** | **-11.2** | **-14.9** | **-18.8** | **-56.7** |
| **Proposed** | | | | | | |
| Mains | 40.8 | 44.3 | 46.3 | 47.6 | 49.0 | **228.0** |
| Services | 22.7 | 22.5 | 22.4 | 22.3 | 22.1 | **112.0** |
| LTS | 1.6 | 12.0 | 7.9 | 7.1 | 5.5 | **34.0** |
| **Total** | **65.1** | **78.8** | **76.5** | **76.9** | **76.7** | **374.1** |

***Table 1-2***

# 2 INTRODUCTION

## 2.1 PRICE CONTROL REVIEW TIMETABLE

The final proposals for the one-year price control have been accepted by the GDNs. Ofgem is now carrying out a further review to set price control allowances for 1 April 2008 to 31 March 2013. The full process is shown in the following diagram.

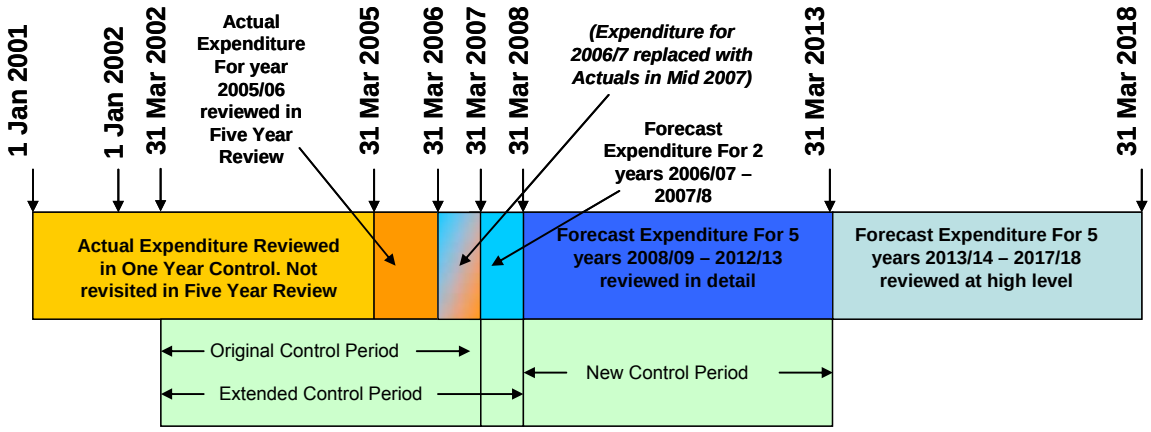


*Figure 2-1*

## 2.2 FIVE YEAR CONTROL

Ofgem appointed PB Power working in partnership with Rune Associates Limited to assist them in the preparation of the Capex and Repex elements of the Business Plan Questionnaires (BPQs). Subsequently Ofgem extended this work to include the analysis of the Capex, Repex and Direct Opex submissions by the GDNs.

Our findings on the Capex and Repex submissions are contained in this report, whilst the Direct Opex findings are the subject of a separate report.

The questionnaires were issued on 30 June 2006. These were returned to Ofgem between 6 and 13 October 2006. Additionally a series of cost visits were held with the GDNs between 10 November and 1 December 2006. Our findings have been drawn from the BPQs, cost visits and responses to supplementary questions sent to the GDNs.

## 2.3 BUSINESS PLAN QUESTIONNAIRE

A combined BPQ was issued on 30 June. This covered the Financial Statements, Opex, Capex and Repex requests. The Capex and Repex areas covered by this report were covered by 20 Excel worksheets, guidance to the GDNs as to how to complete the worksheets and additional narrative questions.

GDNs were asked to respond to Ofgem by 6 October 2006 and to upload all the data onto PB Power's file management system, PBShare. All parties in the process were granted appropriate access to relevant folders and documents. Some documents had to be provided in paper copy and these were sent both to PB Power and to Ofgem.

As the analysis of the submissions progressed and where the return was either unclear or insufficient it became necessary to ask the GDNs for additional information. These supplementary questions and the additional information which was presented in reply, were logged and stored on PBShare.

At the end of the process the worksheets were updated to include all amendments submitted and should be read in conjunction with this report.

## 2.4 PURPOSE

The purpose of the report is for PB Power to provide recommendations to Ofgem on the efficient levels of expenditure required by WWU to carry out their activities in the Wales & West Network. Ofgem will consider these recommendations together with other information in proposing appropriate expenditure allowances for 2008/09 to 2012/13.

## 2.5 ANALYSIS AND REPORTING PROCESS

The BPQ was designed to collect all the data required for analysis.

PB Power has structured this report into the following workstrands:

i) Capex: for Local Transmission System (LTS) and Storage: for all work on the network from 85 bar down to 7 bar, including HP and LP storage.

ii) Capex: for connections works on the below 7 bar network.

iii) Capex: for mains reinforcement and governor works on the below 7 bar network.

iv) Capex: for other operational items including Plant & Equipment and Land & Buildings.

v) Capex: for non-operational items including I.T. and System Operation work.

vi) Repex: for all replacement work below 7 bar including the Policy Mains Replacement Programme.

vii) Repex: for all LTS replacement work above 7 bar

### 2.5.1 COST NORMALISATION

A key requirement for robust analysis is that GDN costs for particular Capex/Repex activities should be allocated on a consistent basis. Following detailed analysis of the BPQ returns, a number of adjustments have been made to achieve this objective. These adjustments include applying the results of the work on accounting adjustments carried out by Ofgem. The process restates the GDNs' BPQ submissions on this "normalised" basis.

### 2.5.2 COST ASSESSMENT PROCESS

The expenditure projections for the efficient level of expenditure required by the GDN have been carried out in a number of different ways depending on the activity and quality of information available for this review.

Principally two main techniques have been used:

- comparative benchmarking between GDNs where workload is sufficiently well defined to obtain reliable regression analysis, and
- a bespoke review by our consultants to form a judgement on the appropriate expenditure projections based on the information provided.

With both methods full analysis of the information presented in the context of the requirements of a Gas Distribution business has been carried out to support the findings.

The process of developing our expenditure proposals has the following steps:

- Cost normalisation,
- Establishing base year for cost analysis,
- Benchmarking costs derived from the base year costs,
- Workload projections for the period 2005/06 to 20012/13,
- Cost projections,
- Gap adjustment.

### 2.5.3 ESTABLISH BASE YEAR

A base year was chosen in order to carry out the comparative regression analysis. The preferred year was 2005/06, where the availability of actual outturn values removed any element of variation due to GDN forecast values. However, for some activities the year 2006/07 has been used due to variations in the 2005/06 data. Generally it has been found that the year 2004/05 contains too many inconsistencies in data reporting, mainly due to the network sales process, and is not suitable as a base year for comparative analysis.

### 2.5.4 BENCHMARK COST ANALYSIS PROCESS

We have determined benchmark costs in the manner most appropriate to the data and the activity.

Some costs were best assessed on an individual basis. For example, lift and shift pipeline costs are contract specific.

These costs were removed before determination of the benchmark costs of an activity, and were assessed separately. If appropriate an allowance for such costs were added back after the assessment of the costs for the activities which are common across GDNs.

Where possible we used comparative analysis to determine benchmark activity costs. In general we have used the following type of cost function which is common in the regulatory literature:

$$\text{Cost} = K w^{a} \qquad (1)$$

where K and a are constants.

Where there are economies of scale associated with an activity, a<1, so that the unit cost of an activity for a larger network will be less than for a smaller network. For each activity we have used our knowledge and experience to explore different cost drivers and select the most appropriate workload driver (w) for the activity concerned.

By taking the natural log of equation (1) we can derive the following equation:

$$\ln(\text{Cost}) = \ln(K) + a \ln(w) \qquad (2)$$

This equation is used to carry out the regression analysis and estimate each of the parameters of the cost function.

#### 2.5.4.1 Assessment of regression outcome

When we have carried out regression analysis we have assessed the fit of the regression line to the data points by calculating the $r^2$ value and by carrying out hypothesis testing where the $r^2$ values are not directly comparable.

The value of $r^2$ is one indicator of goodness of fit. It is the proportion of the variance in the cost data that is explained by the variance in the cost data derived from the Ordinary Least Squares (OLS) regression.

We have used appropriate tests to determine whether the linear or the logarithmic linear regression gives the better fit to the data and have used the regression with the better fit. Where there is no significant difference in fit the logarithmic linear regression has been used.

For all the regression relationships used in this report $r^2>0.7$. Unit cost and/or bottom-up analysis has been used in all other cases.

The values of $r^2$ have the following significance:

- It is possible that the data points could show a relationship between the reported costs and the explanatory variable by chance. Analysis of variance identifies the component of the cost variable which is explained by the regression and the component unexplained by the regression. This gives a value for the F statistic and taking into account the number of data points, this can be used to test whether the explanation provided by the regression is better than is likely to have arisen by chance. With 8 (GDN) data points the test value for the F statistic is 5.99 and the corresponding value for $r^2$ is 0.5. If $r^2$>0.5 we can reject the hypothesis that the relationship arose by chance at the 5% significance level. If $r^2$>0.7 we can further reject the hypothesis at the 1% significance level

In order to test for the robustness of the regression results and in particular of the slope of the regression line, we have tested each regression result for heteroscedasticity (that is for a relationship between the variance in the disturbance term and the magnitude of the explanatory variable). This is important since evidence of heteroscedasticity could indicate a mis-specification in the regression model. The regression results presented in this report do not show such evidence at a significant level.

Although we have carried out detailed work to seek to ensure that the costs used in the regression analysis have been allocated to activities on a consistent basis across all GDNs, we recognise that that some different allocations may remain and that the use of regression to determine benchmark costs could potentially lead to an inadequate level of total Capex/Repex for a particular GDN. We have addressed this possibility by selecting the upper quartile value, rather than the lowest value as the benchmark cost, with any remaining effects mitigated by the gap closure process.

#### 2.5.4.2 Two or more workload drivers

In all cases activity costs are driven by a number of different workload types. We have therefore constructed a composite scale variable (CSV) which includes the different drivers scaled by the proportion of costs attributable to each type of workload.

Logarithmic linear regression has been used to determine the relationship between costs and the CSV in this report.

#### 2.5.4.3 Regression Values

Further details of the regression calculations and numbers are given in Appendix 8.

### 2.5.5 WORKLOAD PROJECTONS

The above approach has allowed the analysis to fully reflect the workload forecast by the GDNs, adjusted as deemed appropriate by our consultants. It has also minimised any inconsistent allocation of costs between activities, which is suspected in a number of areas.

The PB Power workload projections for the activity are determined for the period 2005/06 to 2012/13 from the activity analysis.

### 2.5.6 COST PROJECTIONS

This benchmark performance applied to our workload projections has then been used as the target which all under performing GDNs should move towards.

The following shows the performance measures used in assessing the Capex/Repex proposals.

| Performance Measures Used in Determining The Opex Proposals | |
|---|---|
| **Benchmark Performance** | The Upper Quartile performance as determined from the regression analysis tracked forward from the base year to 2012/13 taking account of PB Power's expected productivity improvements. When showing this trend in the charts, along side our proposals, it is also adjusted for PB Power's assumptions for real price effects. |
| **Baseline Performance** | The GDNs BPQ reported performance in the base year tracked forward to 2012/13 taking account of PB Power's expected productivity improvements. When showing this trend in the charts, along side our proposals, it is also adjusted for PB Power's assumptions for real price effects. |

***Table 2-1***

The benchmark costs against workload are shown in pink on the graphs. This is the target which all under performing GDNs should move towards

In the logarithmic linear regressions the pink line is parallel to the regression line.

In our approach annual productivity improvements are applied to total costs. This gives the end (2012/13) target cost line, shown in yellow on the graphs. This represents the expected position of the benchmark 2012/13 costs after allowing for the productivity improvements we expect to apply to a frontier efficient company.

### 2.5.7 GAP ADJUSTMENT

In order to form a view of the speed at which the GDNs should be expected to move towards this target performance, extrapolation of the base year performance has also been carried out for the whole period using our standard assumptions for any price rises which are expected to be in excess of the Retail Prices Index (RPI). Section 2.7 provides more details on real price effects.

A gap adjustment has been included where appropriate to provide a smooth transition from the BPQ level of costs at the PB Power workload levels to the benchmark performance by 2012/13. The gap adjustment will allow the GDN a period to review and amend their work arrangements to achieve the proposed benchmark efficient cost levels.

### 2.5.8 SUMMARY CHART

The overall process for deriving our recommended expenditure projections is shown in the flow chart below.

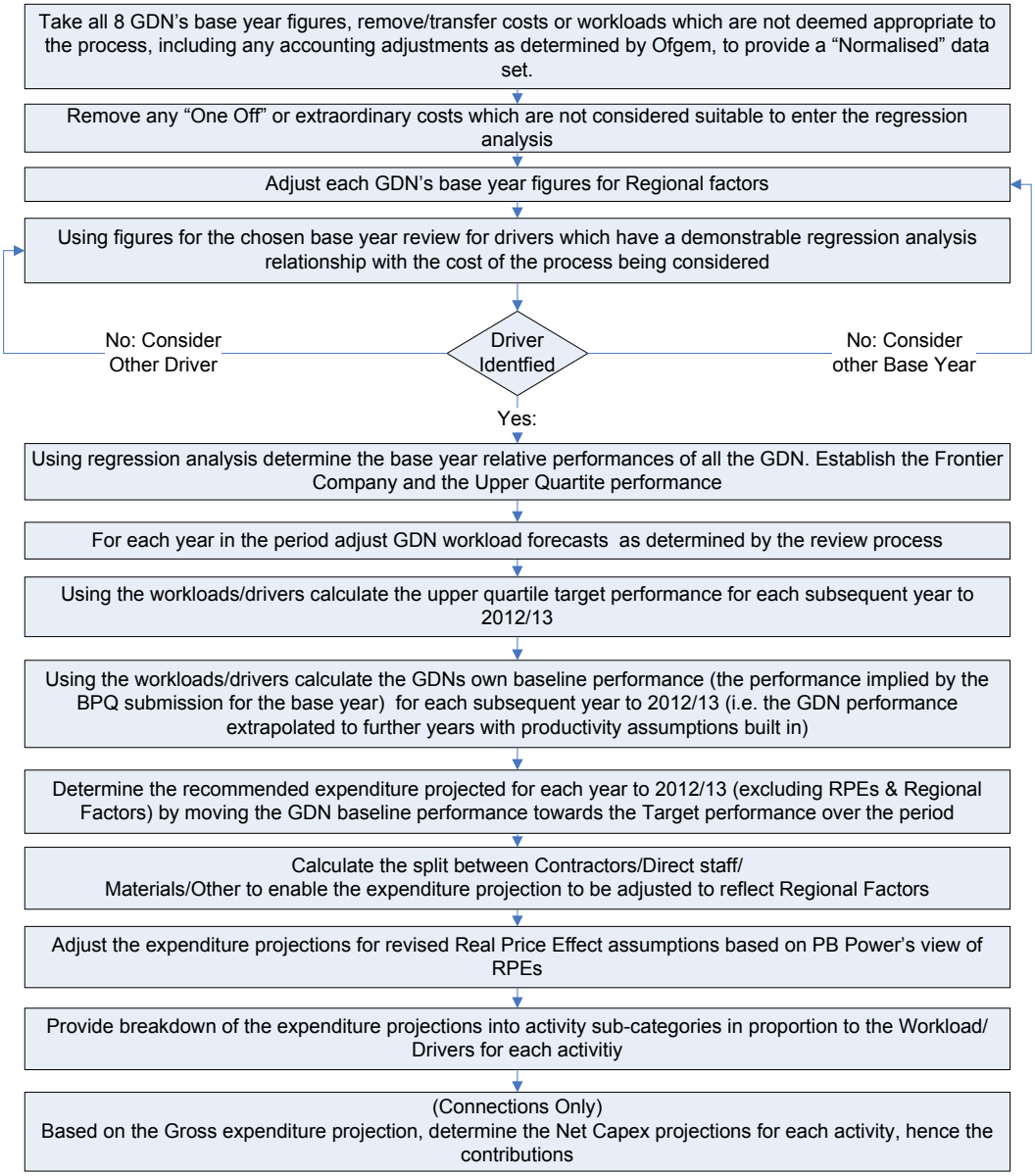


***Figure 2-2***

### 2.5.9 CONSULTANT ANALYSIS

Where analysis has shown that the workload is small, irregular or unit costs are volatile the regression techniques are not considered robust. For these activities a process has been used whereby the BPQ costs have been "Normalised" as outlined in section 2.5.1 above, and have then been restated taking account of regional factors and removing real price assumptions which have been declared by the GDN. This provides our consultants with an objective presentation of the costs and workloads for them to review and make appropriate recommendations regarding adjustments. The process is outlined in Figure 2-3

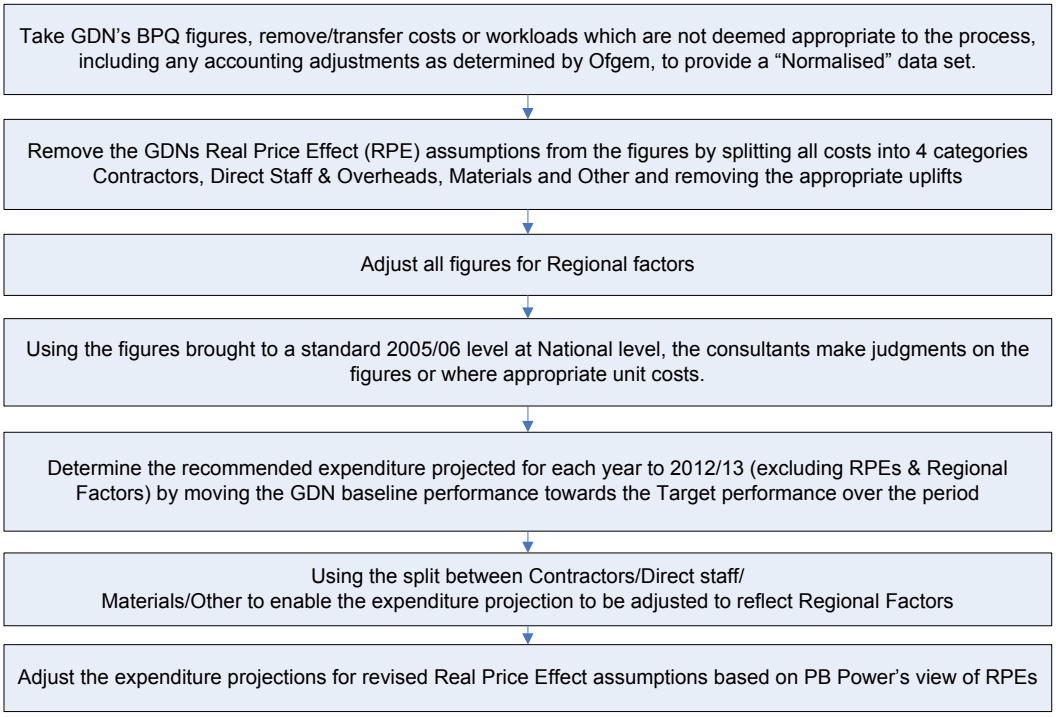


***Figure 2-3***

Once the adjustments have been assessed the process then reapplies the regional factors and our standard assumptions for RPEs, thus delivering our recommended projections for the activity.

## 2.6 COSTS

All costs in the report are in 2005/06 prices unless otherwise stated.

The table below shows the factors which have been used to convert pre 2005/06 costs to 2005/06. These factors have been used throughout the analysis.

| Convert to | Convert from: 2000 | 2001 | Q1 2002 | 2002/03 | 2003/04 | 2004/05 | 2005/06 |
|---|---|---|---|---|---|---|---|
| **Index** | 170.25 | 173.35 | 173.87 | 177.52 | 182.48 | 188.15 | 193.11 |
| **2000** | 1.00 | 0.98 | 0.98 | 0.96 | 0.93 | 0.90 | 0.88 |
| **2001** | 1.02 | 1.00 | 1.00 | 0.98 | 0.95 | 0.92 | 0.90 |
| **Q1 2002** | 1.02 | 1.00 | 1.00 | 0.98 | 0.95 | 0.92 | 0.90 |
| **2002/03** | 1.04 | 1.02 | 1.02 | 1.00 | 0.97 | 0.94 | 0.92 |
| **2003/04** | 1.07 | 1.05 | 1.05 | 1.03 | 1.00 | 0.97 | 0.94 |
| **2004/05** | 1.11 | 1.09 | 1.08 | 1.06 | 1.03 | 1.00 | 0.97 |
| **2005/06** | 1.13 | 1.11 | 1.11 | 1.09 | 1.06 | 1.03 | 1.00 |

***Table 2-2***

## 2.7 REAL PRICE EFFECTS

The submissions have been made on the basis of 2005/06 prices and RPEs have also been identified. In addition to the increases from the Retail Prices Index (RPI) assumed at an annual rate of 2.5%, other costs have been assessed as potentially rising faster than this rate. These additional increases used in this report have been summarised in Table 2-3 and are discussed further in the sections below. The assumptions used by WWU for RPEs are given in Appendix 8.

We have made adjustments to the submissions for all areas of the BPQ excluding Non-Operational Capex as we consider most of this expenditure is project based which will have been made on the basis of the best available planned processes at the time of the submissions. We consider it more appropriate to consider adjustments to this type of expenditure on a case by case basis.

| Real Price Effects | | 2005/06 | 2006/07 | 2007/08 | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 |
|---|---|---|---|---|---|---|---|---|---|
| Contractor Rates Year on Year | 2.25% | 100.0 | 102.3 | 104.6 | 106.9 | 109.3 | 111.8 | 114.3 | 116.9 |
| Materials year on Year | 1.00% | 100.0 | 101.0 | 102.0 | 103.0 | 104.1 | 105.1 | 106.2 | 107.2 |
| Direct Labour | 1.00% | 100.0 | 101.0 | 102.0 | 103.0 | 104.1 | 105.1 | 106.2 | 107.2 |

***Table 2-3***

### 2.7.1 CONTRACTOR PRICES

Contractor prices have a major impact on the costs of the GDN operations particularly in the areas of connections, mains replacement works and LTS projects. All GDNs have forecast that contractor prices will increase at a greater rate than the RPI. They have quoted particularly the Price Adjustment Formulae for Construction Contracts Indices published by the DTI (commonly known as the Baxter Indices) as evidence of the historical rate of real price inflation for these contracts. These trends have been set out in Figure 2-4 below.

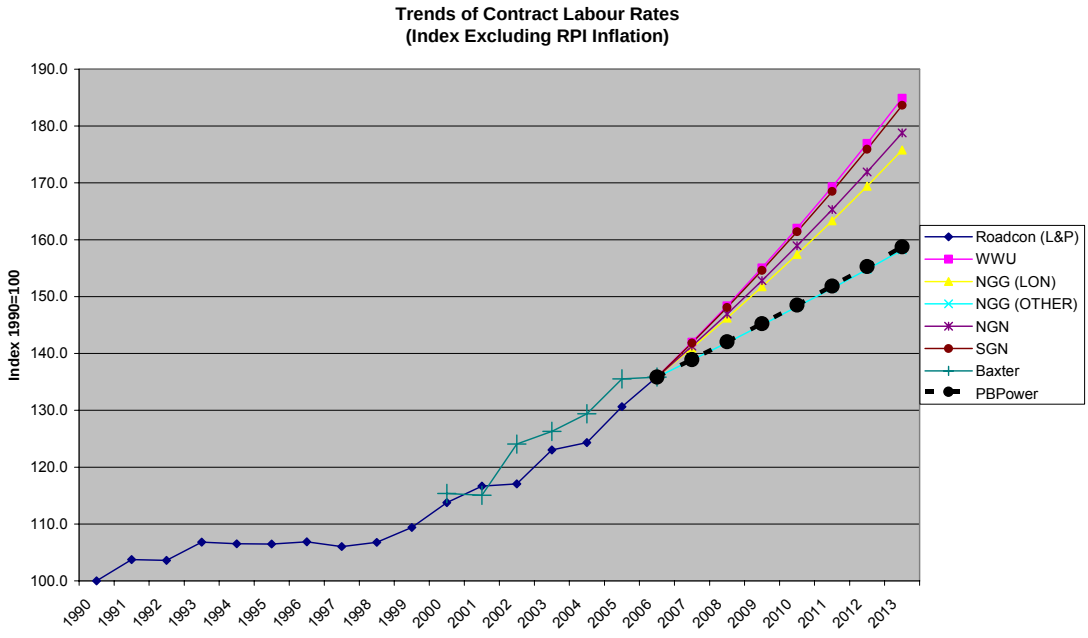


***Figure 2-4***

We have investigated these trends looking for comparisons for the gas distribution costs. These indices do not uniformly increase month by month as there tend to be step changes each year as contracts are re-negotiated. Examination of the most recent trends suggests that the high increases experienced a year ago have flattened out.

We have also compared the data with the Public Sector Construction Works Indices (Road Construction) published by the DTI. Whilst this sector is not directly reflective of gas distribution activities it is useful as a comparator to the Baxter Indices. As can be seen from Figure 2-4, whilst the two indices show small differences year on year the trends demonstrate very similar increase.

Having considered all of the previous trend information we have concluded that a projection of 2.25% is appropriate which is also shown in Figure 2-4.

Our analysis assumes a single rate of Contractor price increases across all GDNs with no differences between regions of the UK for the rate of increase.

### 2.7.2 DIRECT LABOUR COSTS

All GDNs have submitted the view that direct labour costs will continue to increase at a greater rate than the RPI.

Forecasting future wage and salary trends in relation to inflation is a matter of speculating on the outcome of future negotiations and many complex factors. Government's concern is with the control of inflation and as such encourages settlements at or below inflation.

The best evidence for future trends comes from recent experience. The DTI Employment Relations Research Series document No 56 dated March 2006 indicates that in the past decade, UK employees have enjoyed strong real (inflation adjusted) wages growth of 2.75% per year in the private sector. Public sector employees saw a slightly lower annual growth rate of around 2.25% to 2.5% in real earnings. This period spanned the introduction of the minimum wage and it appears that more recent real growth has slowed. The most recent Annual Survey of Hours and Earnings (ASHE) in April 2006 indicated that median gross weekly earnings were 4.1% in 2005. During this period inflation averaged 3%. Continuing this trend, the Ernst & Young ITEM Club indicated recently that average earnings increased annually by 4.1% in the year to November, despite a tightening labour market.

Based on recent evidence, a real price effect forecast of 1% for direct staff costs has been used in our analysis.

### 2.7.3 MATERIAL COSTS

All GDNs have submitted the view that material costs will continue to increase at a greater rate than the RPI. Having reviewed these rates we believe a reasonable rate of increase above RPI will be 1%. We conclude that this figure should be taken together with the productivity savings assumed which balance the effect of these increases.

### 2.7.4 OTHER COSTS

No specific evidence has been provided on real price rises for other costs and therefore our analysis has assumed no increases above RPI.

## 2.8 REGIONAL FACTORS

### 2.8.1 CONTRACTOR PRICES

We have based our initial views on the Quarterly Review of Building Prices as published by the Building Construction Information Service (BCIS) of the Royal Institution of Chartered Surveyors (RICS). This document provides a complete regional index of construction costs for the UK. For the purposes of our analysis we have rebased the October 2006 indices with Northern Ireland, Jersey and the Scottish Highlands excluded.

We have estimated the percentage for each county falling into each GDN, thus being able to derive an index of construction costs for each GDN. The table below sets out the values used for the analysis, the same factors have been used for each year. Details of the assumptions used to determine these factors are given in Appendix 7.

| Regional Factors | WW | No | Sc | So | EoE | Lon | NW | WM |
|---|---|---|---|---|---|---|---|---|
| Regional Factors (Contractor Prices) | 0.96 | 1.01 | 0.99 | 1.06 | 1.00 | 1.11 | 0.93 | 0.94 |

***Table 2-4***

### 2.8.2 DIRECT LABOUR COSTS

The Annual Survey of Hours and Earnings (ASHE) published by the DTI shows that there is a substantial London effect on average earnings. This shows that London wages are on average 30% higher than the national average.

Using this figure for London only, an assessment has been made as to how this impacts the GDNs. We concluded that only Southern and London GDNs are affected and that they are not fully exposed to the 30% uplift as the whole of the GDN is not within London and many activities are carried out away from the London location.

Our conclusions are set out in Table 2-5.

| Regional Factors | WW | No | Sc | So | EoE | Lon | NW | WM |
|---|---|---|---|---|---|---|---|---|
| Regional Factors (Direct Labour) | 0.98 | 0.98 | 0.98 | 1.03 | 0.98 | 1.10 | 0.98 | 0.98 |

***Table 2-5***

### 2.8.3 MATERIAL COSTS

No specific evidence has been provided of a regional impact on material prices and therefore our analysis has used any regional factors for material costs.

### 2.8.4 OTHER COSTS

No specific evidence has been provided of a regional impact on material prices and therefore our analysis has used any regional factors for other costs.

## 2.9 PRODUCTIVITY

Although we have not undertaken a full study of past productivity we have examined published information to determine an assumed base annual increase in productivity. We understand other consultants are undertaking broader economic studies of the operation of the GDN businesses.

Looking at the productivity information published by National Statistics on output per worker the average annual increase over the last 10-40 years is in the range 1.7% - 2.0%. In addition a report on the OFWAT web site compiled by Stone & Webster Consultants Limited in 2004 concluded “Broadly, the average rate of Opex productivity growth for [Water and Sewage Companies] has been in the range 1.7-1.9% per annum over the [period 1992-93 to 2002/03]”. In the light of these figures we have made a conservative assumption of 1% base annual increase. We have then used our engineering experience and judgement when reviewing the business plans of the companies to determine where we believe there is scope for additional productivity above this base rate.

The table below lists the areas in which our analysis has used an assumption for productivity to automatically generate our proposals over the period. The table also shows where we believe there is scope for productivity improvements, higher scope being identified by more ticks.

In other areas of analysis we have used the GDN's own forecasts modified as appropriate for specific issues.

| Activities | Rate | Potential Opportunities (Above base Productivity) | | | | | |
|---|---|---|---|---|---|---|---|
| | | New Techniques | Labour Productivity | Clerical Support Costs | Process Improvements | Contractual Reductions | IS Improvements |
| Opex – Work Management | 1% | | | | | | √√√ |
| Opex – Remaining | 1% | | | | | | |
| Capex - Connections | 3% | √ | √√ | √√√ | √√√ | √√ | √√ |
| Capex – Mains Reinforcement | 2% | √√ | √ | √ | √ | √√√ | √ |
| Repex - All | 1.75% | √ | √ | √ | √ | √√ | √ |

***Table 2-6***

Our productivity assumptions are extrapolated to subsequent years based on the regression carried out on the information provided in the regression base year. We recommend that following the update of 2006/07 outturn figures, our assumptions are reviewed in the light of potential performance improvements already achieved during the 2006/07 financial year.

## 2.10 OUTER MET AREA

A geographical area on the boundary of the East of England Network and the London Network, the Outer Met Area, is for regulatory and income accounting purposes part of the East of England Network. However, the area is managed by NGG as part of the London Network.

In the review of Capex all comparative analysis has been carried out on the basis that the costs and work for the Outer Met Area have been included within the London figures. The BPQ has been completed by NGG on this basis

In the review of Repex all comparative analysis has been carried out on the basis that the costs and work for the Outer Met Area have been included within the East of England figures. The BPQ has been completed by NGG on this basis

The operating costs, assets and liabilities are deemed to be 9% of the transportation business operating costs, assets and liabilities of the London Network. We recommend that future returns and analysis is carried out on the basis that all aspects of the Outer Met Area is reported and analysed as being part of East of England Network.

# 3 LTS AND STORAGE CAPEX

## 3.1 SUMMARY

| Net Capex £m (2005/06 prices) | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 | Total |
|---|---|---|---|---|---|---|
| **BPQ Submission** | | | | | | |
| Pipelines | 6.3 | 36.8 | 19.4 | 5.7 | 8.2 | **76.5** |
| NTS Offtakes | 1.9 | 1.6 | 1.5 | 0.7 | 0.2 | **5.9** |
| PRSs | 7.3 | 5.4 | 8.2 | 5.2 | 1.1 | **27.2** |
| Other storage | 0.4 | 0.4 | 0.3 | 0.3 | 0.1 | **1.4** |
| **Total** | **16.0** | **44.2** | **29.3** | **11.9** | **9.6** | **111.0** |
| **Normalisation Adjustments** | | | | | | |
| Pipelines | 0.6 | 4.7 | 3.1 | 1.1 | 1.9 | **11.3** |
| NTS Offtakes | 0.2 | 0.2 | 0.2 | 0.1 | 0.0 | **0.8** |
| PRSs | 0.7 | 0.7 | 1.3 | 1.0 | 0.3 | **3.9** |
| Other storage | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | **0.2** |
| **Total** | **1.5** | **5.6** | **4.7** | **2.3** | **2.2** | **16.3** |
| **Normalised BPQ** | | | | | | |
| Pipelines | 6.9 | 41.5 | 22.5 | 6.9 | 10.1 | **87.8** |
| NTS Offtakes | 2.1 | 1.8 | 1.8 | 0.8 | 0.2 | **6.7** |
| PRSs | 8.0 | 6.0 | 9.5 | 6.2 | 1.4 | **31.1** |
| Other storage | 0.4 | 0.5 | 0.3 | 0.3 | 0.1 | **1.6** |
| **Total** | **17.5** | **49.8** | **34.0** | **14.2** | **11.8** | **127.3** |
| **Adjustments** | | | | | | |
| Pipelines | -0.4 | -29.9 | -3.0 | -0.1 | -0.6 | **-34.1** |
| NTS Offtakes | -0.3 | -0.3 | -0.3 | 0.2 | 0.3 | **-0.4** |
| PRSs | -1.6 | -1.5 | -1.8 | 1.2 | 1.5 | **-2.1** |
| Other storage | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | **-0.1** |
| **Total** | **-2.3** | **-31.7** | **-5.1** | **1.2** | **1.1** | **-36.7** |
| **Proposed** | | | | | | |
| Pipelines | 6.6 | 11.6 | 19.4 | 6.7 | 9.4 | **53.8** |
| NTS Offtakes | 1.8 | 1.5 | 1.5 | 1.0 | 0.5 | **6.3** |
| PRSs | 6.4 | 4.6 | 7.7 | 7.4 | 2.9 | **29.0** |
| Other storage | 0.4 | 0.4 | 0.3 | 0.3 | 0.1 | **1.5** |
| **Total** | **15.2** | **18.1** | **28.9** | **15.5** | **12.9** | **90.5** |

***Table 3-1***

## 3.2 POLICIES & PROCEDURES

### 3.2.1 INTRODUCTION

This section reviews the various statements made by Wales & West in support of their planning and decision making processes which drive and deliver LTS and Storage Capex.

LTS and Storage Capex is determined by gathering forecast supply and demand data and using network simulation models to determine the optimum plant necessary to meet the capacity requirements. We are unable to confirm that there is evidence that planning work for development of the Wales and West Utilities GDN is carried out in a wholly satisfactory manner. Conversely there is no specific evidence that this is not the case.

Appendix 1 reviews the financial and technical framework under which Wales & West operates, the structure it utilises to manage their assets effectively and the key policies it adopts to ensure it meets its statutory and licence obligations and other regulatory requirements.

### 3.2.2 SCOPE OF POLICIES AND PROCEDURES

Wales & West policy T/PL/NP4 sets out the requirements for above 7 bar network analysis, and policy T/PL/NP2 sets out the procedure for the validation of Local Transmission System (LTS) and describes the process needed to provide the required level of accuracy. A description was given of the process used to develop and match the network models to the actual network, including the network validation process. Wales & West's network planning arrangements are reviewed in Appendix 2.

Wales & West uses a range of network analysis tools including GBNA for < 7bar networks and graphical Falcon for steady state and transient analysis of the Local Transmission System (LTS), and has described how demands are derived for each. This indicates an appropriate level of coordination and consistency between the analysis sections dealing with different pressure tiers. Wales & West states that, in conjunction with Advantica, it is migrating from using GBNA to SynerGEE Gas analysis tool.

An important feature of network modelling is the determination of the diurnal storage volumes needed under 1 in 20 network conditions. Wales & West uses the Storage Simulation Model (SSM). SSM uses demand data, diurnal swing information and forecast performance data taken from system operation as core inputs. This information is run through a statistical model with demand and weather forecasting data to simulate the network's storage requirements. Following the analysis the results are reviewed for consistency with previous trends as part of the process of setting the appropriate diurnal storage volume (expressed as a percentage of peak demand) for the planning period.

In terms of financial controls, all capital projects are approved within the governance framework set by the Wales & West Board. All capital projects in excess of £100,000 require direct approval of the Investment Committee chaired by the Chief Executive Officer. Projects in excess of £1m require the recommendation of the Investment Committee and the approval of the Board.

Wales & West describes the selection of projects to address predicted capacity shortfalls with net present cost a key part of the project selection process. Net present value criteria are used to select projects which improve future operating efficiency.

### 3.2.3 REVIEW AND UPDATE PROCESS

Wales & West's responses indicate that their process for regular review of network capacity ensures that their plans deliver appropriate and timely solutions whilst remaining flexible to accommodate supply or demand changes.

Wales & West are currently developing asset management procedures based on the principles of BSI PAS55. These procedures will prioritise actions to ensure that the appropriate type and quality of data is available to support key business decisions in investment management.

Wales & West states that it has engaged a firm of external consultants to undertake a survey of its level of compliance with PAS55 requirements, but that it has followed the PAS55 principles in respect of capital, replacement and operating expenditure.

Wales & West have described the process for updating the key parameters of the SSM model on an annual basis, with the largest factor influencing the volume of storage required being forecast demand. The current version of the model was introduced in 2003, and Wales & West report no proposed changes for incorporation in the future.

### 3.2.4 EFFICIENCY AND PRODUCTIVITY

Wales & West uses an in-house project management capability for LTS projects.

Project completion performance is monitored by Wales & West's Investment Committee, which has a mechanism for formal review if projects are 10% overspent or 15% underspent.

## 3.3 HISTORICAL PERFORMANCE

### 3.3.1 INTRODUCTION

Wales & West's historical expenditure was reviewed in detail as part of the 1 year review.

This section summarises Wales & West's expenditure on the LTS in the period 2002/03 to 2005/06.

### 3.3.2 DEFINITION OF ACTIVITY

The Local Transmission System (LTS) operates at pressures > 7barg and transports gas from NTS offtakes to distribution systems and directly to some large users. The LTS is the primary source of additional diurnal storage related to demand growth, and is also required to transmit diurnal storage where this is procured from the NTS. Expenditure to reinforce the LTS is driven by increases in demand, but investment in reinforcement pipelines is generally more economic where a project provides capacity to meet more than one year's growth in demand. Therefore expenditure on LTS projects tends to be lumpy.

### 3.3.3 ESTABLISH UNDERLYING COSTS

Wales & West's capital expenditure on LTS & Storage over the period 2002/03 to 2005/06 is shown in the figure below. The figure shows actual expenditure in 2005/06 prices.

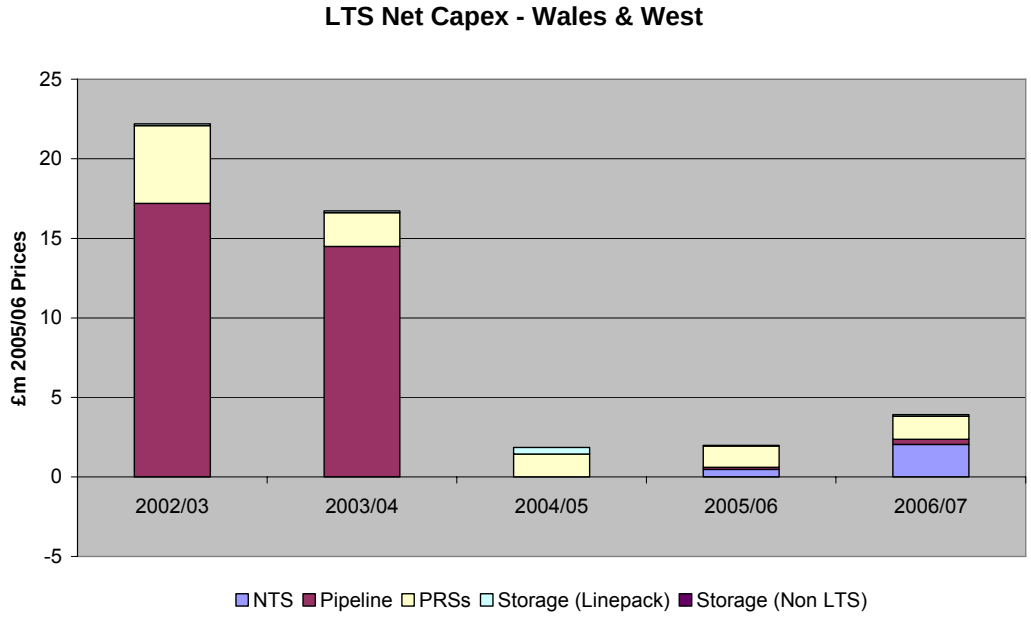


***Figure 3-1***

Following this expenditure, the next major project to increase LTS capacity is proposed by Wales & West for completion in 2009/10.

### 3.3.4 EFFICIENT LEVEL OF COSTS

Over the period 2002/03 to 2005/06, Wales & West's expenditure on LTS capital projects was £44.1m (2005/06 prices).

The 1 year review investigated one project in detail, the Gilwern to Hafodyrynys 24 km 600mm (commissioned 2005/06, £24.1m outturn costs, including some PRS costs) pipeline, amounting to 52% of the total expenditure over the four year period. The above project has been included in the unit cost assessment described in Appendix 6

## 3.4 FORECAST

### 3.4.1 INTRODUCTION

The efficiency of forecasting LTS and storage capital expenditure requirements depends on the performance of the GDN in network planning and design and on the effectiveness of their business planning processes. The network planning and design performance was reviewed as part of the 1 year review, with specific questions asked in this review regarding diurnal storage planning and the control of expenditure. The policies and procedures applied by Wales & West, including their business planning processes were reviewed in section 3.2. Specific project assumptions are challenged below.

Wales & West comprises 3 LDZs (South West, Wales South, Wales North). LTS & storage expenditure requirements are driven in the main by the projected growth in the 1 in 20 peak day over the period.

Wales & West are predicting peak demand to increase only very slightly over the 4 year period 2005/06 to 2008/09, whereas National Grid's Transportation's Ten Year Statement 2006 is predicting that 2008/09 demand in Wales & West's area will be 1% higher than in 2005/06. For comparison, over the 4 years from 2001/02 to 2005/06 peak demand in Wales & West's area decreased by 1%.

Wales & West has provided information on demand forecasting performance over the period since 2002/03. It said that the general trend is that demand has been over-forecast.

Overall Wales & West is forecasting a rise in peak demand of 6 GWh/day per year over the period from 2006/07 to 2012/13 whereas National Grid are forecasting peak demand rising at 13 GWh/day per year on average with the strongest rises in demand in the later years of the plan.

The following table shows Wales & West's forecasts of demand over the period to 2012/13 and the rate of increase in the forecast demand.

| Peak demands South West, Wales North, Wales South LDZs in aggregate | WWU forecasts GWh/day | % annual increase in peak demand from 2006/07 |
|---|---|---|
| 2006/07 | 547 | N/A |
| 2008/09 | 558 | 1.0% |
| 2012/13 | 584 | 1.1% |

***Table 3-2***

If Wales & West had used the National Grid peak demand forecasts, its LTS investment plans would have shown different phasing of investments to those shown in the BPQ submission.

Demand forecasts accuracy was raised with Wales & West including the uncertainties surrounding current trends in usage, and they considered they were using the most appropriate forecasts for planning purposes. For the period 2008/09 to 2012/13, the

Wales & West forecasts are less likely to continue the reported trend to over-forecast than the National Grid forecasts.

Our work has not included an analysis of demand forecasts in sufficient depth to make a judgement on the most appropriate forecasts to use for capital expenditure planning. In this report we have carried out a cost analysis, assuming the GDN proposed demand forecasts.

The level of LTS & storage future investment is also driven by the level and pattern of historical investment, since individual investments can provide capacity for a number of future years.

### 3.4.2 COMPANY PROPOSALS

Wales & West have stated that RPE uplifts have been omitted from their BPQ submission in error. We have therefore made the appropriate normalisation adjustments to their figure prior to analysis. The figure below shows the normalised company projections of capital expenditure on LTS & storage projects.

**BPQ Submission of LTS Normalised Net Capex - Wales & West**

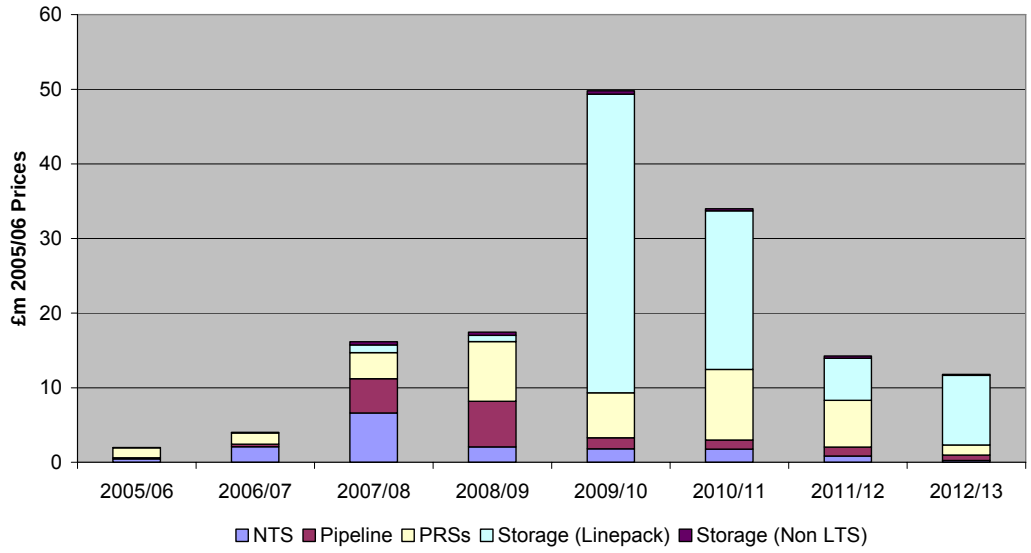


***Figure 3-2***

The following schemes have been reviewed:

**Corston Field to Hinton Charterhouse (12.3km 450mm)**

- Project costs: £9.9m
- Project commissioning date: 2009/10
- Wales & West state that this project will provide 0.124mcm of diurnal storage to SW LDZ at a cost of £80m/mcm. We consider the estimate of diurnal storage releasable to be somewhat high and that this provision of diurnal storage is marginally economic (see Appendix 5).
- The project timing is consistent with taking ongoing quantities of diurnal storage from the NTS.
- Project adjustments are discussed in section 3.4.4

**Kingston St Mary to Crowcombe (11km 450mm)**

- Project costs: £9.1m
- Project commissioning date: 2010/11
- Wales & West state that this project provides 0.04mcm of diurnal storage to SW LDZ. We consider the estimate of diurnal storage to be reasonable, giving a cost of £228m/mcm. We do not consider that this provision of diurnal storage to be economic (see Appendix 5). WW have not provided any evidence of local transmission constraints that would justify specific reinforcement expenditure.
- The project timing is consistent with taking ongoing quantities of diurnal storage from the NTS.
- Project adjustments are discussed in section 3.4.4

**Frampton Cotterell to Coldharbour Lane (7km 900mm)**

- Project costs: £9.6m
- Project commissioning date: 2010/11
- Wales & West state that this project will release 0.04mcm of diurnal storage. We consider that the volume of diurnal storage releasable could be up to 0.08 mcm, giving a cost of diurnal storage to SW LDZ of £120m/mcm. We consider that this provision of diurnal storage as not economic (see Appendix 5). WW have not provided any evidence of local transmission constraints that would justify specific reinforcement expenditure.
- The project timing is consistent with taking ongoing quantities of diurnal storage from the NTS.
- Project adjustments are discussed in section 3.4.4

**Hinton Charterhouse to Trowbridge (9km 450mm)**

- Project costs: £7.4m
- Project commissioning date: 2012/13
- Wales & West state that this project will release 0.03mcm of diurnal storage, giving a cost of diurnal storage to SW LDZ of £245m/mcm. We do not consider that this provision of diurnal storage to be economic (see Appendix 5).
- The project timing is consistent with taking ongoing quantities of diurnal storage from the NTS.
- Project adjustments are discussed in section 3.4.4

**Bancyfelin to Lampeter (20km 600mm)**

- Project costs: £26.2m
- Project commissioning date: 2009/10
- Wales & West state that this project will release 0.27mcm of diurnal storage to WS LDZ at a cost of £97m/mcm. We consider the estimate of diurnal storage releasable to be somewhat high and that this provision of diurnal storage is marginally economic (see Appendix 5).
- The project timing is not consistent with taking ongoing quantities of diurnal storage from the NTS.
- Project adjustments are discussed in section 3.4.4

**Uskmouth power station specific reinforcement (6km 300mm)**

- Project costs: £6.5m (net after customer contributions)
- The project cost includes two PRS rebuilds
- Project commissioning date: 2008/09
- There is no formal agreement to begin the necessary construction work and the project could fail or be deferred.
- Project adjustments are discussed in section 3.4.4

### 3.4.3 PB POWER PROPOSALS

Our proposed projections are derived from a review of the specific projects costs plus a review of the overall expenditure required to meet load growth (called the capacity adjustment). Our proposed costs are discussed in section 3.4.4.

The need for diurnal storage capacity is an important indicator of load growth and driver for investment, alongside the 1 in 20 peak demand.

The figure below shows the diurnal storage capacity installed within the GDN and to be procured from the NTS over the period to 2012/13.

**Provision of Diurnal Storage Capacity - Wales & West**

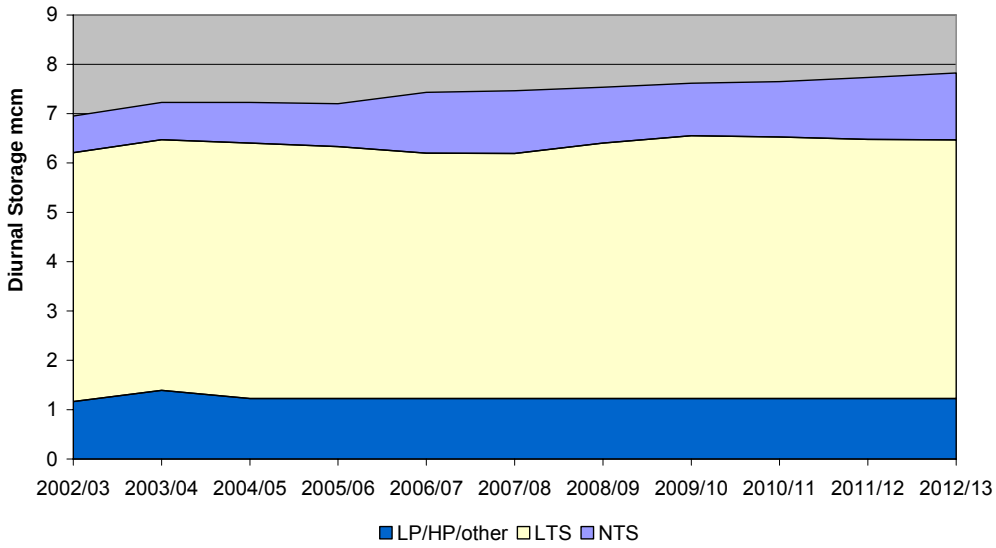


***Figure 3-3***

This graph shows that Wales & West has planned on the basis of an increasing volume of diurnal storage being taken from the NTS since 2002/03 and that over the period from 2005/06, the volume of LTS linepack is broadly flat.

In 2006/07, 17% of diurnal storage is procured from the NTS overall and is required to meet a deficit in SW LDZ. In 2009/10, the last year of the current offtake arrangements, 14% of diurnal storage is planned to be taken from the NTS, primarily to supply SW LDZ.

### 3.4.4 SPECIFIC COST AREAS

This section describes the specific costs reviewed by PB Power and how the separate capacity adjustment is calculated and applied.

**Pipelines**

We have carried out an analysis of a range of LTS pipeline construction projects (see Appendix 6). Our view is that the following unit costs are appropriate to LTS pipelines, reflecting the average lengths and conditions of construction.

| LTS pipeline diameter | Unit cost (2005/06 prices) |
|---|---|
| 450mm | £0.7m per km |
| 600 mm | £0.8m per km |
| 900mm | £1.0m per km |

***Table 3-3***

Although we would expect GDNs to capture ongoing efficiency improvements in both procurement and in construction methods throughout the plan period, we have not included any adjustments to the unit costs for such effects.

Applying these costs to the pipeline project described in Section 3.4.2, the following costs are proposed:

Corston Field to Hinton Charterhouse (12.3km 450mm)

- Wales & West cost estimates excluding RPEs = £9.9m
- PB Power estimate excluding RPEs = £8.6m
- Variance from Wales & West proposal = -£1.3m (excluding RPE effects)

Kingston St Mary to Crowcombe (11km 450mm)

- Wales & West cost estimates excluding RPEs = £9.1m
- PB Power estimate excluding RPEs = £7.7m
- Variance from Wales & West proposal = -£1.4m (excluding RPE effects)

Frampton Cotterell to Coldharbour Lane (7km 900mm)

- Wales & West cost estimates excluding RPEs = £9.6m
- PB Power estimate excluding RPEs = £7.0m
- Variance from Wales & West proposal = -£2.6m (excluding RPE effects)

Hinton Chaterhouse to Trowbridge (9km 450mm)

- Wales & West cost estimate excluding RPEs = £7.4m
- PB Power estimate excluding RPEs = £6.3m
- Variance from Wales & West proposal = £1.1m (excluding RPE effects)

Bancyfelin to Lampeter (20km 600mm)

- Wales & West cost estimates excluding RPEs = £26.2m
- PB Power estimate excluding RPEs = £16.0m
- Variance from Wales & West proposal = -£10.2m (excluding RPE effects)
- Adjustments are made to defer the completion date until 2013/14.
- Wales & West state that this project is need for 2009/10 to ensure its storage strategy is maintained. Our timing assessment takes into account that Wales South has a surplus of diurnal storage of 0.122mcm in 2006/7 and has the potential to take some storage from the NTS. Wales & West have provided additional information that indicates that the timing of this project is finely balanced and that a project could be required in the later years of this review period. We therefore recommend that this project is reviewed as part of the 2006 update work.

Uskmouth power station specific reinforcement (6km 300mm)

- This project is specifically to provide supplies to a power station. A decision to proceed with the scheme is not expected from the customer until later in 2007 or 2008. We recommend that this expenditure is allowed subject to an ARCA being in place.

**Condition based Capex**

Wales & West are proposing to carry out inspections of all pre 1970 and 25% of post 1970 LTS pipelines within the network. This follows a recent external inspection of a pipeline in North Wales which has resulted in the decision to programme replacement due to condition. Wales & West have provided copies of the inspection reports. The condition of these pipelines cannot be monitored using the OLI1 internal inspection pig because of their small diameter or because of unsuitable flow conditions. Wales & West are proposing to survey a total of 555kms of pipeline over three years commencing in 2008/09, at a forecast cost of £160,000 per annum. We support this work programme.

It is noted that Wales & West are proposing to replace the security fencing at all PRS and NTS offtake sites.

Preheaters

Wales & West have described their proposed preheater replacement programme. It is based on replacement of preheaters over 3 years to a prioritised programme. Initially the programme was based on replacement at 15 NTS offtakes and 91 LTS sites and this is the basis of the BPQ submission expenditure. Wales & West have demonstrated the need to replace preheaters but we have not seen evidence that they need to be replaced in the 3 year period, or that the effect of the associated plant outages would not pose operational difficulties. We propose that the replacement work is carried out across the 5 year period as shown in the following table.

| £m 2005/06 prices (excluding RPEs) | 2006/07 | 2007/08 | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 |
|---|---|---|---|---|---|---|---|
| PRSs | | | | | | | |
| Pre-heaters BPQ submission | | | 3.1 | 3.0 | 3.0 | | |
| Pre-heaters expenditure included in assessment | | | 1.9 | 2.0 | 2.0 | 1.5 | 1.5 |
| NTS offtakes | | | | | | | |
| Pre-heaters BOQ submission | | | 0.5 | 0.5 | 0.5 | | |
| Pre-heaters expenditure included in assessment | | | 0.3 | 0.3 | 0.3 | 0.3 | 0.2 |

***Table 3-4***

Subsequently Wales & West have indicated that further assessment has indicated that fewer NTS offtakes need preheater work but that a higher number of LTS sites need replacement with the total workload remaining about the same. We have not reallocated expenditure between NTS offtakes and LTS sites but would expect that Wales and West would use the total allowance to best effect across both categories of assets.

**Capacity adjustment**

We have reviewed above the major projects proposed by the Network. In addition, the Network has proposed a number of smaller projects which have not been reviewed.

We consider that the analysis used in this section provides supporting evidence to the specific project analysis carried out above and that where a GDN has made provision for a number of projects at various locations through their network, it provides a means of assessing the overall level of expenditure that gives the GDN flexibility to select the appropriate mix of small projects to remedy local constraints.

In order to assess whether the overall level of expenditure on capacity related projects is consistent with forecast increases in demand, this capacity related expenditure has been assessed against the stated requirements for incremental diurnal storage. Since diurnal storage is calculated as a percentage of peak demand, incremental diurnal storage is a good measure of incremental capacity requirements.

The GDN diurnal storage requirement is determined from the SSM model, with projected volumes determined by a number of factors, including demand forecasts and the capability of the LTS to profile its gas take from the NTS (and the ability of the NTS to deliver such volumes).

| | 2006/07 | 2007/08 | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 |
|---|---|---|---|---|---|---|---|
| SW | | | | | | | |
| Peak demand GWh/d | 296 | 299 | 303 | 306 | 310 | 315 | 320 |
| Diurnal storage required mcm | 4.03 | 4.07 | 4.126 | 4.166 | 4.221 | 4.289 | 4.357 |
| WS | | | | | | | |
| Peak demand GWh/d | 199 | 201 | 202 | 204 | 206 | 208 | 209 |
| Diurnal storage required mcm | 2.527 | 2.552 | 2.565 | 2.59 | 2.615 | 2.641 | 2.653 |
| WN | | | | | | | |
| Peak demand GWh/d | 52 | 53 | 53 | 54 | 54 | 54 | 55 |
| Diurnal storage required mcm | 0.749 | 0.763 | 0.763 | 0.777 | 0.777 | 0.777 | 0.792 |
| Total stated diurnal storage required mcm | 7.306 | 7.386 | 7.453 | 7.534 | 7.614 | 7.707 | 7.802 |

***Table 3-5***

The above table shows Wales & West projected demands and diurnal storage requirements over the period 2006/07 to 2012/13.

The following table shows the final storage requirements for 2006/07, showing that 17% of diurnal storage was supplied from the NTS.

| | |
|---|---|
| Final storage requirement | 7.31mcm |
| Storage availability | |
| - within GDN | 6.20mcm |
| - from NTS | 1.23mcm |
| - Total | 7.43mcm |

***Table 3-6***

GDNs have described the issues surrounding the availability of NTS linepack after the current arrangements end in 2009/10. We have estimated a notional cost of NTS linepack (if it were available) of £50m per mcm (see Appendix 5); we have called this our reference cost. Unit linepack costs in the LTS are driven by both the pressure range and the pipe diameter, and GDN plans show that large diameter pipelines are being installed to provide diurnal storage.

We recognise that LTS expenditure is lumpy in nature, but in this review period, the average length of proposed pipelines across all GDNs is 12km. We have estimated that a pipeline of this length produces up to 0.1mcm of diurnal storage (depending on pressure range and diameter), and typically around 0.05mcm. In other words, LTS projects can be matched fairly closely to increased requirements for diurnal storage. It is also noted that new or modified PRSs can generate linepack at lower costs than new pipelines, and in some cases can provide diurnal storage increments in smaller steps to match requirements more precisely.

We therefore consider that GDNs should be able to meet their incremental diurnal storage associated with load growth at costs approaching our reference costs. We also recognise that linepack storage volumes reduce as demands increase and so the cost of meeting the total diurnal storage requirement (transmission capacity and storage considered together) will generally be higher than the cost of meeting the growth in diurnal storage alone. We have assumed a factor of 2 times applied to the reference cost is appropriate to allow for this effect.

Therefore where we consider that a GDN has a requirement to invest in diurnal storage over the period from 2006/07 to 2012/13 the efficient cost of constructing that capacity is assessed against 2 times the reference cost and an adjustment made where the costs exceed this threshold.

The following table shows the adjusted LTS Capex proposals, and the deduction of the non-capacity Capex to give the net adjusted Capex (capacity related). The table also shows this expenditure expressed on a cumulative basis from 2006/07 to 2012/13.

The table further shows the cumulative diurnal storage increment proposed by the GDN and the associated reference expenditure, also expressed on a cumulative basis.

| | 2006/07 | 2007/08 | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 |
|---|---|---|---|---|---|---|---|
| Adjusted LTS Capex £m | 4.0 | 15.2 | 15.2 | 18.1 | 28.9 | 15.5 | 12.9 |
| Non-capacity capex £m | 0.3 | 6.7 | 11.4 | 6.9 | 6.3 | 6.0 | 3.7 |
| Net adjusted capex (capacity related) £m | 3.7 | 8.5 | 3.8 | 11.2 | 22.5 | 9.4 | 9.2 |
| Cumulative net capex £m | 3.7 | 12.2 | 16.0 | 27.1 | 49.7 | 59.1 | 68.3 |
| | | | | | | | |
| Cumulative diurnal storage increment mcm | | 0.1 | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 |
| Reference expenditure £m | 0.0 | 4.2 | 7.7 | 12.1 | 16.5 | 21.7 | 27.1 |
| Capacity adjustment £m | 0.0 | -2.3 | -2.3 | -2.3 | -2.3 | -2.3 | -2.3 |

***Table 3-7***

If the cumulative Net Capex is more than 2 times the cumulative reference expenditure, consideration is given to a capacity expenditure adjustment. The above table indicates that a capacity adjustment of £2.3m pa could apply to Wales and West. However, analysis of the source of this adjustment indicates that the GDN is providing capacity for the Uskmouth power station load, and to take increasing quantities of diurnal storage from the NTS in addition to the reviewed LTS projects. We consider this expenditure to be efficient and have not applied the calculated capacity adjustment. Therefore, no capacity adjustment is applied to Wales & West.

## REAL PRICE EFFECTS

Section 2.7 sets out the real price effects assumed by WWU[1] in their BPQ proposals and also the real price effects proposed by PB Power.

In addition to any efficiency adjustments, the Network costs have been normalised by adjustments to remove the GDN real price effects and the PB Power real price effect assumptions have subsequently been added in deriving the proposed allowances.

### 3.4.5 RECOMMENDATIONS

The following figure summarises our capital expenditure proposals for the price control period (2008/09 to 2012/13) for LTS & storage. The build-up of these proposals is given in section 3.1.

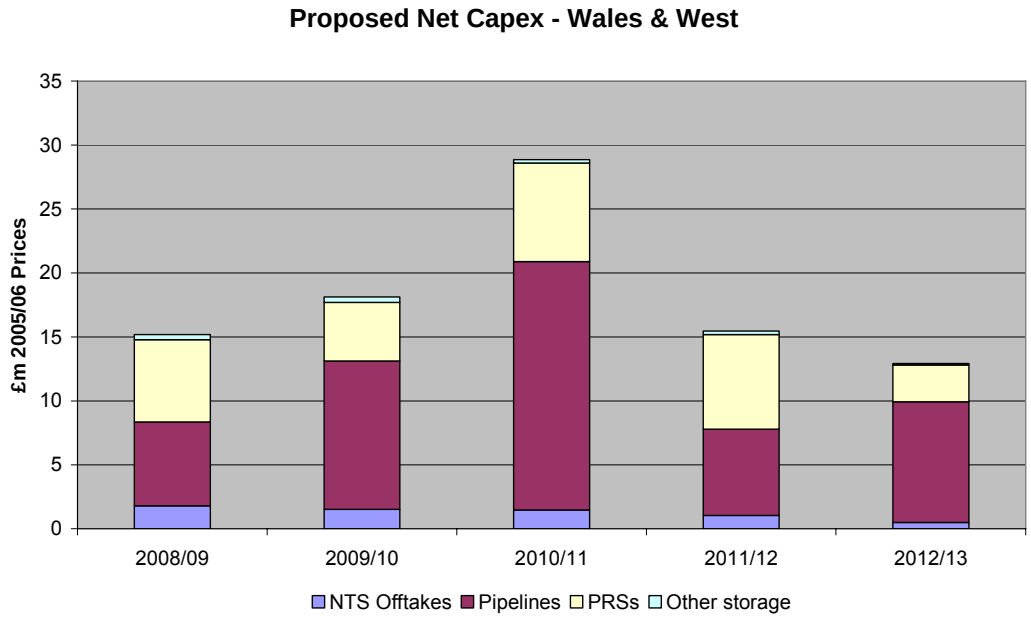


***Figure 3-4***

[1] WWU have omitted these effects in error and have been added by PB Power as a normalisation adjustment

# 4 CONNECTIONS CAPEX

## 4.1 SUMMARY

| Net Capex £m (2005/06 prices) | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 | Total |
|---|---|---|---|---|---|---|
| **BPQ Submission** | | | | | | |
| New Housing | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | **7.1** |
| Existing Housing | 6.8 | 7.2 | 7.5 | 7.7 | 7.9 | **37.1** |
| Non-Domestic | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | **2.5** |
| **Total** | **8.7** | **9.1** | **9.4** | **9.7** | **9.8** | **46.7** |
| **Normalisation Adjustments** | | | | | | |
| New Housing | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | **0.0** |
| Existing Housing | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | **0.0** |
| Non-Domestic | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | **0.0** |
| **Total** | **0.0** | **0.0** | **0.0** | **0.0** | **0.0** | **0.0** |
| **Normalised BPQ** | | | | | | |
| New Housing | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | **7.1** |
| Existing Housing | 6.8 | 7.2 | 7.5 | 7.7 | 7.9 | **37.1** |
| Non-Domestic | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | **2.5** |
| **Total** | **8.7** | **9.1** | **9.4** | **9.7** | **9.8** | **46.7** |
| **Adjustments** | | | | | | |
| New Housing | -0.8 | -0.8 | -0.8 | -0.9 | -0.8 | **-4.1** |
| Existing Housing | -1.3 | -1.7 | -2.0 | -2.4 | -2.7 | **-10.1** |
| Non-Domestic | -0.4 | -0.3 | -0.4 | -0.4 | -0.3 | **-1.7** |
| **Total** | **-2.5** | **-2.8** | **-3.2** | **-3.6** | **-3.8** | **-16.0** |
| **Proposed** | | | | | | |
| New Housing | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | **3.0** |
| Existing Housing | 5.4 | 5.5 | 5.4 | 5.4 | 5.3 | **27.0** |
| Non-Domestic | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | **0.7** |
| **Total** | **6.2** | **6.3** | **6.2** | **6.1** | **6.0** | **30.7** |

***Table 4-1***

## 4.2 POLICIES & PROCEDURES

WWU Policies and Procedures associated with connections activities have been reviewed as detailed in Appendix 1. The various levels of engineering and safety documents together with the governance arrangements have been reviewed and no issues found.

The key policies covering the connection of new assets constructed by others to the Wales & west network are:-

- Connections Policy Manual

  The suite of documents forming the WWU Connections Policy Manual sets out the principles and policies applicable to all activities associated with connections to the Network and those activities relating to the point at which gas is supplied to customers. The activities include new connections, increases in demand, alteration, disconnection and taking ownership of pipes laid by others. Each is contained in a separate Policy Statement.

- Management Procedure for the design of 3rd Party System Extensions and Connections to WWU Networks

WWU/PM/NP14 is for use in the design of all new mains, services and risers, to be connected to a parent main which is operating at a pressure not exceeding 7bar. It also includes the procedure for evaluation of alterations to existing services subject to increased demands. Its purpose is to provide a consistent and defensible approach to the sizing of services, stub connections and approach mains and the quotation of design pressures.

We are of the opinion that these documents provide a comprehensive commercial and technical methodology for the management of new connections to the Network.

## 4.3 HISTORICAL PERFORMANCE

### 4.3.1 INTRODUCTION

Connections Capex includes all expenditure associated with the provision of new customer connections to the below 7 bar distribution network. The workload volume is driven by customer requests for gas connections.

### 4.3.2 DEFINITION OF ACTIVITY

#### 4.3.2.1 Gross Capex

Connections expenditure is allocated to the following customer categories:

- Connections to New housing
- Connections to Existing housing
- Connections to Non-domestic

The BPQ information details the mains and services expenditure against these categories. Expenditure on governors associated with new connections is also included and is allocated to district or service governor categories.

Mains activities also include specific reinforcement necessitated by individual requests for a new connection to the network. Specific reinforcement is subject to an economic test to determine the associated customer contribution.

#### 4.3.2.2 Net Capex

Connections Net Capex consists of the expenditure which is not re-charged to the customer including the Domestic Load Connection Allowance (DLCA)[2], the Final Connection Allowance[3] and the cost of Employer Ordered Works (EOW). EOW is work that is essential to complete the connection to the distribution system but is not foreseen when the quotation to the customer is given, e.g. additional work resulting from inaccurate mains records.

### 4.3.3 ESTABLISH UNDERLYING COSTS

Figure 4-1 shows the trends in total mains and total services gross expenditure for the period 2002/03 to 2006/07.

The reductions in services expenditure in 2005/06 and 2006/07 are due to workload reductions, particularly in the existing housing category, and a 37% reduction in unit costs.

[2] The Domestic Load Connection Allowance (DLCA) comprises the mains connection and up to the first 10m of service pipe in the public highway. Qualifying premises must be situated within 23m of a relevant main (Gas Act Section 10 para 2(a)).

[3] Final connection allowances are applicable to non-domestic loads up to 2,196,000kWh situated within 23m of a relevant main. Since 2005 the majority of GDNs have withdrawn this allowance.

The increase in mains expenditure in 2005/06 is coincident with a 28% reduction in workload and a 105% increase in unit costs compared to 2004/05.

It has not been possible to analyse these expenditure movements further due to inconsistencies in the disaggregation of connections data to mains and services level for this period (see Section 4.3.4.1 - Data Accuracy)

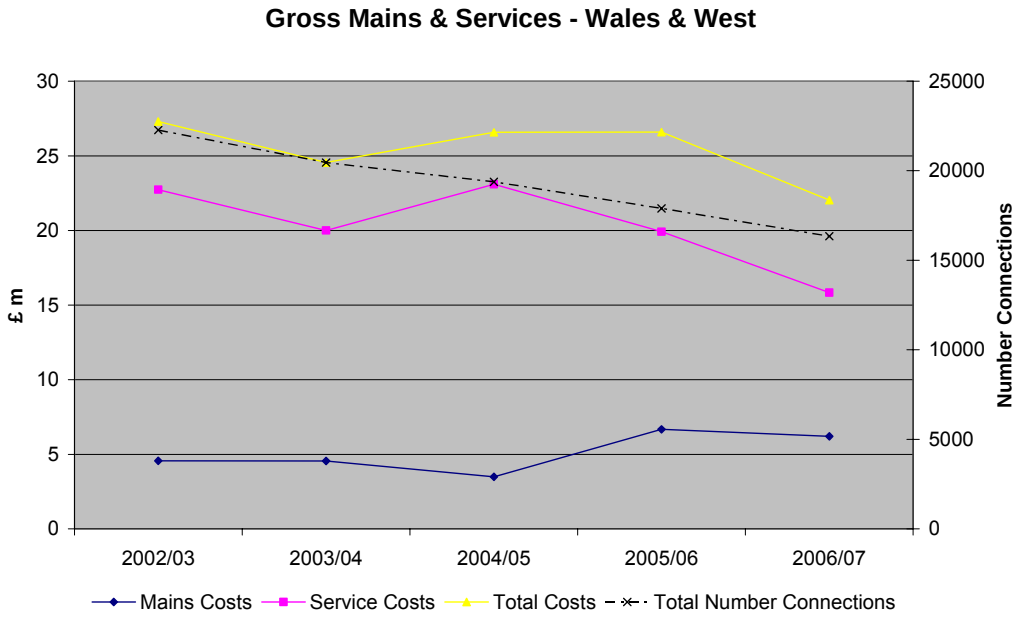


***Figure 4-1***

The trend in total cost per connection for the period 2002/03 to 2006/07 is included in the chart in Section 4.4.3.1 for the period to 2012/13.

## 4.3.4 PROPOSED EFFICIENT LEVEL OF COSTS

### 4.3.4.1 Data Accuracy

Connections activities are separated into three main categories: New Housing connections, Existing Housing connections and Non-Domestic connections. The BPQ returns have been made by the GDNs against these categories, together with the costs associated with feeder mains, specific reinforcement and governors.

We have examined the 2005/06 and 2006/07 BPQ data returned by the GDNs to determine the degree of consistency in the allocation of expenditure to the mains and services activity categories.

Generally, the GDNs have stated that their management information systems do not generate information in the format and degree of disaggregation required. Therefore, information has been synthesised and accuracy cannot be assured, particularly the expenditure allocations between mains and services activities. It is evident that there is a significant degree of inconsistency between the GDNs in terms of the BPQ information returned, including wide variations in mains and services unit costs.

In addition to our concerns regarding the reliability of the reported split of costs between the three categories of connection, the costs associated with feeder mains, specific reinforcement and governors must be allocated between these categories. Following feedback from the GDNs these costs are allocated between the Non-Domestic and New Housing categories only, as we have been advised that there is limited or no expenditure on these activities associated with Existing Housing connections.

Given the concerns outlined above we have investigated methods of minimising the impact of the allocation of costs between categories by carrying out benchmarking analysis on both a separate and total connections basis.

#### 4.3.4.2 Analysis Process

We have developed expenditure projections for the efficient level of expenditure required by Wales & West to carry out its connections activities through benchmarking across GDNs, analysis of their workload assumptions, and review of their forecasts. The analysis process is described in detail in Section 2.

No normalisation adjustments have been identified for this activity.

We have applied a 20% overall reduction to the forecast mains workload, as specified in Section 4.4.2.2.

We have carried out analysis using both 2005/06 and 2006/07data. Having examined both years we concluded that 2006/07data provided the most robust analysis for the projections. In addition, we have carried out the analysis both at the total connections level and also at the level of separate analysis in each of the three connections activity categories.

The regression carried out for Existing Housing separately provided robust results, however, the regressions for the Non-Domestic and New Housing categories were less conclusive. We believe this is due in part to uncertainty of the correct allocation of costs between the connections categories and in part to the lack of precise allocation of specific reinforcement, feeder mains and governor installations costs.

We concluded that analysis of the total costs would deliver the most representative review of the effectiveness of the Connections operation. However, we have tested this conclusion by comparing the outcomes of both the total and separate analyses. By using each analysis we have derived the total expenditure which is considered appropriate for the number of connections proposed. We therefore generated a comparison for each year of the control period, for each GDN, giving a total of 40 comparisons.

Figure 4-2 below shows the number of these samples for each percentage variation. It can be seen that in almost 80% of the samples, the difference in outcome between the total and separate analysis was less than 4%. These results confirmed our view that the analysis at the total connections level was the most appropriate basis for our proposals.

The total connections analysis resulted in higher costs in 37 of the 40 sample comparisons.

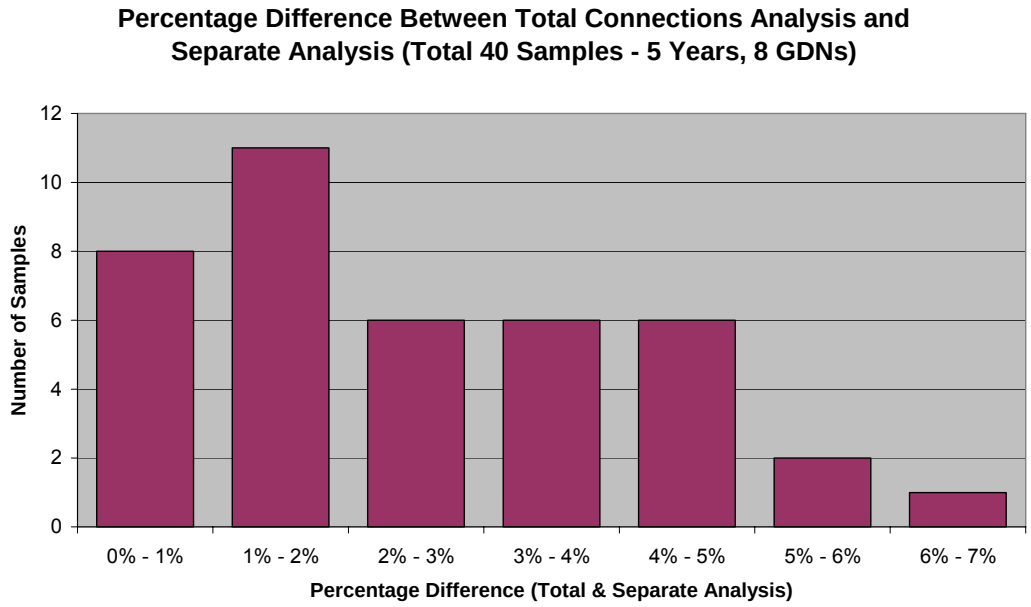


***Figure 4-2***

WWU has made significant organisational changes during 2005/06 to deliver efficiency improvements in the management and execution of all connections processes and activities. WWU has not quantified precisely the level of improvement expected but we are of the view that efficiency savings within the range 5% in 2007/08 reducing to 2% in 2012/13 are appropriate. This range has been smoothed in the analysis process to 3% year on year over the forecast period, in addition to any catch up to the benchmark performance level by underperforming GDNs.

In order to derive our projections for efficient expenditure we have assumed that where a GDN is underperforming the benchmark, the gap with the benchmark will be reduced over the forecast period to 30% at 2012/13. Where a GDN is outperforming the benchmark the projection will be reduced year on year to match the GDN's out performance in 2012/13.

Finally, the projections are adjusted to incorporate Regional Factors and our Standard Real Price Effect assumptions, as specified in Section 2.7.

#### 4.3.4.3 Benchmarking Analysis

A number of regression options have been explored, however, for most activities we have concluded that the most suitable regression is achieved by analysis of the logarithmic values of normalised costs and the chosen driver. A "basket of work" approach has been used to produce a driver based on a weighted average of a number of different work elements (pipe sizes). The driver is calculated by multiplying the work volume by a nominal unit cost for the activity. The approach is not sensitive to the actual level of these nominal unit costs, but works on the relative costs between work types.

This approach allows the analysis to fully reflect the workload forecast by the GDNs, adjusted for the period 2008/09 to 2012/13 as deemed appropriate by our consultants.

The starting point for setting the target benchmark is an Ordinary Least Squares (OLS) regression on the eight data points, one for each GDN, applicable in the base year (2006/07). The $R^2$ value indicates how well the variation in costs is explained by the variation in the workload driver.

The OLS regression calculation takes into account all the data points in determining the relationship between the costs and the workload driver. This relationship could be used to determine the frontier costs for each network, but these costs are unlikely to be efficient since generally only some networks will be operating at the efficiency frontier.

We therefore propose to obtain the benchmark cost relationship by adjusting the OLS regression line so that it reflects efficient network performance rather than average performance.

This relationship could be constructed by shifting down the regression line until all the data points are above the line except for one data point which is on the line. This is the Corrected Ordinary Least Squares (COLS) regression line.

However, we consider that there are differences between GDNs which may not be fully explained by the regression analysis and that it is reasonable to set the frontier relationship by shifting the regression line down to the upper quartile. This is the upper quartile COLS regression line and is shown in pink on the charts. This is the target which all under performing GDNs should move towards.

Where the regression uses log-linear analysis, the effect of rejecting the OLS regression line as the frontier relationship in favour of the upper quartile COLS regression line is to reduce the target costs of each network by the same percentage.

With this approach, 75% of networks will be performing at or below the frontier in the base year and these networks will be expected to continue to improve their performance over the period to 2012/13, and our proposed ongoing productivity improvements are set out in Section 4.4.4.1. The resulting target costs for 2012/13 are shown in yellow on the charts.

### Total Connections

Figure 4-3 shows the benchmarking analysis of 2006/07 connection costs for the total connections category.

Workload and costs associated with large scale Local Authority modernisation schemes in Scotland have been excluded from the regression analysis as this is a low unit cost activity which is unrepresentative of the general level of costs associated with connections to existing housing.

Wales & West's performance ranks 3rd best after allowing for regional factors.

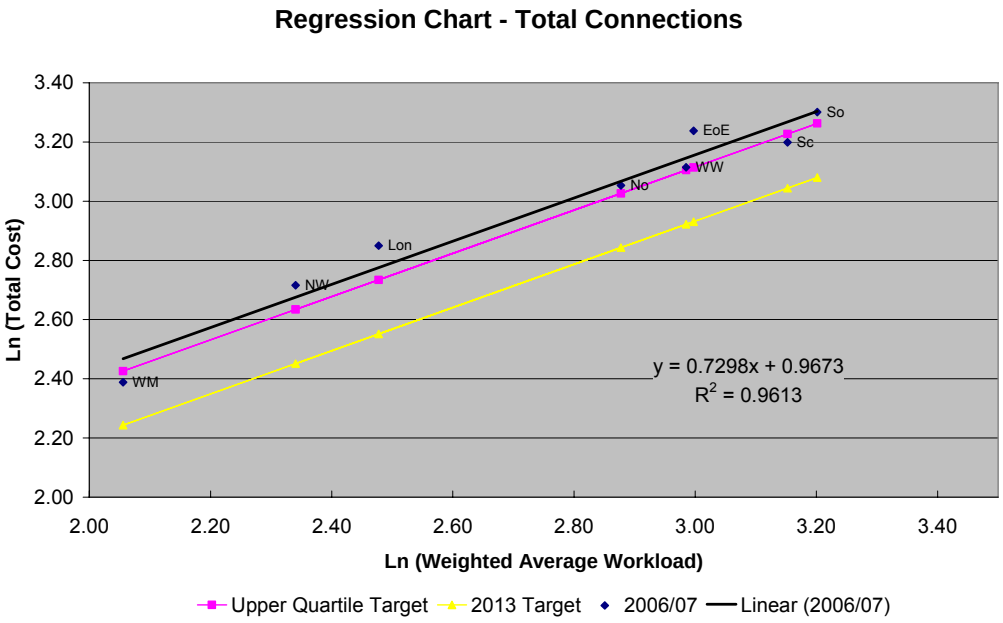


***Figure 4-3***

### New Housing Connections

Figure 4-4 shows the benchmarking analysis of 2006/07 connection costs for the new housing activity category.


***Figure 4-4***

## Existing Housing Connections

Figure 4-5 shows the benchmarking analysis of 2006/07 connection costs for the existing housing activity category.

Workload and costs associated with large scale Local Authority modernisation schemes in Scotland have been excluded from the regression analysis as this is a low unit cost activity which is unrepresentative of the general level of costs associated with connections to existing housing.

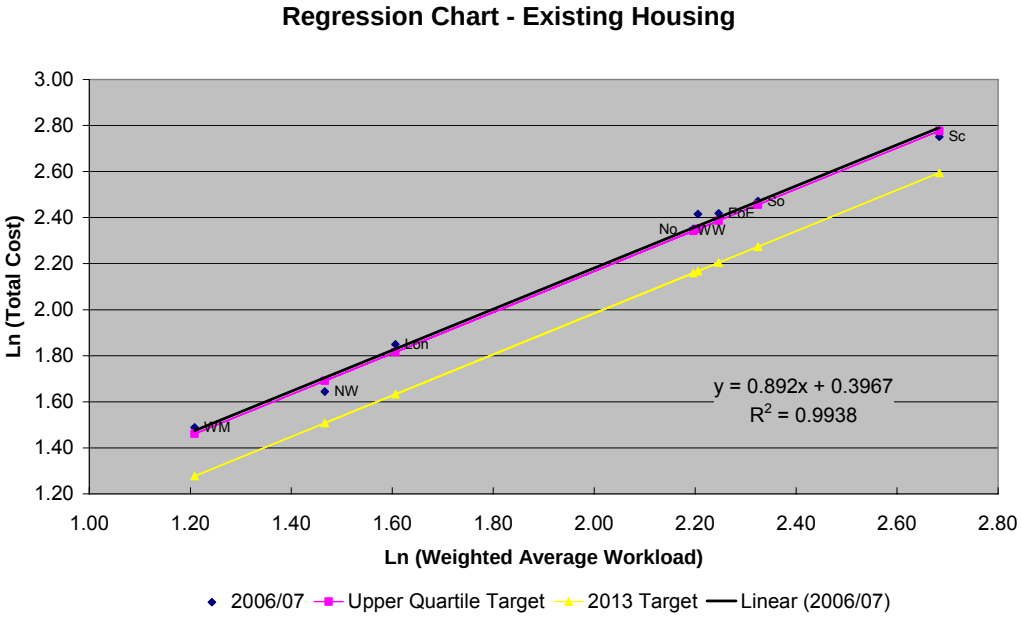


***Figure 4-5***

**Non-domestic Connections**

Figure 4-6 shows the benchmarking analysis of 2006/07 connection costs for the non domestic activity category.

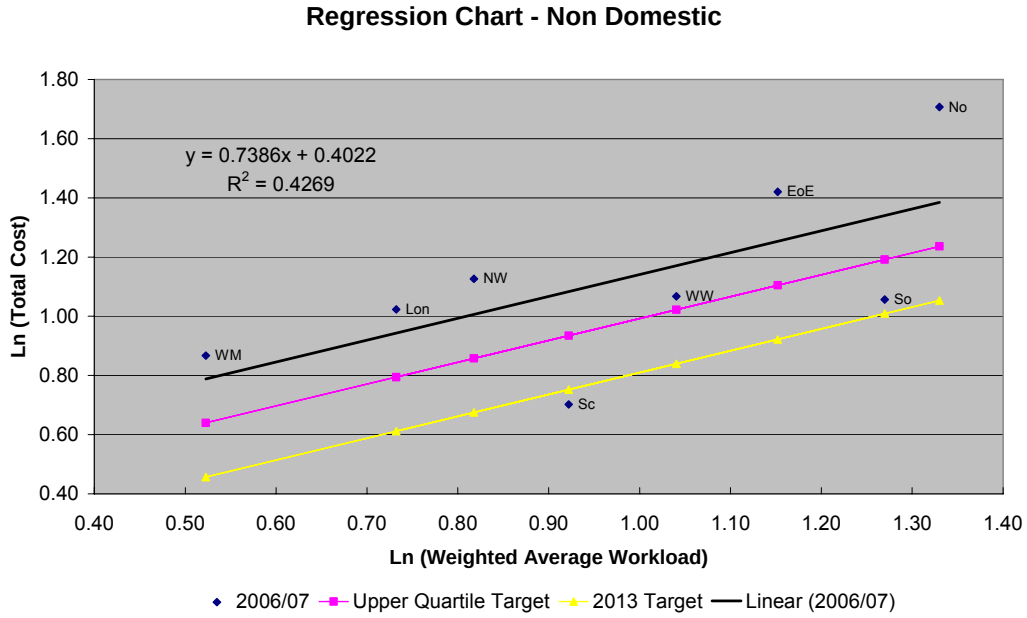


***Figure 4-6***

# 4.4 FORECAST

## 4.4.1 INTRODUCTION

During the period 2002/03 to July 2005, Fulcrum Connections (FC) undertook all connections activities on behalf of Wales & West and the other GDNs. The Service Provider Contract (SPC) formed the basis for the contractual relationship between Wales & West and FC. NGG coordinated the interface between FC and the GDNs.

Immediately following acquisition of the network, WWU declared the intention to in-source all connections activities and served notice to terminate the contract with Fulcrum Connections (FC) with effect from September 2005. The primary concerns that led to that decision were regarding FC's ability to achieve standards of service, as required by the licence, and the consequential effect on WWU's reputation.

The Board Paper associated with the decision to in-source also makes reference to high cost of delivery by FC. In terms of cost benefit, the paper states that the main efficiency gains expected are in relation to office based costs, assessed at a saving of £7m p.a. but offset in the first year by start-up costs of £3.3m. EPC operational costs charged by FC were considered accurate with little scope to achieve reductions. WWU has implemented new systems to manage connections activities efficiently and ensure that Standards of Service are met.

In assessing the Network's expenditure projections for connections activities we have reviewed the annual workload volumes proposed together with the forecasting assumptions applied.

## 4.4.2 COMPANY PROPOSALS

### 4.4.2.1 Key Assumptions

In addition to the generic assumptions for Wales & West, detailed in Section 2.7, WWU has stated that their connections expenditure forecasts also take into account the following assumptions and issues:

**Gross expenditure**

- Mains workload volumes are based on historic trends and identified future events.
- Services workload volumes are based on market forecasts and WWU's view of retained market share as follows:
    - New housing market share range 2008/09 to 2012/13 - 30% to 27%
    - Existing housing market share range 2008/09 to 2012/13 - 53% to 58%
    - Non domestic market share 2008/09 to 2012/13 - 63%
- New housing mains and services workload volumes will remain at 2006/07 levels.
- Non domestic mains workload volumes will reduce by 20% from 2006/07 levels due to an increase in Utilities Infrastructure Provider (UIP) works. Services will remain at 2006/07 levels.
- District and service governor MP/LP numbers will reduce by 20% from 2006/07 due to an increase in UIP works.
- District and service governor IP/LP numbers will remain at 2006/07 levels.

We have examined the BPQ submission and found that the assumptions regarding governors are not reflected in the data.

**Net expenditure**

- The unit cost of the DLCA is estimated at £760
- The DLCA will apply to 90% of services to existing housing.
- The FCA is applied to all non domestic connections at a unit cost of £89.
- Nil cost associated with 'time lag'[4]
- Nil cost associated with unaccepted quotations.

WWU has not specified an assumption for EOW but we have examined the BPQ data for a sample forecast year and have assessed the expenditure associated with EOW at approximately 13% of the total mains and services gross expenditure.

### 4.4.2.2 Workload Forecasts

Figures 4-7 and 4-8 show Wales & West's connections mains and services workload forecasts.

Wales & West's workload forecasts for the period 2008/09 to 2012/13 have been reviewed taking into account historical trend levels and WWU's assumptions.

The downward trend in existing housing services workload volumes over the period 2004/05 to 2006/07 is not carried forward into the forecasts which are virtually flat to 2012/13. We have considered whether to reduce the forecast workload volumes and have concluded that no adjustment should be made.

[4] Historically, a significant proportion of Net Capex resulted from work in progress, i.e. work that was quoted before a price increase but executed after the price change. Connection charges were based on current costs at the time of quotation and, therefore, when costs were increasing under recovery occurred.

Forecast workload volumes for new housing and non-domestic services are consistent with historical trends and are flat to 2012/13.

We recommend that the BPQ service connections workload forecasts are accepted.

The national average total mains length per connection is 3.03m for the period 2008/9 to 2012/13 and Wales & West is 30% in excess of the national average at 3.95m. There is no apparent justification for this forecast level of activity and, therefore, we have applied a 20% overall reduction to the forecast mains workload.

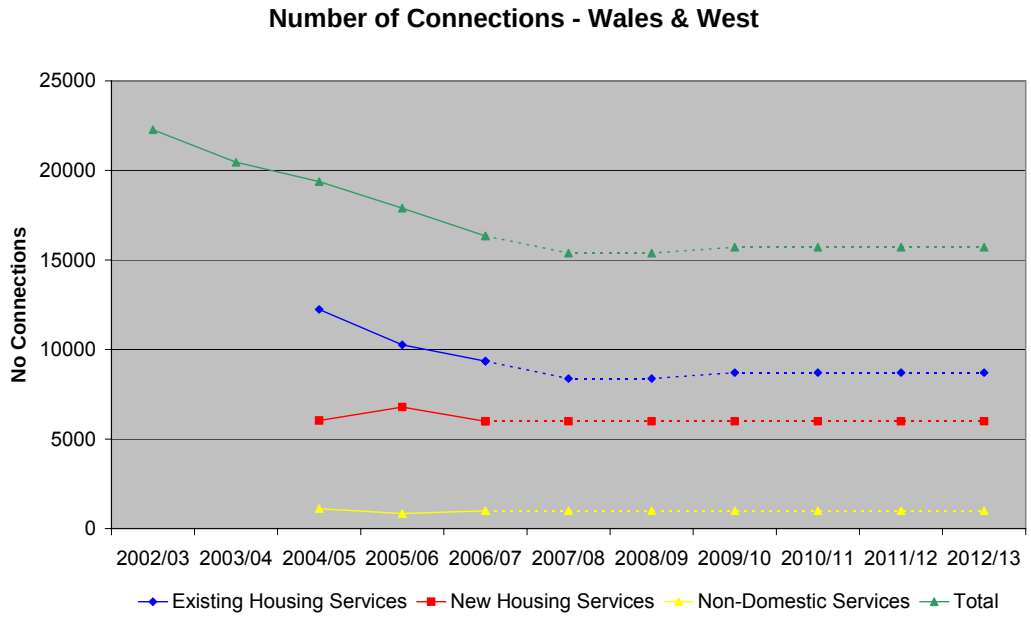


***Figure 4-7***

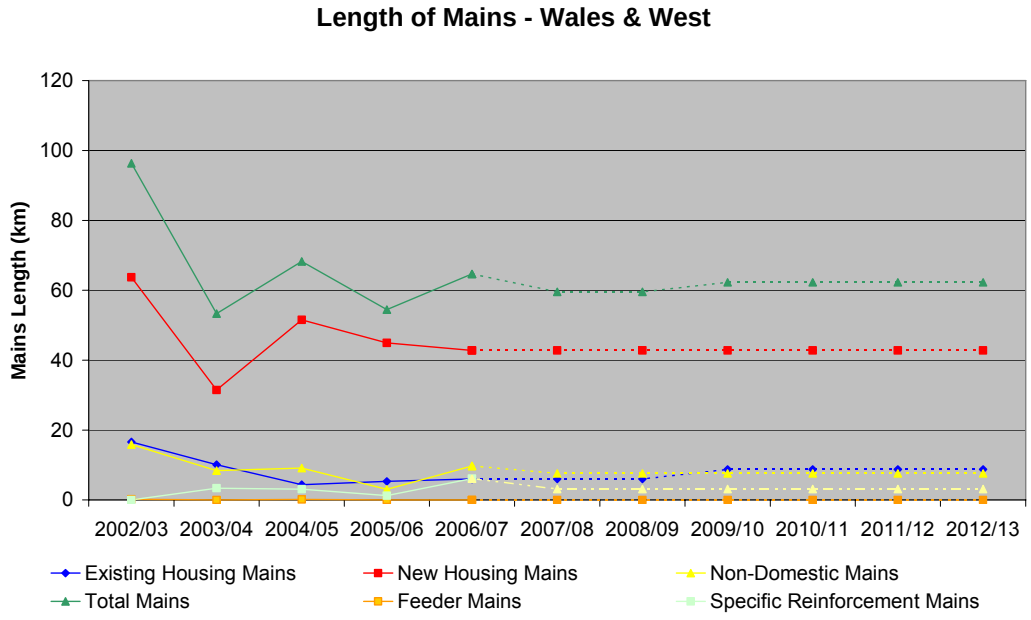


***Figure 4-8***

### 4.4.3 PB POWER PROPOSALS

The regression analysis is used to determine the total Gross Capex which is appropriate for the proposed workload. The regression workload drivers are then used to apportion this total expenditure between all work activities based on the proposed workloads for each activity. The costs for feeder mains, specific reinforcement and governors have been split between New Housing and Non-Domestic Connections in proportion to the number of connections in each category.

#### 4.4.3.1 Total Connections

Figure 4-9 shows Wales & West's gross expenditure projections for the total connections category over the forecast period 2008/09 to 2012/13.

The recommended expenditure projection reflects closing the gap with the target performance to 30% at 2012/13.

**Chart showing Wales & West's Proposed Connection Gross Capex**

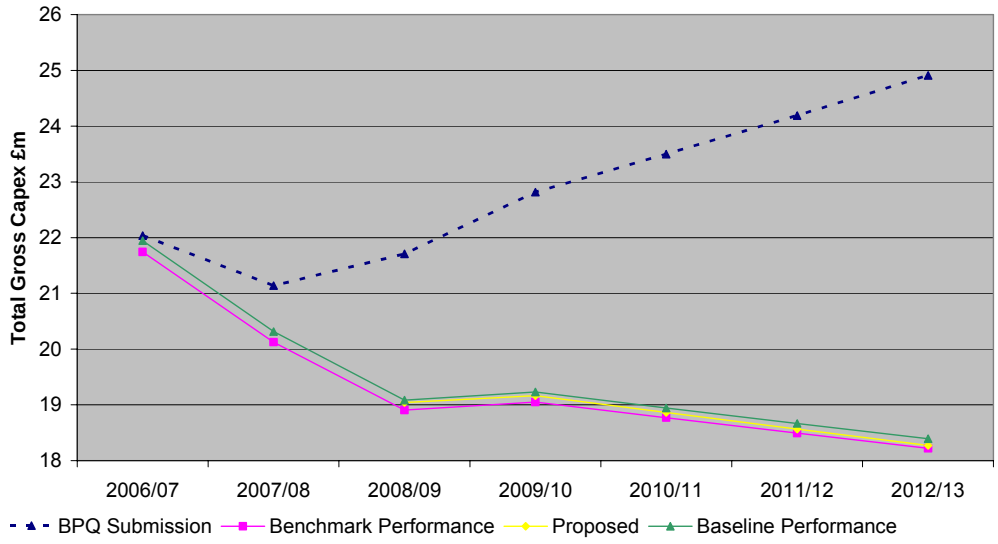


***Figure 4-9***

Figure 4-10 shows Wales & West's cost per connection projections for total connections over the forecast period 2008/09 to 2012/13.

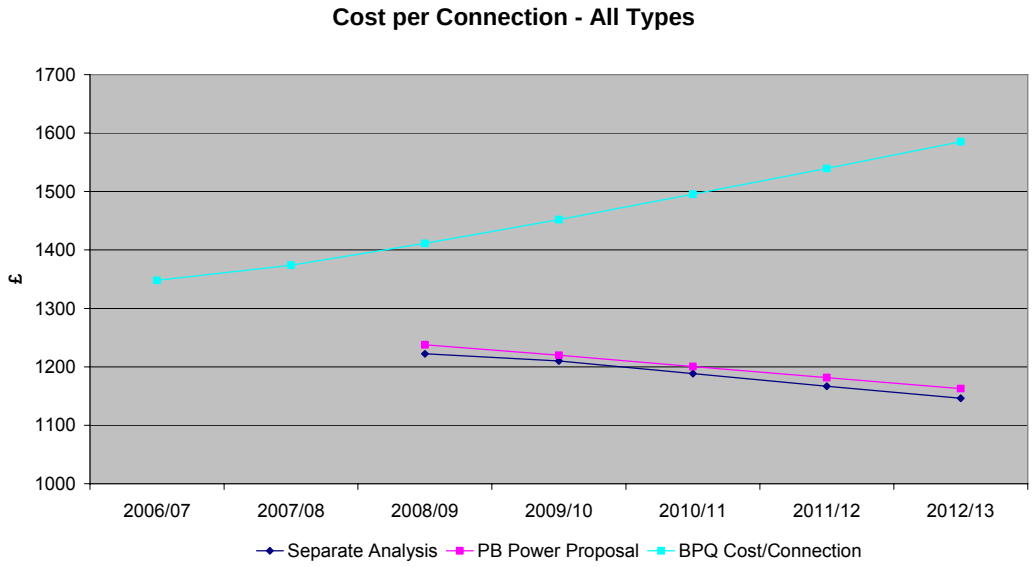


***Figure 4-10***

Gross expenditure for total connections is summarised in Table 4-2 below.

| Total Connections Gross Capex All figures £m 2005/06 prices | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 | Total |
|---|---|---|---|---|---|---|
| BPQ Gross Submission | 21.7 | 22.8 | 23.5 | 24.2 | 24.9 | 117.1 |
| Normalisation Adjustment | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Normalised Gross BPQ | 21.7 | 22.8 | 23.5 | 24.2 | 24.9 | 117.1 |
| Workload Adjustment | -1.4 | -1.5 | -1.5 | -1.6 | -1.6 | -7.5 |
| Efficiency Adjustment | -1.3 | -2.2 | -3.1 | -4.1 | -5.0 | -15.7 |
| Total Adjustments | -2.7 | -3.6 | -4.6 | -5.6 | -6.6 | -23.2 |
| Projected Gross | 19.0 | 19.2 | 18.9 | 18.6 | 18.3 | 93.9 |

***Table 4-2***

### 4.4.3.2 New Housing Connections

Figure 4-11 shows Wales & West's cost per connection projections for the new housing connections category over the forecast period 2008/09 to 2012/13.

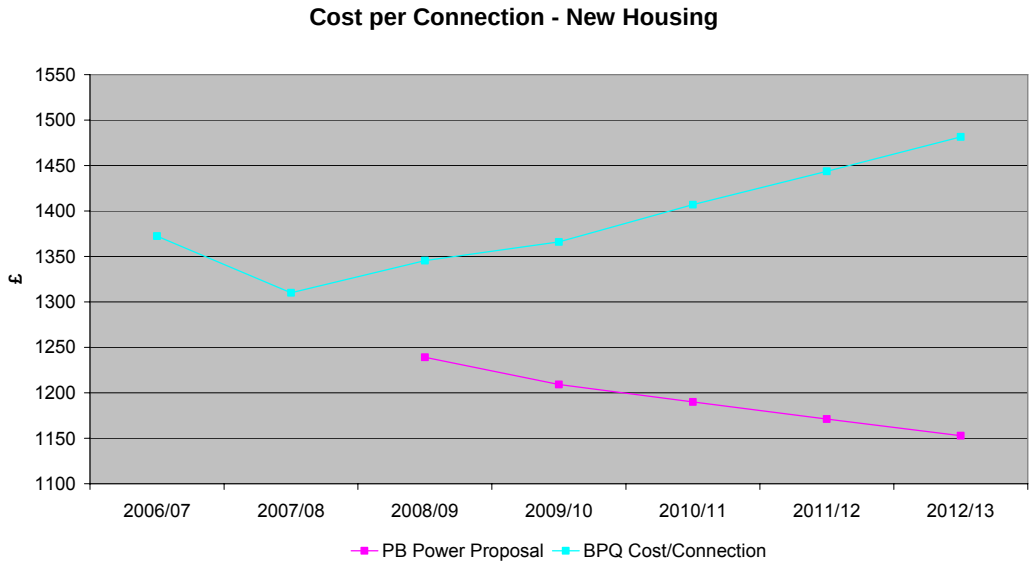


***Figure 4-11***

Gross expenditure for new housing connections is summarised in Table 4-3 below.

| New Housing Gross Capex<br>All figures £m 2005/06 prices | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 | Total |
|---|---|---|---|---|---|---|
| BPQ Gross Submission | 8.1 | 8.2 | 8.4 | 8.7 | 8.9 | 42.3 |
| Normalisation Adjustment | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Normalised Gross BPQ | 8.1 | 8.2 | 8.4 | 8.7 | 8.9 | 42.3 |
| Workload Adjustment | -1.0 | -1.0 | -1.0 | -1.1 | -1.1 | -5.2 |
| Efficiency Adjustment | 0.3 | 0.1 | -0.3 | -0.6 | -0.9 | -1.3 |
| Total Adjustments | -0.6 | -0.9 | -1.3 | -1.6 | -2.0 | -6.5 |
| Projected Gross | 7.4 | 7.3 | 7.1 | 7.0 | 6.9 | 35.8 |

***Table 4-3***

### 4.4.3.3 Existing Housing Connections

Figure 4-12 shows Wales & West's cost per connection projections for the existing housing connections category over the forecast period 2008/09 to 2012/13.

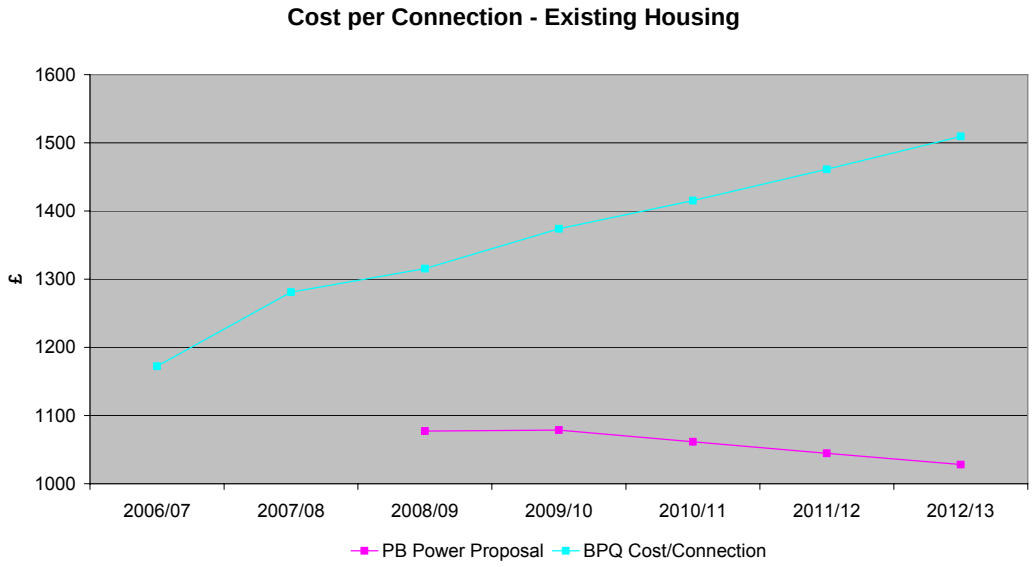


***Figure 4-12***

Gross expenditure for existing housing connections is summarised in Table 4-4 below.

| Existing Housing Gross Capex All figures £m 2005/06 prices | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 | Total |
|---|---|---|---|---|---|---|
| BPQ Gross Submission | 11.0 | 12.0 | 12.3 | 12.7 | 13.2 | 61.2 |
| Normalisation Adjustment | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Normalised Gross BPQ | 11.0 | 12.0 | 12.3 | 12.7 | 13.2 | 61.2 |
| Workload Adjustment | -0.2 | -0.2 | -0.2 | -0.2 | -0.3 | -1.1 |
| Efficiency Adjustment | -1.8 | -2.3 | -2.8 | -3.4 | -3.9 | -14.3 |
| Total Adjustments | -2.0 | -2.6 | -3.1 | -3.6 | -4.2 | -15.5 |
| Projected Gross | 9.0 | 9.4 | 9.2 | 9.1 | 9.0 | 45.7 |

***Table 4-4***

#### 4.4.3.4 Non-domestic Connections

Figure 4-13 shows Wales & West's cost per connection projections for the non domestic connections category over the forecast period 2008/09 to 2012/13.

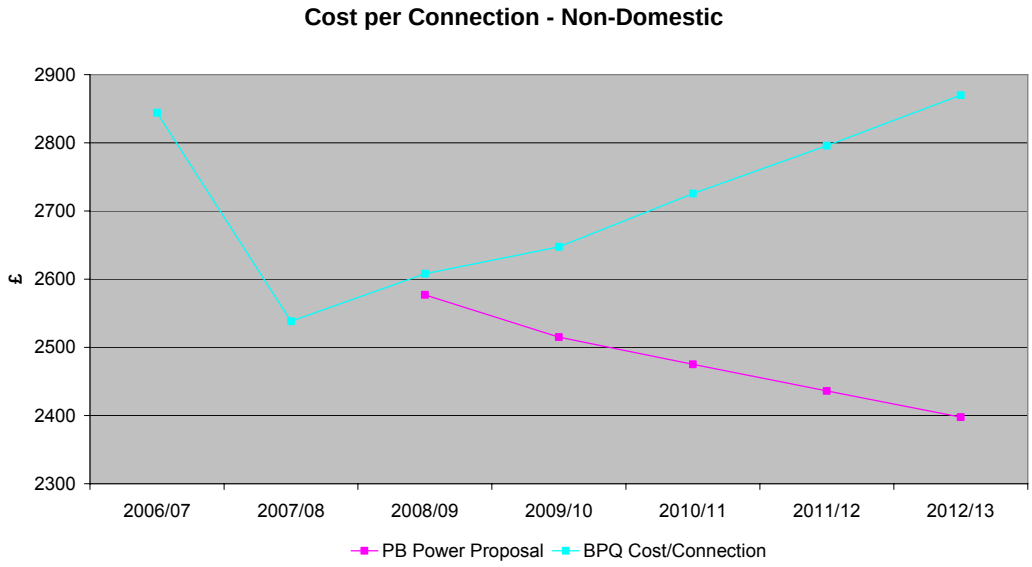


***Figure 4-13***

Gross expenditure for non domestic connections is summarised in Table 4-5 below.

| Non-Domestic Gross Capex<br>All figures £m 2005/06 prices | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 | Total |
|---|---|---|---|---|---|---|
| BPQ Gross Submission | 2.6 | 2.6 | 2.7 | 2.8 | 2.9 | 13.6 |
| Normalisation Adjustment | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Normalised Gross BPQ | 2.6 | 2.6 | 2.7 | 2.8 | 2.9 | 13.6 |
| Workload Adjustment | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -1.2 |
| Efficiency Adjustment | 0.2 | 0.1 | 0.0 | -0.1 | -0.2 | -0.1 |
| Total Adjustments | 0.0 | -0.1 | -0.3 | -0.4 | -0.5 | -1.2 |
| Projected Gross | 2.6 | 2.5 | 2.5 | 2.4 | 2.4 | 12.4 |

***Table 4-5***

### 4.4.3.5 Connections Net Capex

Our recommended connections Net Capex projections are based on the benchmarking analysis Gross Capex projections and incorporate the following assumptions:

- DLCA cost - Determined at 58% of existing housing services and 5% of new housing services gross Capex, based on the weighted average of the GDN DLCA assumptions for the base year 2006/07.
- EOW cost - Assessed at 6% of combined mains and services gross expenditure for all connections categories, which is the lowest level assumed by the majority of the GDNs.
- Final Connection Allowance (non-domestic) - nil
- Costs associated with time lag & unaccepted quotations - nil

Our recommended Net Capex projections are detailed in Section 4.4.6 - Recommendations.

## 4.4.4 SPECIFIC COST AREAS

### 4.4.4.1 Efficiency Improvements

WWU has made significant organisational changes during 2005/06 to deliver efficiency improvements in the management and execution of all connections processes and activities. WWU has not quantified precisely the level of improvement expected but we are of the view that efficiency savings within the range 5% in 2007/08 reducing to 2% in 2012/13 are appropriate. This range has been smoothed in the analysis process to 3% year on year over the forecast period.

### 4.4.4.2 Waste Management Regulations

The EU Landfill Directive is setting tighter standards on wastes that can go to landfill. Following recent changes in Regulations (July 2005) to bring England and Wales in line with the Directive, it is expected that more waste will be classified as “non-hazardous” rather than “inert” as at present. The standard Landfill Tax charge is currently £21/tonne for non-hazardous waste, with a lower rate of £2/tonne charged for inert waste. The Government has stated that the standard rate for non-hazardous waste will increase by at least £3 annually to a rate of £35 in 2010.

We acknowledge that the changes to the Regulations will generate additional costs but we judge that GDNs are able to mitigate these by improving the management and scope of operational practices such as minimisation of excavation, re-use of materials, recycling, conditioning and materials testing to establish inert status.

The effect of the increased tax charge has been assessed and we have concluded that the resulting additional expenditure associated with Capex operations is minimal and, therefore, no adjustment has been made to our expenditure projections. However, we recognise that there is uncertainty regarding the cost implications of these Regulations and recommend that the GDN be required to model the costs, based on our workload projections, for further consideration.

## 4.4.5 REAL PRICE EFFECTS

The recommended cost projections presented in Section 4.4.6 incorporate our real price inflation assumptions, as detailed in Section 2.7.

## 4.4.6 RECOMMENDATIONS

### 4.4.6.1 Workload

We recommend that our projections for Wales & West‘s workload volumes are accepted, as detailed in Table 4-8 below.

| BPQ Workload Volumes | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 |
|---|---|---|---|---|---|
| District Governors | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Existing Housing Mains <=180mm | 6.0 | 8.7 | 8.7 | 8.7 | 8.7 |
| Existing Housing Mains>180mm | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Existing Housing Services | 8384 | 8713 | 8713 | 8713 | 8713 |
| Feeder Mains <=180mm | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Feeder Mains >180mm | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| New Housing Mains <=180mm | 41.5 | 41.5 | 41.5 | 41.5 | 41.5 |
| New Housing Mains >180mm | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 |
| New Housing Services | 6000 | 6000 | 6000 | 6000 | 6000 |
| Non-Domestic Mains <=180mm | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 |
| Non-Domestic Mains >180mm | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 |
| Non-Domestic Services | 1000 | 1000 | 1000 | 1000 | 1000 |
| Service Governors | 166 | 166 | 166 | 166 | 166 |
| Specific Reinforcement Mains <=180mm | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 |
| Specific Reinforcement Mains >180mm | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |

***Table 4-6***

| Workload Adjusted Volumes | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 |
|---|---|---|---|---|---|
| District Governors | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Existing Housing Mains <=180mm | -1.2 | -1.7 | -1.7 | -1.7 | -1.7 |
| Existing Housing Mains>180mm | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Existing Housing Services | 0 | 0 | 0 | 0 | 0 |
| Feeder Mains <=180mm | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Feeder Mains >180mm | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| New Housing Mains <=180mm | -8.3 | -8.3 | -8.3 | -8.3 | -8.3 |
| New Housing Mains >180mm | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 |
| New Housing Services | 0 | 0 | 0 | 0 | 0 |
| Non-Domestic Mains <=180mm | -1.4 | -1.4 | -1.4 | -1.4 | -1.4 |
| Non-Domestic Mains >180mm | -0.1 | -0.1 | -0.1 | -0.1 | -0.1 |
| Non-Domestic Services | 0 | 0 | 0 | 0 | 0 |
| Service Governors | 0 | 0 | 0 | 0 | 0 |
| Specific Reinforcement Mains <=180mm | -0.5 | -0.5 | -0.5 | -0.5 | -0.5 |
| Specific Reinforcement Mains >180mm | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 |

***Table 4-7***

| Workload Projections Volumes | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 |
|---|---|---|---|---|---|
| District Governors | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| Existing Housing Mains <=180mm | 4.8 | 7.0 | 7.0 | 7.0 | 7.0 |
| Existing Housing Mains>180mm | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Existing Housing Services | 8384 | 8713 | 8713 | 8713 | 8713 |
| Feeder Mains <=180mm | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Feeder Mains >180mm | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| New Housing Mains <=180mm | 33.2 | 33.2 | 33.2 | 33.2 | 33.2 |
| New Housing Mains >180mm | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| New Housing Services | 6000 | 6000 | 6000 | 6000 | 6000 |
| Non-Domestic Mains <=180mm | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 |
| Non-Domestic Mains >180mm | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| Non-Domestic Services | 1000 | 1000 | 1000 | 1000 | 1000 |
| Service Governors | 166 | 166 | 166 | 166 | 166 |
| Specific Reinforcement Mains <=180mm | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 |
| Specific Reinforcement Mains >180mm | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |

***Table 4-8***

### 4.4.6.2 Expenditure

Our recommended Net Capex projections are detailed in Tables 4-9, 4-10 and 4-11 below.

| New Housing Net Capex<br>All figures £m 2005/06 prices | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 | Total |
|---|---|---|---|---|---|---|
| BPQ Net Submission | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 7.1 |
| Normalisation Adjustment | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Normalised Net BPQ | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 7.1 |
| Workload Adjustment | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Efficiency Adjustment | -0.8 | -0.8 | -0.8 | -0.9 | -0.8 | -4.1 |
| Total Adjustments | -0.8 | -0.8 | -0.8 | -0.9 | -0.8 | -4.1 |
| Projected Net | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 3.0 |

***Table 4-9***

| Existing Housing Net Capex<br>All figures £m 2005/06 prices | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 | Total |
|---|---|---|---|---|---|---|
| BPQ Net Submission | 6.8 | 7.2 | 7.5 | 7.7 | 7.9 | 37.1 |
| Normalisation Adjustment | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Normalised Net BPQ | 6.8 | 7.2 | 7.5 | 7.7 | 7.9 | 37.1 |
| Workload Adjustment | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Efficiency Adjustment | -1.3 | -1.7 | -2.0 | -2.4 | -2.7 | -10.1 |
| Total Adjustments | -1.3 | -1.7 | -2.0 | -2.4 | -2.7 | -10.1 |
| Projected Net | 5.4 | 5.5 | 5.4 | 5.4 | 5.3 | 27.0 |

***Table 4-10***

| Non-Domestic Net Capex<br>All figures £m 2005/06 prices | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 | Total |
|---|---|---|---|---|---|---|
| BPQ Net Submission | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 2.5 |
| Normalisation Adjustment | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Normalised Net BPQ | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 2.5 |
| Workload Adjustment | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 |
| Efficiency Adjustment | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -1.6 |
| Total Adjustments | -0.4 | -0.3 | -0.4 | -0.4 | -0.3 | -1.7 |
| Projected Net | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.7 |

***Table 4-11***

# 5 MAINS AND GOVERNOR CAPEX

## 5.1 SUMMARY

| Net Capex £m (2005/06 prices) | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 | Total |
|---|---|---|---|---|---|---|
| **BPQ Submission** | | | | | | |
| Reinforcement Mains | 5.5 | 10.2 | 6.0 | 6.3 | 6.5 | **34.5** |
| District Governors | 3.8 | 3.8 | 2.6 | 2.6 | 2.1 | **14.9** |
| Service Governors | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | **0.4** |
| **Total** | **9.4** | **14.0** | **8.7** | **9.0** | **8.8** | **49.8** |
| **Normalisation Adjustments** | | | | | | |
| District Governors | -1.9 | -1.9 | -0.8 | -0.8 | -0.6 | **-5.9** |
| **Total** | **-1.9** | **-1.9** | **-0.8** | **-0.8** | **-0.6** | **-5.9** |
| **Normalised BPQ** | | | | | | |
| Reinforcement Mains | 5.5 | 10.2 | 6.0 | 6.3 | 6.5 | **34.5** |
| District Governors | 1.8 | 1.9 | 1.8 | 1.9 | 1.6 | **9.0** |
| Service Governors | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | **0.4** |
| **Total** | **7.4** | **12.1** | **7.9** | **8.2** | **8.2** | **43.9** |
| **Adjustments** | | | | | | |
| Reinforcement Mains | 0.3 | 0.1 | -0.2 | -0.4 | -0.7 | **-0.9** |
| District Governors | 0.0 | -0.1 | -0.1 | -0.1 | -0.1 | **-0.4** |
| Service Governors | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | **0.0** |
| **Total** | **0.3** | **0.0** | **-0.3** | **-0.5** | **-0.8** | **-1.3** |
| **Proposed** | | | | | | |
| Reinforcement Mains | 5.8 | 10.3 | 5.8 | 5.9 | 5.9 | **33.6** |
| District Governors | 1.8 | 1.8 | 1.7 | 1.8 | 1.4 | **8.6** |
| Service Governors | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | **0.4** |
| **Total** | **7.7** | **12.2** | **7.6** | **7.7** | **7.4** | **42.6** |

***Table 5-1***

## 5.2 POLICIES & PROCEDURES

WWU Policies and Procedures associated with reinforcement mains and governors activities have been reviewed as detailed in Appendix 1. The various levels of engineering and safety documents together with the governance arrangements have been reviewed and no issues found.

## 5.3 HISTORICAL PERFORMANCE

### 5.3.1 INTRODUCTION

Mains and Governor Capex includes all expenditure associated with reinforcement of the below 7bar distribution network to ensure that transportation capacity is adequate to meet the forecast peak demand. Network reinforcement is substantially driven by general demand growth and the objective of the activity is to ensure that the minimum pressure required at customers' meters is maintained throughout the network. The workload volume is generated from periodic network analysis supported by validation to ensure consistency between modelled and actual pressures.

Governor Capex also includes expenditure associated with governor replacement activities.

## 5.3.2 DEFINITION OF ACTIVITY

### 5.3.2.1 Reinforcement Mains

General reinforcement mains activity and expenditure is driven by the following:

- The requirement to ensure that the transportation capacity of the distribution network is adequate to meet the forecast 1:20 peak demand to a 5 year horizon without constraint.
- GDN policy regarding the maximum operating pressure (MOP) of the distribution network and the necessity to ensure that the minimum pressure requirement at customer's meters is maintained throughout the network.
- Up sizing of risk policy replacement mains to compensate for the effects of mains abandonment and replacement of transportation capacity.
- Non-contiguous reinforcement activity associated with customer connection requests.
- General demand growth.

### 5.3.2.2 Governors

Governor activity and expenditure is driven by the following:

- New district governor installations associated with distribution network reinforcement necessitated by general demand growth.
- Replacement of district governor installations to increase capacity due to demand growth.
- Replacement of district and service governor installations due to obsolescence.
- Failure of district and service governor installations, and the economics of repair versus replacement.
- Replacement of district and service governor installations to ensure compliance with risk mitigation policy requirements and design standards.

## 5.3.3 ESTABLISH UNDERLYING COSTS

### 5.3.3.1 Reinforcement mains

Figure 5-1 shows reinforcement mains gross expenditure levels for the period 2002/03 to 2006/07.

The high workload volumes and expenditure in 2002/03 and 2003/04 included six major projects (>£0.5m) and resulted from a Transco initiated validation programme in 1999/2000 to validate all low and medium pressure networks. This workload and high unit costs resulted in higher levels of reinforcement expenditure.

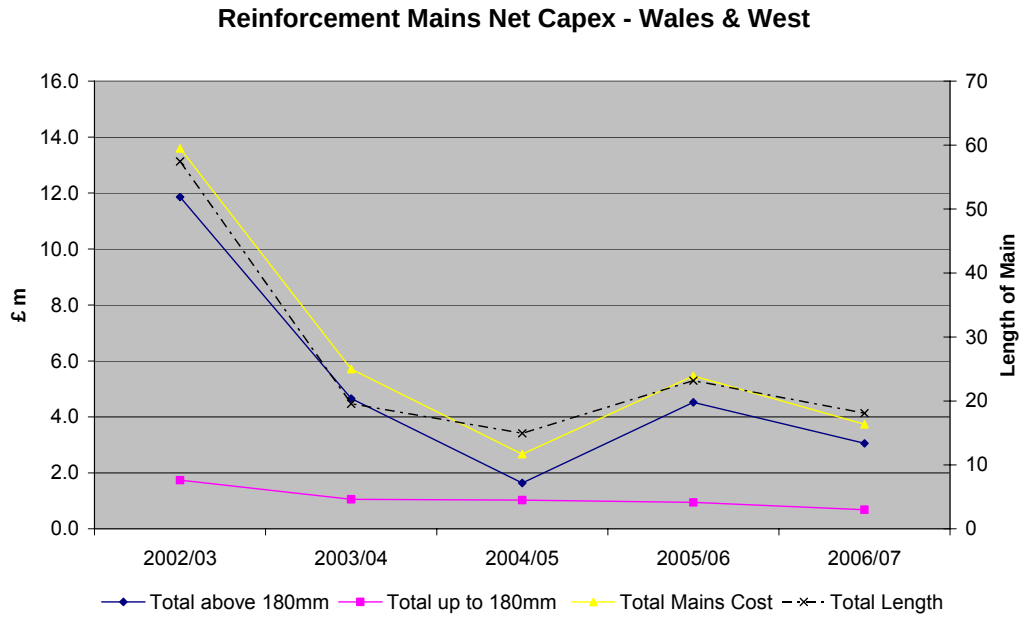


***Figure 5-1***

### Governors - Renewal and Growth

Figure 5-2 shows renewal and growth governor gross expenditure levels for the period 2002/03 to 2006/07.

The variability of workload volumes and expenditure between years does not reveal any trend to inform our review of the forecasts. Expenditure increased in 2006/07 as a consequence of a high governor renewal workload volume compared to historic levels.

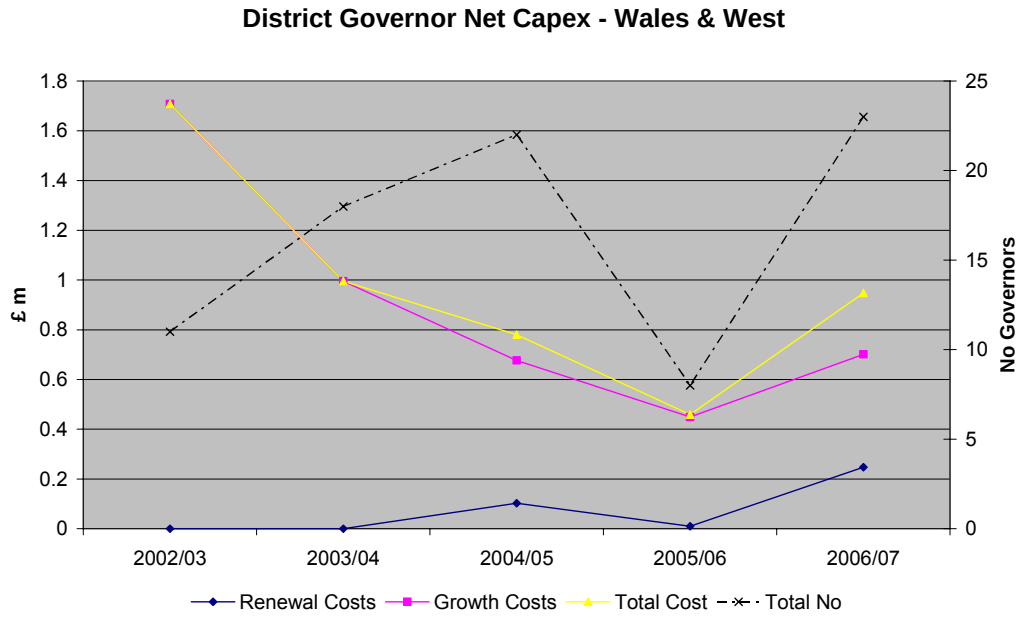


***Figure 5-2***

### 5.3.3.2 Governors - Service

Figure 5-3 shows domestic and non- domestic service governor gross expenditure levels for the period 2002/03 to 2006/07.

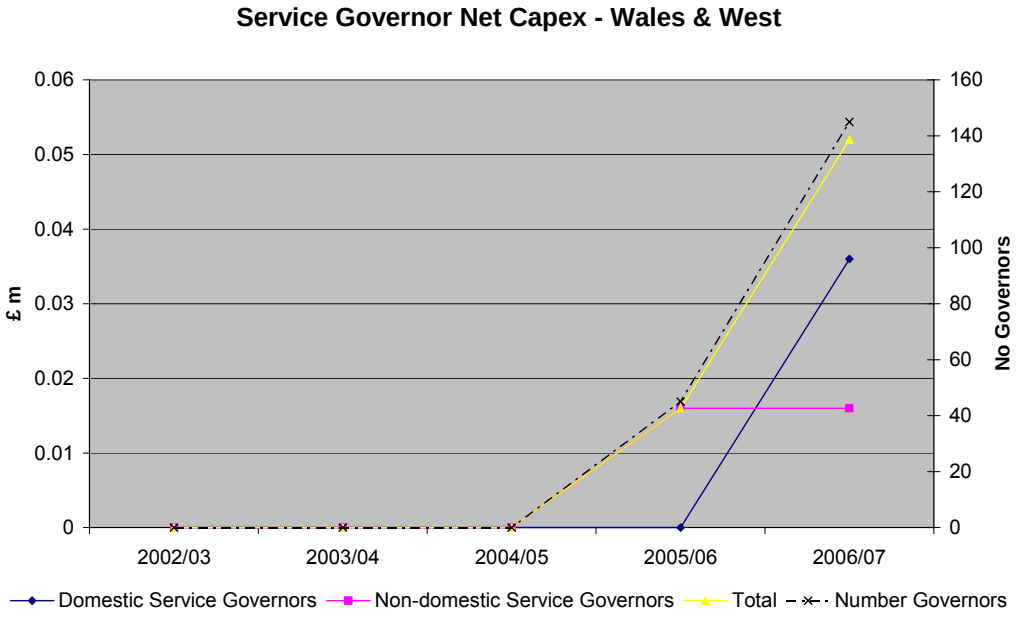


***Figure 5-3***

## 5.3.4 PROPOSED EFFICIENT LEVEL OF COSTS

### 5.3.4.1 Analysis Process

We have developed projections for the efficient level of expenditure required by Wales & West to carry out its reinforcement and governors activities through benchmarking across GDNs, analysis of their workload assumptions, and review of their forecasts.

Normalisation adjustments have been identified for district governors related activities. WWU's forecasts include expenditure associated with replacement of governor kiosks due to condition, kiosk modifications to ensure compliance with the Dangerous Substances and Explosive Atmospheres Regulations 2002 (DSEAR), replacement fencing and security fencing/land. This expenditure, £5.92m for the period 2008/09 to 2012/13, has been allocated incorrectly and has been transferred to Other Operational Capex.

No adjustments to workloads have been identified.

Reinforcement mains activities are separated into two main categories, below and above 180mm pipe size bands. Using 2005/06 as a base year, we have carried out regression analysis for the separate categories and also for total reinforcement mains. The analyses for the separate categories are adversely affected by outlying values and having examined the results we concluded that total reinforcement mains data provided the most robust regression and analysis for the projections. The analysis process is described in detail in Section 2.

WWU has not quantified a level of efficiency improvement for this activity. However, we are of the opinion that there is scope for improvements driven by optimised management of operations and review of period contract arrangements. It is considered that 2% year on year performance improvement is appropriate for this activity, in addition to any progression to the benchmark performance level by underperforming GDNs.

In order to derive our projections for efficient expenditure we have assumed that where a GDN is underperforming the benchmark, the gap with the benchmark will be reduced over the forecast period to 30% by 2012/13. Where a GDN is outperforming the benchmark the projection will be reduced year on year to match the GDN's out performance in 2012/13.

The expenditure projections are adjusted to incorporate Regional Factors and our Standard Real Price Effect assumptions, as specified in Section 2.7.

#### 5.3.4.2 Reinforcement Mains Benchmarking Analysis

A number of regression options have been explored, however, for most activities we have concluded that the most suitable regression is achieved by analysis of the logarithmic values of normalised costs and the chosen driver. A "basket of work" approach has been used to produce a weighted average of a number of different work elements (pipe sizes). The driver is calculated by multiplying the work volume by a nominal unit cost for the activity. The approach is not sensitive to the actual level of these nominal unit costs, but works on the relative costs between work types.

This approach allows the analysis to fully reflect the workload forecast by the GDNs, adjusted for the period 2008/09 to 2012/13as deemed appropriate by our consultants.

The starting point for setting the target benchmark is an Ordinary Least Squares (OLS) regression on the eight data points, one for each GDN, applicable in the base year (2005/06). The $R^2$ value indicates how well the variation in costs is explained by the variation in the workload driver.

The OLS regression calculation takes into account all the data points in determining the relationship between the costs and the workload driver. This relationship could be used to determine the frontier costs for each network, but these costs are unlikely to be efficient since generally only some networks will be operating at the efficiency frontier.

We therefore propose to obtain the benchmark cost relationship by adjusting the OLS regression line so that it reflects efficient network performance rather than average performance.

This relationship could be constructed by shifting down the regression line until all the data points are above the line except for one data point which is on the line. This is the Corrected Ordinary Least Squares (COLS) regression line.

However, we consider that there are differences between GDNs which may not be fully explained by the regression analysis and that it is reasonable to set the frontier relationship by shifting the regression line down to the upper quartile. This is the upper quartile COLS regression line and is shown in pink on the charts. This is the target which all under performing GDNs should move towards.

Where the regression uses log-linear analysis, the effect of rejecting the OLS regression line as the frontier relationship in favour of the upper quartile COLS regression line is to reduce the target costs of each network by the same percentage.

With this approach, 75% of networks will be performing at or below the frontier in the base year and these networks will be expected to continue to improve their performance over the period to 2012/13, and our proposed ongoing productivity improvements are set out in Section 5.3.4.1. The resulting target costs for 2012/13 are shown in yellow on the charts.

Figure 5-4 shows the output from benchmarking analysis of 2005/06 cost performance for total reinforcement mains and indicates a very good fit for this activity. The values of cost and synthetic drivers being less than one, lead to the logarithmic values being negative at these values.

Wales & West's performance ranks 6$^{th}$ best after allowing for regional factors.

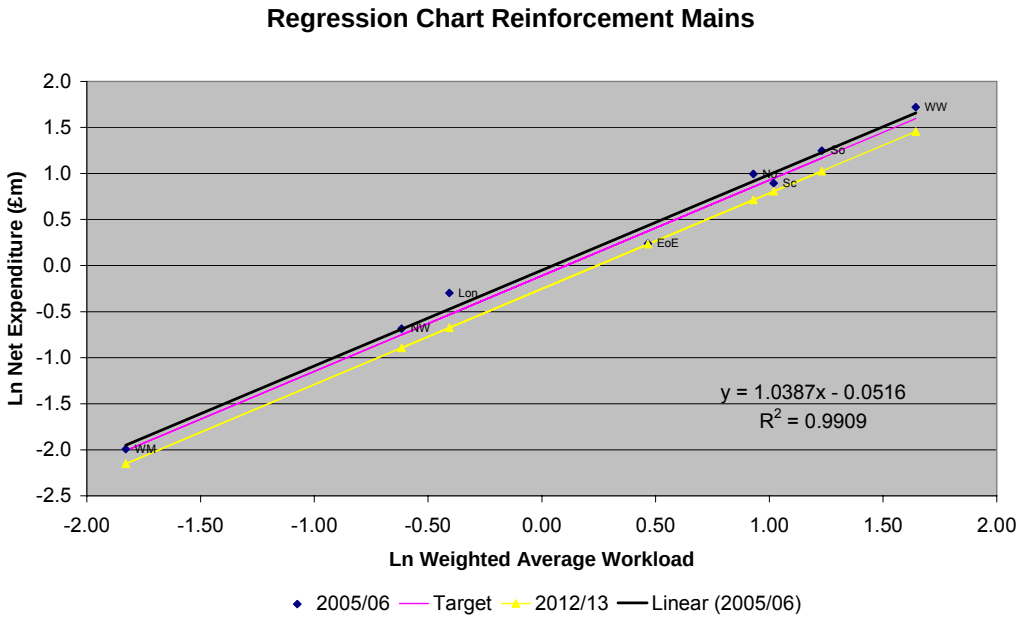


***Figure 5-4***

#### 5.3.4.3 Governors Analysis

We have examined the BPQ information returned by the GDNs and wide variations in unit costs are evident across all activity categories. Unit cost performance for governor activity categories is significantly influenced by workload volumes, design pressure and capacity, complexity of site installation and cost allocation issues, e.g. costs associated with inlet/outlet mains connections, site security, telemetry, pressure optimisation equipment. We have asked for further information on cost allocations from the GDNs but the responses did not reveal any significant reasons for the unit cost variations.

Governor activities are separated into three main categories, i.e. renewal, growth and service. We have carried out regression analysis for the separate categories and also for total governors. Due to data inconsistencies, the results did not provide a robust basis for our expenditure projections over the forecast period. Therefore, our analysis is based on review of BPQ workload and unit cost projections for the renewal, growth and service governor activity categories taking into account historical and forecast trends, and WWU's assumptions.

Recommended expenditure projections incorporate any adjustments made in the review process, Regional Factors and our Standard Real Price Effect assumptions.

We are of the opinion that governors' operational activities do not provide the opportunity for significant improvements in efficiency, We have therefore applied no efficiency adjustments.

## 5.4 FORECAST

### 5.4.1 INTRODUCTION

#### 5.4.1.1 Reinforcement Mains

Wales and West's forecasts include expenditure to reduce LP system average operating pressures from 35.55 mbar in 2005/06 to 33.1 mbar in 2012/13 and, as a consequence, to reduce shrinkage and leakage related Opex. Achievement of this objective is dependent on the following contributory factors:

- Pressure management equipment upgrade and replacement.

Historically, the maximum operating pressures (MOP) of the large LP networks in the Wales LDZ have been elevated to 65 - 70 mbar which is significantly in excess of the 50 mbar level generally adopted by GDNs as the MOP for mixed materials mains networks. It is presumed that the decision to raise pressures was justified on the basis of deferral of reinforcement and took into account the existence of pressure management systems which optimise operating pressures to ensure that the networks are only subjected to the maximum level at times of peak demand, and for short periods of time. The pressure management systems currently in operation were installed twenty years ago and were originally designed to operate in over a range of 21 to 50 mbar. They are now both inefficient in terms of capability to minimise pressures and are obsolete. Wales and West has included £14m expenditure in their 2008/09 to 2012/13 forecasts for Other Operational Capex to replace and upgrade these systems to current design standards.

- Renegotiation of Third Party IGT contractual pressures.

  High CSEP contracted pressures act as a constraint on reductions in operating pressures. The extent to which these arrangements are inhibiting pressure optimisation to minimise leakage is currently under investigation, following which Wales & West intends to implement procedures agreed at the IGT Forum to renegotiate contractual pressure commitments.

- Network reinforcement to facilitate infeed pressure reductions.

  Wales & West's forecast mains reinforcement workload volumes include 6km per year to reduce operating pressures in the Wales LDZ LP networks.

Wales & West's forecasts for reinforcement mains also incorporate the following activities:

- General reinforcement - Growth

  This activity is driven by the requirement to ensure that the transportation capacity of the distribution network is adequate to meet the forecast 1:20 peak demand to a 5 year horizon taking into account growth in demand.

- Replacement mains upsizing

  A proportion of the reinforcement workload results from upsizing of mains replacement to compensate for the loss of transportation capacity caused by inserting smaller mains. The accounting convention generally operated is such that if a replacement main is greater than 2" larger in diameter, the expenditure is allocated to reinforcement. The replacement mains upsizing workload is driven by the requirement to contain maximum operating pressures and ensure adequate transportation capacity in the distribution system to meet forecast demand. Wales & West's forecasts include 6.5km per year replacement mains upsizing to offset the effect of replacement techniques on transportation capacity and facilitate reductions in network operating pressures.

In conclusion, we are satisfied that the workload forecasts are reasonable and propose no adjustments.

#### 5.4.1.2 Governors

In assessing the Network's expenditure forecasts for governors we have reviewed the annual workload volumes and unit costs proposed, together with the forecasting processes applied. Also, we have investigated the background to the policy associated with their district governors renewal programme and our conclusions are detailed in the following section of this report.

**WWU District Governors renewal programme**

WWU's expenditure forecasts for the period 2008/09 to 2012/13 include £4.32m to replace 100 district governor installations that do not comply with current policy

(equivalent to the NGG policy T/PL/R6 October 2004). Mitigation of risk is the principal reason for replacement but the policy also addresses issues associated with obsolescence and minimisation of lifecycle costs. The policy is supported by a management procedure (equivalent to the NGG policy T/PM/GOV/1) that incorporates a decision support tool to determine priority for replacement based on risk, and the associated programme of work commenced substantially in 2007/08.

The information provided by WWU in response to a supplementary question indicated that the affected governor installations generally comprise streams of single regulators with inlet pressures up to 7 bar that do not incorporate safety devices to protect the downstream distribution network from over or under - pressurisation in the event of equipment failure. Such installations were originally identified as high priority for replacement under the terms of a risk based policy implemented in 1984 following a number of failure incidents. At that time a prioritised programme of replacement work was established which was scheduled for completion in the year 2000. A policy review in 1994 extended the deadline to 2010 and further guidance was issued in 1996 which resulted in re-assessment of the necessity for replacement and removal of particular installation types from the programme.

It can be argued that expenditure associated with replacement of governor installations that do not incorporate the required number of safety devices should have been incurred in the period 1984 to 1994 and, therefore, the expenditure projections for the period 2008/09 to 2012/13 should be reduced to take account of this issue. This does not imply that the current policy is inappropriate technically or the workload identified is not necessary. In our opinion the policy is entirely appropriate to ensure safe operation of district governors and security of supply within the distribution network. The replacement workload forecasts have not been adjusted since it is necessary to undertake the work.

WWU has amended the response to the supplementary question and has given an assurance that the forecast governor renewal workload for Wales and West does not include any installations that do not incorporate the required number of safety devices and would have been categorised as high priority for replacement prior to the policy review in 1994. Therefore, our expenditure projections do not incorporate any adjustments associated with this issue.

**WWU Service and Growth District Governors forecasts**

We are satisfied that the forecasts for growth and service governors are reasonable and propose no adjustments.

## 5.4.2 COMPANY PROPOSALS

### 5.4.2.1 Reinforcement mains

**Key Assumptions**

In addition to the generic assumptions for Wales & West, detailed in Section 2.7, WWU has stated that their reinforcement mains expenditure forecasts also take into account the following assumptions and issues:

- The work load diameter mix will change over the period with a predicted increase of 10% in the >180mm diameter band work due to upsizing of replacement projects.
- Reinforcement is required to lower LP network operating pressures to reduce the level of Shrinkage.
- Expenditure forecasts are based on 2005/06 unit costs with addition of real price increases.

**Workload Forecasts**

Figure 5-5 shows the reinforcement mains workload forecasts for Wales & West.

The lead time for planning for distribution system reinforcement projects is generally 2 to 3 years and is based on network validation exercises. Therefore the workload projections for the period 2008/9 to 2012/13 are, substantially, estimates based on the key assumptions and historical levels.

Wales & West's LP average system pressures are forecast to decrease from 35.55 mbar in 2005/06 to 33.1 mbar in 2012/13. This decrease is aligned with the forecast assumptions and will contribute to reductions in shrinkage and leakage related Opex.

We requested sample project documents that include a cost/benefit analysis taking into account the capital cost of the reinforcement works and Opex costs arising from the alternative of increasing system pressure. However, Wales & West could only provide examples where reinforcement has been undertaken to maintain extremity pressures and ensure that the MOP is not compromised, which is indicative of the Wales LDZ high MOP issue described in Section 5.4.1.1.

Wales & West's reinforcement mains workload forecasts include approximately 6.5km per year associated with replacement mains upsizing.

The workload forecasts have been considered taking into account historical trend levels, WWU's assumptions and the impact of major projects. Workload volumes across the forecast period include increased >180mm activity which reflects the assumptions. The exceptionally high >180mm workload volume in 2009/10 is substantially due to the 16.5km Bude reinforcement project.

We have not identified any issues and recommend that the workload forecasts are accepted

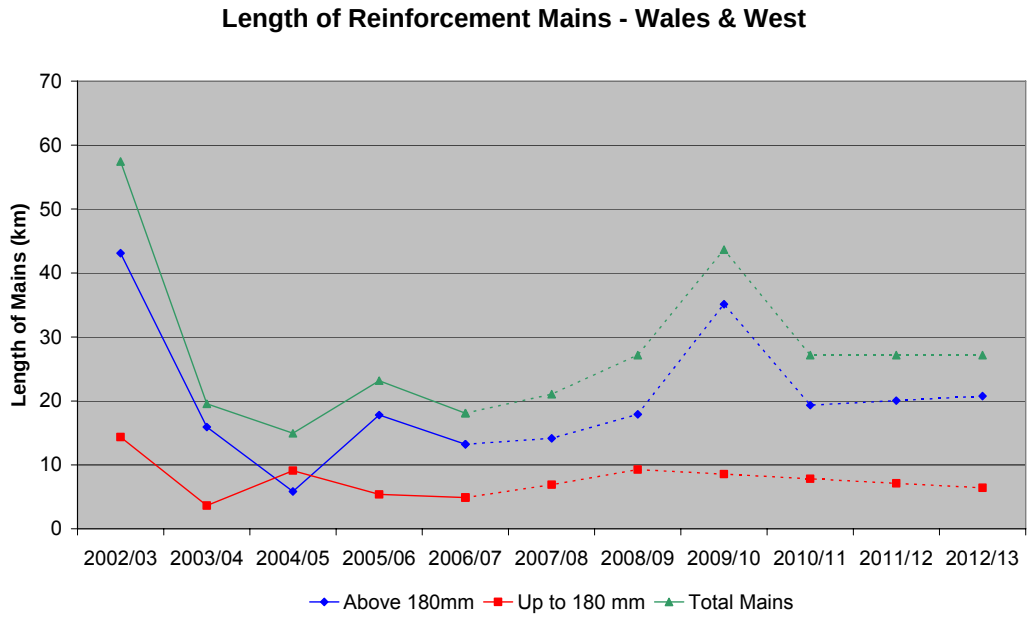


***Figure 5-5***

### 5.4.2.2 Governors

**Key Assumptions**

In addition to the generic assumptions for Wales & West, detailed in Section 2.7, WWU has stated that their governors expenditure forecasts also take into account the following assumptions and issues:

- Growth governors workload forecasts are driven by reinforcement activity.
- Renewal governors workload forecasts are driven by condition, security, obsolescence, serviceability and upgrade to meet increased demand in the downstream network.
- Below ground governor installations, both growth and renewal, will increase from the current level of 25% to 50% over a period of 10years from 2005/06.
- Service governors workload forecasts reflect a policy of replace on failure.
- Expenditure forecasts are based on 2005/06 unit costs with addition of real price increases.

In a response to a supplementary question, Wales & West confirmed that the renewal governors forecast workload is entirely associated with installations that do not incorporate the number of safety devices required by current risk mitigation policies. This matter is considered further in Section 5.4.1.2.

Governor installation upgrade activity to meet increased demand in the downstream network is included in the growth category.

**Workload Forecasts**

Figures 5-6 and 5.7 show the governor workload forecasts for Wales & West.

The growth governors workload forecasts have been considered taking into account historical trends and WWU's assumptions. We have not identified any issues and recommend that the growth workload forecasts are accepted.

A review of the renewal governors workload forecasts is included in Section 5.4.1.2. For the reasons identified we recommend that the renewal governors workload forecasts are accepted.

Service governors workload forecasts reflect a policy of replace on failure. Historical data is suspect and, therefore, does not provide a credible trend into the forecast period.

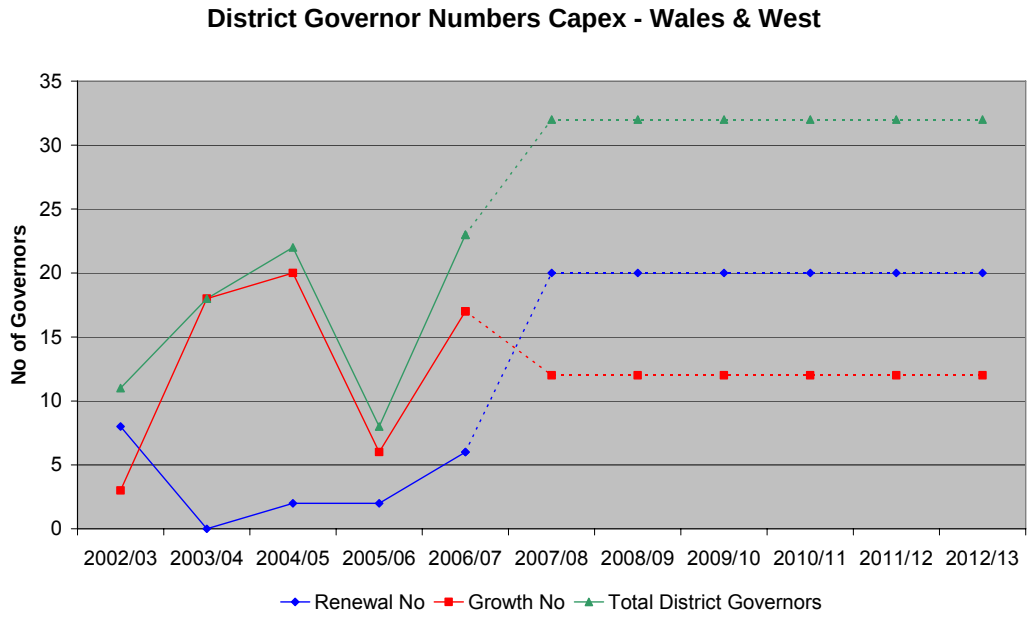


***Figure 5-6***

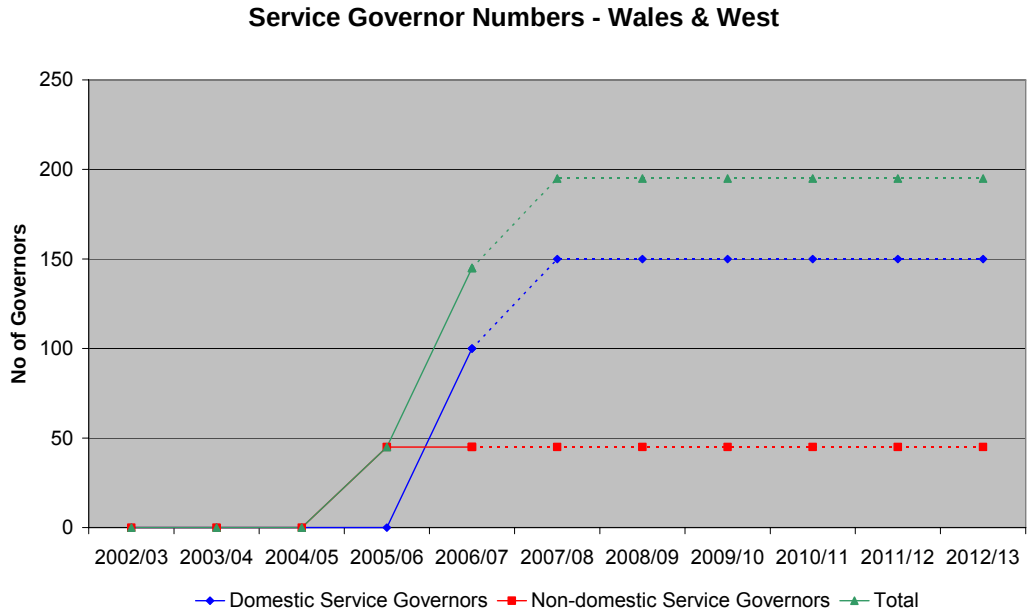


***Figure 5-7***

## 5.4.3 PB POWER PROPOSALS

### 5.4.3.1 Reinforcement mains

Figure 5-8 shows Wales & West's expenditure projections for the total reinforcement mains activity over the period 2005/06 to 2012/13.

The recommended expenditure projections reflect closing the gap with the target performance to 30% by 2012/13. The Real Price Effects specified in Section 5.3.5 and Regional Factors are also incorporated.

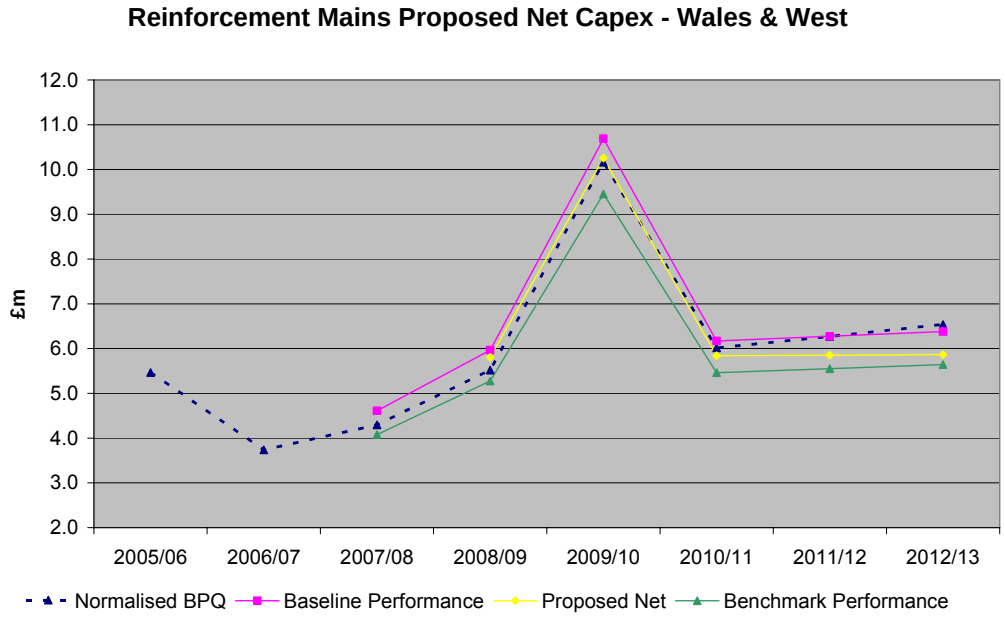


***Figure 5-8***

### 5.4.3.2 Governors

As stated in Section 5.3.4.3, governors cost projections for the forecast period have been assessed by review of BPQ workload and unit cost forecasts for the renewal, growth and service governor activity categories taking into account historical trends and WWU's assumptions. Recommended cost projections take into account any adjustments made.

No adjustments have been made to Wales & West's workload and expenditure forecasts.

Figures 5-9 and 5.10 show the expenditure projections for governor activities over the period 2005/06 to 2012/13.

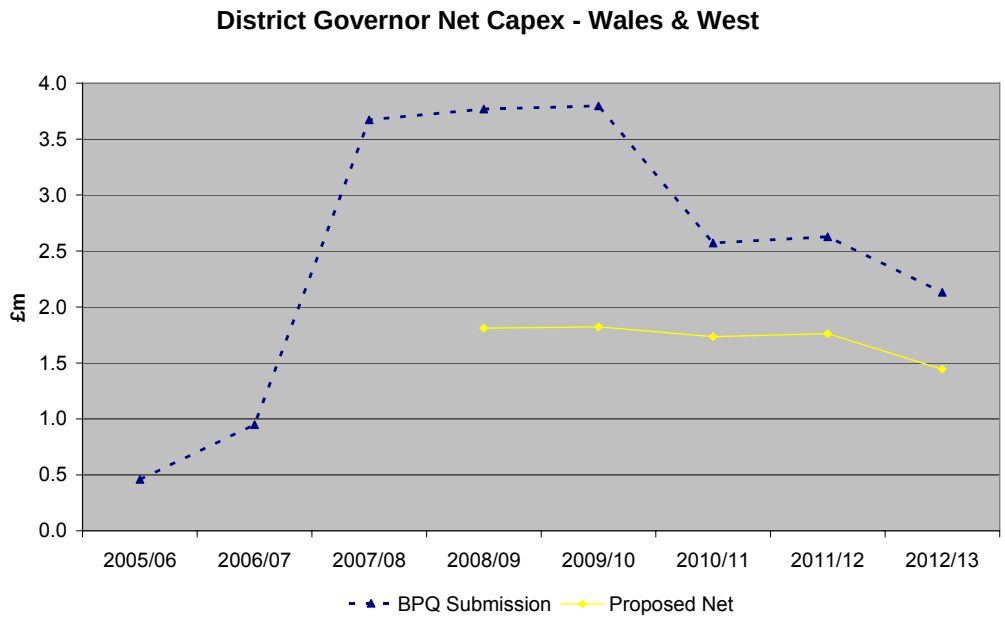


***Figure 5-9***

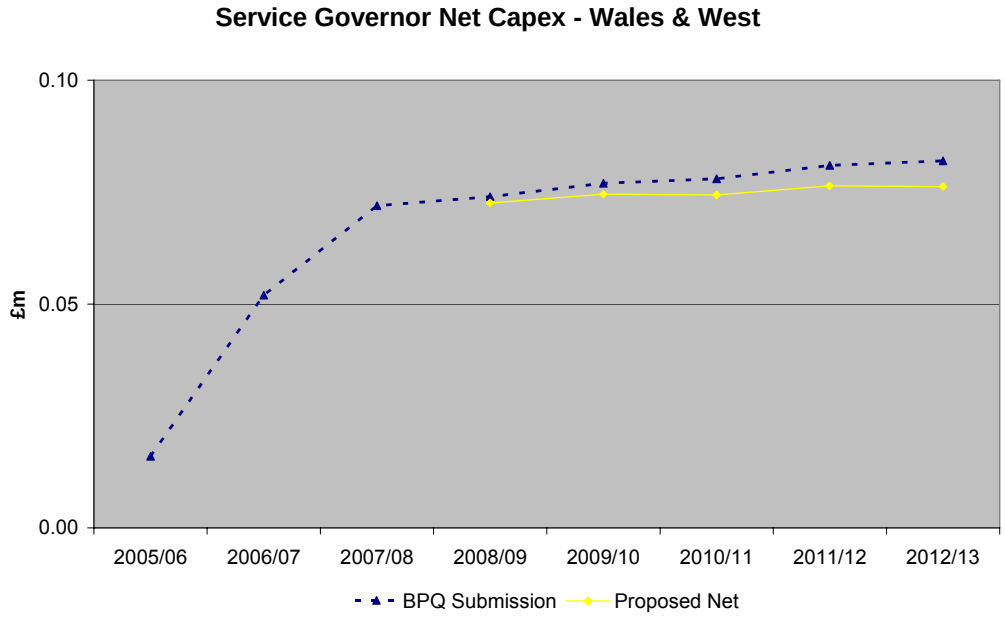


***Figure 5-10***

## 5.4.4 SPECIFIC COST AREAS

### 5.4.4.1 Efficiency Improvements

WWU has not quantified a level of efficiency improvement for reinforcement mains. However, we are of the opinion that there is scope for improvement driven by optimised management of operations and review of period contract arrangements. It is considered that 2% year on year performance improvement is appropriate for this activity.

### 5.4.4.2 Governors - Renewal

No adjustments have been made to Wales & West's workload forecasts but expenditure projections have been adjusted in accordance with Section 5.3.1.2., i.e. the projections for the renewal category are zero.

### 5.4.4.3 Waste Management Regulations

The EU Landfill Directive is setting tighter standards on wastes that can go to landfill. Following recent changes in Regulations (July 2005) to bring England and Wales in line with the Directive, it is expected that more waste will be classified as "non-hazardous" rather than "inert" as at present. The standard Landfill Tax charge is currently £21/tonne for non-hazardous waste, with a lower rate of £2/tonne charged for inert waste. The Government has stated that the standard rate for non-hazardous waste will increase by at least £3 annually to a rate of £35 in 2010.

We acknowledge that the changes to the Regulations will generate additional costs but we judge that GDNs are able to mitigate these by improving the management and scope of operational practices such as minimisation of excavation, re-use of materials, recycling, conditioning and materials testing to establish inert status.

The effect of the increased tax charge has been assessed and we have concluded that the resulting additional expenditure associated with Capex operations is minimal and, therefore, no adjustment has been made to our expenditure projections. However, we recognise that there is uncertainty regarding the cost implications of these Regulations and recommend that SGN be required to model the costs, based on our workload projections, for further consideration.

## 5.4.5 REAL PRICE EFFECTS

The recommended cost projections presented in Section 5.3.6 incorporate our real price effect assumptions, as detailed in Section 2.7.

## 5.4.6 RECOMMENDATIONS

### 5.4.6.1 Workload

We recommend that the Wales & West BPQ workload forecasts for reinforcement mains and governors activities are accepted, as summarised in Tables 5.2, 5.3 and 5.4.

| Reinforcement Mains Length (km) | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 |
|---|---|---|---|---|---|
| BPQ | | | | | |
| <180mm | 9.3 | 8.5 | 7.8 | 7.1 | 6.4 |
| >180mm | 17.9 | 35.1 | 19.3 | 20.0 | 20.7 |
| | 27.2 | 43.7 | 27.2 | 27.2 | 27.2 |
| Normalisation Adjustments | | | | | |
| <180mm | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| >180mm | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| BPQ | | | | | |
| <180mm | 9.3 | 8.5 | 7.8 | 7.1 | 6.4 |
| >180mm | 17.9 | 35.1 | 19.3 | 20.0 | 20.7 |
| Total | 27.2 | 43.7 | 27.2 | 27.2 | 27.2 |
| Work Load Adjustments | | | | | |
| <180mm | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| >180mm | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Projected | | | | | |
| <180mm | 9.3 | 8.5 | 7.8 | 7.1 | 6.4 |
| >180mm | 17.9 | 35.1 | 19.3 | 20.0 | 20.7 |
| Total | 27.2 | 43.7 | 27.2 | 27.2 | 27.2 |

***Table 5-2***

| Number District Governors | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 |
|---|---|---|---|---|---|
| PBQ Workload | | | | | |
| Growth | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 |
| Renewal | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 |
| Total | 32.0 | 32.0 | 32.0 | 32.0 | 32.0 |
| Work Load Adjustments | | | | | |
| Growth | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Renewal | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Projected Workload | | | | | |
| Growth | 12.0 | 12.0 | 12.0 | 12.0 | 12.0 |
| Renewal | 20.0 | 20.0 | 20.0 | 20.0 | 20.0 |
| Total | 32.0 | 32.0 | 32.0 | 32.0 | 32.0 |

***Table 5-3***

| Number Service Governors | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 |
|---|---|---|---|---|---|
| BPQ Workload | | | | | |
| Domestic | 150.0 | 150.0 | 150.0 | 150.0 | 150.0 |
| Non-Domestic | 45.0 | 45.0 | 45.0 | 45.0 | 45.0 |
| Total | 195.0 | 195.0 | 195.0 | 195.0 | 195.0 |
| Work Load Adjustments | | | | | |
| Domestic | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Non-Domestic | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Projected Workload | | | | | |
| Domestic | 150.0 | 150.0 | 150.0 | 150.0 | 150.0 |
| Non-Domestic | 45.0 | 45.0 | 45.0 | 45.0 | 45.0 |
| Total | 195.0 | 195.0 | 195.0 | 195.0 | 195.0 |

***Table 5-4***

### 5.4.6.2 Expenditure

Tables 5-5, 5.6 and 5.7 summarise our net expenditure projections.

| Reinforcement Mains Net Capex All figures £m 2005/06 prices | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 | Total |
|---|---|---|---|---|---|---|
| BPQ Net Submission | 5.5 | 10.2 | 6.0 | 6.3 | 6.5 | 34.5 |
| Normalisation Adjustment | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Normalised Net BPQ | 5.5 | 10.2 | 6.0 | 6.3 | 6.5 | 34.5 |
| Total up to 180mm | 1.3 | 1.2 | 1.2 | 1.1 | 1.1 | 5.9 |
| Total above 180mm | 4.2 | 9.0 | 4.8 | 5.1 | 5.5 | 28.6 |
| Total Adjustments | 0.3 | 0.1 | -0.2 | -0.4 | -0.7 | -0.9 |
| Workload Adjustment | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Efficiency Adjustment | 0.3 | 0.1 | -0.2 | -0.4 | -0.7 | -0.9 |
| Proposed Net | 5.8 | 10.3 | 5.8 | 5.9 | 5.9 | 33.6 |
| Total up to 180mm | 1.2 | 1.1 | 1.0 | 0.9 | 0.8 | 4.9 |
| Total above 180mm | 4.6 | 9.2 | 4.9 | 5.0 | 5.1 | 28.8 |

***Table 5-5***

| District Governor Net Capex All figures £m 2005/06 prices | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 | Total |
|---|---|---|---|---|---|---|
| BPQ Net Submission | 3.8 | 3.8 | 2.6 | 2.6 | 2.1 | 14.9 |
| Normalisation Adjustment | -1.9 | -1.9 | -0.8 | -0.8 | -0.6 | 0.0 |
| Normalised Net BPQ | 1.8 | 1.9 | 1.8 | 1.9 | 1.6 | 9.0 |
| Growth | 0.5 | 0.5 | 0.6 | 0.6 | 0.6 | 2.8 |
| Renewal | 3.2 | 3.3 | 2.0 | 2.1 | 1.5 | 12.1 |
| Total Adjustments | 0.0 | -0.1 | -0.1 | -0.1 | -0.1 | -0.4 |
| Workload Adjustment | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Efficiency Adjustment | 0.0 | -0.1 | -0.1 | -0.1 | -0.1 | -0.4 |
| Disallowed Costs | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Proposed Net | 1.8 | 1.8 | 1.7 | 1.8 | 1.4 | 8.6 |
| Growth | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 2.6 |
| Renewal | 1.3 | 1.3 | 1.2 | 1.2 | 0.9 | 5.9 |

***Table 5-6***

| Service Governor Net Capex All figures £m 2005/06 prices | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 | Total |
|---|---|---|---|---|---|---|
| BPQ | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.4 |
| Domestic | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.3 |
| Non-Domestic | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 |
| Total Adjustments | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Proposed Net | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.4 |
| Domestic | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.3 |
| Non-Domestic | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 |

***Table 5-7***

# 6 OTHER OPERATIONAL CAPEX

## 6.1 SUMMARY

| Net Capex £m (2005/06 prices) | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 | Total |
|---|---|---|---|---|---|---|
| **BPQ Submission** | | | | | | |
| Plant & Equipment | 6.2 | 5.4 | 4.4 | 4.1 | 3.0 | **23.0** |
| Land & Buildings | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | **0.5** |
| **Total** | **6.3** | **5.5** | **4.5** | **4.2** | **3.1** | **23.5** |
| **Normalisation Adjustments** | | | | | | |
| Plant & Equipment | 1.9 | 1.9 | 0.8 | 0.8 | 0.6 | **5.9** |
| **Total** | **1.9** | **1.9** | **0.8** | **0.8** | **0.6** | **5.9** |
| **Normalised BPQ** | | | | | | |
| Plant & Equipment | 8.2 | 7.3 | 5.1 | 4.8 | 3.6 | **29.0** |
| Land & Buildings | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | **0.5** |
| **Total** | **8.3** | **7.4** | **5.2** | **4.9** | **3.7** | **29.5** |
| **Adjustments** | | | | | | |
| Plant & Equipment | -3.7 | -3.7 | -1.3 | -1.4 | -1.0 | **-11.1** |
| Land & Buildings | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | **0.0** |
| **Total** | **-3.7** | **-3.7** | **-1.4** | **-1.4** | **-1.0** | **-11.1** |
| **Proposed** | | | | | | |
| Plant & Equipment | 4.5 | 3.6 | 3.8 | 3.4 | 2.6 | **17.9** |
| Land & Buildings | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | **0.5** |
| **Total** | **4.6** | **3.7** | **3.9** | **3.5** | **2.7** | **18.3** |

**Table 6-1**

## 6.2 POLICIES & PROCEDURES

### 6.2.1 INTRODUCTION

#### 6.2.1.1 Land and Buildings

There are no indicated specific policies or procedures relating to this area.

WWU holds the freeholds for its operational sites which are not covered by easements or wayleaves. The Network's sites such as offices, depots and stores are a mix of leased and owned sites.

#### 6.2.1.2 Plant and Equipment

WWU have not offered any specific policies or procedures relating to Plant and Equipment.

### 6.2.2 EFFICIENCY AND PRODUCTIVITY

#### 6.2.2.1 Land and Buildings

Procurement of operational sites (PRIs, pig traps, block valves etc) will normally be included in the appropriate Capex project authorisation process. Rates paid for such sites may often have a 'ransom' element which is unavoidable except by following a compulsory purchase order which takes too long and would add other delay costs to the projects. The optimum project solution would only be changed if this element becomes material.

Procurement of other sites is normally on an open market basis and therefore optimum solutions can usually be attained.

#### 6.2.2.2 Plant and Equipment

Investment in new plant and equipment has a direct bearing on the productivity and efficiency of the work areas for which it is provided. Therefore a reasonable and sustained level of investment is to be expected to support productivity and improvements in these activities.

## 6.3 HISTORICAL PERFORMANCE

### 6.3.1 DEFINITION OF ACTIVITY

#### 6.3.1.1 Land and Buildings

This activity covers the procurement of freeholds for non-operational sites and capitalized upgrades to leased premises which are not funded by the landlord (e.g. adding air conditioning, building a security fence etc.).

#### 6.3.1.2 Plant and Equipment

This section includes for the procurement of leakage management and pressure management equipment, pipe bridges, VESAS and new wheeled plant.

In addition, a number of items have been transferred from C3 (Service Governors) to Other Operational Capex, namely proposed spend on governor kiosks and governor site fencing.

Proposed works on compliance with DSEAR regulations are recommended to be disallowed at this stage (please see below).

### 6.3.2 ESTABLISH UNDERLYING COSTS

#### 6.3.2.1 Land and Buildings

| Net Capex £m All figures in 2005/06 Prices | 2002/03 | 2003/04 | 2004/05 | 2005/06 | 2006/07 |
|---|---|---|---|---|---|
| Land & Buildings | 0.7 | 0.3 | 0.3 | 0.0 | 0.0 |

**Table 6-2**

These costs represent one-off periodic expenditure only, indicating that there is no trend. Although the actual spend has been low in recent years and is proposed to be even lower for the review period.

#### 6.3.2.2 Plant and Equipment

| Net Capex £m All figures in 2005/06 Prices | 2002/03 | 2003/04 | 2004/05 | 2005/06 | 2006/07 |
|---|---|---|---|---|---|
| Plant & Equipment | 2.1 | 0.8 | 0.6 | 0.0 | 0.3 |

**Table 6-3**

This demonstrates a reducing spend up to the time of the GDN sale, but the proposals for the review period show a material increase.

# 6.4 FORECAST

## 6.4.1 COMPANY PROPOSALS

### 6.4.1.1 Land and Buildings

Wales and the West Network proposes to spend £0.5m over the five year period which is the lowest proposal by any GDN.

| Net Capex £m All figures in 2005/06 Prices | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 | Total |
|---|---|---|---|---|---|---|
| Land & Buildings | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.5 |

**Table 6-4**

**Land & Building Net Capex**

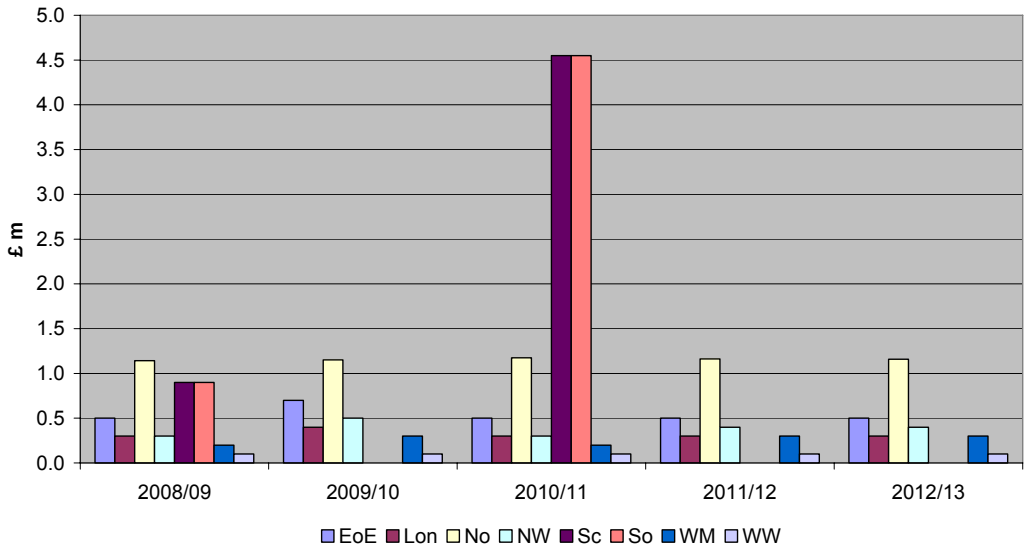


**Figure 6-1**

### 6.4.1.2 Plant and Equipment

The network is proposing to spend £29.0m over the five year period. This comprises £23.0m in the original submission, £5.9m of transfers from Service Governors, including £3.5m for DSEAR work.

| Net Capex £m All figures in 2005/06 Prices | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 | Total |
|---|---|---|---|---|---|---|
| Plant & Equipment | | | | | | |
| BPQ | 6.2 | 5.4 | 4.4 | 4.1 | 3.0 | 23.0 |
| Normalised Adjustment | 1.9 | 1.9 | 0.8 | 0.8 | 0.6 | 5.9 |
| Normalised BPQ | 8.2 | 7.3 | 5.1 | 4.8 | 3.6 | 29.0 |

**Table 6-5**

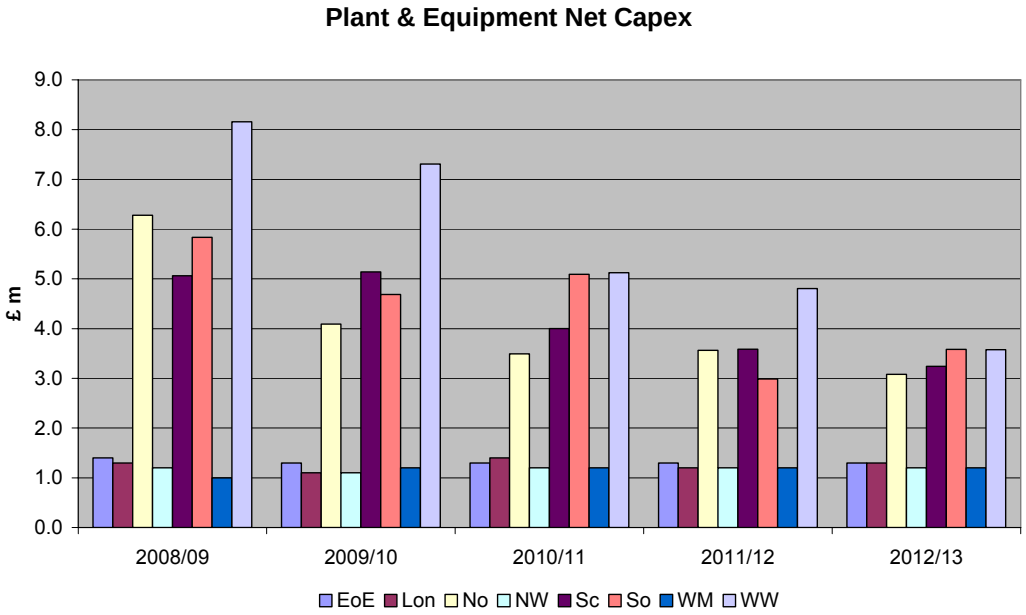


**Figure 6-2**

## 6.4.2 SPECIFIC COST AREAS

### 6.4.2.1 Land and Buildings

The Land and Building costs are low compared with other GDNs. This is assumed to relate to the site rationalisation programme which WWU has already undertaken before the start of the review period.

### 6.4.2.2 Plant and Equipment

As well as the range of subcategories listed on the submission on worksheet C5 at a cost of £23.0m over the period, WW Network has proposed to spend £3.5m over the period complying with DSEAR regulations. These costs have been transferred from 'Service Governors' and this is shown as a normalisation adjustment.

Whilst WWU are right to identify this requirement, there is not enough information available to us at this time to determine whether this work is necessary and justified. However, it is expected that this will be followed up before the final determination of the allowances for the review period.

In addition, other work relating to governor kiosk upgrading has been transferred into Other Operational Capex and this is also shown as a normalisation adjustment.

## 6.4.3 RECOMMENDATIONS

### 6.4.3.1 Land and Buildings

In considering the appropriate level to set the target maximum level of expenditure, we have discounted the GDN with the lowest proposed spend over the period as this in our view is not sustainable for the other GDNs.

We have therefore in this case taken the upper quartile performance of the remaining 7 GDNs and this gives a target maximum spend over the period of £1.5m.

WW Network's proposed expenditure is below the target level for the five year period, and so it is proposed that this is allowed in full.

#### 6.4.3.2 Plant and Equipment

The Plant and Equipment section comprises of a wide set of activities and not all GDNs have requested monies against all activities.

WWU have provided sufficient details of the proposals for us to determine that the work is necessary.

Therefore, after adjustments for real price effects and discounting the request for DSEAR funding at this stage (see 6.4.2.2 above), we propose that the expenditure requests are allowed in full.

# 7 NON-OPERATIONAL CAPEX

## 7.1 SUMMARY

| GDN Capital Expenditure £m (05/06 prices) | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 | 5 Yr Total |
|---|---|---|---|---|---|---|
| System Operations | 8.3 | 3.1 | 2.3 | 2.3 | 2.3 | 18.3 |
| IS Infrastructure | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 4.7 |
| IS Systems | 2.1 | 2.1 | 2.1 | 8.9 | 8.9 | 24.3 |
| xoserve Capex | 1.8 | 0.2 | 1.9 | 1.5 | 0.2 | 5.5 |
| Vehicles | 4.8 | 2.0 | 1.3 | 3.0 | 5.2 | 16.3 |
| Telecoms, Office | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.5 |
| Security | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 |
| Furniture and fittings | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.3 |
| Tools & Equipment | 1.6 | 1.3 | 1.0 | 1.0 | 0.8 | 5.7 |
| Other | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total | 20.1 | 9.8 | 9.7 | 17.8 | 18.4 | 75.9 |
| **Efficiency Adjustments** | | | | | | |
| System Operations | -5.2 | -1.3 | 0.3 | 0.3 | -0.6 | -6.6 |
| Net Total | -5.2 | -1.3 | 0.3 | 0.3 | -0.6 | -6.6 |
| **Proposed Net Capex** | | | | | | |
| System Operations | 3.1 | 1.8 | 2.5 | 2.5 | 1.7 | 11.7 |
| IS Infrastructure | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 4.7 |
| IS Systems | 2.1 | 2.1 | 2.1 | 8.9 | 8.9 | 24.3 |
| xoserve Capex | 1.8 | 0.2 | 1.9 | 1.5 | 0.2 | 5.5 |
| Vehicles | 4.8 | 2.0 | 1.3 | 3.0 | 5.2 | 16.3 |
| Telecoms, Office | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.5 |
| Security | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 |
| Furniture and fittings | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.3 |
| Tools & Equipment | 1.6 | 1.3 | 1.0 | 1.0 | 0.8 | 5.7 |
| Other | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total Proposed | 14.9 | 8.5 | 10.0 | 18.1 | 17.8 | 69.3 |

***Table 7-1***

Non-Operational Capex includes various assorted activities. These are discussed under each of the headings shown below, as appropriate, in this section.

- System Operations
- IS Costs, which includes IS Systems and IS Infrastructure Costs
- xoserve
- Vehicles costs
- Other, which comprises the remaining Non-Operational Capex items (Telecoms & Office, Security, Furniture and fittings, Tools & Equipment and Other)

WWU's total Non-Op Capex Spend is second highest of all the GDNs as shown below in Figure 7.1

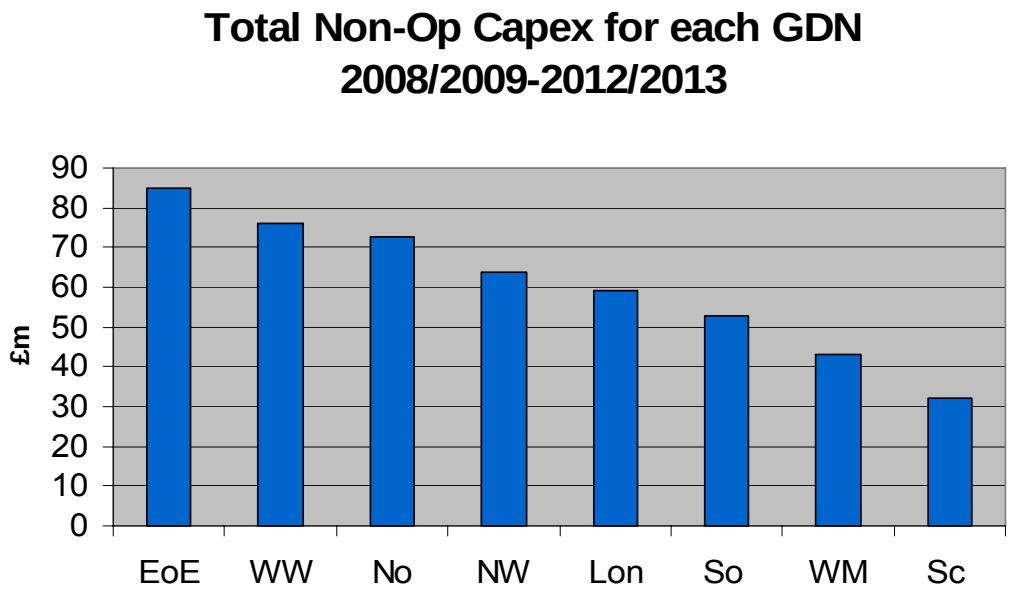


***Figure 7-1***

## 7.2 BACKGROUND

### 7.2.1 INTRODUCTION

This section reviews the relevant background to the operations covered under Non-Operational Capex.

#### 7.2.1.1 System Operation

#### 7.2.1.2 The DNCS programme.

The Gas Transportation Management System (GTMS) is the Supervisory Control & Data Acquisition (SCADA) System effecting operational control over all UK Distribution Networks. All GDNs are currently operated, by National Grid Gas (NGG) at Hinckley, under the System Operation Managed Service Agreement (SOMSA).

GTMS is old technology and has been enhanced by NGG since its inception in the mid 1980's; it has been in its current form since 1996. NGG completed an assessment of the system establishing its longevity at no later than 2009; the major issues are spares and an unsupported operating System.

With this in mind NGG embarked upon a course of action to replace the system and to keep it effective until the decommissioning date; respectively known as the Distribution National Control System (DNCS) and Prolonged Active Life (PAL) projects. The decision to replace GTMS was taken in autumn 2005 with support from all GDN's to collaboratively undertake the job. The GDNs supported the reasoning that this was the most appropriate technical option for the industry, cost effective and would allow a phased exit from SOMSA, once delivered to NGG, within a timeframe to suit all 4 GDNs. Specification work was undertaken and a contract awarded to a consortium led by Serck controls.

NGG has entered into a formal collaboration agreement withNGN, SGN and WWU to jointly replace the existing GTMS control system with this new Serck control system and for it to be deployed into NGG's Control Centre at Hinckley. The new control system is being designed to have the same operating functionality as the GTMS, although its architecture will be developed such that its operating structure is aligned to individual GDNs to facilitate transfer and so ease SOMSA exit. It is planned to complete GTMS

replacement and deploy the new system into NGG in summer 2008. This constitutes Phase 1 of the project. The costs for Phase 1 have been agreed with Serck and a sharing arrangement for these costs has been agreed between the DN's.

Phase 2 of the project is the implementation (essentially, a replication) of the system into the GDNs to enable them to exit SOMSA and take over operational control for themselves. Each GDN is responsible for its own costs in delivering the systems into its own business and is contracting separately with Serck for this part of the project.

Ofgem granted WWU a 'Relinquishment of Operational Control' for a finite period; SOMSA expires 31st March 2008 with any extensions needing regulatory agreement. However, the nature of the collaboration project (DNCS) is such that exit of SOMSA by any Network during the construction phase would not be possible due to the demands on NGG staff and Management. Presently WWU has an outline timeline for transfer of responsibilities from NGG. Late Summer 2009 (or early spring 2010) are seen as preferred exit option dates. However, there are no detailed transfer plans in place with NGG for the transfer of operation. WWU, jointly with NGG, SGN and NGN are working to identify and understand the exact extent of the activities that would have to be completed by NG and WWU to allow transfer of operations.

Through the collaboration agreement NGG, NGN, SGN and WWU are working to identify and understand the exact extent of the activities that would have to be completed by NGG and its partners to allow transfer of operations.

PB Power believes that the collaborative project to replace the GTMS is the most efficient solution for the industry. There are several reasons for this

1. The collaborative project reduces the time in which a system can be constructed; 4 individual systems for 3 exiting GDNs would call on the same NGG control and IS staff for assistance resulting in a pinch point in any program. These staff would also be working on the NGG variant of the System.
2. The sorting of the System into the correct components for exit whilst constructing a new system is viewed as cost effective. Serck only need to construct one system & slice it appropriately instead of up to potentially 4 contractors constructing 4 different Systems. The GDNs then benefit from an initially aligned system capable of future individual development.
3. Collaboration allows for a phased agreed exit from SOMSA.

#### 7.2.1.3 IS Capex

IS Costs include IS Systems and IS Infrastructure (essentially software and hardware respectively). PB Power has reviewed the IS Capex expenditure with a view to confirming that the planned projects are appropriate and categorising which projects might be expected to yield productivity (Opex) savings over the longer term. Further work is being carried out on whether levels of expenditure are appropriate for IS projects. As a result no adjustments have currently been made in this report.

#### 7.2.1.4 xoserve

xoserve is a separate business which started trading on 1st May 2005 as a wholly owned subsidiary of National Grid Group. On 1st June it became multi-owned by the GDN's and National Grid UK Transmission. The shareholding is split amongst National Grid NTS (11%) and all the DN's in proportion to the number of supply points in March 2005.

xoserve provides transactional services primarily through UK LINK, as well as IS Support and Change Management to the DN's under an Agency Services Agreement (ASA).

xoserve is planning a series of significant capital development projects in the next period, including a rewrite of UK-LINK.

xoserve has until now charged depreciation on its Capex costs to the DN's.

PB Power understands that xoserve is now proposing to recover the cost of capital expenditure from the GDNs in the year in which it is incurred. To date the GDNs have treated xoserve charges as Opex – although some (NG and WWU) have submitted elements of Capex in their forecast costs. PB Power are therefore reviewing and, where necessary, adjusting the Opex/Capex split for each DN.

WWU has submitted a significant level of xoserve Opex, with some Capex also.

xoserve cost forecasts and the scope of development work they will undertake in the next period are the subject of an ongoing industry discussion workgroup.

xoserve is jointly owned by the DN's, although National Grid is not able to exercise voting power proportionate to its total shareholding. The work programme is determined through industry consultation and in response to customer requirements.

xoserve states in its BPQ submission that it plans to deliver 3% annual savings on direct operating costs (salaries, pensions, agency staff costs, travel and subsistence) offset by real earnings growth of 2% for directly employed staff.

xoserve procures significant levels of bought-in services, including IS Support services, from National Grid. As a result many of its costs have been subject to competitive purchase through National Grid's procurement processes.

However, xoserve makes regular full value-for-money reviews of all of its bought-in services to ensure that its provision continues to be cost effective and efficient in the market place. In general, xoserve benefits significantly from National Grids purchasing power.

#### 7.2.1.5 Vehicles

With regard to Vehicles, WWU policy is to own their commercial vehicles, which will have been inherited from NGT on finance leases. Consequently there are no Opex costs other than day-to-day running costs eg fuel maintenance and licensing. Company cars are obtained on finance leases, since they have short asset lives and high depreciation, and because the volatility of the residual asset value makes them a riskier investment.

WWU has a fleet which averages at 756 vehicles over the five year period.

WWU describe their replacement strategy (WWU 104) as 'designed to consider vehicle condition whilst also taking note of standard industry practice where selecting vehicles for replacement'. They also state in their BPQ submission that they prioritise by assessing the age of individual vehicles, their condition based upon the cost of repairs and the down time which adversely affects operational efficiency'.

WWU expect their strategy to yield:-

- A reduction in non-routine maintenance
- A reduction in replacement vehicle hire costs
- An improvement in fuel consumption with the associated environmental benefits
- An improvement in operational performance as a result of less down time arising from vehicle breakdowns.

WWU are planning a fleet replacement programme during the next period, but have not provided any further information.

#### 7.2.1.6 Other

Other costs in the Non-Operational Capex category include Telecoms & Office, Security, Furniture and fittings, Tools & Equipment and 'Other'. PB Power has made inter-GDN comparisons of these costs.

# 7.3 HISTORICAL PERFORMANCE

## 7.3.1 INTRODUCTION

The following table shows WWU's performance in Non-Operational Capex in the previous period (NB: 5 years to end 2006/2007), and compares the total historical with the total forecast costs in the BPQ submission for the next review period (NB: 5 years), as a high level indication of the general trends in each cost item. The forecast for 2007/2008 is shown for completeness but is not included in the totals.

| GDN Reported Net Capex £m (2005/2006 prices) | 02/03 | 03/04 | 04/05 | 05/06 | 06/07 | Total Historic Period | 07/08 | Next Period Total | Change |
|---|---|---|---|---|---|---|---|---|---|
| System Operations | 0.0 | 1.3 | 1.2 | 0.0 | 1.1 | 3.6 | 5.7 | 18.3 | 14.7 |
| IS Infrastructure | 0.0 | 0.0 | 0.0 | 29.9 | 1.8 | 31.7 | 0.9 | 4.7 | -27.1 |
| IS Systems | 0.0 | 0.0 | 0.0 | 0.9 | 14.7 | 15.6 | 2.1 | 24.3 | 8.6 |
| xoserve Capex | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.6 | 5.5 | 5.4 |
| Vehicles | 2.5 | 0.0 | 0.1 | 0.9 | 4.5 | 8.0 | 5.3 | 16.3 | 8.3 |
| Telecoms, Office | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.5 | 0.4 |
| Security | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.3 | 0.3 | 0.2 |
| Furniture and fittings | 0.0 | 0.1 | 0.0 | 0.0 | 1.5 | 1.6 | 0.1 | 0.3 | -1.4 |
| Tools & Equipment | 0.0 | 0.0 | 0.0 | 1.0 | 0.8 | 1.7 | 1.5 | 5.7 | 3.9 |
| Other | 4.9 | 4.7 | 4.8 | 0.0 | 0.0 | 14.4 | 0.0 | 0.0 | -14.4 |
| Total | 7.5 | 6.1 | 6.1 | 32.7 | 24.6 | 77.0 | 16.7 | 75.9 | -1.1 |

***Table 7-2***

### 7.3.1.1 System Operation

DN network control is still carried out by NGG on behalf of the networks, as part of the SOMSA agreements. It is therefore not meaningful to compare historical performance of the GDNs in relation to SO costs.

### 7.3.1.2 IS Capex

WWU has clearly been making significant investment in their IS Infrastructure since 2005/2006, and it would appear that the major expenditure will be largely completed before the next period.

### 7.3.1.3 xoserve

xoserve has only existed as a standalone business since 2005. The annual levels of forecast Capex for xoserve are higher than those in the historic period, reflecting the forthcoming development programme which is anticipated for xoserve.

### 7.3.1.4 Vehicles

There is a significant increase in Vehicles expenditure for 2007/2008 and the forthcoming review period, reflecting the replacement programme which WWU anticipate.

#### 7.3.1.5 Other

WWU have forecast an increase in Tools and Equipment expenditure for the forthcoming period, but have not allocated any costs specifically to 'Other' under Non-operational Capex.

## 7.4 FORECAST

### 7.4.1 INTRODUCTION

The table below shows the overall forecast position for WWU, as submitted in their BPQ:

| GDN Capital Expenditure £m (05/06 prices) | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 | 5 Yr Total |
|---|---|---|---|---|---|---|
| System Operations | 8.3 | 3.1 | 2.3 | 2.3 | 2.3 | 18.3 |
| IS Infrastructure | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 4.7 |
| IS Systems | 2.1 | 2.1 | 2.1 | 8.9 | 8.9 | 24.3 |
| xoserve Capex | 1.8 | 0.2 | 1.9 | 1.5 | 0.2 | 5.5 |
| Vehicles | 4.8 | 2.0 | 1.3 | 3.0 | 5.2 | 16.3 |
| Telecoms, Office | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.5 |
| Security | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 |
| Furniture and fittings | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.3 |
| Tools & Equipment | 1.6 | 1.3 | 1.0 | 1.0 | 0.8 | 5.7 |
| Other | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total | 20.1 | 9.8 | 9.7 | 17.8 | 18.4 | 75.9 |

***Table 7-3***

### 7.4.2 COMPANY PROPOSALS

#### 7.4.2.1 System Operation

WWU have submitted a significant level of System Operation Non-Operational Capex.

NGG are managing the collaborative project centrally and charging the other GDNs for NGG provided services including the management activity. NGG has supplied figures for the breakdown of the charging mechanism to include both its internal IS & management costs with a view to full allowance. We have used this is assessing the appropriate level of SO Capex to allow.

#### 7.4.2.2 IS Capex

WWU has submitted a total of £29m for IS Infrastructure and IS Systems costs. PB Power has reviewed the IS Costs submitted by the DN's with a view to confirming that the planned projects are appropriate and categorising which projects might be expected to yield productivity (Opex) savings over the longer term. Further work is being carried out on whether levels of expenditure are appropriate for IS projects. As a result no adjustments have currently been made in this report.

#### 7.4.2.3 xoserve

The following table shows how WWU has submitted its total xoserve costs, split between Opex and Capex, alongside the equivalent figures which xoserve has submitted for its anticipated turnover from WWU.

| Wales & West (£m 2005/2006 prices) | 2005/06 | 2006/07 | 2007/08 | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 | 2013/14 | Total shown | 5year total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Opex | 2.84 | 3.49 | 3.16 | 3.14 | 3.12 | 3.11 | 3.11 | 3.09 | 3.08 | 28.15 | 15.57 |
| Capex | 0.00 | 0.13 | 0.61 | 1.82 | 0.15 | 1.93 | 1.50 | 0.15 | 1.18 | 7.47 | 5.55 |
| Total | 2.84 | 3.62 | 3.78 | 4.96 | 3.27 | 5.04 | 4.60 | 3.25 | 4.26 | 35.62 | 21.12 |
| xoserve turnover | 2.85 | 3.62 | 3.78 | 4.96 | 3.27 | 5.04 | 4.60 | 3.25 | 4.26 | 35.63 | 21.12 |
| Difference | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 |

***Table 7-4***

For all GDNs, the amount they anticipate being charged is the same (within rounding errors) as the turnover xoserve expects to receive.

#### 7.4.2.4 Vehicles

During the next period, WWU state they intend to replace their ageing vehicles at a cost of £16.3m.

#### 7.4.2.5 Other

WWU have submitted a total of £5.7m for tools and equipment, £0.3m each for Security and Furniture & Fittings, and £0.5m for Telecoms & Office expenditure. WWU has not submitted any 'Other' costs. These items are compared with the other DNs below.

### 7.4.3 SPECIFIC COST AREAS

#### 7.4.3.1 System Operation

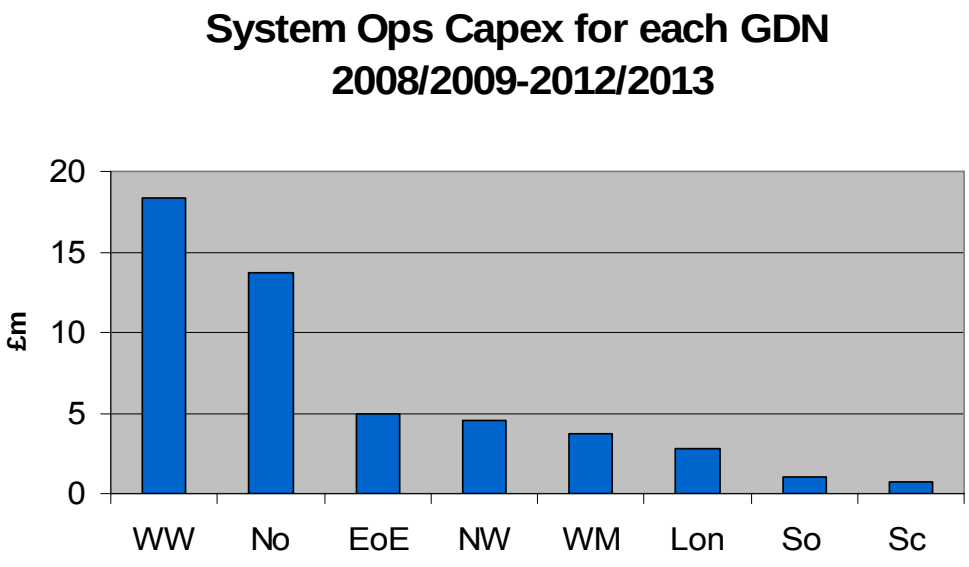


***Figure 7-2***

WWU's proposed spend on System Operations Capex is high compared with the other GDNs, as illustrated in figure 7.2 above.

However, it was clear at the point of network sales that costs associated with SOMSA exit would not be allowed, and Ofgem set out the following principles in its consultation document [5]regarding the allowable costs for GTMS replacement:-

- Ofgem must be satisfied that GTMS is obsolete before any replacement costs are allowed.
- Only efficient costs of GTMS replacement would be allowed. Any additional costs intended to facilitate SOMSA exit would not be allowed, nor any costs associated with bringing forward the replacement to facilitate SOMSA exit.

We are satisfied that the GTMS is effectively obsolete, as from 2009 spares will no longer be readily available and the operating system will no longer be supported by the suppliers.

We believe that the collaborative programme of replacement is the most efficient solution, and therefore that the agreed allocation of the costs of Phase 1 (implementation of DNCS into NGG) constitute allowable costs, according to Ofgem's principles above. In addition, we are aware that NGG propose to charge the GDNs an additional amount to cover NGG's costs in managing the replacement programme. We therefore believe the non-NGG GDNs should also be allowed an amount to cover this additional cost.

The cost allocation agreed through the collaborative project are shown in table 1.4 , along with a 50% uplift for the non-NGG GDNs which we estimate should reflect what they are likely to be charged by NGG for programme management:-

| Phase 1 Costs - Established Position<br>Cost Sharing £m<br>agreed between the Parties | NGG | NGN | WWU | SGN | Total |
|---|---|---|---|---|---|
| Without Uplift | 9.70 | 1.17 | 1.06 | 2.11 | 14.04 |
| After Uplift | 9.70 | 1.80 | 1.59 | 3.16 | 16.25 |
| Date of SOMSA exit | - | Apr-09 | Sep-09 | Sep-08 | |

***Table 7-5***

WWU share of the established costs is £1.06m, and after our 50% uplift, their allowance is calculated at £1.59m.

We have examined the BPQ submissions, and note that NGG's declared GTMS expenditure is phased from 2006/2007 to 2008/2009, and this corresponds to our understanding of the planned duration of the project. So we have phased the allowable costs correspondingly across that period. We note that WWU has declared SOMSA exit costs for each year of the period, even though SOMSA exit is due to be complete by Sept 09.

We have made a further allowance for Non-SCADA systems. NGG has estimated the costs of replacement of SC2004 and other non-SCADA systems as £7.8m in total for all its networks. It has also estimated a cost of £4.6m which it expects to be paid for by the Non-NGG GDN's for 'Analysis and Delivery' of Non-SCADA systems.

SC2004 is in need of rationalisation and upgrade as it is an assortment of various disparate systems, including forecasting and interruption management systems. Rather than being technically obsolete or unsupported, the functionality is in part made obsolete as a result of SOMSA exit, but the systems would in any case be due for improvements during the next review period.

We believe that in practice the most effective means of development of SC2004 is still under consideration by NGG and the other GDN's and that it is likely to be most efficient if the GDN's collaborated to provide replacements for the Non-SCADA elements of their required System Control functionality. We also believe that NGG is likely to benefit from

[5] Third Consultation, section 3.28, p23

the 'Analysis and Delivery', the costs of which it has currently allocated exclusively to the other GDN's.

NGG and the other GDN's may yet choose to adopt a collaborative approach to non-SCADA systems provision, or may choose to develop these systems separately.

We believe it is appropriate that some allowance should be made for all the GDN's for these systems, since they are essential operationally and without them (or access to them) the GDN's will not be able to operate independently.

However, following Ofgem's line in relation to SOMSA exit and GTMS costs, we believe that only efficient costs should be allowed and it would therefore be inappropriate to allow the full costs of new Non-SCADA systems provision to each of the GDN's.

Therefore, we have calculated an allowance for each GDN for Non-SCADA systems based on National Grids' estimate of these two elements of cost associated with Non-SCADA systems. We have allocated a total of £12.4m across all the GDN's on a 4:2:1:1 split (following the basic rationale for the split of GTMS costs). For WWU this results in a total allowance of £1.55m.

We have also allowed for the telemetry costs which WWU have submitted for condition-based telemetry replacement.

Table 7.6 below shows the declared SO costs from the BPQ submission, followed by our assessment of the allowable costs, our total deduction, and the remaining 'proposed' SO Capex costs.

| WWU (£m 2005/2006 prices) | 06/07 | 07/08 | 08/09 | 09/10 | 10/11 | 11/12 | 12/13 | 5 Yr Total |
|---|---|---|---|---|---|---|---|---|
| SO Costs as submitted | 1.10 | 5.71 | 8.34 | 3.10 | 2.27 | 2.27 | 2.33 | 18.31 |
| Allowed GTMS share of Costs | 0.48 | 0.80 | 0.32 | 0.00 | 0.00 | 0.00 | 0.00 | 0.32 |
| Allowed SC2004/Bus Apps Costs | 0.00 | 0.00 | 0.00 | 0.00 | 0.78 | 0.78 | 0.00 | 1.55 |
| Telemetry | 0.00 | 2.78 | 2.78 | 1.79 | 1.77 | 1.77 | 1.73 | 9.83 |
| Total 'Allowed' costs | | | 3.10 | 1.79 | 2.55 | 2.55 | 1.73 | 11.70 |
| Total 'Efficiency Adjustment' | - | - | -5.24 | -1.32 | 0.28 | 0.28 | -0.60 | -6.61 |
| Proposed SO Costs | - | - | 3.10 | 1.79 | 2.55 | 2.55 | 1.73 | 11.70 |

***Table 7-6***

Note that the phasing of the GTMS costs illustrates how the costs fall mostly in the previous period. We are making adjustments for the 2008/2009 -2012/2013 period only in this report.

#### 7.4.3.2 IS Capex

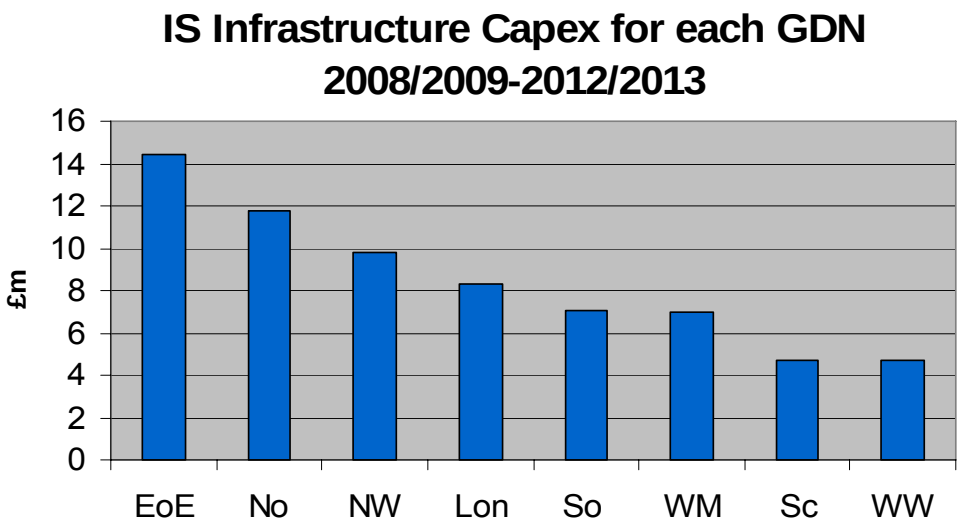


*Figure 7-3*

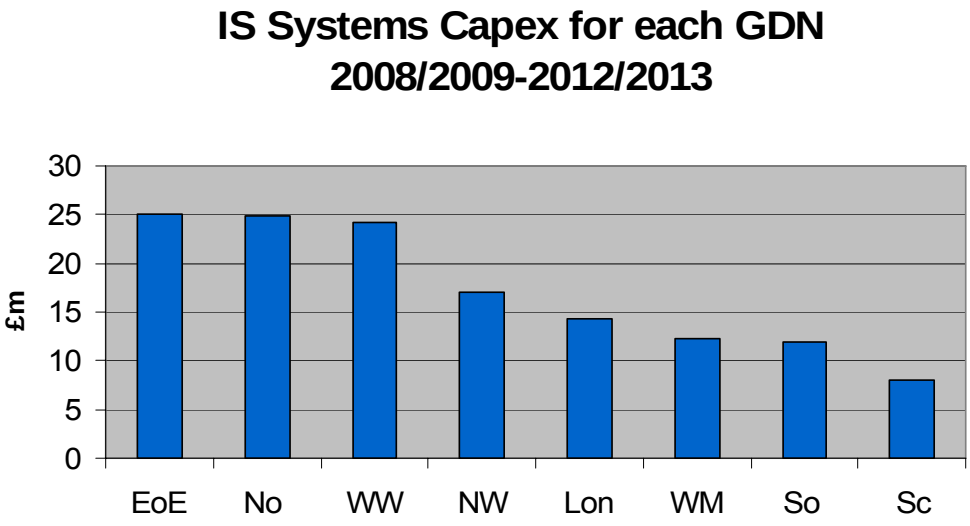


*Figure 7-4*

WWU has submitted a relatively high figure for IS Systems relative to the other GDNs, as shown in Figure 7.3. Further work is being carried out on whether levels of expenditure are appropriate for IS projects.

The following table shows the components of IS Capex submitted by WWU. Since WWU have not submitted any further breakdown of these costs we have assumed they may all be considered to contribute to productivity.

| Wales & West (£m 2005/2006 prices) | 2005/06 | 2006/07 | 2007/08 | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 | 5 year total |
|---|---|---|---|---|---|---|---|---|---|
| IS Infrastructure | 29.9 | 1.8 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 4.7 |
| IS Systems | 0.9 | 14.7 | 2.1 | 2.1 | 2.1 | 2.1 | 8.9 | 8.9 | 24.3 |
| Total IS Capex | 30.8 | 16.6 | 3.1 | 3.1 | 3.1 | 3.1 | 9.9 | 9.9 | 28.9 |
| Assumed Productivity 20% Total | 6.2 | 3.3 | 0.6 | 0.6 | 0.6 | 0.6 | 2.0 | 2.0 | 5.8 |

***Table 7-7***

#### 7.4.3.3 xoserve

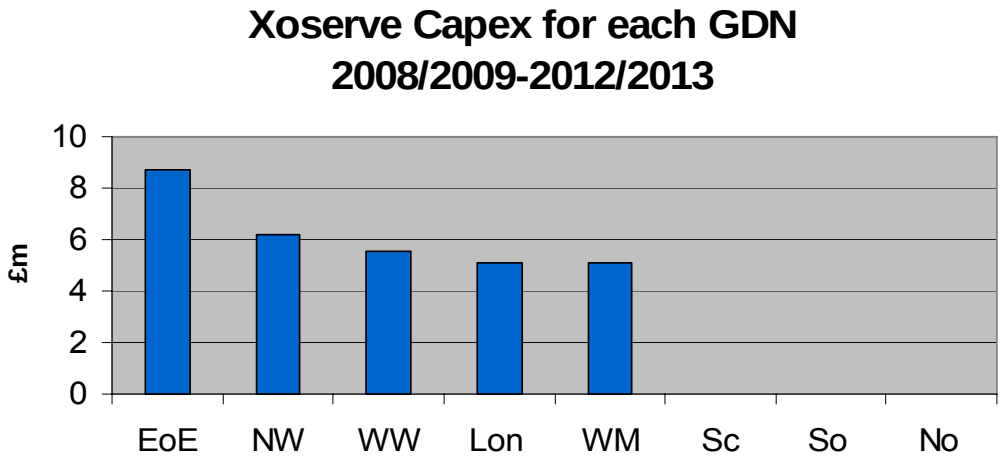


***Figure 7-5***

Although the total amount of expenditure submitted by all the GDNs equals the turnover that xoserve has set out as expected, three GDNs have not submitted any of their share as Capex. Since the costs relate to capital projects which xoserve intend to charge in the year in which they are incurred, we believe it is appropriate that an element of each GDNs total xoserve costs should be allocated as Capex.

In the case of WWU, we have verified that the Opex/Capex split is such that the Capex allocation reflects the proportionate shareholding of WWU in xoserve and hence their appropriate share of the costs allocated to them. We have used this approach (with NGG's Opex/Capex split) to estimate appropriate Capex allocations for those GDNs who have not charged some of their xoserve costs to Capex.

#### 7.4.3.4 Vehicles

Comparing vehicles to numbers of employees for all the GDNs, it is clear that there is a broadly consistent approach, and this demonstrates the dependency of vehicles on the number of employees. WWU is forecasting the second highest spend of all the GDNs, and whilst this reflects the larger size of their fleet relative to the others, it is also the highest spend per vehicle of all the GDNs.

However, no adjustment to the company's forecast costs is currently proposed as we believe this reflects the size of their GDN and the nature of the way in which they allocate staff and contractors to vehicles.

#### 7.4.3.5 Other

WWU remaining Non-Operational Capex cost areas are Telecoms and Office, Furniture & Fittings, Security and Tools & Equipment. These are compared with the other GDNs in the charts below.

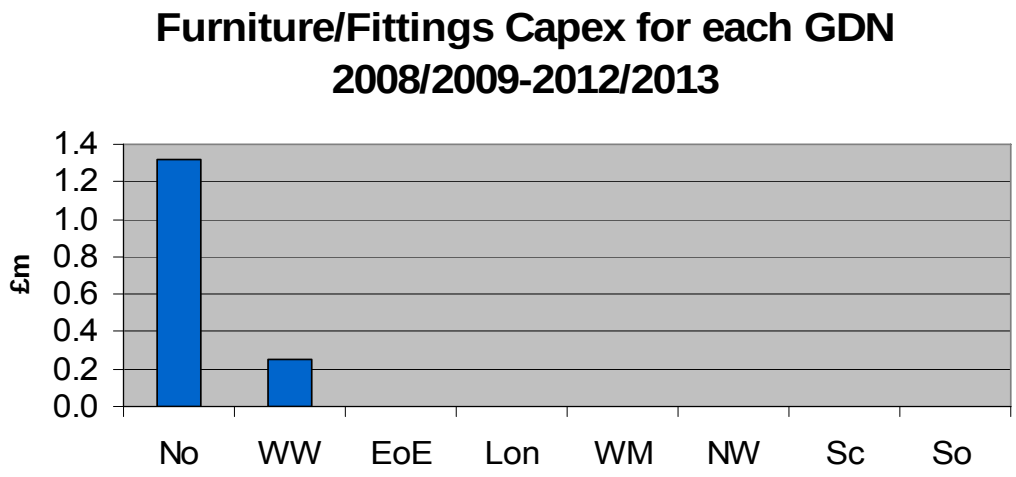


*Figure 7-6*

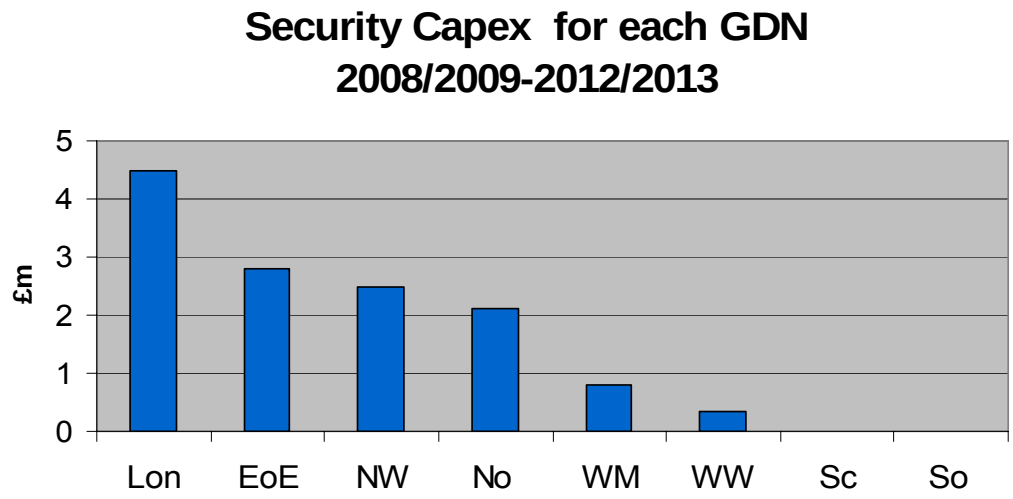


*Figure 7-7*

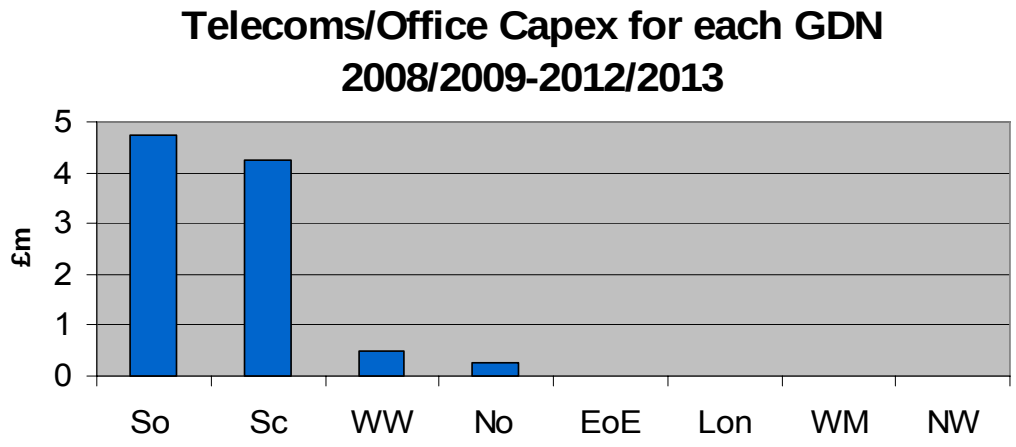


***Figure 7-8***

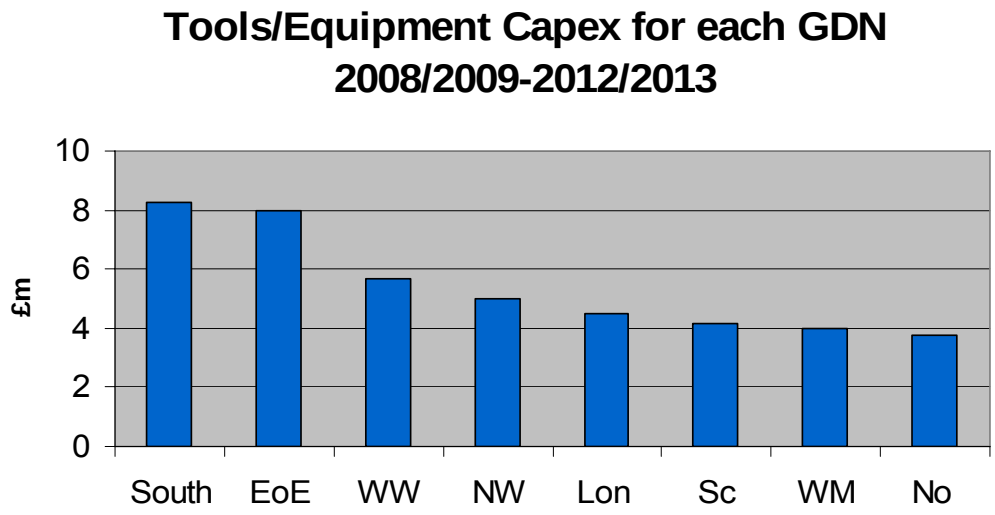


***Figure 7-9***

WWU has not submitted any other Non-Operational Capex expenditure designated as 'Other'. The charts above show that their remaining cost components appear reasonable relative to the other GDNs.

## 7.4.4 RECOMMENDATIONS

### 7.4.4.1 System Operation

PB Power believes that the allowable costs of GTMS replacement, according to Ofgem's principles set out in the Consultation document, are the costs associated with the delivery of Phase 1 of the collaborative project to replace the existing system. We believe the collaborative project is the most efficient means of delivering GTMS replacement. The costs of Phase 1 have been allocated between the parties to the collaboration agreement and WWU's agreed share overall is £1.06m. We have made a 50% uplift to this to allow for project management charges which NGG propose to charge the GDNs, and we have phased this allowable cost in line with our understanding of the scheduled programme of GTMS development.

We have calculated a further allowance for Non-SCADA systems upgrades based on an overall view of efficient costs of replacement for all the GDN's combined. We have split this allowance between the GDN's on a 4:2:1:1 basis (giving a total of £1.55m for WWU)

We have also allowed for condition-based telemetry replacement costs.

### 7.4.4.2 IS Capex

PB Power is not proposing any adjustments to IS Capex Spend at this time. Further work is ongoing to determine whether levels of expenditure are appropriate for IS projects.

### 7.4.4.3 Xoserve

We have validated that the Capex submitted by WWU in relation to xoserve accurately reflects what they will be charged by xoserve, and that this is appropriately split between Opex and Capex. No adjustments are therefore necessary.

### 7.4.4.4 Vehicles

Since there is broad consistency in the ratio of numbers of vehicles to number of employees, no adjustment to the company's proposed costs is necessary.

### 7.4.4.5 Other

WWU remaining Non-Operational Capex costs all appear reasonable relative to the other GDNs and therefore no adjustments are necessary.

### 7.4.4.6 Recommendations Summary

**The following summarises our recommendations in respect of Non-Operational Capex:-**

The summary table at the start of this chapter shows a total deduction of £6.6m from SO Capex after an allowance totalling £11.7m (for GTMS replacement costs, non-SCADA systems costs and condition-based telemetry replacement costs).

# 8 MAINS AND SERVICES REPEX

## 8.1 SUMMARY

| Tables for Forecast section for each area of spend £m (05/06) | | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 | Total |
|---|---|---|---|---|---|---|---|
| **BPQ Submission** | | | | | | | |
| | HSE Enforcement Policy | 35.1 | 40.6 | 44.7 | 48.2 | 52.0 | **220.6** |
| | MP Ductile iron | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | **0.0** |
| Mains | Non-Rechargeable Diversions | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | **2.1** |
| | Other Policy & Condition | 4.5 | 4.7 | 4.9 | 5.1 | 5.3 | **24.5** |
| | Rechargeable Diversions (Net) | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | **0.5** |
| | Non-Domestic Services | 0.3 | 0.3 | 0.3 | 0.4 | 0.4 | **1.7** |
| Services | Domestic Services | 25.8 | 26.8 | 27.7 | 28.8 | 29.9 | **138.9** |
| | Multi-occupancy Buildings | 1.1 | 1.2 | 1.2 | 1.3 | 1.3 | **6.0** |
| **Total** | | **67.3** | **74.1** | **79.4** | **84.2** | **89.4** | **394.4** |
| **Normalisation Adjustments** | | | | | | | |
| **Total** | | **0.0** | **0.0** | **0.0** | **0.0** | **0.0** | **0.0** |
| **Normalised** | | | | | | | |
| | HSE Enforcement Policy | 35.1 | 40.6 | 44.7 | 48.2 | 52.0 | **220.6** |
| | MP Ductile iron | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | **0.0** |
| Mains | Non-Rechargeable Diversions | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | **2.1** |
| | Other Policy & Condition | 4.5 | 4.7 | 4.9 | 5.1 | 5.3 | **24.5** |
| | Rechargeable Diversions (Net) | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | **0.5** |
| | Non-Domestic Services | 0.3 | 0.3 | 0.3 | 0.4 | 0.4 | **1.7** |
| Services | Domestic Services | 25.8 | 26.8 | 27.7 | 28.8 | 29.9 | **138.9** |
| | Multi-occupancy Buildings | 1.1 | 1.2 | 1.2 | 1.3 | 1.3 | **6.0** |
| **Total** | | **67.3** | **74.1** | **79.4** | **84.2** | **89.4** | **394.4** |
| **Adjustments** | | | | | | | |
| | HSE Enforcement Policy | -0.1 | -2.1 | -4.2 | -6.3 | -8.7 | **-21.3** |
| | MP Ductile iron | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | **0.0** |
| Mains | Non-Rechargeable Diversions | 0.0 | 0.0 | -0.1 | -0.1 | -0.1 | **-0.3** |
| | Other Policy & Condition | 0.8 | 0.6 | 0.4 | 0.2 | 0.0 | **1.9** |
| | Rechargeable Diversions (Net) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | **-0.1** |
| | Non-Domestic Services | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | **0.8** |
| Services | Domestic Services | -3.9 | -5.1 | -6.2 | -7.4 | -8.6 | **-31.2** |
| | Multi-occupancy Buildings | -0.8 | -0.8 | -0.8 | -0.9 | -0.9 | **-4.2** |
| **Total** | | **-3.8** | **-7.3** | **-10.7** | **-14.3** | **-18.2** | **-54.3** |
| **Proposed** | | | | | | | |
| | HSE Enforcement Policy | 35.0 | 38.5 | 40.6 | 41.9 | 43.3 | **199.3** |
| | MP Ductile iron | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | **0.0** |
| Mains | Non-Rechargeable Diversions | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | **1.9** |
| | Other Policy & Condition | 5.4 | 5.3 | 5.3 | 5.3 | 5.2 | **26.4** |
| | Rechargeable Diversions (Net) | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | **0.4** |
| | Non-Domestic Services | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | **2.5** |
| Services | Domestic Services | 21.9 | 21.7 | 21.5 | 21.4 | 21.2 | **107.7** |
| | Multi-occupancy Buildings | 0.3 | 0.3 | 0.4 | 0.4 | 0.4 | **1.8** |
| **Total** | | **63.5** | **66.8** | **68.7** | **69.9** | **71.1** | **340.0** |

***Table 8-1***

## 8.2 POLICIES & PROCEDURES

T/PL/REP1 and T/PL/REP2 are the key documents requiring the monitoring and removal of risk arising from the distribution system. The mains and services replacement requirements are defined in a policy document (T/PL/REP1) and the procedure in T/PL/REP2. These documents form part of a suite of policies and procedures with comprehensive coverage of the Network's operations. Appendix 1 describes the framework in which the policies and procedures sit and the arrangements for governance, monitoring and review.

The current documents describe the requirements and processes for the replacement of all distribution pipes from identifying those pipes to be replaced, prioritising for replacement and developing projects. The design and optimisation of the replacement system relies on other policies and procedures. The documents have been reviewed and updated on a number of occasions in recent years and a further change is being actively considered.

We found no evidence that the policy and procedure were not properly implemented.

## 8.3 HISTORICAL PERFORMANCE

### 8.3.1 INTRODUCTION

Replacement mains

The replacement of iron mains and associated services is an essential part of the Network's strategy for controlling the risk arising from the network. The rate of replacement and the procedures associated with the selection of pipes and development of projects are regulated by the HSE using the Gas Safety (Management) Regulations and the Pipelines Safety Regulations to enforce its policy. Ofgem's role is to ensure that the Network can fund the programme on an efficient basis.

It is appropriate to re-state here the recent history of the replacement programme that has been running in various forms since the 1970s. HSE requirements and policies and procedures have changed, and the key events are listed below.

| Time Line | |
|---|---|
| 2000 | HSE issues an Improvement Notice in September 2000 requiring 2360 km of MP DI main within 30m of premises to be de-commissioned by 31.12.2002. |
| 2001 | HSE publishes its Enforcement Policy for the replacement of iron gas mains. 91,000km of cast and ductile mains believed to be within 30m of premises. Note that the policy does not include steel mains or service pipes.<br>Ofgem increases mains and services Repex allowances to accommodate the HSE requirement. |
| 2002 | Transco introduces T/PR/REP1 & 2 policy and procedure for replacement. REP2 requires steel services to be replaced irrespective of condition (previously PE clad steel services could be transferred if in satisfactory condition) and unprotected steel <=2" to be replaced in the course of routine replacement work. >2" steel subject to risk assessment. Previously these pipes replaced on a condition basis.<br>Initial (20/70/10) policy introduced (supported by "Smallworld") |
| 2003 | Pipeline Safety Regulations amended to require Networks to submit a replacement programme for approval.<br>Transco submit an amended 20/70/10 policy (supported by MRDST) to HSE for approval. Agreed providing an equivalent amount of risk is removed from the system each year, and requiring an additional 10% of mains to be de-commissioned.<br>Physical survey reveals that actual population of iron mains was 101,000km at 01.04.02 requiring a 10% increase in production to complete the programme within 30 years.<br>HSE requires a minimum national rate of 3,500km/yr de-commissioned mains (an increase from 3,240km) from 06/07 to meet the 30 yr programme. |
| 2004 | Steel pipe included in the risk model. |

***Table 8-2***

The HSE Enforcement policy has been successful in reducing the risk arising from the iron portion of the distribution system. The chart below shows how risk (as predicted from a mathematical model) has fallen steeply in each Network in response to targeted replacement over the last five years.

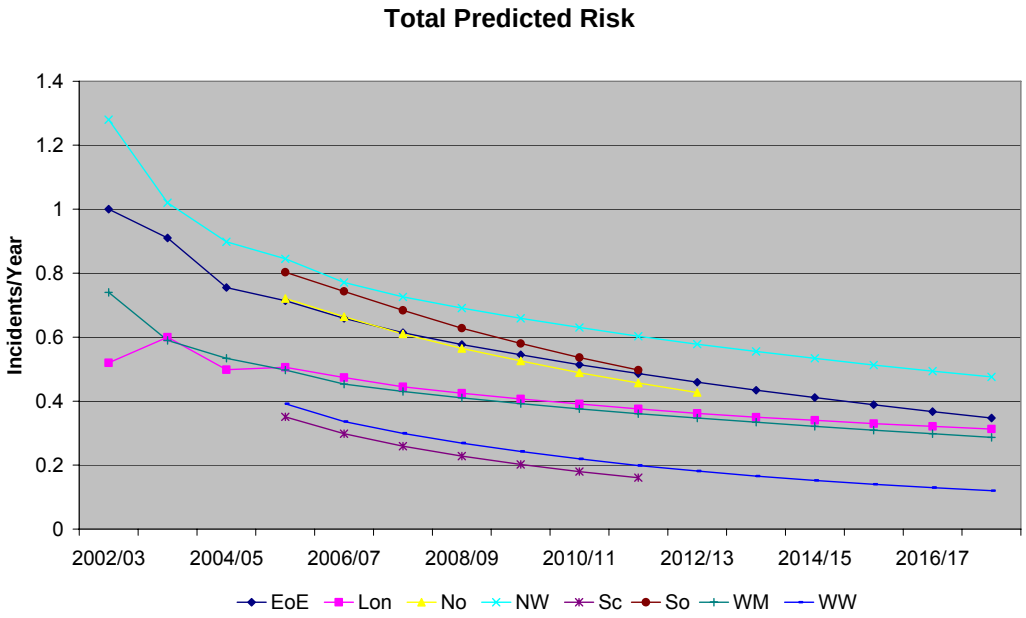


***Figure 8-1***

However, this has been achieved at increasing expense as Networks have been "ramping-up" their replacement activity to meet the HSE's required national replacement rate of 3,500km/yr by 2007/08.

The replacement of mains also generates a services workload as service pipes must be replaced or re-connected to the replacement main.

### 8.3.2 DEFINITION OF ACTIVITY

This section of the report deals with:

Replacement mains – costs and volumes reported in section C8 of the Network BPQ workbook (but excluding LTS Repex, see section 9 below)

Replacement services - costs and volumes reported in section C9 of the Network BPQ workbook and including non–domestic services and risers & lateral connections to multiple occupancy buildings.

### 8.3.3 UNDERLYING COSTS

The table below shows Network reported workload and costs over the first five years of the programme (2006/07 is a forecast)

| Distribution Repex Total Cost Trends 2002/03 - 2006/07 £m All Prices 2005/06 | 2002/03 | 2003/04 | 2004/05 | 2005/06 | 2006/07 |
|---|---|---|---|---|---|
| Replacement mains (excluding re-chargeable Diversions | 37.5 | 24.4 | 31.6 | 31.3 | 32.8 |
| Replacement Services (Domestic) | 10.3 | 16.4 | 18.5 | 23.2 | 24.0 |
| Replacement Services (Non-domestic) | 0.4 | 0.3 | 0.3 | 0.4 | 0.3 |
| Multiple Occupancy Buildings | 0.0 | 0.0 | 0.0 | 0.1 | 0.2 |
| **Total Distribution Repex** | **48.2** | **41.2** | **50.4** | **55.0** | **57.3** |
| **Mains De-commissioned (km)** | **302.7** | **308.7** | **354.3** | **392.0** | **413.8** |

***Table 8-3***

2002/03 costs include the final year of the medium pressure ductile iron programme and are thus not representative of the current 30 year programme.

For the period up to 2005/06, costs associated with multiple occupancy buildings have not been separately identified but are included (where they are incurred) within the total. Re-chargeable mains diversions (normally a small negative cost after contributions) are excluded from the table for clarity.

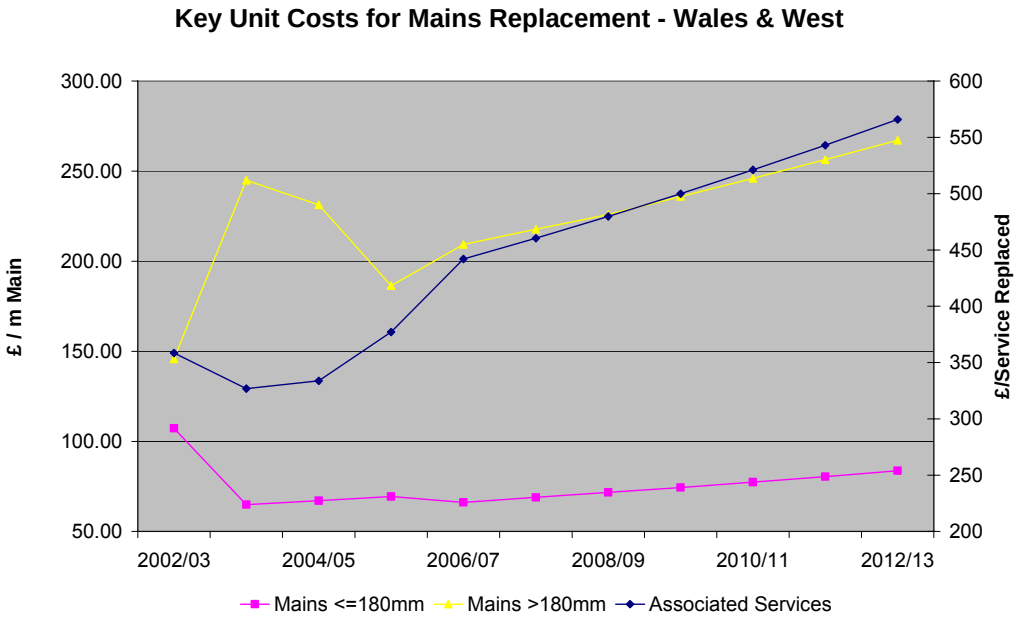


***Figure 8-2***

Following the completion of the medium pressure ductile iron programme in 2003 mains unit costs (<=180mm diameter) have been successfully contained.

Unit costs for mains >180mm are sensitive to diameter and thus variable in historical years. Unit costs are forecast to rise in line with the Network's assumptions of real price effects. (See 8.4.2 below)

Services unit costs (right hand scale) have risen steeply in contrast to <=180mm mains where the Network has been more successful in controlling its costs.

**Total Distribution Repex (Excluding Rechargeable Diversions)**

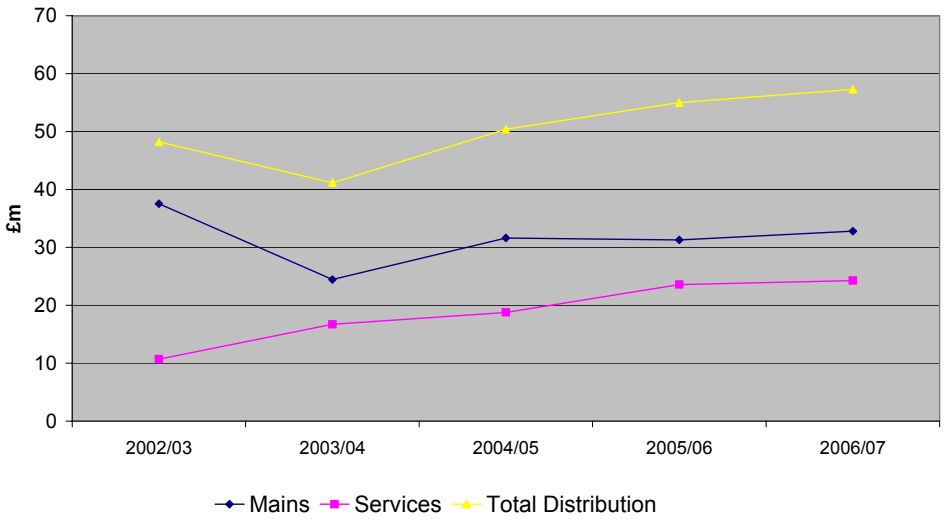


***Figure 8-3***

After completion of the medium pressure ductile iron programme in 2003, costs have risen as the Network "ramps-up" de-commissioning of iron and other mains to a forecast total of 420km/yr (2008/09).

### 8.3.4 APPROACH TO THE ASSESSMENT OF EFFICIENCY

Inter-Network Comparison

In assessing the efficiency of investment (2005/06 onwards) we have examined the Network's 2005/06 costs and compared these with the seven other Networks taking into account, as far as is possible, differences such as mains and services workload, the proportions of direct and contract labour, and regional cost differences as derived from indices published by BCIS (The Building Cost Information Service a subsidiary of the Royal Institution of Chartered Surveyors) and DTI – Annual Survey of Hours and Earnings (ASHE).

We have chosen a regression approach as it avoids the direct comparison of unit costs for different disaggregated cost categories, which we regard as unreliable given differences in cost allocation at a disaggregated level, and enables us to compare the Networks' costs and efficiency on a consistent basis

A number of regression options have been explored, and we have concluded that the most suitable regression is achieved by analysis of the logarithmic values of normalised costs and the chosen driver. A "basket of work" approach has been used to produce a weighted average of a number of different work elements (installed mains pipe sizes and services by job type). The driver is calculated by multiplying the work volume by a nominal unit cost for the activity. The approach is not sensitive to the actual level of these nominal unit costs, but works on the relative costs between work types.

This approach allows the analysis to fully reflect the workload forecast by the Networks, adjusted as deemed appropriate by our consultants.

The starting point for setting the target benchmark is an Ordinary Least Squares (OLS) regression on the eight data points, one for each GDN, applicable in the base year (2006/07). The $R^2$ value indicates how well the variation in costs is explained by the variation in the workload driver.

The OLS regression calculation takes into account all the data points in determining the relationship between the costs and the workload driver. This relationship could be used to determine the frontier costs for each network, but these costs are unlikely to be efficient since generally only some networks will be operating at the efficiency frontier.

We therefore propose to obtain the frontier cost relationship by adjusting the OLS regression line so that it reflects efficient network performance rather than average performance.

This relationship could be constructed by shifting down the regression line until all the data points are above the line except for one data point which is on the line. This is the Corrected Ordinary Least Squares (COLS) regression line.

However, we consider that there are differences between GDNs which may not be fully explained by the regression analysis and that it is reasonable to set the frontier relationship by shifting the regression line down to the upper quartile. This is the upper quartile COLS regression line and is shown in pink on the charts. This is the target which all under performing GDNs should move towards.

Where the regression uses log-linear analysis, the effect of rejecting the OLS regression line as the frontier relationship in favour of the upper quartile COLS regression line is to reduce the target costs of each network by the same percentage.

With this approach, 75% of networks will be performing at or below the frontier in the base year and these networks will be expected to continue to improve their performance over the period to 2012/13. The resulting target costs for 2012/13 are shown in yellow on the charts.

There is a further description of the analysis techniques employed in section 2 of this report.

Figure 8-4 shows the output from benchmarking analysis of 2005/06 cost performance for replacement mains and services.

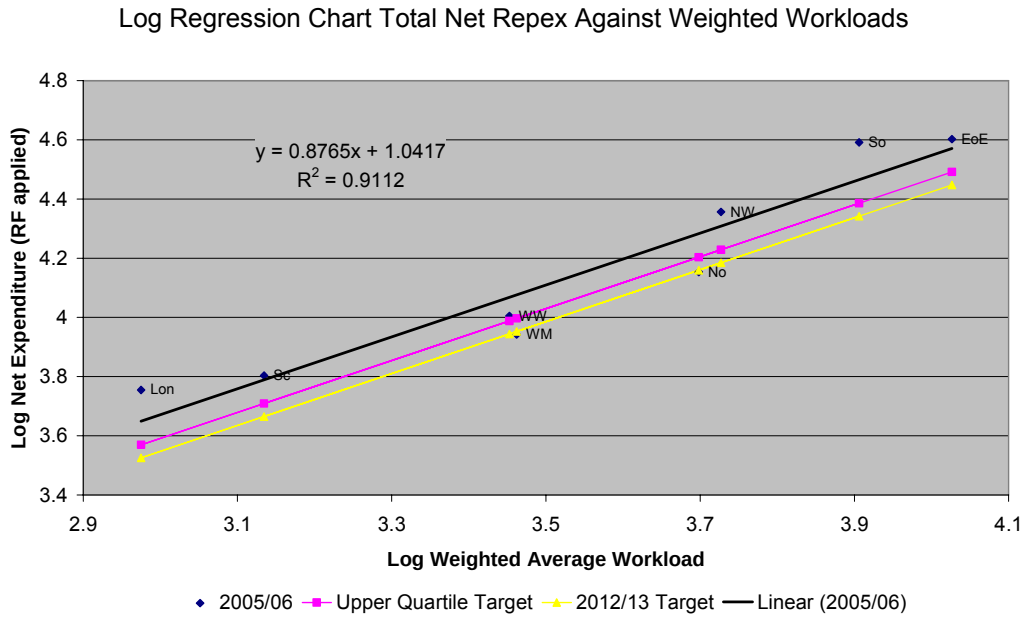


***Figure 8-4***

In the chart above (2005/06) Wales and West are ahead of the upper quartile and are the third most efficient Network

Comparison with Other Utilities' Costs

Ofwat Comparison

We have compared the cost of the Network's activities with data for water supply companies published by Ofwat.[6]

Gas and water mains installation activities are similar to the extent that the companies work in comparable conditions using similar technologies based around PE pipe systems. There are many minor differences which we have not evaluated and one major difference: the gas supply network has few valves, and flow-stopping equipment is needed for every dis-connection and re-connection required by the replacement process, whereas in water supply flow-stopping is achieved by operating existing valves. These "live gas" connections account for a significant element of mains replacement costs.

The replacement of gas and water services differs in that a water company's ownership ends at the footpath stop valve whereas the gas network extends to the meter control valve. In addition GDNs are required to undertake soundness and appliance safety checks prior to restoring the supply.

As part of its review process Ofwat compiles a series of "standard cost estimates" provided by the water companies. These cost estimates are prepared in accordance with assumptions provided by Ofwat to exclude atypical costs and normalise certain other costs. Because of this the Ofwat costs are lower than those that would normally be achieved within the business.

We have compared the standard costs estimates with the unit costs within the companies' BPQ submissions. These unit costs include all costs for the activity and therefore allowance must be made for the difference between the Network unit costs and standard cost estimates. The principal differences are:

The additional cost of gas connections.

Disposal of excavated material beyond the assumed 1km.

Replacement of the entire gas service and gas safety obligations

For comparison purposes an adjustment has been made to reported costs to allow for the above and this shows that gas and water costs are generally of the same order.

[6] Water and sewerage service unit costs and relative efficiency 2003-04 report - Ofwat

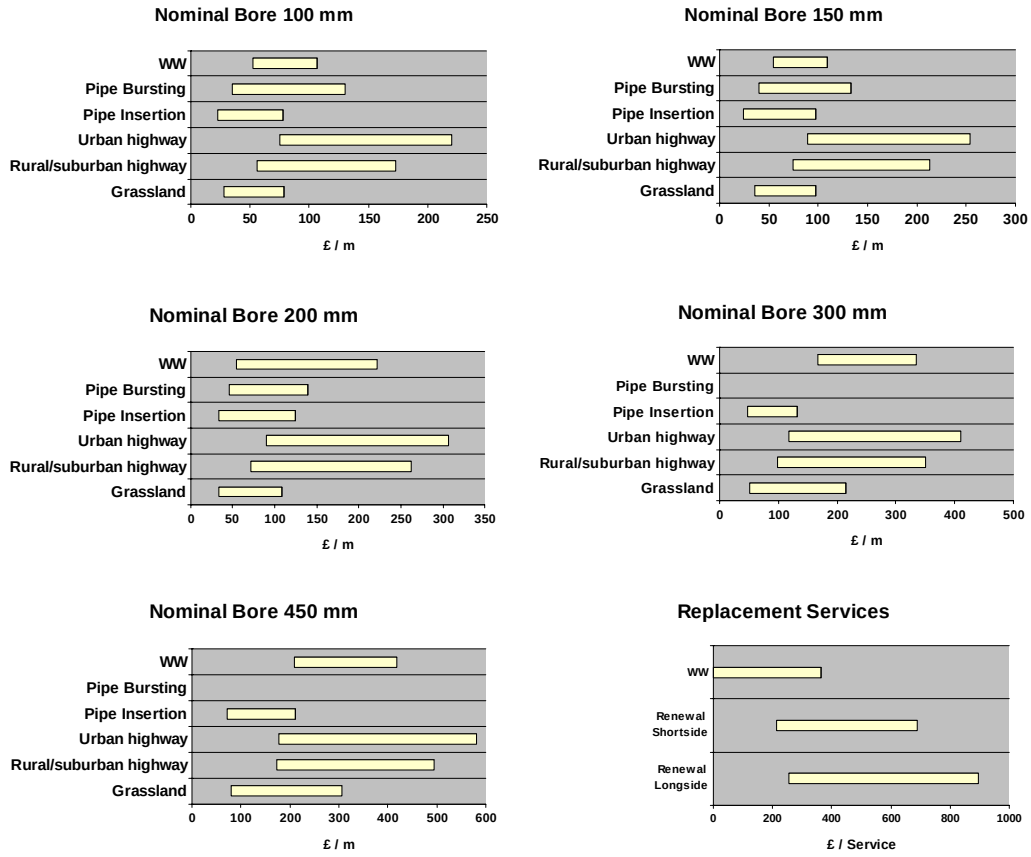


***Figure 8-5***

Base Year (2005/06) Assumptions and Adjustments

We have carefully examined the base year volumes and costs since it is this year that establishes the relative position of the Network and the potential efficiency savings available.

| Installed Mains Base Year (2005/06) Assumptions and Adjustments (Excluding Re-Chargeable Diversions) | Volume (km) | Gross (Including Overheads) £m |
|---|---|---|
| **BPQ Submission** | | |
| HSE Enforcement Policy | 315.6 | 28.2 |
| MPDI Programme | 0.0 | 0.0 |
| Other Policy & Condition Mains | 40.9 | 2.5 |
| Non-rechargeable Diversions | 3.6 | 0.5 |
| **Total Repex Mains** | **360.1** | **31.3** |
| **Normalised BPQ** | | |
| HSE Enforcement Policy | 315.6 | 28.2 |
| MPDI Programme | 0.0 | 0.0 |
| Other Policy & Condition Mains | 40.9 | 2.5 |
| Non-rechargeable Diversions | 3.6 | 0.5 |
| **Total Repex Mains** | **360.1** | **31.3** |

***Table 8-4***

We have made no adjustment to 2005/06 mains costs and volumes.

| Replacement Services-domestic Base Year (2005/06) Assumptions and Adjustments | Volume | Gross (Including Overheads) £m |
|---|---|---|
| **BPQ Submission** | | |
| **Domestic Services** | | |
| Relaid services associated with mains replacement | 23065 | 10.8 |
| Relaid services not associated with mains replacement (bulk relays) | 0 | 0.0 |
| Services relaid after escape | 4822 | 2.0 |
| Service test & transfer to new or other main | 19981 | 5.9 |
| Reposition domestic meter - service relays | 0 | 0.0 |
| Purge & relight after domestic service work | 47868 | 1.3 |
| Service relay domestic meterwork | 0 | 0.0 |
| Other domestic services | 1765 | 3.2 |
| **Total domestic services** | | **23.2** |
| **Non-domestic Services** | **321** | **0.3** |
| **Multiple Occupancy Buildings** | | |
| Renew risers | 496 | 0.1 |
| Renew service connections | 0 | 0.0 |
| **Total - Multiple Occupancy Buildings** | | **0.1** |
| **Total Services** | | **23.6** |
| **Normalised BPQ** | | |
| **Domestic Services** | | |
| Relaid services associated with mains replacement | 23065 | 10.8 |
| Relaid services not associated with mains replacement (bulk relays) | 0 | 0.0 |
| Services relaid after escape | 4822 | 2.0 |
| Service test & transfer to new or other main | 19981 | 5.9 |
| Reposition domestic meter - service relays | 0 | 0.0 |
| Purge & relight after domestic service work | 47868 | 1.3 |
| Service relay domestic meterwork | 0 | 0.0 |
| Other domestic services | 1765 | 3.2 |
| **Total domestic services** | | **23.2** |
| **Non-domestic Services** | **321** | **0.3** |
| **Multiple Occupancy Buildings** | | |
| Renew risers | 496 | 0.1 |
| Renew service connections | 0 | 0.0 |
| **Total - Multiple Occupancy Buildings** | **496** | **0.1** |
| **Total Services** | | **23.6** |

***Table 8-5***

We have made no adjustment to 2005/06 services costs and volumes.

Multiple Occupancy Buildings

Historically, the cost of the replacement of that part of the distribution system within apartment blocks has been allocated to mains and services. Typically the cost of replacement risers (the vertical pipes within the block) was allocated to mains and the cost of the lateral connections to services. Work of this type was relatively unusual, and the allocation of costs and volumes was absorbed without overly distorting unit costs.

More recently, Networks have needed to replace these systems more frequently, often by constructing a new system on the face of the building which requires temporary access

by scaffolding. The cost of these replacements is high and Networks requested that these costs were separately identified within the BPQ.

We believe that within the current period the cost of replacement risers, as well as laterals, may have been allocated to services and that, if this is so, services costs may be inflated. This would ultimately be to the advantage of the Networks should a separate allowance for multiple occupancy buildings be made within the next control.

We believe, through the comparison of unit costs and contract rates, that for Wales and West Network these additional costs are likely to be small, but we recommend further work to clarify this area.

## 8.4 FORECAST

### 8.4.1 INTRODUCTION

The Network forecast is generated in seven work categories:

**HSE's Enforcement Policy for the Replacement of Iron Gas Mains.**

The Repex forecast is aimed principally at delivering the requirements of the HSE as defined in its 2001 Enforcement Policy[7]. This requires iron mains within 30m of premises to be de-commissioned over the period to March 2031. The Network follows a programme, accepted annually by HSE, to achieve this.

**Medium Pressure Ductile Iron Programme**

This deals with any instances of medium pressure ductile iron mains within 30m of premises. These mains were de-commissioned in a major programme ending in 2003 but any encroachment, e.g. through new development, will trigger a replacement project.

The Network has opted to include this small workload in the category above.

**Other Policy and Condition Mains**

Small diameter steel mains are replaced if they are associated with Enforcement Policy work; other mains of any material may be replaced on the basis of condition.

The network is proposing to replace specific larger diameter steel mains due to condition and the total replacement proposed is 54km/yr.

**Non-rechargeable diversions**

The Network will occasionally be required to divert mains at its own expense and forecasts a small workload of 2.4km/year

**Re-chargeable diversions**

The Network is required to divert mains on a rechargeable basis, usually in conjunction with highway alterations. The Network is forecasting a workload of approximately 13km/year and minor expenditure caused by a national agreement (in respect of work promoted by Highway Authorities) to fund 18%of the cost in exchange for payment in advance.

**Replacement Services**

Services replaced or transferred in association with mains replacement or relaid after escape, plus a range of other minor services activities.

**Multiple Occupancy Buildings**

Replacement of risers (> 20m) and laterals supplying multiple occupancy buildings.

The Network has not identified the number of connections per year within its submission.

[7] THE HEALTH AND SAFETY EXECUTIVE'S ENFORCEMENT POLICY FOR THE REPLACEMENT OF IRON GAS MAINS – September 2001

**Forecasting Process**

Our review of the forecast has focussed on the major cost areas; the HSE's Enforcement Policy programme, Other Policy and Condition mains, and Replacement Services.

Mains

We have reviewed the process used by the Network to generate its forecast. We found that the Network reasonably takes into consideration relevant factors that influence the forecast; the length and diameter mix of mains to be de-commissioned and installed, the likely ratio of installed to de-commissioned mains, the likely method of construction, the combined impact of upsizing and downsizing and the requirement for associated reinforcement of the system. Historical data is used to inform the forecast and this is modified where appropriate.

The Network has not, in the past, routinely considered the impact of average system pressure increases, in compensation for downsizing, and the associated incremental change in the (Opex) cost of emissions, shrinkage and escapes. This has led to some systems being operated at higher than normal pressure under peak conditions.

Services

Services workload forecasts are similarly generated using historical ratios modified in the light of expected changes to the make-up of the mains workload.

Outputs

Within the forecasting process outputs are also considered. The Network forecasts annually the reduction in risk arising from the distribution system that can be attributed to its replacement programme and the impact of the programme on network capacity is considered on a project by project basis.

Overall we found the Network's forecasts to be reasonably accurate although we have made one minor adjustment detailed in section 8.4.2 below.

## 8.4.2 COMPANY PROPOSALS

| GDN Volumes (as presented) (Excluding Re-Chargeable Diversions) | 2006/07 | 2007/08 | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 |
|---|---|---|---|---|---|---|---|
| **Installed Mains (km)** | | | | | | | |
| HSE Programme | 342.6 | 342.6 | 342.6 | 342.6 | 342.6 | 342.6 | 342.6 |
| MPDI Programme | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Non-rechargeable Diversions | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 |
| Other Policy & Condition Mains | 45.9 | 47.6 | 53.7 | 53.7 | 53.7 | 53.7 | 53.7 |
| **Total Installed Mains (km)** | **390.9** | **392.6** | **398.7** | **398.7** | **398.7** | **398.7** | **398.7** |
| **Replacement Services - domestic** | | | | | | | |
| Relaid services associated with mains replacement | 25096 | 25096 | 25096 | 25096 | 25096 | 25096 | 25096 |
| Relaid services not associated with mains replacement (bulk relays) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Services relaid after escape | 4750 | 4679 | 4609 | 4540 | 4472 | 4405 | 4339 |
| Service test & transfer to new or other main | 23472 | 23472 | 23472 | 23472 | 23472 | 23472 | 23472 |
| Reposition domestic meter - service relays | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Purge & relight after domestic service work | 54366 | 53987 | 53987 | 53987 | 53987 | 53987 | 53987 |
| Service relay domestic meterwork | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other domestic services | 1765 | 1765 | 1765 | 1765 | 1765 | 1765 | 1765 |
| **Total Domestic Services** | **109449** | **108999** | **108929** | **108860** | **108792** | **108725** | **108659** |
| **Replacement Services - Non-domestic** | **349** | **349** | **349** | **349** | **349** | **349** | **349** |
| **Multiple Occupancy Buildings** | | | | | | | |
| Renew service connections | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total riser renewals (m) | 860 | 860 | 860 | 860 | 860 | 860 | 860 |

***Table 8-6***

| GDN Costs as presented (Normalised) £m 2005/06 Prices (Excluding Re-Chargeable Diversions) | 2006/07 | 2007/08 | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 |
|---|---|---|---|---|---|---|---|
| **Installed Mains** | | | | | | | |
| HSE Programme | 30.0 | 31.3 | 35.1 | 40.6 | 44.7 | 48.2 | 52.0 |
| MPDI Programme | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Non-rechargeable Diversions | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 |
| Other Policy & Condition Mains | 2.4 | 2.9 | 4.5 | 4.7 | 4.9 | 5.1 | 5.3 |
| **Total Installed Mains** | **32.8** | **34.6** | **40.0** | **45.7** | **50.0** | **53.7** | **57.7** |
| **Replacement Services - Domestic** | | | | | | | |
| Relaid services associated with mains replacement | 12.7 | 13.3 | 13.8 | 14.3 | 14.9 | 15.4 | 16.0 |
| Relaid services not associated with mains replacement (bulk relays) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Services relaid after escape | 1.8 | 1.8 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 |
| Service test & transfer to new or other main | 7.0 | 7.3 | 7.5 | 7.8 | 8.1 | 8.5 | 8.8 |
| Reposition domestic meter - service relays | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Purge & relight after domestic service work | 1.5 | 1.6 | 1.7 | 1.7 | 1.8 | 1.8 | 1.9 |
| Service relay domestic meterwork | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Other domestic services | 0.9 | 0.9 | 1.0 | 1.0 | 1.0 | 1.1 | 1.1 |
| **Total Domestic Services** | **24.0** | **24.9** | **25.8** | **26.8** | **27.7** | **28.8** | **29.9** |
| **Replacement Services - Non-domestic** | **0.3** | **0.3** | **0.3** | **0.3** | **0.3** | **0.4** | **0.4** |
| **Multiple Occupancy Buildings** | | | | | | | |
| Renew service connections | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total riser renewals (m) | 0.2 | 1.0 | 1.1 | 1.2 | 1.2 | 1.3 | 1.3 |
| **Total** | **0.2** | **1.0** | **1.1** | **1.2** | **1.2** | **1.3** | **1.3** |
| **Total Repex** | **57.3** | **60.8** | **67.2** | **74.0** | **79.3** | **84.1** | **89.3** |

***Table 8-7***

### 8.4.3 PB POWER PROJECTIONS

Proposed Workloads

Replacement Mains

In assessing the Network's forecast for mains replacement we have reviewed the annual volume and diameter mix of the proposed workload.

HSE Enforcement Policy

Our starting point was the principal requirement of the HSE's Enforcement Policy – that iron mains within 30m of premises be de-commissioned by March 2032. We have assessed the workload on that basis, taking the remaining population of iron pipes to be de-commissioned (2006) and dividing by 26, the number of remaining years in the programme. The Network has opted not to include a "ramp-down" period at the end of the programme and we calculated the appropriate rate of abandonment at 361 km/yr, the same as that proposed. We understand that, on an annual basis, the Network takes into account the contribution to de-commissioned mains (within the target population) from other replacement activities such as condition replacement and mains diversions. We note that this adjustment has not been included in the forecast but recognise that it is

likely to be small and a reasonable contingency measure against possible increases in the target population arising from encroachment or data correction.

Diameter Mix of Installed Mains

In addition to the overall length of installed mains the diameter mix is a significant cost factor. We compared the diameter mix with that of the target population to ensure a reasonable match taking into account that mains insertion (the most economic method of replacement) would create a bias towards the smaller diameters of installed mains.

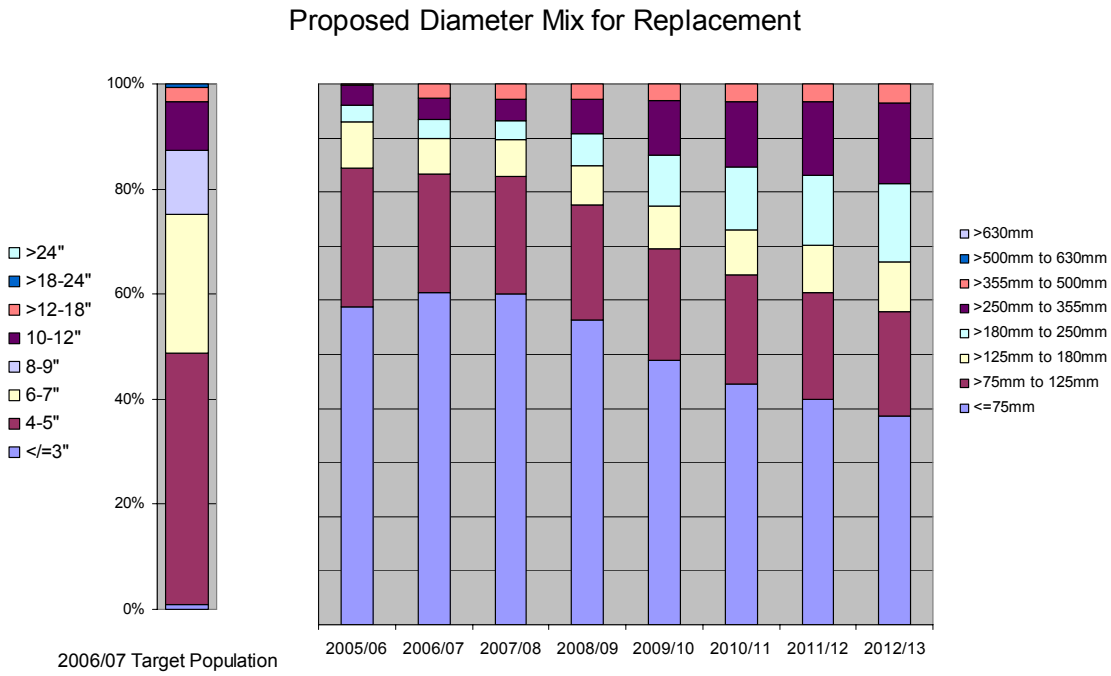


***Figure 8-6***

We also compared the Network's forecast with that of others and came to the overall conclusion that the forecast diameter mix is correct.

Diameter Mix of De-commissioned Mains

We have reviewed the Network's proposal for de-commissioned mains comparing it with the target population. Whilst the Network will give priority to replacing the higher risk mains (mostly smaller diameters) it should also be proportionately addressing the larger diameters. Overall we found reasonable proportionality between the target population and the Network's proposals for these larger diameters.

| 2006/07 Target Population | 1/25th Illustration | Network's Forecast - Abandoned Mains (HSE Programme) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 2005/06 | 2006/07 | 2007/08 | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 |
| 87 | </=3" | 3 | 21 | 33 | 15 | 10 | 8 | 7 | 3 | 3 |
| 4310 | 4-5" | 172 | 209 | 230 | 244 | 225 | 199 | 184 | 176 | 165 |
| 2386 | 6-7" | 95 | 66 | 65 | 66 | 71 | 72 | 65 | 61 | 72 |
| 1101 | 8-9" | 44 | 16 | 16 | 15 | 29 | 46 | 65 | 75 | 75 |
| 836 | 10-12" | 33 | 12 | 12 | 10 | 16 | 25 | 29 | 34 | 34 |
| 242 | >12-18" | 10 | 8 | 5 | 10 | 10 | 11 | 11 | 12 | 12 |
| 61 | >18-24" | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7 | >24" | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9028 | | 361 | 332 | 361 | 361 | 361 | 361 | 361 | 361 | 361 |

***Table 8-8***

Ratio of installed to de-commissioned mains

We have examined the ratio of installed to de-commissioned mains within the proposal and compared this with others. We have assumed continued upsizing of around 8km/yr, and in line with overall reinforcement proposals. After taking into account up-sizing (see below) the Network is forecasting an abandoned/installed ratio of 1.03 which we regard as low and we have thus adjusted installed mains to restore the ratio to 1.05.

**Overall Mains Replacement Ratio Networks' Proposals**

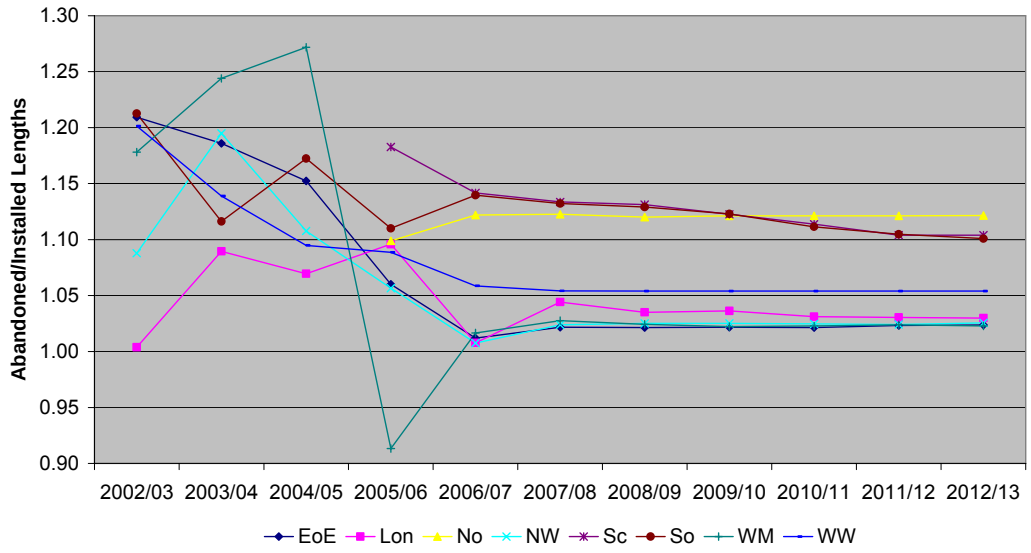


***Figure 8-7***

Reinforcement and Up-sizing

The Network operates an accounting rule such that (together with other conditions) if a replacement main is greater than 2" larger in diameter (up-sized) it is charged to reinforcement and Capex. Reinforcement and up-sizing can compensate for the loss of capacity caused by inserting new smaller diameter mains and where reinforcement or up-sizing is required, total project costs should be optimised.

We understand that the Network routinely undertakes up-sizing and reinforcement to maintain network pressures, and to prevent the network Maximum Operating Pressure

(MOP) from being exceeded, but that cost-benefit analysis (taking into account pressure raising alternatives and effects on emissions and PREs) is not in routine use.

Use of cost-benefit analysis will allow the Network to optimise project costs by taking into account the benefits of increased system operating pressure, off-set by the cost of emissions and PREs. We considered making an adjustment to the Network's forecast as the use of cost-benefit analysis would normally permit modest pressure raising and more downsizing and insertion. We decided against this because:

Average system pressure is comparatively high.

The Network's emissions are higher than some larger Networks

The proposed diameter mix already compares favourably with other Networks' proposals.

Some of the large networks in Wales and West are currently being operated at higher than normal pressures under peak conditions and the opportunities for downsizing and insertion may be limited until reinforcement/pressure management schemes are implemented. This issue is explained further in section 5.4.1.1

**Average System Pressure**

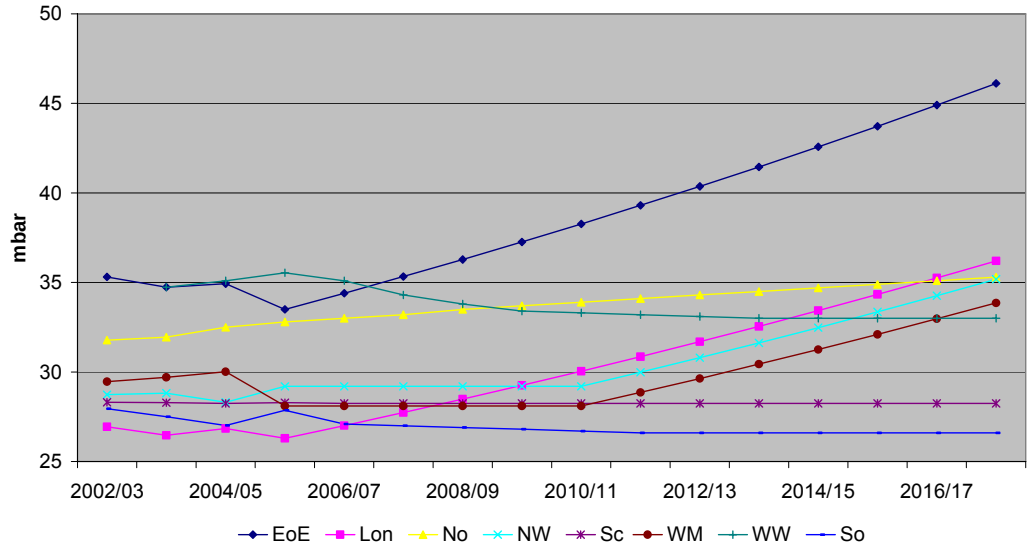


***Figure 8-8***

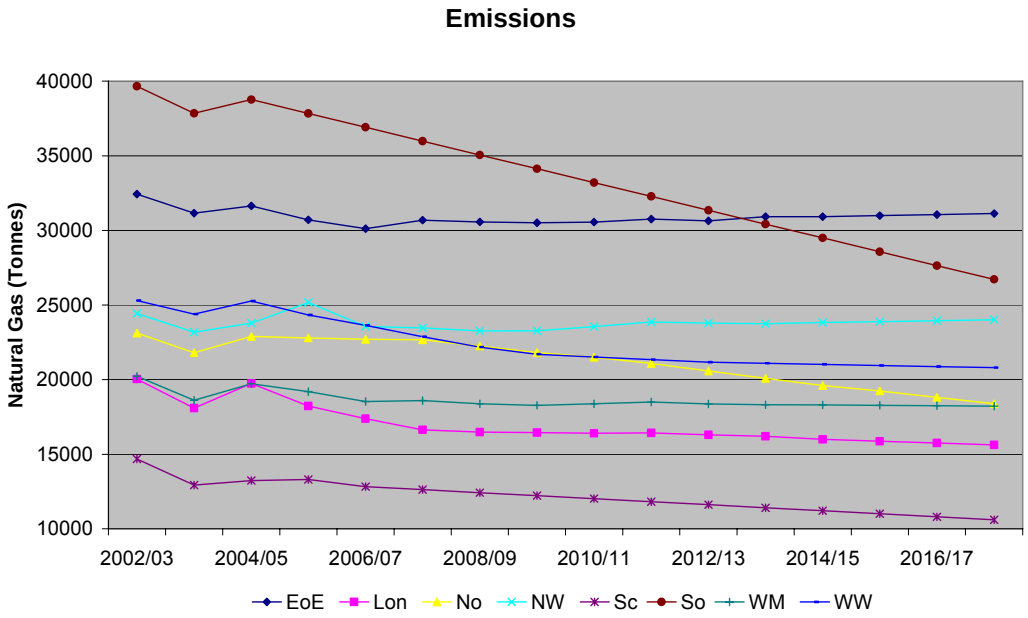


***Figure 8-9***

Other Policy and Condition Mains

Iron and Steel Mains

We have reviewed the Networks forecast workload relating to Other Policy and Condition Mains and compared it to others. We found the Network's forecast to be relatively high, but we have accepted the Network's explanation that:

> It has a high population of 2" steel main (previously regarded as services and often unrecorded) that is replaced in conjunction the HSE Enforcement Programme.
>
> It has identified a population of steel mains for replacement on the basis of condition where the cathodic protection system has failed.

We therefore propose no adjustment to volumes.

Replacement Services

We have reviewed the Network's forecast for domestic services workload and established the number of services jobs/km of mains abandoned. We have also compared the forecast with others on a normalised basis and found the Network's forecast to be relatively high at 116 services jobs/km of mains de-commissioned. We have however verified this by examination of selected individual projects and a detailed project list and we concluded that the network's forecast was reasonable and we propose no adjustment to volumes.

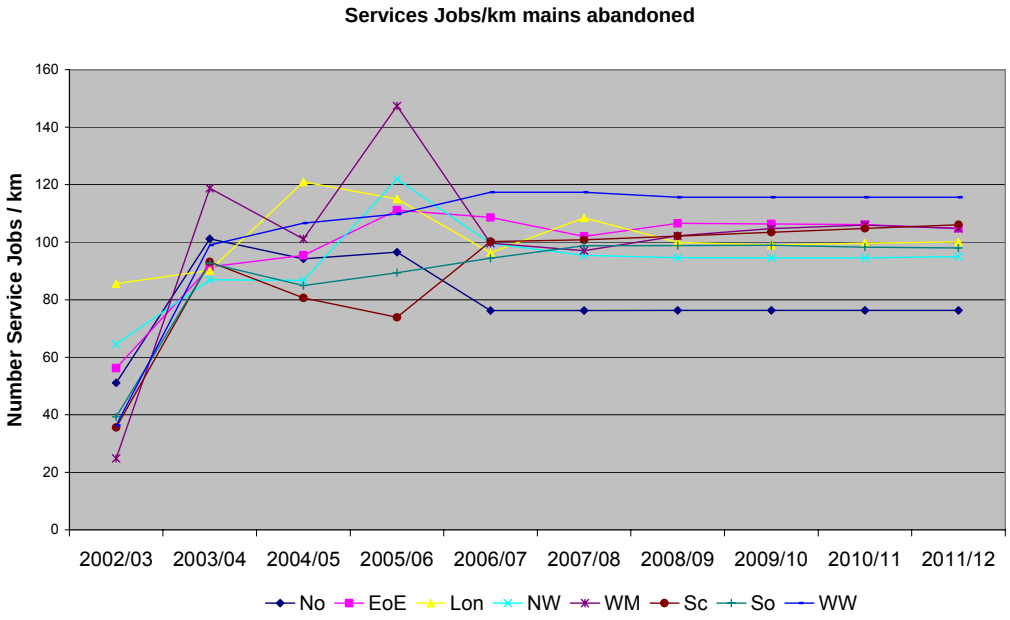


***Figure 8-10***

Transferred Services

In addition to the overall numbers of services jobs, the mix of relayed and transferred services is a significant cost factor. We compared the proposed proportions with historical data (together with that of other networks) and concluded that the Network had been accurate in the proportion of transferred services forecast.

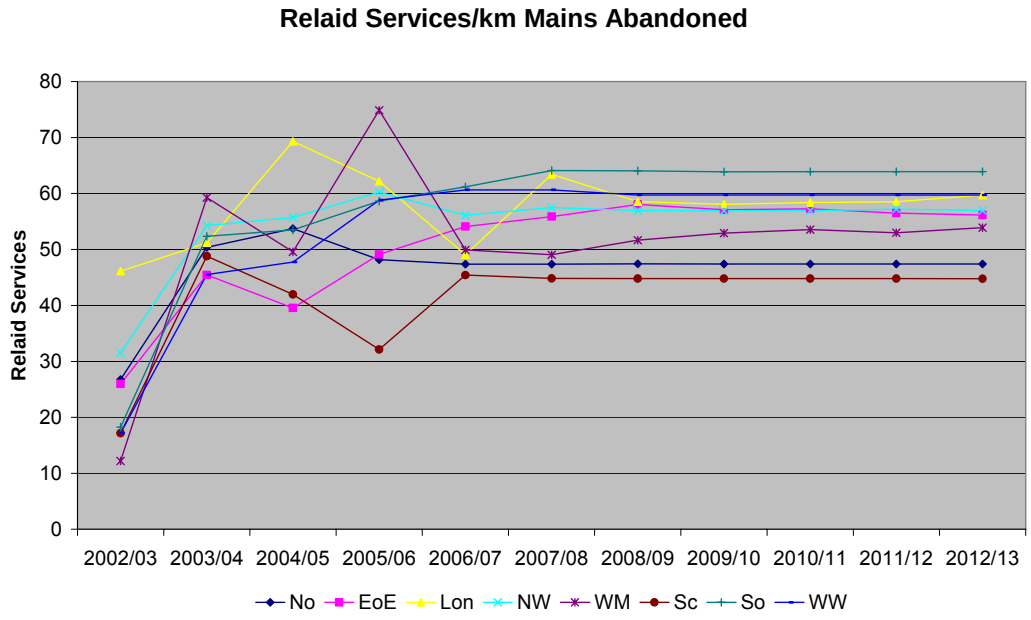


***Figure 8-11***

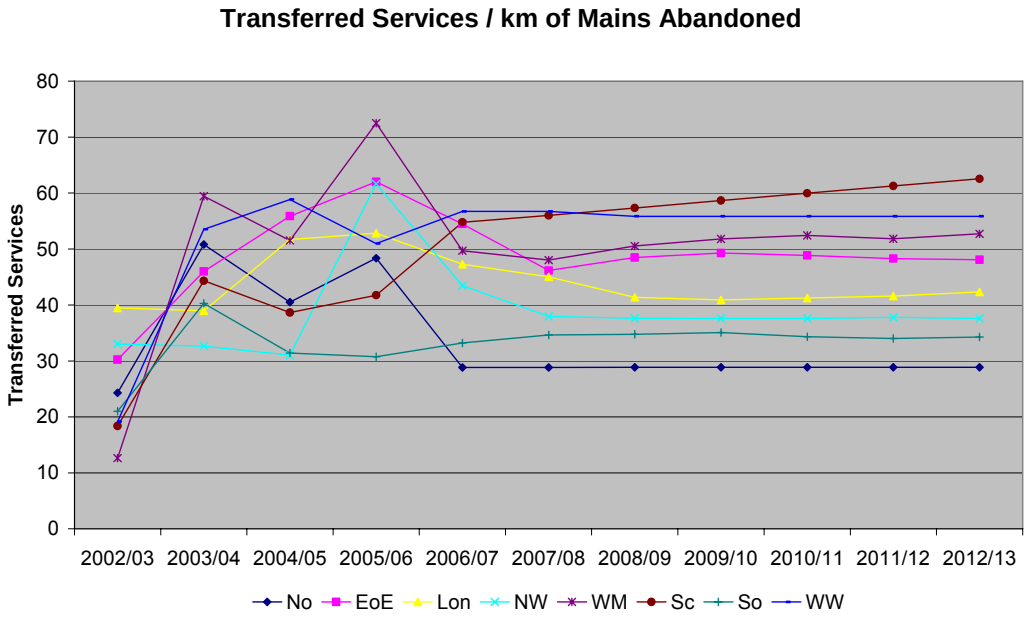


***Figure 8-12***

Non-domestic Services

We have accepted the forecast volumes as being in reasonable proportion to the domestic services workload and propose no adjustment.

Multiple Occupancy Buildings

The Network has forecast expenditure of £1.2m/year for the replacement of risers & laterals in high-rise blocks. The Network acknowledges that it has no planned programme of work and it is not clear how this forecast has been arrived at.

The Network is right however, to be considering the condition of these assets and their future, but replacement is relatively expensive on a cost per customer basis and in some cases may not be economically justified.

The Network has a survey (T/PM/LC21; 10% complete) in progress aimed at establishing the population of risers and laterals and their condition. We note however that this survey does not record the number of customers connected nor the use of gas (i.e. cooking, heating etc.) and we recommend that these factors are incorporated so that the consequences of isolation, in the event of an escape that cannot be located or repaired, can be included in prioritising the work.

Ofgem, in its GDPCR Third Consultation Document, has invited views on the issues associated with the replacement of these connections and there may be developments which would enable Networks to follow a process leading to an alternative to replacement in some instances, although it is recognised that there are inevitably costs associated with this option.

We acknowledge that it is appropriate that the Network incorporates multiple occupancy buildings within its replacement programme, however we feel that at present too little is known about the population, its condition, and the consequences of isolation, to prioritise the work or assess the appropriate rate of replacement.

We have therefore recommended expenditure sufficient, in our judgement, to deal with risers and laterals on a replace on failure basis and/or to start some selective replacement. If the Network can provide better data on the population, its condition and the consequences of isolation, it may be reasonable for Ofgem to increase the allowance to accommodate a programme of prioritised replacement.[8]

| GDN Volumes (Adjusted) | 2006/07 | 2007/08 | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 |
|---|---|---|---|---|---|---|---|
| **Installed Mains (km)** | | | | | | | |
| HSE Programme | 342.6 | 342.6 | 337.3 | 337.3 | 337.3 | 337.3 | 337.3 |
| MPDI Programme | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Non-rechargeable Diversions | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 |
| Other Policy & Condition Mains | 45.9 | 47.6 | 53.7 | 53.7 | 53.7 | 53.7 | 53.7 |
| **Total Installed Mains (km)** | **390.9** | **392.6** | **393.4** | **393.4** | **393.4** | **393.4** | **393.4** |
| **Replacement Services - domestic** | | | | | | | |
| Relaid services associated with mains replacement | 25096 | 25096 | 25096 | 25096 | 25096 | 25096 | 25096 |
| Relaid services not associated with mains replacement (bulk relays) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Services relaid after escape | 4750 | 4679 | 4609 | 4540 | 4472 | 4405 | 4339 |
| Service test & transfer to new or other main | 23472 | 23472 | 23472 | 23472 | 23472 | 23472 | 23472 |
| Reposition domestic meter - service relays | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Purge & relight after domestic service work | 54366 | 53987 | 53987 | 53987 | 53987 | 53987 | 53987 |
| Service relay domestic meterwork | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Other domestic services | 1765 | 1765 | 1765 | 1765 | 1765 | 1765 | 1765 |
| **Total Domestic Services** | **109449** | **108999** | **108929** | **108860** | **108792** | **108725** | **108659** |
| **Replacement Services - Non-domestic** | **349** | **349** | **349** | **349** | **349** | **349** | **349** |
| **Multiple Occupancy Buildings** | | | | | | | |
| Renew service connections | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total riser renewals (m) | 860 | 860 | 258 | 258 | 258 | 258 | 258 |

***Table 8-9***

Proposed Costs

In section 8.2.4 above we explained how we established the relative position of each Network, the upper quartile and the Network with the lowest unit costs overall.

We expect Networks behind the upper quartile to improve and close the gap. Networks such as Wales and West, that are in front of the upper quartile (frontier Networks) are also expected to improve by closing the gap with our projection of their costs over the period to 2012/13. Our projection is based on the assumptions at 8.4.5 below and a 1.75% per annum productivity improvement.

[8] We have asked all the Networks to provided an update of their survey information and a revised forecast as part of the 2006/07 BPQ update

On-going efficiency improvements

As part of our review we have considered how these efficiencies may be achieved.

Work Delivery

Repex work is primarily delivered by means of Engineering Period Contractors (EPCs) – conventional “schedule of works” contracts due to expire in July 2007. The Network is currently following a process to appoint contractors to an alliance arrangement that will use the target cost approach and appropriate incentives to focus on efficiency improvements.

Target cost arrangements such as these can be effective in reducing costs but we believe that they are best applied to large projects where management can be focussed on cost reduction from design, through work delivery, to project completion.

Project Scale

We have noted from a list of 80 2005/06 projects provided by the Network that the average project size was just 1.4km with the largest project 5.0km. We feel that a move to substantially larger projects would enable more detailed planning and management of the project and improve efficiency. Other advantages of this approach are better management of customer issues (notification, disconnection time, reconnection, internal reinstatement etc.) and traffic and highway occupation times. Large projects also make techniques such as aggregate recycling, and the re-use of excavated material through conditioning more achievable, as well as providing the critical mass for further innovation.

Zonal Replacement

The move to larger projects may be inhibited by the current 20/70/10 approach to project selection and assembly, and the HSE’s past insistence that any change in policy should deliver at least as much risk removal.

HSE stated at its 2005 Review “After the first few years of the 30 year programme, the very high scoring mains should have been removed and the order in which the remainder are replaced may not be as significant. HSE see potential safety benefits for increased efficiency to allow higher annual decommissioning targets and improve the effectiveness of the 30 year programme."

Whilst the HSE’s primary interest is in risk reduction, in the above statement it also recognises the importance of completing the work efficiently. Whilst HSE also seeks higher annual decommissioning targets, its Enforcement Policy and its selection of the 30 year programme recognise the difficulties associated with faster de-commissioning. In its 2005 Review it recognised (Table 3) that the overall de-commissioning rate was likely to continue at 3,500km/year.

If the Network found that its 20/70/10 approach was inhibiting efficiency, and since a significant quantity of risk has now been removed from the network, the Network could

approach HSE with a strategy that removes risk by zone (rather than mains unit) prioritisation (supplemented by the removal of individual high risk pipes as necessary) and at the decommissioning rates required to achieve the programme over the full 30 years.

We note that HSE must approve a programme that is suitable and sufficient and in our view this could reasonably be taken to mean HSE acceptance of methods of prioritisation that are consistent with the high rates of production required to deliver the thirty year programme.

### 8.4.4 SPECIFIC COST AREAS

Multiple Occupancy Buildings

The cost of replacement risers and lateral connections to apartments within multiple occupancy buildings is influenced by a number of factors. We have reviewed the Network's proposals and compared them with data from other Networks including some examples of completed projects.

The recommended investment is our view of the reasonable cost of a "replace on failure" approach and is based on limited data provided by the Network on its population of these buildings and likely costs.

Changes in the Regulation of the Disposal of Waste

The Network will be exposed to cost increases arising directly from the Landfill Regulations and Landfill Taxes. It will also incur other costs to optimise overall expenditure in this area and minimise waste to landfill.

Improved waste segregation will be required to prevent more of its waste being classified under the Landfill Regulations as "non-hazardous" rather than "inert" as at present. The shift from inert to non-hazardous status is primarily driven by the volume of bituminous materials to be disposed of, either directly, or where inert material has become contaminated with bituminous material making the whole of the contaminated waste non-hazardous and subject to higher disposal charges. In addition, the Environment Agency is becoming more active in enforcing the Landfill Regulations and Landfill Operators are becoming more cautious in accepting material as "inert", causing it to be disposed of as "non-hazardous" at higher cost.

As well as disposal charges, the Landfill Tax charge is currently levied at £2/tonne for inert/inactive waste, with a standard rate of £21/tonne charged for all other waste. The Government has stated that the standard rate for non-hazardous waste will increase by at least £3[9] annually to a rate of £35 in 2010.

The Network has included these higher tax costs within its forecast together with associated costs related to the improved segregation of materials and increases in tipping charges and estimates the effect to be about £1m/annum.

There is considerable uncertainty around the likely change in disposal and tax charges going forward. Variables are:

The volume of waste and the proportion of inert and non-hazardous (and possibly small volumes of hazardous) material for disposal.

The marginal costs of waste segregation and the level, and cost, of recycling achieved.

The cost of testing to establish the status of waste for disposal.

The rate of Landfill Tax due on the waste for disposal.

The Landfill Tax charge in our base year was £18/tonne (Standard Rate) and our analysis has made no allowance for the proposed increases in subsequent years. Nor has any allowance been made for possible changes in the enforcement of the Landfill Regulations.

We therefore recommend that this is treated as an uncertain cost and that an adjustment is made following further assessment.

Real price effects

We agree with the Network's view on the likely trend in labour and material costs but take a more optimistic view of RPI +2.25% (contractors) and RPI + 1% (direct labour & materials) each year. Our view has to be considered in conjunction with our overall productivity assumption of a 1.75% year on year gain.

[9] Revised to £8 each year to 2011 in the recent Budget statement.

Further details of our assumptions can be found in section2

### 8.4.5 RECOMMENDATIONS

| GDN Projected Costs | 2006/07 | 2007/08 | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 |
|---|---|---|---|---|---|---|---|
| **Installed Mains** | | | | | | | |
| HSE Programme | 33.1 | 33.2 | 35.0 | 38.5 | 40.6 | 41.9 | 43.3 |
| MPDI Programme | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Non-rechargeable Diversions | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |
| Other Policy & Condition Mains | 3.5 | 3.8 | 5.4 | 5.3 | 5.3 | 5.3 | 5.2 |
| Rechargeable Diversions | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| **Total Installed Mains** | **37.1** | **37.5** | **40.8** | **44.3** | **46.3** | **47.6** | **49.0** |
| **Replacement Services - domestic** | | | | | | | |
| Relaid services associated with mains replacement | 12.4 | 12.3 | 12.2 | 12.1 | 12.0 | 12.0 | 11.9 |
| Relaid services not associated with mains replacement (bulk relays) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Services relaid after escape | 2.3 | 2.3 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 |
| Service test & transfer to new or other main | 5.8 | 5.7 | 5.7 | 5.6 | 5.6 | 5.6 | 5.6 |
| Reposition domestic meter - service relays | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Purge & relight after domestic service work | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 |
| Service relay domestic meterwork | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Other domestic services | 0.9 | 0.9 | 0.9 | 0.9 | 0.8 | 0.8 | 0.8 |
| **Total Domestic Services** | **22.2** | **22.1** | **21.9** | **21.7** | **21.5** | **21.4** | **21.2** |
| **Replacement Services - Non-domestic** | **0.5** | **0.5** | **0.5** | **0.5** | **0.5** | **0.5** | **0.5** |
| **Multiple Occupancy Buildings** | | | | | | | |
| Renew service connections | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total riser renewals (m) | 0.2 | 1.0 | 0.3 | 0.3 | 0.4 | 0.4 | 0.4 |
| **Total** | **0.2** | **1.0** | **0.3** | **0.3** | **0.4** | **0.4** | **0.4** |
| **Total Repex** | **60.1** | **61.2** | **63.5** | **66.8** | **68.7** | **69.9** | **71.1** |

***Table 8-10***

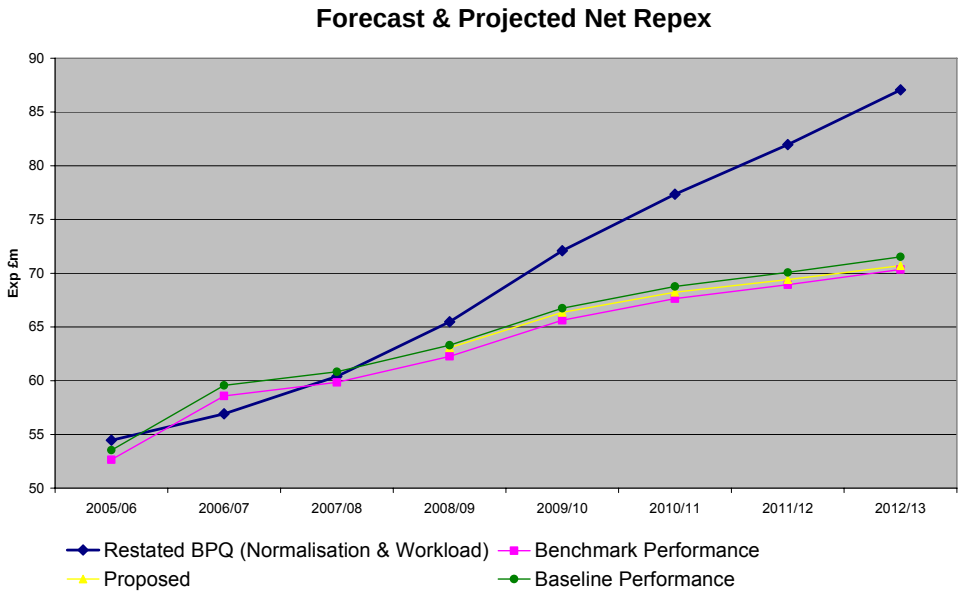


***Figure 8-13***

### 8.4.5.1 Supplementary Incentive Mechanism

The Supplementary Incentive Mechanism was introduced within the 2001 Price Control Review to address the "diameter effect" where a workload of smaller (than forecast) diameter mains could produce savings for the Network. The current incentive applies only to mains abandoned and rewards the Network if mains replacement costs are less than the "value" of the mains abandoned. This is calculated annually by multiplying the length abandoned in each diameter band by the appropriate matrix value. Thus the incentive acts to minimise the cost of replacement mains and maximise the mains abandoned.

Operation of the current incentive has raised the following issues:

Rather than simply minimising the cost of replacement mains, the incentive should reflect the need to optimise whole project costs and consider:

i) The cost of replacing the associated services (Repex)

ii) The requirement for system reinforcement (Capex)

iii) The effect on the operating pressure of the network, the level of public reported escapes and emissions/shrinkage (Opex)

We are satisfied that the Network does take these factors into account but we do not think it appropriate that the incentive should continue in its current form as it can be conceived as an incentive to transfer costs to these other areas and as a potential impediment to best practice in network management.

We understand that Ofgem intends to address these issues by including services within the Repex incentive and by equalizing incentives across replacement and other Capex.

We have therefore expressed the recommended expenditure in terms of mains decommissioned. In doing so we have made judgements on the overall ratio of mains installed to mains de-commissioned, and the likely diameters of installed mains (and the relative proportions) that contribute to the cost of de-commissioning by diameter band.

We have drawn on data made available to us during this review to allocate proportions of smaller, equivalent and larger diameters of installed pipe to each diameter band of de-commissioned mains. We thus developed a set of standard unit costs which set the relationship of each diameter band. These unit costs were then applied to the projected volumes to give a total notional cost and a scaling factor when compared to our

recommended efficient costs. Standard unit costs were then adjusted and applied to the projected volumes to total to the recommended efficient cost for each year as shown below.

Re-chargeable diversions are excluded as in the current version of the supplementary incentive mechanism

| De-commissioned Mains | 2008/09 | | | 2009/10 | | |
|---|---|---|---|---|---|---|
| £m (05/06) | Volume (km) | Unit Cost (£/m) | Total £m | Volume (km) | Unit Cost (£/m) | Total £m |
| </=3" | 45.93 | 62.27 | 2.86 | 43.77 | 62.02 | 2.71 |
| 4-5" | 231.60 | 67.99 | 15.75 | 205.83 | 67.71 | 13.94 |
| 6-7" | 77.28 | 95.66 | 7.39 | 78.37 | 95.27 | 7.47 |
| 8-9" | 37.38 | 176.95 | 6.61 | 54.71 | 176.23 | 9.64 |
| 10-12" | 17.60 | 247.23 | 4.35 | 26.62 | 246.21 | 6.55 |
| >12-18" | 10.40 | 358.51 | 3.73 | 10.90 | 357.03 | 3.89 |
| >18-24" | 0.00 | | 0.00 | 0.00 | | 0.00 |
| >24" | 0.00 | | 0.00 | 0.00 | | 0.00 |
| | **420.19** | | **40.69** | **420.19** | | **44.20** |

| | 2010/11 | | | 2011/12 | | |
|---|---|---|---|---|---|---|
| £m (05/06) | Volume (km) | Unit Cost (£/m) | Total £m | Volume (km) | Unit Cost (£/m) | Total £m |
| </=3" | 43.04 | 61.22 | 2.64 | 39.21 | 60.30 | 2.36 |
| 4-5" | 190.89 | 66.84 | 12.76 | 183.05 | 65.83 | 12.05 |
| 6-7" | 71.15 | 94.04 | 6.69 | 67.31 | 92.62 | 6.23 |
| 8-9" | 73.48 | 173.96 | 12.78 | 83.48 | 171.33 | 14.30 |
| 10-12" | 30.23 | 243.05 | 7.35 | 35.23 | 239.37 | 8.43 |
| >12-18" | 11.40 | 352.44 | 4.02 | 11.90 | 347.11 | 4.13 |
| >18-24" | 0.00 | | 0.00 | 0.00 | | 0.00 |
| >24" | 0.00 | | 0.00 | 0.00 | | 0.00 |
| | **420.19** | | **46.23** | **420.19** | | **47.51** |

| | 2012/13 | | |
|---|---|---|---|
| £m (05/06) | Volume (km) | Unit Cost (£/m) | Total £m |
| </=3" | 39.04 | 61.53 | 2.40 |
| 4-5" | 171.95 | 67.18 | 11.55 |
| 6-7" | 78.09 | 94.52 | 7.38 |
| 8-9" | 83.48 | 174.84 | 14.60 |
| 10-12" | 35.23 | 244.27 | 8.61 |
| >12-18" | 12.40 | 354.22 | 4.39 |
| >18-24" | 0.00 | | 0.00 |
| >24" | 0.00 | | 0.00 |
| | **420.19** | | **48.93** |

***Table 8-11***

# 9 LTS REPEX

## 9.1 SUMMARY

| Repex £m (05/06 prices) | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 | Total |
|---|---|---|---|---|---|---|
| **BPQ Submission** | | | | | | |
| LTS | 1.6 | 12.6 | 8.4 | 7.7 | 6.2 | **36.4** |
| **Total** | **1.6** | **12.6** | **8.4** | **7.7** | **6.2** | **36.4** |
| **Normalisation Adjustments** | | | | | | |
| LTS | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | **0.0** |
| **Total** | **0.0** | **0.0** | **0.0** | **0.0** | **0.0** | **0.0** |
| **Normalised BPQ** | | | | | | |
| LTS | 1.6 | 12.6 | 8.4 | 7.7 | 6.2 | **36.4** |
| **Total** | **1.6** | **12.6** | **8.4** | **7.7** | **6.2** | **36.4** |
| **Adjustments** | | | | | | |
| LTS | -0.1 | -0.6 | -0.5 | -0.6 | -0.6 | **-2.4** |
| **Total** | **-0.1** | **-0.6** | **-0.5** | **-0.6** | **-0.6** | **-2.4** |
| **Proposed Repex** | | | | | | |
| LTS | 1.6 | 12.0 | 7.9 | 7.1 | 5.5 | **34.0** |
| **Total** | **1.6** | **12.0** | **7.9** | **7.1** | **5.5** | **34.0** |

***Table 9-1***

## 9.2 POLICIES & PROCEDURES

### 9.2.1 INTRODUCTION

LTS Repex work falls into two categories. Firstly rechargeable works which are instigated by and paid for by the requesting authority (Local Authority, Highways Agency etc). WWU's policy here is to recover uplifted costs including any attributable overheads where applicable. Secondly, non-rechargeable works which result from legal requirements to relocate (lift and shift) pipelines under the terms of the easements (e.g. private land, railway bridges), or for 'asset condition' reasons such as corrosion or unstable land conditions (e.g. mining subsidence). Once the work has been identified and categorised the design, procurement, monitoring and control processes are the same as for LTS Capex projects.

### 9.2.2 SCOPE OF POLICIES AND PROCEDURES

As stated above, the planning and procurement of the actual works will be treated as per LTS Capex projects plus a further financial process for ensuring full recovery of costs from third parties for rechargeable work.

### 9.2.3 REVIEW AND UPDATE PROCESS

There is no specific reference in the submission to review processes for LTS Repex projects, but again the processes for LTS Capex controls will apply here for non-rechargeable work (condition replacement) generated by the GDN.

### 9.2.4 EFFICIENCY AND PRODUCTIVITY

All major works identified under LTS Repex will be open market tendered except for small and operationally complex work which may be undertaken by a period contractor on tendered rates.

Usually a replacement project will be more operationally complex than an equivalent capital project as it may need to be undertaken in stages and be linked with requirements to maintain continuous gas supplies. Hence unit costs or other such comparators are not useful here.

As with LTS Capex projects, the key to efficient execution is good planning. WWU have a well developed plan in the medium term and have stated an expectation, based on their current condition surveys, that there will be a continuing programme for several years.

## 9.3 HISTORICAL PERFORMANCE

### 9.3.1 ESTABLISH UNDERLYING COSTS

| LTS Net Repex All figures £m 2005/06 prices | 2002/03 | 2003/04 | 2004/05 | 2005/06 | 2006/07 |
|---|---|---|---|---|---|
| BPQ Gross Submission | 0.7 | 0.8 | 1.8 | 2.1 | 3.3 |
| BPQ Capitalised Overheads | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 |
| BPQ Contributions | 0.7 | 0.1 | 1.9 | 1.5 | 2.5 |
| BPQ Net Submission | 0.0 | 0.8 | 0.0 | 0.6 | 0.8 |

***Table 9-2***

Rechargeable LTS Repex work is largely dictated by third parties. Therefore the historical trend cannot be taken as an indication of historical performance or efficiency. Work is tendered to ensure that the lowest cost is procured.

## 9.4 FORECAST

### 9.4.1 COMPANY PROPOSALS

The submission listed two named major pipeline replacement projects. Subsequent correspondence has elicited information relating to a third named project within the review period.

WWU have a high mileage of small diameter high pressure steel feeder mains in excess of forty years old. These were laid at the time when steel (and welding) qualities were poor and pipeline construction standards were being evolved. In particular, wrapping techniques were, by today's standards, poor and there is evidence of substantial pipe corrosion.

[Note: Ofgem are reviewing the accounting policy for large LTS Repex projects with a view to confirming whether this is Repex or Capex]

| LTS Net Repex All figures £m 2005/06 prices | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 |
|---|---|---|---|---|---|
| BPQ Gross Submission | 1.6 | 12.6 | 8.4 | 7.7 | 6.2 |
| BPQ Capitalised Overheads | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| BPQ Contributions | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| BPQ Net Submission | 1.6 | 12.6 | 8.4 | 7.7 | 6.2 |

***Table 9-3***

### 9.4.2 SPECIFIC COST AREAS

Although the year on year expenditure can be variable, this is because it comprises a series of one-off projects which occur when they are needed. There will be no meaningful trend.

For the Wales and the West Network in the five year period, all the proposed work is non-rechargeable.

WW Network has proposed major relays of three significant pipelines which are corroding badly. These are 'like for like' replacements needing neither increases in size or in maximum operating pressure. These have been the subject of supplementary questions which have been satisfactorily answered.

### 9.4.3 REAL PRICE EFFECTS

Real prices for this work will follow material and contracting price projections for LTS Capex work and have been adjusted accordingly.

### 9.4.4 RECOMMENDATIONS

WWU have listed three named pipeline replacement projects and it is proposed that after adjustment for real price effects, these are allowed in full.

It is also noted that their proposals for beyond 2012/13 indicate a continued high level of expenditure in this category. From the evidence presented to date, this is likely to be necessary.

# APPENDIX 1 FINANCIAL & TECHNICAL POLICIES

## A 1.1 INTRODUCTION

This section reviews the Financial and Technical framework under which Wales and West Utilities Gas Network operates, the structure it utilises to effectively manage their assets and the key policies it adopts to ensure it meets its Statutory Licence obligations and other legislative requirements.

## A 1.2 APPROACH

The key policies used by the Network have been reviewed and where appropriate comments are made on our findings.

Our analysis has been to consider key polices under the following headings:

**Purpose** -- context of the Policy, how it fits with legal requirements and its financial impact

**Appropriateness** -- does it deliver the required outcomes, are financial and/or technical risks adequately managed and does it fit with the Statutory and legal requirements of the Network owner/operator

**Safety and Environment** – are the safety and environmental risks appropriately managed, and are they clearly understood and documented

**Omissions and Improvements** – have any improvements or omissions been identified preventing achievement of the declared objectives

**Implementation** – have any issues relating to clarity of understanding and consistency of implementation been identified

This review of Policies and Procedures does not comprise a full and comprehensive approval process designed to ensure compliance with all policy requirements and statutes which could only be achieved with a properly conducted and structured audit programme. The objective is to consider whether the high level objectives of the policy are met and that the content is appropriate for the purpose intended.

## A 1.3 FINANCIAL AND TECHNICAL FRAMEWORK

Wales and West Utilities (WWU) began operations on 1 June 2005, taking over the Wales and West Network from National Grid (NG). The Network is managed using a small central Asset Management structure based in a single new office in Newport, South Wales. WWU state the role of Asset Management as assessing and specifying the minimum cost network consistent with meeting the Network statutory and licence requirements.

Other key aspects of the structure include Business Support which brings together all customer facing support activities and is also responsible for the planning, scheduling and dispatch of work.

Operations who work to the overall plan produced by Asset Management and the detailed schedules provided by Business Support. Operations are also responsible for customer service,
safety and managing work effectively including the Repex programme of mains replacement via the use of EPC contract arrangements.

Finally Corporate is responsible for providing the support function activities required to

operate as a stand alone network company e.g. Safety, Finance, Regulation, HR.

The Licence held by WWU under the Gas Act requires them to;

- have a network code which sets out the transportation arrangements between WWU, the NTS, other DN's and gas shippers for connection to and use of its pipeline system; and
- maintain security standards for system development. This standard stipulates that the pipeline system must be capable of meeting peak aggregate daily

demand that is only likely to be exceeded (whether on one or more days) in 1 year out of 20 years

The Gas Safety (Management) Regulations 1996 require WWU to prepare a Safety Case for acceptance by the Health and Safety Executive. Compliance with their current safety case is mandatory and the WWU Gas Requirements Manual (GRM) is a reference depository of the policies and procedures they use to ensure that the Network fulfils its safety obligations, complies with their Transporter Licence and delivers the arrangements necessary to comply with their current Safety Case.

An overview of the technical and financial framework within the Network is shown in the diagram below.

**Technical and Financial Framework**

| Board Level | |
|---|---|
| Statutory, legal and regulatory requirements | |
| Financial | Technical |
| Investment Guidelines | |
| Budgeting process | Safety Case |
| Project definition, alternatives etc. | Gas Requirements Manual |
| Levels of authority | STCs |
| Monitoring & control | Policies and Procedures |
| Re-authorisation of over/underspends | Change Process & authorisation |
| Project completion | Compliance Audit |
| PIAs | |
| | |

***Table A1 - 1***

The key requirement of this framework is for the Board of WWU to structure and operate the business such that they comply with the statutory, legal and regulatory obligations placed upon them.

## TECHNICAL POLICY FRAMEWORK

he Gas Requirements Manual (GRM) defines the policies used for the engineering of the Network assets, the protection of the public, the well being of their workforce and contractors and the protection of the environment. Many sections of the GRM are aligned with corresponding sections of the Safety Case. The GRM is the central policy reference document that governs all other SHE and Engineering documents. It summarises the high-level arrangements for key gas activities and provides links to other documents for full details in specific subject areas.

It is put forward as the key document referenced by managers and staff involved in gas engineering activities. The GRM along with the Safety Case describes what they do and how they operate to achieve a safe and reliable gas transportation network.

The GRM covers the following areas:

1. Legislative Compliance
2. Risk Management
3. Control of Documents
4. Change Management
5. Technical Authority Levels: Competence and Behaviour
6. Safe Working Practices and Safe Control of Operations
7. Environment
8. Occupational Health
9. Use of Contractors
10. Gas Escapes
11. Gas Supply Emergencies
12. Gas Quality
13. Metering
14. Incident Reporting and Investigation
15. Network Planning Analysis
16. Records Data Management
17. Network Asset Integrity
18. Distribution Pipe Replacement
19. LNG
20. Audit
21. Security
22. Telemetry

WWU have confirmed that they are still working to the National Grid version of the GRM. They state their aim as the development of a Asset Management System to PAS55 with the GRM combined into a single Asset and HS&E management procedure. No timescale is provided for the development and certification of the PAS55 Asset management structure.

## A 1.4 POLICY DEVELOPMENT & CONTROL

Within WWU, engineering and SHE documents are developed and approved within a governance framework which is headed by the Distribution Network Safety and Engineering Committee (DNSEC)

The Distribution Network Safety and Engineering Committee (DNSEC) reports to the WWU Executive and has close links with the WWU Board Health, Safety and Environment Committee.

Arrangements for the control of engineering and SHE documents are detailed in WWU/PM/GR/2: Management Procedure for the Control of SHE and Engineering Documents

As could be expected at this early stage post sale WWU have not commenced an overall review of their engineering Policies and Procedures. Some Transco legacy policies have been simplified and some make reference to WWU but the majority of P&P in place still remain as Transco legacy documents.

WWU have signaled their intention to develop an Asset Management System to the PAS55 standard but no timescale is provided for this change. As the Asset Management system is developed to meet the PAS55 standard WWU would need to review the P&P documents they intend to utilize for the sound engineering management of their Network.

## A 1.5 Financial Policy Framework

The WWU Investment Procedure describes the processes used by the Network to instigate and approve investment expenditure. Reference is made in this document to the WWU Delegated Authority Schedule within

The Investment Process is controlled by the WWU Investment Committee (WWUIC), whose Terms of Reference are given in Appendix 6.83A. This paper states the policy for

the presentation and approval of major Capital, Replacement, and Revenue schemes. The WWUIC approves schemes within its delegated authority, or recommends for approval those schemes beyond its delegated authority for further review by the board as determined by the level of expenditure requested.

The WWUIC meets monthly and consists of the following members;
Chief Executive Officer (chair)
Chief Finance Officer
Head of Network
Head of Finance
Head of Operations
Investment Manager (Committee Secretary)

The annual expenditure plan is reviewed by the WWUIC.

Delegated authority levels are in place within the Network Investment Control procedure with the WWUIC authority set at £1,000,000. Investments above this level require approval by the WW Board.

Standard escalation procedures apply to the project approval process.

A PIA is mandatory for all projects greater than £30m.

# A 1.6 FINDINGS

## A 1.6.1 ENGINEERING AND SAFETY POLICY DOCUMENTS

**THE VARIOUS LEVELS OF ENGINEERING AND SAFETY DOCUMENTS TOGETHER WITH THE ASSOCIATED GOVERNANCE** arrangements **HAVE BEEN REVIEWED AND NO ISSUES FOUND.**

## A 1.6.2 TECHNICAL FRAMEWORK

As indicated above WWU currently utilise the suite of policies and procedures previously used within National Grid Transco, although it is understood a number of documents have been reviewed.

The Technical governance process within WWU is clear but does not as yet have the full stamp of the Network's approval. This should however become more so as the Policies and Procedures are reviewed and fully incorporated into the Network SHE and engineering management framework.. Mandatory change control processes are in place to ensure proper document control and policy governance. Directors and Senior Managers are involved in the major governance groups reviewing and authorising safety, health, environmental and engineering policies.

As stated above WWU are currently utilising the NGG version of the GRM with the intent of combining the GRM and HSE policy documents into a singular Asset Management system compliant with PAS55 principles as a step to certification under this process. As the GRM is described as the governing depository engineering and SHE policies and procedures we believe WWU should set out a clear timetable for the attainment of PAS55 or undertake to review and revise as appropriate they GRM as an interim measure.

## A 1.6.3 FINANCIAL FRAMEWORK

WWU have generally adopted the NG governance process and amended it to reflect their status as a stand alone company. Delegated authority levels are in place and integrated into Investment procedures. Investment is controlled by the WWUIC.

The documents reviewed show a clear process for budget formulation and approval, financial control and monitoring of investment expenditure. The WWU Investment Procedure was clearly written and described the mandatory processes to be followed for investment authorisation.

# APPENDIX 2 NETWORK PLANNING

## A2.1 PLANNING POLICY

WWU carries out network planning in accordance with the Policy for Network Planning (T/PL/NP/18). This document sets out the policy requirements for network planning activities for use with all natural gas systems operating at pressures up to 100 bar.

For systems above 7 bar, network analysis is carried out using Graphical Falcon. WWU states that it has carried out validation work for each of its three LTS networks in line with the company policy and procedures T/PL/NP4 (Policy for above 7 bar network analysis) and T/PR/NP2 (Procedure for validation of high pressure models).

## A2.2 ONE YEAR REVIEW

The 1 year review reported that having examined the data provided by the WWU, and taking into account the limitations about the depth of coverage, we are unable to confirm that there was evidence that planning work for development of WWU is carried out in a wholly satisfactory manner. Conversely there was no specific evidence that this is not the case.

## A2.3 THIS REVIEW

In this review demand and diurnal storage planning were reviewed in particular:

i) We asked about the demand experience in the years 2004/05 and 2005/06 and the impact on forecasts

WWU stated that their forecasts were based on the published 2006 LTDS

Following a discussion and review process, WW adopted the demand forecasts provided by xoserve.

WWU said that the largest effect is on the forecast of the >732 MWh firm and interruptible categories, and that these are believed to have been influenced most directly by the high fuel prices and the demand side response that has been evident in these years.

WW said that this scenario is expected to continue over the next few years until the market gains confidence over increased storage facilities and improved import facilities through the interconnector and LNG import terminals.

In response to this, WWU have reduced its expectation of growth in the above demand categories from previous demand forecasts. This has led to a reduction in the peak day demand forecast for the period to 2012/13.

ii) We asked WWU about their post invesment appraisal processes and in particular lessons learnt in relation to LTS projects and how these are reported and disseminated.

WWU said that the process for disseminating lessons learned from PIAs is via the WWU Investment Committee (WWUIC). All PIAs are presented to the Investment Committee and lessons learned are then passed down the appropriate management chain by the Investment Committee members. To supplement this WWU said that they will also be discussing lessons learned at the monthly LTS Project Planning meeting, the monthly < 7 bar (District Governors) meeting and the monthly < 7 bar (Mains) meeting.

WWU provided a list of the PIAs requested by the WWUIC, stating that the projects were chosen in order to examine a cross section of categories of work. Some of the projects selected were overspent and some were underspent in order to determine both positive and negative lessons learned. Lessons learned are usually specific to the relevant project and as such are not collated into one

master list. WWU provided a list of the lessons learned from the Hallatrow to Paulton-Timsbury reinforcement project.

We believe this approach to be satisfactory.

iii) WWU provided an overview of the process of calculating diurnal storage volumes and details of the maximum volume of diurnal storage required and express this as a % of the 1 in 20 peak day demand in each year.

WWU report that the SSM model data is updated annually and that this can drive changes in the output value year on year. They adopt a diurnal storage % value which provides stability in financial planning from one year to the next.

The following table shows the differences storage values, expressed as a percentage of peak demands.

| Diurnal storage (% of peak demand) | Period 2008/09 to 2012/13 |
|---|---|
| SW | |
| SSM value | 14.60% |
| Final value | 14.80% |
| WS | |
| SSM value | 14.17% |
| Final value | 13.80% |
| WN | |
| SSM value | 15.97% |
| Final value | 15.65% |

***Table A2-1***

WWU observed that if large forecast error figures are included in the model then this can lead to excessively high SSM values. Also, where the 1 in 20 demand is close to the maximum offtake flow value, this can lead to an inflated SSM value being generated. WWU did not appear to appreciate the significance of these results for NTS offtake capacity upgrading, although significant sums were included in their capital programme for such upgrades.

We recognise that the output from the SSM model can vary from year to year, reflecting changes in the input data which can lead to different constraints becoming active, and that there is merit in a degree of consistency from year to year in the diurnal storage % value. However, we believe that the active constraints should be identified and reviewed against the investment programme and where appropriate the SSM model should be rerun to establish consistency with the final diurnal storage % value selected, or to revise the selected value.

iv) It is also noted that the rising system pressures planned by WWU in its distribution system over the 5 year control period will increase the importance and frequency with which network validation needs to be carried out.

# APPENDIX 3 PROCUREMENT & LOGISTICS

Following on from the one year review a further review and assessment of the procurement and logistics operation within Wales and West Utilities has been completed to ascertain whether or not the strategic approach and process is robust and effective in managing costs whilst maintaining security of supply.

Since the sell off of the Networks by National Grid, the new networks including NGG have a different market place in which to procure goods, services and works to support their business. There is no longer the advantage of large volume and single buyer status, so it is therefore crucial for the Network Companies to look for ways through procurement and logistics to obtain the best market solution possible for their particular needs and minimize costs.

## A3.1 SOURCING STRATEGY

Wales and West Utilities (WWU) have demonstrated that they have a positive and proactive sourcing strategy. They have a procurement department responsible for providing the entire business with the expertise to source products and services that the business requires and for contract management of those purchases.

They have implemented procurement initiatives such as e-Catalogues and e-Sourcing which will improve the efficiency of Procurement.

## A3.2 STRATEGIC PURCHASES

### A3.2.1 MAINS AND SERVICE LAYING

WWU are in the middle of a re-tendering exercise to select partners for their new engineering period contracts. Their strategy is to move towards a collaborative arrangement, where their contracting partners and WWU as the client work together as an alliance. The contract will be operated on a target cost basis with incentive mechanisms on both the client and contractor to manage and reduce costs. It is also intended to separate the element of risk out of the schedule of rates (which is currently included and paid for whether or not the risk materialises).

This process is positive and the strategy should produce competitive costs for this activity. This presents a good opportunity for procurement to reduce these costs going forward.

### A3.2.2 PE PIPE AND FITTINGS

WWU have recently tendered their requirements for PE Pipe and Fittings. This contract is due to be awarded on 01/02/07.

The tender document used in this process is very comprehensive and the strategy for the supply of these products emphasises the need for the Supplier and WWU to work together to continuously improve and minimise the impacts of cost pressures.

The evidence provided demonstrates a robust comprehensive process and should have resulted in a competitive set of tender submissions being received. It was also stated that WWU have located a potential additional supplier. In this market place with limited suppliers it is vital that new competition is brought in. If this proves to be successful it will not only reduce the risks associated with security of supply by adding another source to the market place but it may also reduce prices by increasing competition in a market place with very few suppliers.

If the final contract reflects the requirements of the tender document then it should, if managed effectively be an ideal opportunity to minimise costs in this area going forward.

### A3.2.3 CONNECTIONS

WWU now has its connections activities as an in-house operation. Most of the work is undertaken by direct labour although they use contractors to undertake some of the work that they cannot resource in-house. They have developed a new network management system for connections activities and this was implemented in July 2006. They are also planning to introduce a comprehensive management information system early in 2007.

They have taken steps to address many of the customer charging inefficiencies identified under the one year PCR. Cost benefits are expected from the significant changes that are in process but these have not been quantified by WWU. The end of year results for 06/07 should give an indication of any benefits being realised as a result of the changes being made.

Efficient procurement processes will be able to contribute to the cost effectiveness of WWUs' connections activities.

### A3.2.4 BULK PURCHASES

Specific information was requested with regard to the purchase of Vehicles, Telecoms, Office Security, Furniture and Tools & Equipment.

WWU are currently starting a phased 3 year programme to replace the company's fleet of commercial vehicles. They have placed an OJEU notice in the Official Journal. Their preferred strategy for this purchase is to buy directly from the manufacturer for the vehicles and have a separate contract for the internal racking systems.

All of their bulk purchases are subject to their general purchasing strategy for commodity based purchases. This process is robust and WWU should be able to obtain competitive prices to suit their particular business requirements and associated volumes.

### A3.2.5 SECURITY OF SUPPLY

WWU have contracts in place or are tendering for the majority of their requirements. They also have a warehousing and logistics operation based in Avonmouth Bristol.

## A3.3 LABOUR SHORTAGES

WWU recognise that there is a shortage of labour in the market and that this will lead to increasing cost pressures. In order to minimise the impacts of this WWU state that they will attempt to offer good visibility of work and are investigating an initiative to increase the productivity of their own workforce, so that they have the capacity to flex work activities in the future.

Any initiatives that can increase the availability of skilled labour are an opportunity to reduce and minimise cost increases.

## A3.4 SUMMARY

WWU have demonstrated through the evidence provided that they have a robust procurement process and a dedicated Procurement function to both put contracts in place as well as contract manage those arrangements to ensure that they fulfil their contractual commitments.

Their procurement strategies encourage continuous improvement from their suppliers and incentivise both parties to reduce and minimise costs. This has been evident from the information provided for their Mains and Service Laying tender exercise and their PE Pipe and Fittings process.

By managing their contracts effectively they have the opportunity to minimise the impact of cost increases going forward.

# APPENDIX 4 GTMS/SOMSA EXIT PLANS

## A4.1 INTRODUCTION

In February 2003, NG announced a 2-year program of Gas Distribution Control centralisation from 4 centres into a single UK control centre at Hinckley. The activity was to be carried out as part of the Control Centre Development Project (CCDP) an encompassing program that moved the gas national control centre to a new purpose built facility in Warwick.

The Distribution National Control Centre (DNCC) was opened in summer 2005 with full UK gas distribution control undertaken from Hinckley.

The Gas Transportation Management System (GTMS) is the Supervisory Control & Data Acquisition (SCADA) System that Controls the combined UK Distribution Networks. Originally, the System was to be replaced as a part of the roll out of the Transmission Control System; the iGMS project. However, a new iGMS for Distribution Control was removed from the program. The logic of the curtailment was entirely due to a change in focus of the NG business. Originally seen as a fully integrated system involving UK gas control, the company faced business separation issues as a result of Network sales, which rendered iGMS, for distribution, as an unfeasible option.

Given the backdrop of the issues of business separation the decision was then taken to alter the business ownership of DNCC moving management responsibility to Distribution, Network Strategy. The function of Distribution control is performed from Hinckley, which is wholly owned and operated by National Grid, with an agreement to operationally service all independent networks under a contract. That contract, known as SOMSA – System Operation Managed Service Agreement – is for all Operating services required for any given network.

## A4.2 GMTS REPLACEMENT

GTMS is old technology based upon a Logica system dating from the mid 1980's. The System has been enhanced in house by NG over the years since its inception and has been used in its current form since 1996. However, one of the drivers for iGMS was the age of the GTMS product. GTMS spares availability is limited and there are issues of unsupported software by the manufacturer. NG undertook and completed work to establish the viability of continued running & support; the outcome was that it was considered unsustainable beyond 2009 and that a new System must be sought as a matter of some urgency. Investigation was undertaken into the possibly of moving the system to new computer hardware. Unfortunately, GTMS programmes are also embedded into the Operating System; a system that is not supported by the manufacturer.

A project was therefore established to keep GTMS functioning until 2009, the Prolonged Active Life (PAL) and a second project to replace GTMS was given approval in autumn 2005. Work was undertaken to provide a replacement specification on a modern platform, put the specification to market and engage a suitable contractor. After some 10 months of work SERCK controls was chosen from a shortlist of 4 companies.

The Distribution National Control System (DNCS) Project aims to replace GTMS with a like for like System but on a modern and sustainable platform and at the least possible cost to the industry as a whole.

## A4.3 NETWORK SALES

The sale of distribution networks had a profound effect on gas distribution control for all parties, Distribution Networks and Control staff.

It was clear at the outset that given the safety elements associated with gas control and the difficulties to unpick control operations that handling distribution control for the newly

formed businesses would be extremely difficult. An agreement (contract) was developed, referred to earlier as SOMSA. A team was established at Hinckley who constructed, trained staff on and issued industry standard procedures for use by Network and control staff alike. The agreements were established between NGG and all other network owners. However, the SOMSA has always had a finite lifespan and a clear condition of the sale was that control should pass to the new owners. The costs associated with this transfer being factored into the sales process. To allow for the planning of the transfer post sales, Ofgem allowed a relinquishment of operational control for an initial period until March 2008, with the possibility of an extension beyond this stage subject to clear exit planning.

The agreement includes the provision of data and access to Systems to facilitate the transfer of control; however, it specifically excludes the provision of a SCADA System.

## A4.4 AGREEMENT TO WORK TOGETHER

Following sales all owners reviewed the options for the provision of a new SCADA system to enable control to be passed back to the new owners. The owners all came to the conclusion that a collaborative approach to replacing the GTMS was the best way forward. Having considered the options available we would support this approach, although risk management is essential to ensure such a collaborative approach does not have difficulties in management and decision-making. It can be stated that we feel some of the risk factors are mitigated by a like for like arrangement in that the specification will be clear.

The approach was to replace the system, initially at Hinckley, and once proved robust further phases would establish the same system at the new owner locations and transfer from Hinckley would then be made.

A governance process has been adopted with an overarching program board to cover all activities associated with SOMSA exit of which GTMS replacement was one of several activities and has it's own project board and governance.

It is clear from the governance structure that SOMSA Exit is the goal with GTMS replacement as an enabler.

Network Owners need to provide their own project management delivery organisation to dovetail into the collaborative project.

Each owner has expressed a wish to exit. Early indications are a timetable as follows:

- Summer 2008 SGN
- Spring 2009 NGN
- Autumn 2009 WWU

However, there are no detailed transfer plans in place with NG for the transfer of operation. The owners continue to jointly work together to identify and understand the exact extent of the activities that would have to be completed by all participants.

# APPENDIX 5 REFERENCE UNIT COST OF DIURNAL STORAGE

This appendix sets out the basis for the reference unit cost of diurnal storage used in the PB Power cost assessment.

Based on the unit pipeline costs set out in Appendix 6, the following graph shows the typical unit cost of linepack storage over a notional pressure range of 20 bar. The actual pressure range for a diurnal storage project can be higher or lower than 20 bar depending on the particular circumstances and location.

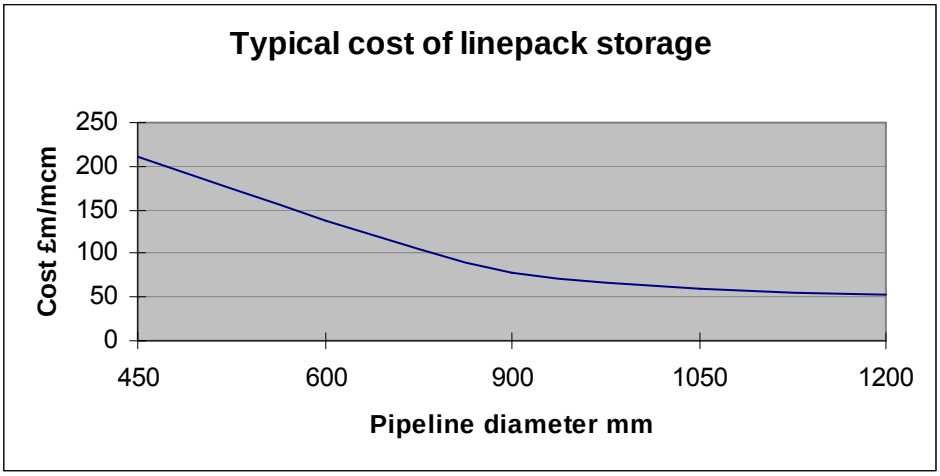


***Figure A5- 1***

The graph shows that the unit cost of diurnal storage reduces with pipeline diameter. The NTS uses larger diameter pipelines almost exclusively and so the cost of diurnal storage from the NTS will be around the £50m per mcm shown for a 1200mm diameter pipeline.

The GDN plans also show a movement towards larger diameter pipelines and so there will tend to be some convergence between the unit costs of storage from the LTS and from the NTS. However, the unit cost of pipeline construction for NTS project may be less than for LTS projects because of economies of scale, and so units cost of NTS storage may well be below the £50m/mcm in some cases.

Also in some cases the pressure cycling range of LTS (or NTS) projects can be substantially in excess of the 20 bar assumed here in which case the unit cost of LTS (or NTS) storage can be well below the £50m/mcm level.

We believe that a reference unit cost of £50m/mcm is reasonable for the assessment of GDN diurnal storage projects.

**Economic storage**

Based on the above analysis we have classified diurnal storage projects as follows:

- Economic: Projects with a unit cost of £50m/mcm or less. (The classification of a project as economic does not mean that there is necessarily a need for the project)
- Marginally economic: Projects with a unit cost of between £50m/mcm and £100m/mcm.
- Not economic: Generally, projects with a unit cost of over £100m/mcm. However, there may be exceptional local transmission constraints which might justify including projects in this category in the plan if evidence of such circumstances is provided.

# APPENDIX 6 LTS PIPELINE UNIT COSTS

We have reviewed the costs of LTS pipeline projects over the period 2002/03 to 2012/13 which were reported in the BPQ submissions by the GDNs to establish unit costs of different diameter pipeline projects for cost projection purposes.

The following graph shows the data points derived from the BPQ submissions and used in the analysis. It also shows the PB Power unit costs assumptions.

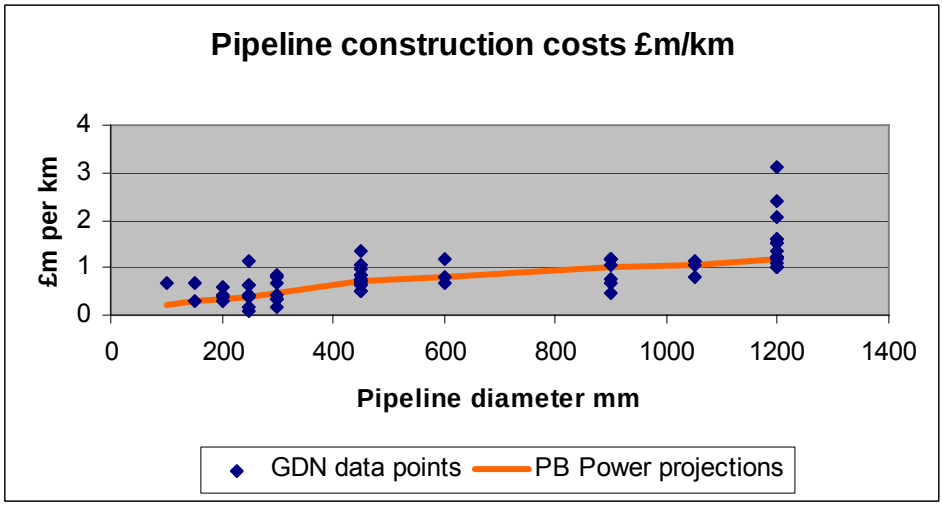


***Figure A6 - 1***

All the data points have been adjusted to 2005/06 price levels and RPEs assumptions have been removed from future project costs.

In selecting our proposed unit costs, we have taken the median values at each pipe diameter and made adjustments to give an increasing trend in unit costs consistent with the step changes in diameter. For the largest pipe diameter (1200mm) we have taken the lower quartile value since the data set included projects with particular route difficulties where individual adjustments for such factors would be appropriate.

We recognise that individual project costs will reflect specific features of the route such as road, rail and river crossings. We also recognise that some project costs have included additional plant such as PRSs. We have removed costs in certain cases but the analysis has not been detailed enough to ensure full consistency. The PB Power projections may therefore represent pipelines with route features giving project cost above average.

The following table shows the PB Power unit costs by pipe diameter used for cost projection purposes.

| Pipeline diameter (mm) | PB Power projection (£m/km) |
|---|---|
| 200 | 0.35 |
| 300 | 0.45 |
| 450 | 0.70 |
| 600 | 0.80 |
| 900 | 1.00 |
| 1050 | 1.05 |
| 1200 | 1.20 |

***Table 6A - 1***

The cost are at 2005/06 prices and exclude the PB Power RPE effects which are added separately in the expenditure assessment.

# APPENDIX 7 REGIONAL FACTORS

## A7.1 BCIS REGIONAL & COUNTY FACTORS

The Regional and County Factors is published by BCIS, a trading Division of the Royal Institute of Chartered Surveyors (RICS). The figures published in October 2006 have been adapted in order to generate a suitable regional factor index for each GDN for comparison purposes for the review.

The county indices have been modified to remove Orkney Islands Area, Shetland Islands, Northern Ireland and the Channel Islands from the figures. Counties have been allocated to GDNs and where they fall between two GDNs and estimate of the spilt between the GDNs has been made.

The table below lists the Counties which have been split between GDNs and the allocation which has been assumed for each GDN.

| COUNTY | WW | No | So | EoE | Lon | NW | WM |
|---|---|---|---|---|---|---|---|
| Cumbria | | 70% | | | | 30% | |
| South Yorkshire | | 50% | | 50% | | | |
| Essex | | | | 70% | 30% | | |
| Hertfordshire | | | | 90% | 10% | | |
| Berkshire | | | 75% | | 25% | | |
| Buckinghamshire | | | 75% | | 25% | | |
| London Postal Districts | | | 50% | | 50% | | |
| Outer London | | | 35% | 30% | 35% | | |
| Hereford and Worcester | 20% | | | | | | 80% |
| Cheshire | | | | | | 80% | 20% |

***Table A7- 1***

The regional factor for the GDN is calculated as a weighted average of the total county factors based on the sample sizes. The BCIS data includes a sample size for each county together with the factor for that county. Where the Counties are considered to fall into one or more GDN footprint we have estimated the proportion of the County sample which should be allocated to each GDN. (For example the sample size for London Postal Districts in the BCIS data is 528, we have estimate that this County should be split 50% to each of London and Southern GDNs, therefore sample sizes of 264 have been allocated to each GDN)

For each GDN a weighted average factor is then calculated. The resulting tables used to produce the GDN indices are given below.

| Wales & West | Network/ County Factor | Sample Size |
|---|---|---|
| Avon | 1.02 | 92.0 |
| Cornwall | 0.99 | 103.0 |
| Devon | 0.99 | 163.0 |
| Gloucestershire | 1.02 | 73.0 |
| Somerset | 0.99 | 74.0 |
| Hereford and Worcester | 0.94 | 23.8 |
| Clwyd | 0.87 | 50.0 |
| Dyfed | 0.94 | 36.0 |
| Gwent | 0.92 | 52.0 |
| Gwynedd | 0.89 | 23.0 |
| Mid Glamorgan | 0.91 | 54.0 |
| POWYS | 0.90 | 23.0 |
| South Glamorgan | 0.93 | 46.0 |
| West Glamorgan | 0.89 | 31.0 |
| **Network Value** | **0.96** | **843.8** |

***Table A7- 2***

| Northern | Network/ County Factor | Sample Size |
|---|---|---|
| Cleveland | 1.02 | 62.0 |
| Cumbria | 1.05 | 44.1 |
| Durham | 1.01 | 113.0 |
| Northumberland | 1.04 | 46.0 |
| Tyne Wear | 1.01 | 172.0 |
| Humberside | 1.00 | 104.0 |
| North Yorkshire | 1.03 | 92.0 |
| South Yorkshire | 1.01 | 63.5 |
| West Yorkshire | 1.00 | 212.0 |
| **Network Value** | **1.01** | **908.6** |

***Table A7- 3***

| Scotland | Network/ County Factor | Sample Size |
|---|---|---|
| Borders Scotland | 0.99 | 18.0 |
| Central Scotland | 0.98 | 32.0 |
| Dumfries & Galloway | 0.93 | 23.0 |
| Fife | 0.96 | 62.0 |
| Crampian | 0.90 | 134.0 |
| Highland | 0.93 | 42.0 |
| Lothian | 1.02 | 131.0 |
| Strathclyde | 1.03 | 363.0 |
| Tayside | 0.98 | 85.0 |
| **Network Value** | **0.99** | **890.0** |

***Table A7- 4***

| Southern | Network/ County Factor | Sample Size |
|---|---|---|
| Kent | 1.05 | 215.0 |
| Surrey | 1.10 | 151.0 |
| East Sussex | 1.05 | 119.0 |
| West Sussex | 1.04 | 118.0 |
| Berkshire | 1.04 | 100.5 |
| Buckinghamshire | 1.03 | 135.8 |
| Hampshire | 1.01 | 293.0 |
| Isle of Wight | 1.00 | 18.0 |
| Oxfordshire | 0.99 | 104.0 |
| London Postal Districts | 1.18 | 264.0 |
| Outer London | 1.10 | 112.0 |
| Dorset | 1.02 | 96.0 |
| Wiltshire | 1.01 | 94.0 |
| **Network Value** | **1.06** | **1820.3** |

***Table A7- 5***

| East of England | Network/ County Factor | Sample Size |
|---|---|---|
| South Yorkshire | 1.01 | 63.5 |
| Derbyshlre | 0.94 | 120.0 |
| Leicestershire | 0.94 | 92.0 |
| Lincolnshire | 0.94 | 81.0 |
| Northamptonshire | 1.00 | 123.0 |
| Nottinghamshire | 0.93 | 135.0 |
| Cambridgeshire | 1.04 | 185.0 |
| Norfolk | 0.98 | 102.0 |
| Suffolk | 1.01 | 109.0 |
| Bedfordshire | 1.02 | 71.0 |
| Essex | 1.02 | 152.6 |
| Hertfordshire | 1.06 | 117.0 |
| Outer London | 1.10 | 96.0 |
| **Network Value** | **1.00** | **1447.1** |

***Table A7- 6***

| London | Network/ County Factor | Sample Size |
|---|---|---|
| Essex | 1.02 | 65.4 |
| Hertfordshire | 1.06 | 13.0 |
| Berkshire | 1.04 | 33.5 |
| Buckinghamshire | 1.03 | 45.3 |
| London Postal Districts | 1.18 | 264.0 |
| Outer London | 1.10 | 112.0 |
| **Network Value** | **1.11** | **533.2** |

***Table A7- 7***

| North West | Network/ County Factor | Sample Size |
|---|---|---|
| Cumbria | 1.05 | 18.9 |
| Cheshire | 0.92 | 127.2 |
| Greater Manchester | 0.93 | 297.0 |
| Lancashire | 0.93 | 167.0 |
| Merseyside | 0.94 | 175.0 |
| **Network Value** | **0.93** | **785.1** |

***Table A7- 8***

| West Midlands | Network/ County Factor | Sample Size |
|---|---|---|
| Hereford and Worcester | 0.94 | 95.2 |
| Shropshire | 0.93 | 79.0 |
| Staffordshire | 0.91 | 133.0 |
| Warwickshire | 0.96 | 96.0 |
| West Midlands | 0.94 | 318.0 |
| Cheshire | 0.92 | 31.8 |
| **Network Value** | **0.94** | **753.0** |

***Table A7- 9***

# APPENDIX 8 DATA TABLES & REGRESSION

## A8.1 INTRODUCTION

Much of the data entered into the BPQs submitted in October 2006 has been transferred to a database format within Microsoft Excel.

The format allows the data to be manipulated in a number of ways to enable PB Power to determine the appropriate analysis mechanism for each activity.

The sections below give explanations and worked examples of the data calculations use on our analysis.

### A8.1.1 ANALYSIS USED

There are three principal forms of analysis which have been carried out to make the projections for our proposals.

The first uses regression analysis to carry out comparisons between the costs and workloads of each GDN. The projection is based on a base year of either 2005/06 or 2006/07 using workloads to project our proposals for the full control period. The GDN's own proposals are used as a test against our own projections.

The second method makes use of the GDN's own proposals across the whole period. In order to use the GDN's proposals we first remove the GDN's own assumptions for RPEs. We then form a view on the workloads and costs applying adjustments we consider appropriate. Finally PB Power's assumptions for RPE are then applied to create the final proposal.

Finally PB Power has also made use of bottom-up analysis where regression was not appropriate or to support the use of regressions.

### A8.1.2 REGIONAL FACTORS

Regional factors have been considered to impact the costs of activities carried out in the network, unless specifically stated otherwise. Costs are disaggregated into the four categories of Contractors, Direct Staff/Overheads, Materials and Other. Regional factors have been applied to Contractor and Direct Staff costs. No regional factors have been applied to materials or other expenditure.

### A8.1.3 RPE ADJUSTMENTS

WWU's assumptions for RPEs used in the analysis are shown in the table below

| Contractors | Direct Staff | Materials | Other |
|---|---|---|---|
| 4.50% | 2.00% | 2.50% | 0.00% |

***Table 8A - 1***

PB Power assumptions for RPEs used in the analysis are shown in the table below

| Contractors | Direct Staff | Materials | Other |
|---|---|---|---|
| 2.25% | 1.00% | 1.00% | 0.00% |

***Table 8A - 2***

## A8.2 WORKED EXAMPLE

A worked example is given below for the Connections work activity. Many of the principles of the data calculations are similar for other work activities, where different techniques are used these are detailed under the appropriate activity heading.

## A8.2.1 EXPLANATION OF THE COSTS AND VOLUME INPUTS TO THE REGRESSION ANALYSIS.

For Connections the regression analysis has been carried out on the 2006/07 data although for other activities 2005/06 has been used as the base year. Full details of the reasoning behind the choice of base year are given in the main report under each activity.

Steps for tracking the data – example Connections

From the BPQ the Connections costs submitted have been taken as below

**Gross + Overheads**

| £m | Gross | Overheads | Total |
|---|---|---|---|
| District Governors | 0.05 | 0.00 | 0.05 |
| Existing Housing Mains>180mm | 0.00 | 0.00 | 0.00 |
| Existing Housing Services | 8.48 | 1.95 | 10.43 |
| Feeder Mains >180mm | 0.00 | 0.00 | 0.00 |
| New Housing Mains >180mm | 0.09 | 0.05 | 0.14 |
| New Housing Services | 2.26 | 1.34 | 3.60 |
| Non-Domestic Mains >180mm | 0.13 | 0.08 | 0.20 |
| Non-Domestic Services | 1.13 | 0.67 | 1.80 |
| Service Governors | 0.34 | 0.02 | 0.36 |
| Specific Reinforcement Mains >180mm | 0.09 | 0.06 | 0.15 |
| New Housing Mains <=180mm | 2.29 | 1.35 | 3.64 |
| Existing Housing Mains <=180mm | 0.33 | 0.20 | 0.53 |
| Non-Domestic Mains <=180mm | 0.44 | 0.26 | 0.70 |
| Feeder Mains <=180mm | 0.00 | 0.00 | 0.00 |
| Specific Reinforcement Mains <=180mm | 0.28 | 0.16 | 0.44 |

***Table 8A - 3***

Using both the appropriate regional factors (RF) and the expenditure analysis the figures have been disaggregated into expenditure for Contractors, Direct + Overheads, Materials and Other

| GDN Regional Factor | Contractor | Direct |
|---|---|---|
| Wales & West | 0.96 | 0.98 |

***Table 8A - 4***

| Direct | Contract | Materials | Other |
|---|---|---|---|
| 60% | 20% | 10% | 10% |

***Table 8A - 5***

e.g. Existing Housing Services (Contractor Costs) **8.48 x 0.20 / 0.96 = 1.76**

| £m | RF Contractor | RF Direct/ Overheads | RF Materials | RF Other | RF Total |
|---|---|---|---|---|---|
| District Governors | 0.01 | 0.03 | 0.01 | 0.01 | 0.05 |
| Existing Housing Mains>180mm | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Existing Housing Services | 1.76 | 7.20 | 0.85 | 0.85 | 10.65 |
| Feeder Mains >180mm | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| New Housing Mains >180mm | 0.02 | 0.11 | 0.01 | 0.01 | 0.14 |
| New Housing Services | 0.47 | 2.76 | 0.23 | 0.23 | 3.68 |
| Non-Domestic Mains >180mm | 0.03 | 0.16 | 0.01 | 0.01 | 0.21 |
| Non-Domestic Services | 0.24 | 1.38 | 0.11 | 0.11 | 1.84 |
| Service Governors | 0.07 | 0.23 | 0.03 | 0.03 | 0.37 |
| Specific Reinforcement Mains >180mm | 0.02 | 0.12 | 0.01 | 0.01 | 0.15 |
| New Housing Mains <=180mm | 0.47 | 2.782 | 0.23 | 0.23 | 3.71 |
| Existing Housing Mains <=180mm | 0.07 | 0.40 | 0.03 | 0.03 | 0.54 |
| Non-Domestic Mains <=180mm | 0.09 | 0.53 | 0.04 | 0.04 | 0.71 |
| Feeder Mains <=180mm | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Specific Reinforcement Mains <=180mm | 0.06 | 0.34 | 0.03 | 0.03 | 0.45 |
| | | | | | 22.51 |

***Table 8A - 6***

Natural Log of this **ln(22.51) = 3.11**

This cost figure is used in the regression analysis along with the equivalent values for other GDNs (See table 8A-10).

### A8.2.2 WORK DRIVER

The workload is weighted by a standard monetary unit value for each activity. These values have been based the average of the GDN submissions.

| Activity | Unit Value | Units |
|---|---|---|
| Existing Housing Mains>180mm | 0.14 | £ 000s/m |
| Existing Housing Mains <=180mm | 0.11 | £ 000s/m |
| Feeder Mains >180mm | 0.16 | £ 000s/m |
| Feeder Mains <=180mm | 0.12 | £ 000s/m |
| District Governors | 0.02 | £ m/Governor |
| Service Governors | 0.002 | £ m/Governor |
| New Housing Mains >180mm | 0.11 | £ 000s/m |
| New Housing Mains <=180mm | 0.085 | £ 000s/m |
| Non-Domestic Mains >180mm | 0.14 | £ 000s/m |
| Non-Domestic Mains <=180mm | 0.11 | £ 000s/m |
| Specific Reinforcement Mains >180mm | 0.25 | £ 000s/m |
| Specific Reinforcement Mains <=180mm | 0.15 | £ 000s/m |
| Existing Housing Services | 0.0009 | £ m/Service |
| New Housing Services | 0.0005 | £ m/Service |
| Non-Domestic Services | 0.0015 | £ m/Service |

***Table 8A - 7***

Multiply by workload volumes

e.g. New Housing Services **6000 x 0.0005 = 3.0**

The workload volume for each activity is multiplied by the unit cost listed above and summed. For Connections gives a total weighted workload driver of 19.79

Natural Log of this **ln(19.79) = 2.99**

Again this figure has been used in the regression analysis.

### A8.2.3 REGRESSION TABLE

The complete Connections regression table is given below:

| GDN | 2006/07 | |
|---|---|---|
| | Volume | Cost |
| EoE | 3.00 | 3.24 |
| Lon | 2.48 | 2.85 |
| No | 2.88 | 3.05 |
| NW | 2.34 | 2.72 |
| Sc | 3.15 | 3.20 |
| So | 3.20 | 3.30 |
| WM | 2.06 | 2.39 |
| WW | 2.99 | 3.11 |

***Table 8A - 8***

On all regression charts the volume driver is plotted along the x-axis and cost against the y-axis.

From this regression table the regression line is obtained and an upper quartile benchmark calculated as the target.

The regression formula takes the form ***Slope*** x ln(***Volume***) + ***Intercept*** = ln (***Cost***)

Regression Formula **0.729785 x ln(Volume) + 0.967332 = ln(Cost)**

Benchmark Formula **0.729785 x ln(Volume) + 0.926086 = ln(Cost)**

### A8.2.4 COST PROJECTIONS

Having calculated the benchmark regression formula for the base year, the ***intercept*** of this formula is reduced each year by the PB Power assumptions for productivity improvements.

| Year | Intercept |
|---|---|
| 2005/06 | 0.93 |
| 2006/07 | 0.93 |
| 2007/08 | 0.90 |
| 2008/09 | 0.87 |
| 2009/10 | 0.83 |
| 2010/11 | 0.80 |
| 2011/12 | 0.77 |
| 2012/13 | 0.74 |

***Table 8A - 9***

The formula is then used each year, with the work driver, to calculate the regionally adjusted cost for the total workload. This total is broken back into the individual activities in proportion to the weighted workload driver for each activity.

| | 2006/07 | 2007/08 | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 |
|---|---|---|---|---|---|---|---|
| Weighted Workload | 19.791 | 18.174 | 17.027 | 17.561 | 17.561 | 17.561 | 17.561 |
| Benchmark | 22.301 | 20.328 | 18.802 | 18.654 | 18.094 | 17.551 | 17.025 |
| Baseline | 22.511 | 20.519 | 18.979 | 18.829 | 18.265 | 17.717 | 17.185 |
| Gap | 0.210 | 0.191 | 0.177 | 0.175 | 0.170 | 0.165 | 0.160 |
| Line A | 30% | 42% | 53% | 65% | 77% | 88% | 100% |
| Line B | 100% | 88% | 77% | 65% | 53% | 42% | 30% |
| Convergence | 0.210 | 0.169 | 0.136 | 0.114 | 0.091 | 0.069 | 0.048 |
| Proposed (Ex RPE & RF) | 22.511 | 20.497 | 18.938 | 18.768 | 18.185 | 17.620 | 17.073 |

***Table 8A - 10***

In the example of Connections the 2006/07 calculation is performed as follows:

**0.729785 x ln(19.79) + 0.926086 = ln(22.30)**

A similar calculation is performed for each year and also for the baseline performance.

The gap between the baseline performance and the benchmark performance is calculated and a convergence is calculated using the percentages in either Line A or Line B in table 8A-12. If the gap figure is negative line A percentages are used; if the gap figure is positive line B percentages are used. The convergence element is added to the benchmark figure to produce the proposed cost (prior to regional factors and RPE adjustments being applied).

In order to reapply regional factors and PB Power's assumptions for RPEs the average of 2nd and 3rd placed GDNs breakdown expenditure percentages for Contractors, Direct/Overheads, Materials and Other has been used.

## A8.3 LTS CAPEX

### A8.3.1 ANALYSIS USED

Regression analysis was not deemed appropriate for the LTS Capex expenditure analysis. Our proposed projections are derived from a review of the specific projects costs plus and a review of the overall expenditure required to meet load growth (called the capacity adjustment).

### A8.3.2 DATA USED IN THE ANALYSIS

Regional factors have not been used in pipeline projects as we believe these projects are procured from nationally (rather than regionally) based contractors and hence are not expected to have a key regional pricing difference.

The expenditure analysis for LTS Capex has been used to split the Net Capex into the four components of Contractors, Direct/Overheads, Materials and Other.

| Direct | Contract | Materials | Other |
|---|---|---|---|
| 0% | 58% | 20% | 22% |

***Table 8A - 11***

From this breakdown adjustments have been made to remove the RPEs assumed by WWU.

For selected pipeline projects a standard unit cost for construction has been used to benchmark the costs (see appendix 6). These unit costs are shown below:

| Pipeline diameter (mm) | PB Power projection (£m/km) |
|---|---|
| 200.0 | 0.35 |
| 300.0 | 0.45 |
| 450.0 | 0.7 |
| 600.0 | 0.8 |
| 900.0 | 1.0 |
| 1050.0 | 1.05 |
| 1200.0 | 1.2 |

***Table 8A - 12***

At the end of the analysis process PB Power's assumptions for RPEs have then been applied to reach our final proposals.

## A8.4 CONNECTIONS

### A8.4.1 ANALYSIS USED

Analysis for Connections has been carried out for the total work activities. The base year for Connections was 2006/07.

### A8.4.2 DATA USED IN THE ANALYSIS

Please refer to the worked example in section A1.1 for details of the Connections tables and values for the separate analysis.

### A8.4.3 REGRESSION TABLE

The Total complete Connections regression table is given below:

| GDN | 2006/07 | |
|---|---|---|
| | ln(Volume) | ln(Cost) |
| EoE | 3.00 | 3.24 |
| Lon | 2.48 | 2.85 |
| No | 2.88 | 3.05 |
| NW | 2.34 | 2.72 |
| Sc | 3.15 | 3.20 |
| So | 3.20 | 3.30 |
| WM | 2.06 | 2.39 |
| WW | 2.99 | 3.11 |

***Table 8A - 13***

All of the analysis for Connections has been carried out on gross expenditure. Once the gross proposal has been calculated the amount of proposed income for the activities needs to be calculated. These percentages have been reached following an assessment of all of the returns made by the GDNs to reach a single assumption for all networks.

| Domestic Load Connection Allowance (DLCA) Percentage of Gross Services Costs | | | | Employer Ordered Works (EOW) Percentage of Gross Connections costs (Services, Mains & Governors) | | |
|---|---|---|---|---|---|---|
| Existing Housing | New Housing | Non Domestic | Existing Housing MOB[10] | Existing Housing | New Housing | Non Domestic |
| 58% | 5% | 0% | 0% | 6% | 6% | 6% |

***Table 8A - 14***

# A8.5 REINFORCEMENT MAINS

## A8.5.1 ANALYSIS USED

Regression analysis has been used for Reinforcement Mains. The regression as been carried out for all pipe sizes with workload volumes being adjusted into a weighted average based on standard unit costs. The base year for Reinforcement Mains is 2005/06.

## A8.5.2 DATA USED IN THE ANALYSIS

The expenditure analysis for Reinforcement Mains Capex has been used to split the Net Capex into the four components of Contractors, Direct/Overheads, Materials and Other.

| Size | Direct | Contract | Materials | Other |
|---|---|---|---|---|
| Total above 180mm | 2% | 50% | 48% | 0% |
| Total up to 180mm | 5% | 75% | 20% | 0% |

***Table 8A - 15***

## A8.5.3 WORK DRIVER

The workload is weighted by a standard monetary value for each activity. These unit costs have been derived from an average of the unit costs as supplied by all GDNs.

| Activity | Unit Value | Units |
|---|---|---|
| Total above 180mm | 254 | £/m |
| Total up to 180mm | 124 | £/m |

***Table 8A - 16***

[10] MOB – Multiple Occupancy Buildings

### A8.5.4 REGRESSION TABLE

The reinforcement regression table is given below:

| GDN | 2005/06 | |
|---|---|---|
| | ln(Volume) | ln(Cost) |
| EoE | 0.47 | 0.24 |
| Lon | -0.41 | -0.30 |
| No | 0.93 | 0.99 |
| NW | -0.62 | -0.69 |
| Sc | 1.02 | 0.90 |
| So | 1.23 | 1.25 |
| WM | -1.83 | -1.99 |
| WW | 1.64 | 1.72 |

***Table 8A - 17***

Due to the workload drivers and costs in £ million sometimes being less that one, the natural logs for these value are negative.

## A8.6 GOVERNORS

### A8.6.1 ANALYSIS USED

Regression analysis was not deemed appropriate for this activity. GDN proposals have been reviewed for RPEs, workload and unit costs.

### A8.6.2 DATA USED IN THE ANALYSIS

The expenditure analysis for Governors Capex has been used to split the Net Capex into the four components of Contractors, Direct/Overheads, Materials and Other.

| Direct | Contract | Materials | Other |
|---|---|---|---|
| 3% | 22% | 70% | 5% |

***Table 8A - 18***

## A8.7 OTHER OPERATIONAL CAPEX

### A8.7.1 ANALYSIS USED

Regression analysis was not deemed appropriate for this activity. As this category contained a wide range of activities and not all these activities were used by every GDN, they were treated as a basket of costs which could be reprioritised by the GDN according to workload and operational needs.

### A8.7.2 DATA USED IN THE ANALYSIS

The expenditure analysis for Other Operational Capex has been used to split the Net Capex into the four components of Contractors, Direct/Overheads, Materials and Other. The split has been done for the purpose of calculation of RPE effects.

| Direct | Contract | Materials | Other |
|---|---|---|---|
| 3% | 22% | 70% | 5% |

***Table 8A - 19***

# NON OPERATIONAL CAPEX

### A8.7.3 ANALYSIS USED

Regression analysis has not been used. Most of the analysis carried out has been carried out at Project level.

### A8.7.4 DATA USED IN THE ANALYSIS

Extracts from the BPQ sheets have been repeated in the data extract tables. These have been linked through to PB Power's proposals.

## A8.8 REPEX MAINS & SERVICES

### A8.8.1 ANALYSIS USED

Regression analysis has been used for selected Repex mains and services activities. Activities associated with multiple occupancy buildings have been excluded from this regression analysis. The base year for the regression was 2005/06.

### A8.8.2 DATA USED IN THE ANALYSIS

The expenditure analysis for Mains and Services Repex has been used to split the Net Repex into the four components of Contractors, Direct/Overheads, Materials and Other.

| Pipe Size/Service | Direct | Contract | Materials | Other |
|---|---|---|---|---|
| <=75mm | 2% | 81% | 17% | 0% |
| >125mm to 180mm | 2% | 81% | 17% | 0% |
| >180mm to 250mm | 0% | 83% | 17% | 0% |
| >250mm to 355mm | 0% | 83% | 17% | 0% |
| >355mm to 500mm | 0% | 83% | 17% | 0% |
| >500mm to 630mm | 0% | 83% | 17% | 0% |
| >630mm | 0% | 83% | 17% | 0% |
| >75mm to 125mm | 2% | 81% | 17% | 0% |
| Non-domestic service replacement | 8% | 61% | 31% | 0% |
| Other domestic services | 5% | 80% | 15% | 0% |
| Relaid services associated with mains replacement | 1% | 85% | 14% | 0% |
| Renew risers (>40m length) to multiple occupancy buildings | 10% | 85% | 5% | 0% |
| Reposition domestic meter - service relays | 20% | 74% | 6% | 0% |
| Service test & transfer to new or other main | 2% | 87% | 11% | 0% |
| Services relaid after escape | 10% | 60% | 30% | 0% |

***Table 8A - 20***

The unit costs used to calculate the weighted average workload drivers in the Repex regression have been developed where possible from contract schedules. The costs used are listed below:

| Activity | Unit Value | Units |
|---|---|---|
| <=75mm | 43.36 | £/m |
| >75mm to 125mm | 50.00 | £/m |
| >125mm to 180mm | 75.17 | £/m |
| >180mm to 250mm | 120.10 | £/m |
| >250mm to 355mm | 147.60 | £/m |
| >355mm to 500mm | 211.20 | £/m |
| >500mm to 630mm | 254.35 | £/m |
| >630mm | 400.00 | £/m |
| Purge & relight after domestic service work | 0.010 | £ 000s/Service |
| Service relay domestic meterwork | 0.090 | £ 000s/Service |
| Service test & transfer to new or other main | 0.147 | £ 000s/Service |
| Other domestic services | 0.296 | £ 000s/Service |
| Relaid services associated with mains replacement | 0.296 | £ 000s/Service |
| Relaid services not associated with mains replacement (bulk relays) | 0.296 | £ 000s/Service |
| Reposition domestic meter - service relays | 1.185 | £ 000s/Service |
| Services relaid after escape | 0.296 | £ 000s/Service |
| Non-domestic service replacement | 0.900 | £ 000s/Service |

***Table 8A - 21***

## A8.8.3 REGRESSION TABLE

The complete Repex regression table is given below:

| | 2005/06 | |
|---|---|---|
| GDN | ln(Volume) | ln(Cost) |
| EoE | 4.03 | 4.60 |
| Lon | 2.98 | 3.76 |
| No | 3.70 | 4.15 |
| NW | 3.73 | 4.36 |
| Sc | 3.13 | 3.80 |
| So | 3.91 | 4.59 |
| WM | 3.46 | 3.94 |
| WW | 3.45 | 4.00 |

***Table 8A - 22***

## A8.9 LTS REPEX

Rechargeable LTS Repex was not subject to this analysis as actual verifiable costs will be recovered. Non rechargeable projects were treated as for LTS Capex - Pipelines.