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# RIIO-GD1: Initial Proposals – Supporting document – Cost efficiency

## Consultation – Supporting Document

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**Overview:**

This Supporting Document to the RIIO-GD1 Initial Proposals sets out our proposed cost allowances for GDNs to enable them to deliver the proposed outputs over RIIO-GD1. This document is aimed at those seeking a detailed understanding of our cost efficiency assessment. Stakeholders wanting a more accessible overview should refer to the Overview consultation document.

# Associated documents

**Main consultation papers**

RIIO-GD1: Initial Proposals - Overview

**Supporting documents**

RIIO-GD1: Initial Proposals – Supporting document – Outputs, incentives and innovation

RIIO-GD1: Initial Proposals – Supporting document – Cost efficiency

RIIO-GD1: Initial Proposals – Supporting document – Finance and uncertainty

**Associated documents**

RIIO-T1/GD1: Initial Proposals – Real price effects and ongoing efficiency appendix

RIIO-GD1: Initial Proposals –Impact assessment

RIIO–T1/GD1: Financial model

Cost of capital study for RIIO–T1 and RIIO-GD1

**Licence consultation documents**

RIIO-T1 and RIIO-GD1: Draft licence conditions – First informal licence drafting consultation

Supporting Document 3: Draft RIIO-GD1 Gas Distribution licence changes

Supporting Document 4: Response template for RIIO-T1 & GD1-First licence drafting consultation

RIIO GD1 Price Control Financial Handbook

**Other associated documents (for GD only)**

RIIO-GD1: Initial Proposals for Gas distribution networks (GDNs) - Headlines

Initial Assessment of RIIO-GD1 business plans and proportionate treatment

Decision on strategy for the next gas distribution price control – RIIO-GD1

Handbook for implementing the RIIO model - Ofgem, October 2010

Glossary for all the RIIO-T1 and RIIO-GD1 documents

# Contents

# 1. Overview of cost assessment methodology

**Chapter Summary**
This chapter provides an overview of our approach to assessing efficient costs, and our proposed cost allowances for gas distribution networks (GDNs) for RIIO-GD1. We also set out the structure of the remainder of this document.
**Question 1:** Do you consider our overall approach to cost assessment appropriate, and if not what changes would you propose?

## Introduction

1.1. Under the RIIO framework we stated that we would draw on a variety of evidence, including the companies' forecasts and our own benchmarking analysis, as a means of informing our assessment of companies' efficient costs

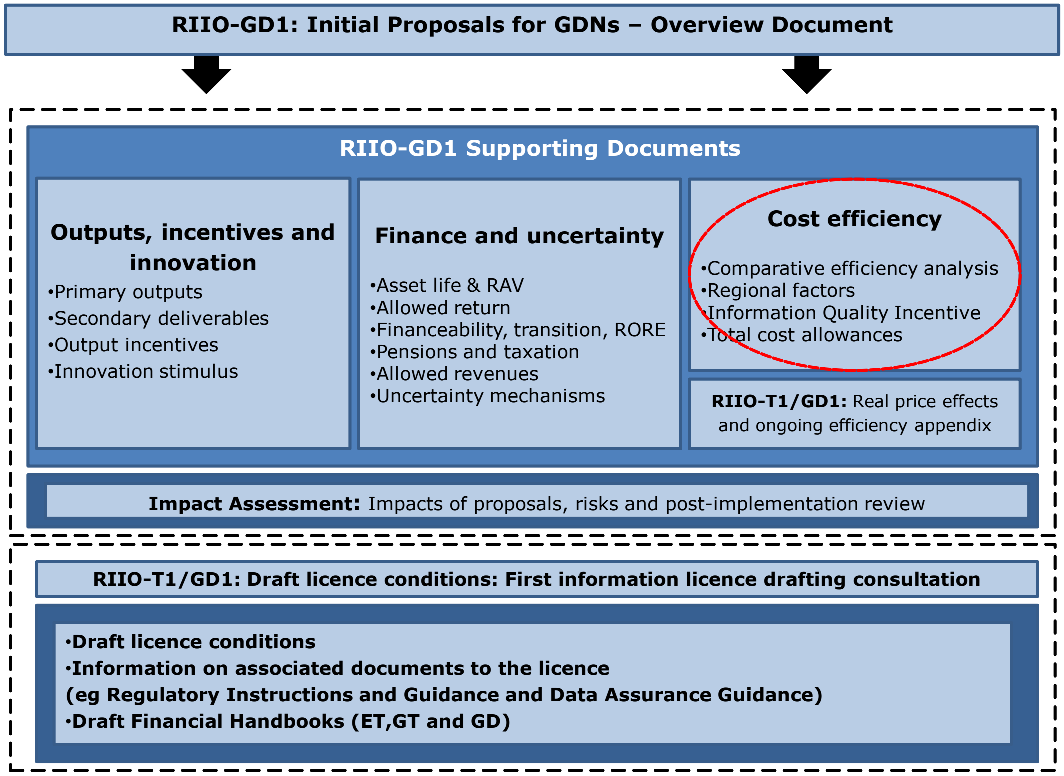
1.2. In order to establish an efficient level of costs, we distinguish between the level of outputs that GDNs need to deliver over RIIO-GD1 (eg in terms of safety, reliability etc), and the efficient unit costs required to deliver those outputs. In the RIIO-GD1 Outputs, Incentives and Innovation Supporting Document we set out our assessment of GDNs' proposed outputs, and our proposed output levels that we will require GDNs to deliver. In this document we set out how we have assessed GDNs' (unit) cost efficiency. Drawing on our proposed output levels identified in the Outputs Supporting Document we also set out our proposed cost allowances (ie bringing together our combined view of outputs and efficient unit costs).

1.3. In this overview chapter we describe the different tools and techniques we have developed to assess GDNs' cost efficiency; our preferred set of models; the adjustments that we have made to companies' forecasts; and our proposed definition of efficient costs and how we intend to interpret our preferred set of models' results. We also set out the proposed cost allowances.

1.4. For Final Proposals, we will be updating our benchmarking based on an extra year of actual costs for 2011-12 which we will receive at the end of July. We also welcome respondents' views on our proposed approach to the cost assessment which we will consider before publishing Final Proposals.

1.5. This is one of a suite of documents we are publishing as part of Initial Proposals. Figure 1.1 below provides a map of the RIIO-GD1 documents.

**Figure 1.1 RIIO-GD1 document map**




*Document links can be found in the 'Associated documents' section of this paper.

## Overview of our methodology and results

### Our different econometric modeling approaches

1.6. We have developed a wide-range of techniques to assess GDNs' cost efficiency. In terms of econometric models we have developed total expenditure (totex) models, models based on individual expenditure areas (ie capex, repex, opex), as well as more disaggregated models, eg at the activity level (repairs, emergency service etc). For each approach, we have also developed econometric models estimated using three years' historical data (2008-09 to 2010-11), as well as models estimated using GDNs' forecast data using 2-year forecast and the full 8-year cost forecasts.

1.7. We consider the different modelling approaches provide useful information in assessing GDNs' comparative efficiency. For example, totex models ensure that we consider GDNs' opex-capex trade-offs in our comparative efficiency assessment, ie that we can identify those GDNs that have minimised total costs. Activity level analysis enables a richer model specification, ie we can take into account a greater number of potential factors that explain costs. Our models based on the principal expenditure lines, opex, capex, and repex, strike a balance between ensuring that we consider trade-offs between cost areas but allow a richer model specification than the high-level totex model.

1.8. In terms of the data period used to estimate the models, we note that models estimated using historical data have the benefit of being anchored on actual data, and lead to more statistically robust models (as we describe below). By contrast, estimating models using forecast data allows us to take into account GDNs' views on how costs will change over the RIIO-GD1 period.

1.9. For all models, we have made pre-modelling adjustments to GDNs' costs to reflect factors not incorporated within the econometric model cost functions. Our main adjustments are for regional cost factors, where we have taken into account regional differences in labour costs, sparsity adjustments (ie to reflect the higher costs of providing emergency services in rural areas), and adjustments to reflect the higher costs of working in the London area. (We explain our adjustments in detail in chapter 2, and appendix 5.)

1.10. We have held a number of working groups with the GDNs to discuss our approach to econometric modeling and our pre-modeling adjustments. We have considered alternative model specifications proposed by GDNs, and we have also investigated our own alternative models. We have set out further details on the alternatives we have used and statistical tests in Appendix 1.

**Our preferred set of econometric models**

1.11. Of the set of models we have developed, we propose to draw on four specific models comprising totex and activity level models estimated using both historical and 2-year forecast data.

1.12. We do not propose to rely on the econometric models we have estimated using the full 8 year RIIO-GD1 period. The reason for excluding these models is that the models have poorer model diagnostics than models based on historical data or 2-year forecast. In particular, the models based on the full eight years forecast period fail our model specification tests.[1]

1.13. We also do not propose to rely on the middle up models results (based on total opex, total capex and total repex). This is not because we have specific concerns with the models' diagnostics; instead we note that the model specifications are similar to the totex models and derive broadly the same comparative efficiency scores for GDNs as for the totex models.

[1] We consider that the poorer model diagnostics is potentially explained by different assumptions GDNs have adopted in setting out their forecasts, eg the relationship between expenditure levels and the workloads that drive the expected cost levels.

**Technical/engineering assessment**

1.14. In addition to econometric modelling we also exclude a range of costs from our regression analysis. For example, we exclude non-controllable costs from our modeled or regressed costs including business rates and pension deficit repairs. We also exclude a number of other company specific costs such as street works' costs (which disproportionately affects NGGD's London GDN and SGN's Southern GDN), gasholder decommissioning costs and land remediation. For such costs, we have considered the efficient level of costs based on a technical or engineering assessment.

1.15. The assessment of some cost categories (eg whether included within our regression analysis or subject to a technical/engineering assessment) depends on the modeling approach. For example, our assessment of asset integrity capex is based on technical/engineering assessment in our activity level analysis but is included within our totex regression model.

1.16. Table 1.1 sets out how we have assessed costs under our three principal modelling approaches (ie totex, expenditure level, and activity level models).

### Table 1.1 Cost assessment techniques used by activities/ cost groups

| | Assessment method | | |
|---|---|---|---|
| **Cost activity or area of costs** | **Activity level (or bottom-up)** | **Capex, repex, opex (or middle-up)** | **Total expenditure (Totex)** |
| **Opex** | Individual activity-level regressions + qualitative assessment of workload (chapter 6 and Appendix 2) | Total opex regressions + qualitative assessment of workload (Chapter 3 and Appendix 2) | Totex benchmarking (Qualitative/technical assessment of workload Chapters 3 and 4) |
| Work management | | | |
| Emergency | | | |
| Repairs | | | |
| Maintenance | | | |
| Other direct activities | Engineering/technical assessment (Chapter 6 and Appendix 2) | | |
| Business support | Inter-network & Hackett Benchmarking (Appendix 6 and 7) | | |
| Shrinkage | Engineering/technical assessment (Chapter 2) | | |
| Xoserve | Technical/engineering assessment (Chapters 4 and 6) | Technical/engineering assessment (Chapters 4 and 6) | Technical/engineering assessment (Chapters 4 and 6) |
| SIUs | | | |
| Holder decommissioning costs | | | |
| Holder site environmental remediation costs | | | |
| Loss of metering | | | |
| Tier 2/3 survey cost | | | |
| Multiple Occupancy Building surveys | | | |
| Costs of interruptible contracts | | | |
| Smart metering set-up costs | | | |
| **Capex** | Individual activity-level regressions (Chapter 7 and Appendix 3) | Total capex regressions (Chapter 3) | Totex regressions (Chapter 3) |
| Connections | | | |
| Mains reinforcement | | | |
| LTS & storage | Qualitative/technical assessment (Chapter 7 and Appendix 3) | | |
| Governors | | | |
| Other operational capex | | | |
| Holder decommissioning costs | | Qualitative/technical assessment (Chapter 7 and Appendix 3) | Qualitative/technical assessment (Chapter 7 and Appendix 3) |
| Fuel poor network extensions | | | |
| **Repex**<br>Tier 1 mains and services costs<br>Tier 2 above threshold mains and service costs | Activity-level regressions (Chapter 8 and Appendix 4)<br>Qualitative/technical assessment<br>(Chapter 8 and Appendix 4) | Total repex regressions (Chapter 3) | Totex regressions (Chapter 3) |
| Tier 2 below threshold & tier 3 mains and service costs | | | |
| Other repex | | | |
| **Costs impacting on several activities** | | | |
| Streetworks | Qualitative/technical assessment (Chapter 4) | Qualitative/technical assessment (Chapter 4 ) | Qualitative/technical assessment (Chapter 4) |
| RPEs | Separate quantitative assessment (Chapter 2 and RIIO GD1/T1 RPEs and ongoing efficiency annex | Separate quantitative assessment (Chapter 2 and RIIO GD1/T1 RPEs and ongoing efficiency annex | Separate quantitative assessment (Chapter 2 and RIIO GD1/T1 RPEs and ongoing efficiency annex |
| Ongoing Productivity | EU KLEMs benchmarking (Chapter 2 and RIIO GD1/T1 RPEs and ongoing efficiency annex | EU KLEMs benchmarking (Chapter 2 and RIIO GD1/T1 RPEs and ongoing efficiency annex | EU KLEMs benchmarking (Chapter 2 and RIIO GD1/T1 RPEs and ongoing efficiency annex |

1.17. We also need to make a number of adjustments to GDNs' cost forecasts. First, we adjust the cost forecasts for the disallowed outputs, ie as identified in the Outputs Supporting Paper. This is because we want to identify unit cost efficiency, as opposed to differences in the assumed level of outputs. Where we have disallowed outputs and the corresponding volumes, we have made corresponding increases to opex costs.

1.18. In a number of cases we have also made adjustments to GDNs' forecast workloads (defined as activities included as explanatory variables within the econometric models). For example we have revised GDNs' forecasts of the number of external reports, which is the cost driver for the repair activity model, where we consider that they have overstated the expected increase. We have made such adjustments to ensure that we do not overstate GDNs' efficient costs because of an overstatement of the expected deterioration of the networks. In considering GDNs' workload forecasts, we have undertaken a comparison of GDNs' forecast workloads, and we have relied on technical/engineering assessment.

1.19. We also make a number of other more minor adjustments, such as adjustments to ensure consistency in cost allocation and exclusion of costs addressed through uncertainty mechanism. We describe the full set of adjustments in Appendix 1.

**Defining benchmark costs**

1.20. For the costs subject to econometric analysis, we estimate the efficient level of costs for a base year. For models estimated using historic data, the base year is 2010-11, and for models based on 2 year forecast data the base year is2013-14. For the base year we define the efficient level of costs as equal to the upper quartile (UQ) GDN costs, ie approximately the third least cost GDN in the base year. In order to identify the efficient level of costs over the remainder of the RIIO-GD1 period, we then roll-forward our benchmark cost to take account of changes in workload and outputs and our assumption for real price effects and ongoing productivity. We set out our assumptions for RPEs and ongoing efficiency in chapter 2.

**Interpreting the preferred models results**

1.21. In terms of interpreting the models' results, we propose to base our proposed efficiency reduction to companies' forecast cost allowances on the average comparative efficiency score for our four preferred models, ie totex and activity level models based on both historical and 2-year forecast data. As set out above, we consider that each modeling approach has its merits, and we consider that drawing on a wide set of models ensures that we do not over emphasise any one modeling approach. We also note that the set of preferred models provide relatively consistent results in terms of GDNs' rankings and absolute efficiency scores.

1.22. We define efficient costs equal to the upper quartile (UQ) GDNs' costs. We propose to set allowances based on the expectation that GDNs could close 75% of the assessed gap between their forecasts and the UQ. The use of the UQ is identical to previous price reviews (eg GDPCR1, and more recently the electricity distribution price review, DPCR5). Our proposed approach to closing the gap and the use of the UQ rather than the frontier acknowledges that a part of the difference in costs across the GDNs relates to factors other than GDNs' relative efficiency (eg statistical error).

1.23. Table 1.2 shows the GDNs' efficiency scores for the four models, and for the average of the four models. As set out, in general, companies' efficiency scores are better for econometric models estimated using forecast models relative to the historical models (on average by 1-2 percentage points). The reason for this is that all GDNs' plans incorporate a forecast increase in costs over the earlier part of the RIIO-GD1 period, and the models estimated using forecast data incorporates the forecast cost increase. The figure also shows that GDNs' comparative efficiency scores for both the totex and activity level models are very close, with the potential exception of NGGD's North West and West Midlands which perform significantly better on the totex relative to the activity level models.

1.24. Taking an average of all four models, NGN is the most efficient group (with costs 6 per cent higher than our notional upper quartile GDN), and WWU is the least efficient group (with costs 16 per cent higher). However, at the licensee level, NGN is most efficient, and NGGD London least efficient. Our IQI mechanism is applied on a GDN basis.

1.25. Under the IQI mechanisms we have required companies' to close 75 per cent of the assessed gap between their forecasts and the UQ. Further details of how we have applied the IQI mechanism are set out in Chapter 9.

1.26. Table 1.2 also sets out the proposed total cost reduction for both outputs and cost efficiency post-IQI. At an industry level we note around half the reduction to GDNs' proposed costs relates to disallowed outputs, and around half relates to cost efficiency (including our assumptions for RPEs and ongoing efficiency). A small element of the reduction is also for costs that we expect to fund through uncertainty mechanisms, eg in relation to smart meter related costs.

**Table 1.2: GDN totex forecasts and Ofgem's proposed allowances**

| GDN | (A) % adjustment for efficiency under historical totex model | (B) % adjustment for efficiency under historical bottom-up model | (C) % adjustment for efficiency under forecast totex model | (D) % adjustment for efficiency under forecast bottom-up model | (E) Average of the 4 approaches - % adjustment for efficiency (pre-IQI) | (F) Total % reduction in the GDNs' forecasts for outputs and efficiency (post-IQI) |
|---|---|---|---|---|---|---|
| EoE | 13% | 15% | 8% | 12% | 12.3% | 13.8% |
| Lon | 19% | 19% | 15% | 19% | 17.9% | 25.5% |
| NW | 9% | 16% | 4% | 15% | 10.9% | 20.0% |
| WM | 5% | 14% | 0% | 14% | 8.0% | 15.7% |
| NGN | 9% | 7% | 4% | 5% | 6.3% | 12.8% |
| Sc | 12% | 11% | 8% | 9% | 9.8% | 16.5% |
| So | 13% | 12% | 8% | 8% | 10.2% | 11.0% |
| WWU | 17% | 18% | 13% | 15% | 16.0% | 24.9% |

[1] inclusive of RPEs
[2] All Smart Metering costs are excluded from the submission costs and proposed allowances

1.27. Table 1.3 shows the average annual expenditure for the first three years of GDPCR1, the average annual GDN forecasts and our allowances. A more detailed split for opex, capex and repex is set out in Chapter 9.

**Table 1.3: Average annual costs (£m, 2009-10 prices)**

| | GDPCR1 Actuals | GDN Plan RIIO-GD1 (no output adjustments) | Ofgem allowance (post IQI) | % change between GD1 plan and our allowances |
|---|---|---|---|---|
| **Industry** | **1,903** | **1,950** | **1,612** | **(17%)** |
| NGG EoE | 280 | 281 | 242 | (14%) |
| NGG Lon | 256 | 277 | 206 | (26%) |
| NGG NW | 240 | 227 | 181 | (20%) |
| NGG WM | 171 | 173 | 146 | (16%) |
| NGN | 192 | 229 | 199 | (13%) |
| SGN SC | 181 | 177 | 148 | (17%) |
| SGN SO | 369 | 346 | 308 | (11%) |
| WWU | 214 | 242 | 182 | (25%) |

(1) The annual costs are controllable costs excluding shrinkage, NTS charges, pension deficit costs and licence rates.
(2)The GDN forecast numbers and our allowances are normalised for loss of meterwork and exclude smart metering and streetwork costs associated with the implementation of permitting by new Highways Authorities and lane rental costs.

## Structure of this document

The remainder of this document is structured as follows:

- **Chapter 2** explains elements of our analysis that are common both to our totex work and more disaggregated analysis. This includes our adjustments for regional factors and company specific factors. It also sets out our assessment of RPEs and ongoing efficiency
- **Chapters 3 and 4** explain our totex and middle-level analysis and sets out the results of this work. It also explains our analysis of costs that have been assessed outside of both the totex and bottom-up regressions.
- **Chapters 5 to 8** explain our bottom-up activity level analysis. Chapter 5 explains the approach as a whole and Chapters 6 to 8 set out further details for opex, capex and repex respectively.
- **Chapter 9** explains how we have brought together the different components of our analysis.
- **Further detail is provided in Appendices 1 to 7**

# 2. Regional adjustments, RPEs and ongoing efficiency

**Question 1:** Do you consider our approach for regional adjustments and company specific factors is appropriate, and if not what changes would you propose?
**Question 2:** Do you agree with our assumptions for real price effects and ongoing efficiency?

2.1. This Chapter explains our proposals for regional labour and company specific adjustments at a high level. Further detail is set out in Appendix 5 and in the step-by-step guide to cost assessment (SSGCA) supporting Appendix which will be published on 3 August. It also sets out our proposals for RPEs and ongoing efficiency. These are explained in more detail in the RIIOT1/GD1 REPs and Ongoing Efficiency Appendix. These assumptions are common to both our totex and bottom-up activity-level analysis.

## Regional labour adjustments and company specific factors

2.2. We have held several consultations with the GDNs and also undertaken our own research to understand the impact of regional labour differences and other company specific factors on the costs of GDNs' operational activities. We have concluded that some of the differences in costs between GDNs can be explained by factors beyond the control of individual GDNs. These factors include wage differences between areas, differences in the structure of their networks or differences in the physical environments that GDNs operate in.

2.3. We recognise the need to make certain adjustments to ensure that we benchmark GDNs on a comparable basis:

- **Regional adjustment for direct and contract labour costs -** We have made an adjustment for each historical year in our analysis and for the RIIO-GD1 forecasts. This recognises that there are additional costs associated with working in London and the South-East and then considers the proportion of work that is done in these areas and elsewhere. For example, we have applied a 15 per cent reduction to London's 2010-11 direct labour costs and 18 per cent reduction to their contract labour costs before carrying out our regressions. We have applied a 7 per cent reduction to Southern's 2010-11 direct labour costs and 8 per cent reduction to their contract labour costs. We have applied 2 and 3 per cent increases to 95.4 per cent of East of England's direct and contract labour costs respectively, but applied 23 per cent reductions to the remaining 4.6 per cent of its direct and contract labour costs. We have applied 3 and 4 per cent increases for 2010-11 direct labour and contract labour costs for the other GDNs.

- **Sparsity adjustments** - We have accepted that there are differences in costs associated with working in relatively sparse areas for the emergency and repair cost activities. We have calculated sparsity indices based on district level data and then made adjustments to the GDNs' cost data based on their relative level of sparsity compared to the national average. We have applied reductions in costs for Wales and the West, Scotland, Northern and East of England and increases in costs for the remaining GDNs. For example, we have reduced Wales and West's costs for the emergency activities by 15 per cent.

- **Urbanity (reinstatement)** - We have accepted that there are additional costs associated with working in highly dense urban areas. We have applied a reduction to London and Southern's costs for reinstatement for the repairs and maintenance activities. We have applied an increase to 95.4 per cent of East of England's costs, but an applied a reduction to the remaining 4.6 per cent of its costs. We have applied an increase in costs for other GDNs.

- **Urbanity (labour productivity)** - We have accepted that there is reduced labour productivity associated with working in the London area. We have applied a 15 per cent productivity adjustment based on evidence provided by SGN. This has been applied to the labour cost element of repex and capex mains reinforcement and connections based on the proportion of work that is carried out within the M25. We have applied a separate GDN-specific adjustment for TMA costs. The streetwork adjustments are set out in Chapter 4.

- **Salt cavity adjustment** - We have made a salt cavity adjustment for North West as they are the only GDN with this type of storage.

2.4. These adjustments are summarised in Table 2.1 below. Further detail is set out in Chapters 6 to 8.

**Table 2.1: Annual average historical costs and RIIO-GD1 forecasts' adjustments (£m, 2009-10)**

| | Historical annual average | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Adjustments | EoE | Lon | NW | WM | NGN | Sc | So | WWU | Industry |
| Regional labour | 4.7 | (25.5) | 5.7 | 4.0 | 4.6 | 3.8 | (19.8) | 4.0 | (18.4) |
| Sparsity | (1.0) | 2.0 | 1.2 | 0.1 | (0.4) | (1.2) | 0.9 | (2.1) | (0.4) |
| Urbanity | (0.6) | (10.6) | 0.1 | 0.1 | 0.2 | 0.0 | (5.2) | 0.1 | (15.9) |
| Salt cavity | | | (0.6) | | | | | | (0.6) |
| Total totex adjustments | 3.2 | (34.1) | 6.5 | 4.3 | 4.3 | 2.6 | (24.1) | 2.0 | (35.3) |
| | RIIO-GD1 Forecasts annual average | | | | | | | | |
| | EoE | Lon | NW | WM | NGN | Sc | So | WWU | Industry |
| Regional labour | 3.7 | (21.2) | 4.3 | 3.3 | 5.2 | 3.9 | (15.9) | 5.1 | (11.6) |
| Sparsity | (0.7) | 1.4 | 0.9 | 0.1 | (0.4) | (1.2) | 0.8 | (2.6) | (1.7) |
| Urbanity | (0.4) | (10.2) | 0.1 | 0.1 | 0.2 | 0.1 | (4.1) | 0.1 | (14.0) |
| Salt cavity | | | (0.6) | | | | | | (0.6) |
| Total totex adjustments | 2.7 | (30.0) | 4.8 | 3.6 | 5.0 | 2.8 | (19.1) | 2.6 | (27.9) |

## Real price effects and ongoing efficiency

2.5. Real price effects (RPEs) and the ongoing efficiency assumption form part of the ex ante allowances of each GDN. The allowance for RPEs represents the expected change in input prices (eg wages) relative to the Retail Prices Index (RPI). The ongoing efficiency assumption is the expected productivity improvements that an efficient company should be able to make over the price control.

2.6. Our labour RPE, comprising around 60 per cent of GDNs' costs, is based on independent forecasts for wage growth over the short term, which indicate negative real wage growth, and an assumption that real wage growth will revert to the long-term trend of 1.4 per cent per annum. Overall, our real wage assumption is 0.5 per cent per annum over the RIIO period, although the cost allowances reflect the expected profile, ie negative RPEs in the early part of the period. In general, our forecast real wage effect is lower than the GDNs' forecasts, primarily because we assume negative real wage effects in years' 2011-12 to 2013-14. (See the RIIO-T1/GD1: RPEs and Ongoing Productivity Appendix).

2.7. We have estimated other input prices based on the historical long-run relationship relative to RPI. Our forecast for material input price effects tend to be higher than the average industry forecast. .

2.8. Taking our forecasts together we estimate a composite RPE of 0.5 per cent per annum (based on weighted average of all inputs), and ongoing productivity 0.8 per cent per annum. The overall net impact is -0.3 per cent per annum. That is we expect GDNs to more than offset input price increases by productivity improvements.

2.9. Compared to GDNs' forecasts our proposed net impact assumption is below the lowest GDN assumption of -0.2 per cent per annum (WWU), and significantly below the highest net impact at 0.6 per cent (NGGD).

# 3. Total expenditure and total opex, capex and repex analysis

**Question 1:** Do you consider our approach to totex is appropriate, and if not what changes would you propose?

3.1. As explained in Chapter 1 we are using a broad range of cost assessment tools to determine our overall cost baselines for the GDNs. This chapter sets out our approach to the totex benchmarking and further detail on the middle-up analysis, which draws together the results of our total opex, capex and repex benchmarking.

**Background and proposed methodology**

3.2. We outlined in our March strategy document our proposals for carrying out totex analysis. We are using totex benchmarking as an important part of our overall toolkit, together with more disaggregated benchmarking and qualitative assessment including technical reviews.

3.3. We have adopted total controllable expenditure (totex) as our measure of total costs. This measure relates more closely to the current state of technology, government regulation and environmental concerns, and the operator's levels of efficiency. We define totex as controllable opex plus shrinkage plus capex plus repex. We have excluded NTS flat capacity charges, research and development (R&D) costs and smart metering costs from the submitted controllable totex. We have excluded other costs such as streetworks and holder demolition as well. We have used a seven year moving average to smooth the capex.

3.4. We have applied the regional cost adjustments explained in Chapter 2 and the normalisation adjustments explained in Appendix 1 to ensure that the costs are consistent across the industry and that we benchmark GDNs on a comparable cost basis. The normalisations and adjustments are made at the cost activity levels and then aggregated at the total opex, capex and repex level, and in turn aggregated at the totex level. For example, an adjustment of £2m in the repairs cost activity and of £3m in the work management cost activity aggregates to £5m in opex, while that of £4m in the capex mains reinforcement cost activity and £2m in the capex connections cost activity aggregates to £6m in capex. The aggregated totex adjustment is £11m. We have summarised the historical and forecast totex normalisations and regional adjustments in Table 3.1.

**Table 3.1: Annual average historical and forecast totex normalisations and adjustments (£m, 2009-10 prices)**

| Costs and adjustments | Historical Totex | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | EoE | Lon | NW | WM | NGN | Sc | So | WWU | Industry |
| Submitted controllable totex | 287 | 260 | 245 | 175 | 199 | 185 | 378 | 220 | 1,950 |
| Totex normalisations | (6) | (3) | (6) | (3) | (4) | (10) | (6) | (9) | (48) |
| Normalised totex | 281 | 257 | 239 | 172 | 195 | 175 | 372 | 211 | 1,901 |
| Totex adjustments | | | | | | | | | |
| Regional labour | 5 | (25) | 6 | 4 | 5 | 4 | (20) | 4 | (18) |
| Sparsity | (1) | 2 | 1 | 0 | 0 | (1) | 1 | (2) | 0 |
| Urbanity | (1) | (11) | 0 | 0 | 0 | 0 | (5) | 0 | (16) |
| Salt cavity | | | (1) | | | | | | (1) |
| Total totex adjustments | 3 | (34) | 7 | 4 | 4 | 3 | (24) | 2 | (35) |
| Adjusted totex | 284 | 223 | 245 | 176 | 199 | 178 | 348 | 213 | 1,866 |
| | RIIO-GD1 Forecasts annual average | | | | | | | | |
| | EoE | Lon | NW | WM | NGN | Sc | So | WWU | Industry |
| Submitted controllable totex | 281 | 277 | 227 | 173 | 229 | 177 | 346 | 242 | 1,950 |
| Totex normalisations | (30) | (37) | (24) | (11) | (13) | (25) | (41) | (16) | (198) |
| Normalised totex | 250 | 240 | 202 | 161 | 216 | 152 | 304 | 226 | 1,752 |
| Totex adjustments | | | | | | | | | |
| Regional labour | 4 | (21) | 4 | 3 | 5 | 4 | (16) | 5 | (12) |
| Sparsity | (1) | 1 | 1 | 0 | 0 | (1) | 1 | (3) | (2) |
| Urbanity | 0 | (10) | 0 | 0 | 0 | 0 | (4) | 0 | (14) |
| Salt cavity | | | (1) | | | | | | (1) |
| Total totex adjustments | 3 | (30) | 5 | 4 | 5 | 3 | (19) | 3 | (28) |
| Adjusted totex | 253 | 210 | 207 | 165 | 221 | 155 | 285 | 229 | 1,724 |

Note: Submitted controllable totex inclusive of RPEs.

### Top-down totex approach

3.5. Our top-down approach uses a single regression model to assess the efficient level of controllable totex (excluding certain costs considered outside the regression and adjusted for regional factors) in the 2010-11 or 2013-14 base year.

3.6. We have used a Cobb-Douglas functional form and estimated a time specific-effects panel data model using the ordinary least squares technique to improve the sample size and robustness of our analysis. We have estimated models using three years' (2008-09 to 2010-11) historical data, two years' forecasts (2013-14 to 2014-15) and eight years' (2013-14 to 2020-21) forecast data for RIIO-GD1. We have rejected the models using the full eight year data as they fail our model specification tests.

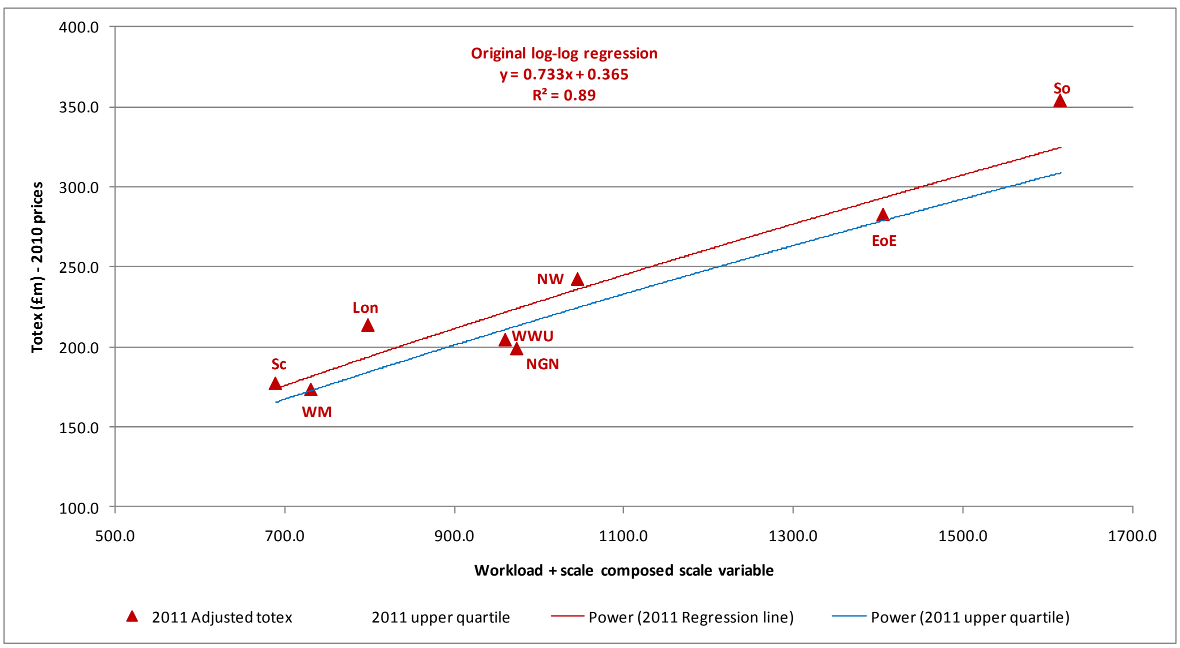
3.7. As set out in Appendix Table A1.2, we used a composite scale variable which combines network scale based on MEAV with workload drivers based on our bottom-up regressions. We have applied a 38 per cent weighting on MEAV, 43 per cent on repex workload, 2 per cent each on mains reinforcement and connections workload, 6 per cent on external condition reports, 5 per cent on maintenance MEAV and 4 per cent weighting on the emergency service CSV. We consider that this reflects a balance of fixed and variable costs in our totex and total opex and capex models.

3.8. Each GDN's totex efficiency score is calculated as a ratio of its adjusted historical or forecast totex to its modelled totex.

3.9. We define efficient costs equal to the upper quartile (UQ) costs. The use of the UQ is identical to previous price reviews (ie GDPCR1, and more recently the electricity distribution price review, DPCR5). Our use of the UQ rather than the frontier acknowledges that a part of the difference in costs across the GDNs relates to factors other than GDNs' relative efficiency (ie statistical error). The UQ costs are shown by the blue line in Figure 3.1.

3.10. The results for the 2010-11 base year show that Northern and Wales & West are below the UQ, West Midlands and East of England are on the UQ, while London, North West, Scotland and Southern are all above the UQ.

**Figure 3.1: Top-down regression and upper quartile presentation**




3.11. The top-down efficiency scores are presented in Table 3.2. The results based the forecasts show an improvement in efficiency rankings from the 2010-11 historical base year for East of England, North West, West Midlands and Southern, and a worsening in efficiency rankings for Northern and Wales & West. London and Scotland's efficiency rankings do not change. We have carried out sensitivity analysis using different totex drivers and weightings and the results were very similar as set out in Appendix 1.

**Table 3.2: Top-down and middle-up totex efficiency scores and rankings**

| | Efficiency ranking | | | | Standardised efficiency scores | | | |
|---|---|---|---|---|---|---|---|---|
| | Top-down | | Middle-up | | Top-down | | Middle-up | |
| **GDN** | 2011 | 2014 | 2011 | 2014 | 2011 | 2014 | 2011 | 2014 |
| EoE | 4 | 2 | 3 | 1 | 0.97 | 0.94 | 0.96 | 0.93 |
| Lon | 8 | 8 | 8 | 8 | 1.11 | 1.12 | 1.11 | 1.12 |
| NW | 6 | 4 | 5 | 4 | 1.03 | 0.98 | 1.02 | 0.97 |
| WM | 3 | 1 | 4 | 2 | 0.96 | 0.92 | 0.97 | 0.94 |
| NGN | 1 | 3 | 1 | 3 | 0.89 | 0.96 | 0.90 | 0.96 |
| Sc | 5 | 5 | 6 | 6 | 1.02 | 0.99 | 1.04 | 1.02 |
| So | 7 | 6 | 7 | 5 | 1.09 | 1.04 | 1.07 | 1.01 |
| WWU | 2 | 7 | 2 | 7 | 0.93 | 1.05 | 0.93 | 1.05 |

3.12. We have derived cost allowances for the whole RIIO-GD1 period by using both qualitative and quantitative analysis to determine our roll forward for differences in outputs and/or workload from those proposed by the GDNs. We have also included our view of efficient costs that have been assessed outside the regression. We have also rolled forwards the base year costs to take account of real input price growth and ongoing efficiency (frontier shift) which is discussed further in Chapter 2.

**Middle-up approach**

3.13. Our middle-up approach draws together three separate regressions for total controllable opex, capex and repex. The normalisations and regional adjustments are made at the disaggregated cost activity levels and then aggregated to total opex, capex and repex.

3.14. We use weighted average repex workload as the repex regression cost driver; a CSV of MEAV, connections workload and mains reinforcement workload as the capex cost driver; and a CSV of MEAV, external condition reports, maintenance MEAV, and the emergency CSV as a cost driver for opex.

3.15. Each GDN's middle-up efficiency score is calculated as a ratio of its adjusted submitted or forecast totex to the sum of the total opex, capex and repex modelled costs. We calculate the UQ benchmark score as explained in the top-down approach.

3.16. The middle-up results for the 2010-11 historical base year show Northern and Wales & West below the UQ, West Midlands and East of England on the UQ, and London, North West, Scotland and Southern above the UQ consistent with the top-down approach.

3.17. The middle-up efficiency results are also presented in Table 3.2. The results based on the forecasts also show an improvement in efficiency rankings from the 2010-11 historical base year for East of England, North West, West Midlands and Southern, and a worsening in efficiency rankings for Northern and Wales & West.

London and Scotland's efficiency rankings do not change. This is again similar to the totex approach.

3.18. Table 3.3 summarises the GDNs' efficiency rankings for the three middle-up approach group cost activities, opex, capex and repex.

**Table 3.3: Middle-up approach efficiency rankings for 2011 and 2014**

| Regression cost activity | NGG | | | | NGN | SGN | | WWU |
|---|---|---|---|---|---|---|---|---|
| | EoE | Lon | NW | WM | | Sc | So | |
| 2014 [2 years' forecast model] | | | | | | | | |
| Total Opex (incl shrinkage) | 4 | 6 | 7 | 1 | 8 | 3 | 2 | 5 |
| Capex - Topdown | 2 | 7 | 4 | 1 | 3 | 6 | 5 | 8 |
| Repex - Topdown | 1 | 8 | 3 | 6 | 2 | 4 | 7 | 5 |
| 2011 [historical model] | | | | | | | | |
| Cost Assessment rankings | NGG | | | | NGN | SGN | | NGG |
| | EoE | Lon | NW | WM | | Sc | So | |
| Total Opex (incl shrinkage) | 6 | 7 | 8 | 5 | 2 | 3 | 4 | 1 |
| Capex - Topdown | 3 | 7 | 4 | 1 | 2 | 8 | 5 | 6 |
| Repex - Topdown | 3 | 7 | 5 | 6 | 1 | 4 | 8 | 2 |

## Results

3.19. To calculate our view of allowances for RIIO-GD1, we roll forward efficient base year costs for changes in outputs and workload volumes and apply our view of growth in input prices and ongoing efficiency. We also include additional costs relating to areas that were assessed separately such as streetwork costs.

3.20. Table 3.4 presents the results of our totex top-down and middle-up analysis in terms of the companies' submitted totex, the submitted totex adjusted for disallowed outputs and our percentage reductions for both the three year historical and the two years' forecast models.

**Table 3.4: Results of the totex and middle-up analysis**

| Average annual costs | | | | | | |
|---|---|---|---|---|---|---|
| GDN | Submitted normalised forecast | Submitted normalised forecast with output adjustment | Historical totex adjustment | Historical Middle-up adjustment | 2 years' forecast totex adjustment | 2 years' middle-up adjustment |
| EoE | 280.5 | 266.3 | 13% | 11% | 8% | 6% |
| Lon | 276.6 | 238.1 | 19% | 21% | 15% | 18% |
| NW | 226.6 | 197.6 | 9% | 10% | 4% | 6% |
| WM | 172.8 | 155.1 | 5% | 7% | 0% | 4% |
| NG | 228.6 | 209.3 | 9% | 10% | 4% | 6% |
| Sc | 176.9 | 159.4 | 12% | 13% | 8% | 11% |
| So | 345.8 | 333.2 | 13% | 13% | 8% | 7% |
| WWU | 242.2 | 206.8 | 17% | 18% | 13% | 14% |

Note: Submitted normalised forecasts Inclusive of RPEs.

# 4. Assessment of costs excluded from regression analysis

**Question 1:** Do you agree with the costs we have excluded from regression analysis and the methodology we have proposed?
**Question 2:** Do you agree with our proposals for smart metering?
**Question 3:** Do you agree with our proposals for loss of meterwork?

4.1. We have excluded certain costs in GDNs' cost submissions from our regression analysis so that we can assess companies on a consistent basis. These are explained by a number of factors such as changes in legislation, new policy and different interpretation of policy.

4.2. We have carried out technical/qualitative assessment of these costs. We are proposing to set a base allowance for these costs, to develop an uncertainty mechanism, or a combination of the two.

4.3. The key areas covered in this chapter are as follows:

- Street works
- Smart metering and loss of meterwork
- Holder decommissioning
- Land remediation
- Other adjustments

**Street works**

The GDNs have forecast a total of £475.6m for streetworks expenditure during RIIO-GD1. This includes activity associated with the Traffic Management Act 2004 (TMA)/Transport (Scotland) Act 2005 (T(S)A) permit schemes (£365.8m)[2], forecast expenditure on lane rental[3] (£34.2m) and costs associated with Section 74 daily charge rates/overstay charges (£73.7m)[4]. Table 4.1 summarises these costs.

[2] Southern also submitted £2m for NRSWA.

[4] No companies forecast street works expenditure for half/full width reinstatement activity.

**Table 4.1 Summary GDN submitted streetworks costs (£m, 2009-10 prices)**

| Forecast street works expenditure RIIO-GD1 | NGGD | | | | NGN | SGN[1] | | WWU | Industry |
|---|---|---|---|---|---|---|---|---|---|
| | EoE | Lon | NW | WM | | Sc | So | | |
| TMA/T(S)A | 56.0 | 90.6 | 58.9 | 1.3 | 15.0 | 21.9 | 110.8 | 13.1 | **367.7** |
| Lane rental | 4.4 | 27.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.3 | **34.2** |
| S74 daily charge rates/overstay charges | 15.9 | 27.6 | 10.3 | 8.0 | 4.4 | 0.0 | 0.0 | 7.4 | **73.7** |
| **Total streetworks expenditure** | **76.4** | **145.7** | **69.24** | **9.271** | **19.42** | **21.9** | **110.8** | **22.88** | **475.6** |

[1]SGN did not include forecast expenditure for lane rental in their business plan data submissions due to the uncertainty during RIIO-GD1

4.4. As the impact of streetworks costs varies between networks, all street works' costs during RIIO-GD1 have been excluded from company submitted costs and subsequent regression analysis. We have removed street works costs from the following activity areas; work management, repairs, maintenance, repex, connections and mains reinforcement.

4.5. An assessment of efficient street works expenditure was made outside the regression efficiency assessment and this was then added back to the relevant activity areas post-regression.

4.6. We are proposing to include lane rental as part of our street works reopener due to ongoing uncertainty as to the timing and level of costs involved

4.7. Only WWU identified S74 daily charges/overstay charges for work undertaken in Highway Authorities (HAs) which have an existing permit scheme. NGGD and NGN forecast charges for HAs where a permit scheme is likely to be implemented at some point during the RIIO-GD1 period. SGN do not forecast S74 daily charge rates/overstay charges.

4.8. Currently we have not allowed costs for S74 daily charge rates/overstay charges that have been identified in the submitted business plans. It is not clear where all GDNs have reported ongoing costs associated with S74 charges. Following IP we intend to gather further information from companies to ensure that these costs have been reported on a consistent basis and to understand whether any of these charges can be considered efficient costs and subsequently allowed.

### Assessment of TMA/T(S)A costs

4.9. The remaining £367.7m street works forecast expenditure covered activity associated specifically with TMA/T(S)A permit schemes.

4.10. Due to ongoing uncertainty regarding the implementation of new TMA/T(S)A permit schemes during the RIIO-GD1 period we asked GDNs to separately identify costs and workload activity for the following projects:

- Projects taking place within a HA where a TMA/T(S)A permit scheme already exists. It covers those HAs where TMA has already been implemented/accepted as part of the IAE re-opener decision (as at 20 December 2011[5]) ie where a GDN has actual cost data associated with scheme.
- Projects taking place within a HA where a TMA/T(S)A scheme does not currently exist but where a permit scheme is likely to be implemented at some point during the RIIO-GD1 period.

**Table 4.2: Summary GDN submitted TMA/T(S)A costs (£m, 2009-10 prices)**

| **TMA/T(S)A forecast expenditure RIIO-GD1** | NGGD | | | | NGN | SGN | | WWU | **Industry** |
|---|---|---|---|---|---|---|---|---|---|
| | EoE | Lon | NW | WM | | Sc | So | | |
| HAs with existing permit scheme | 11.7 | 82.5 | 0.0 | 0.0 | 0.0 | 12.5 | 52.9 | 5.6 | **165.2** |
| HAs with new permit scheme during RIIO-GD1 period | 44.4 | 8.1 | 58.9 | 1.3 | 15.0 | 9.4 | 58.0 | 7.5 | **202.6** |
| **Total TMA/T(S) expenditure** | **56.0** | **90.6** | **58.9** | **1.3** | **15.0** | **21.9** | **110.8** | **13.1** | **367.7** |

4.11. We contacted Department for Transport (DfT) for their assessment of TMA/T(S)A within HAs. From this we were able to determine those HAs which currently operate a permit scheme, HAs due to start operating a permit scheme and permit scheme applications currently being assessed and likely to be implemented before 2021.

4.12. A number of permit schemes are currently being assessed by DfT however there is still uncertainty regarding which additional HAs will implement a permit scheme before 2021 and when within this time period the scheme will be implemented.

4.13. Due to the uncertainty surrounding the implementation of future permit schemes we propose to allow efficient TMA/T(S)A costs only for those GDNs working within HAs where a permit scheme is already in operation ie accepted as part of the IAE re-opener decision. This applies to the following networks; Southern, North London and East of England. Costs associated with new permitting schemes will be considered as part of our street works reopener.

4.14. We stated in our 'December re-opener decision document[5]' that we had insufficient evidence to allow an income adjusting event at present for GDPCR1 for Scotland. We gave the opportunity for them to gather further evidence and to apply for an income adjusting event at the end of GDPCR1. We believe that there is still insufficient evidence to support setting an allowance for RIIO-GD1 and that any costs associated with T(S)A should be part of the street works uncertainty mechanism.

[5] Ofgem decision on TMA/T(S)A GDPCR1 reopener:
http://www.ofgem.gov.uk/Pages/MoreInformation.aspx?docid=545&refer=Networks/GasDistr/GDPCR7-13

Assessment of efficient TMA/T(S)A costs

4.15. Three networks currently operate within HAs where permit schemes already exist; Southern, North London and East of England. We assessed the efficient level of TMA/T(S)A costs for these GDNs in a number of ways. We carried out cost comparisons across GDNs, compared submitted unit costs against historical efficient unit costs from those GDNs which have already experienced the impact of TMA/T(S)A (see TMA/T(S)A re-opener[6]) and reviewed the GDNs' strategies and approaches for managing the impacts of TMA/T(S)A.

4.16. We looked at four areas of TMA/T(S)A cost: permit costs, fixed penalty notices, ongoing administration and other costs. Costs associated with the impact on productivity as a result of the permit scheme were included in the 'other' cost category.

4.17. In order to compare unit costs across companies and over time, cost drivers were identified for each area in line with those identified to inform the TMA/T(S)A reopener summarised in table 4.3.

**Table 4.3: Summary of assumptions used to inform TMA/T(S)A reopener**

| | **Cost driver** | **Efficient unit cost as determined as part of TMA/T(S)A reopener[6]** |
|---|---|---|
| Permits | Number of permits | £80 per permit |
| Fixed penalty notices (FPNs) | Based on an efficient level of penalties to permits | FPNs received in relation to the number of permits issued; 3%, assumed £80 per fixed penalty notice |
| Ongoing administration | Number of projects | £8,000 per project |
| Other costs, includes productivity | Length abandoned mains under the gas mains replacement programme | £18 per metre pipe abandoned |

4.18. All three networks submitted cost and workloads for permits in line with our £80 per permit efficient unit cost so no adjustments were made. They also submitted unit costs for fixed penalty notices in line with our £80 benchmark so no adjustments were made to these.

[6] Ofgem decision on TMA/T(S)A GDPCR1 reopener: http://www.ofgem.gov.uk/Pages/MoreInformation.aspx?docid=545&refer=Networks/GasDistr/GDPCR7-13

4.19. East of England forecast a ratio of three per cent FPN to permits so no adjustments were made. However, Southern and North London forecast high proportions of FPNs to permits (6 per cent and 17 per cent respectively). We recognise the local authorities' view that we should not allow the GDNs to recover any costs associated with fixed penalty notices. They consider that GDNs should aim for zero penalties, however we recognise that there is an efficient level of penalties and GDNs would incur disproportionate costs, which would ultimately be passed to the customer, if they were to achieve zero penalties. In line with the IAE re-opener decision we have scaled back the proportion of FPNs to permits for Southern and North London to 3 per cent.

4.20. Forecast administration costs for Southern were high with an average unit cost of £9,860 per project over RIIO-GD1. We have scaled back administration costs for Southern based on an efficient unit cost of £8,000 per project.

4.21. NGGD did not provide workload data for project numbers. Instead they modelled administration costs by pro-rating them against permit volumes. We estimated the number of projects carried out by NGGD based on ratio of permits per project provided by Southern who reported an average of 42 permits per project. We also estimated the number of projects carried out by NGGD assuming the efficient unit cost of £8,000 per project. Both methods provided similar estimate of project numbers for NGGD so we applied the assumption of 42 permits per project.

4.22. Average administration costs over RIIO-GD1 period were £9,852 per project for East of England and just above £8,000 per project for North London. We set administration costs for both networks based on an efficient unit cost of £8,000 per project.

4.23. Southern and East of England networks forecast a productivity impact of £14 per metre and £17 per metre respectively. No adjustments were made to productivity costs for these networks.

4.24. North London forecast high productivity costs compared to other networks and did not provide evidence to support these costs. The forecasts provided by North London suggested that the impact will be £36 per metre in line with their reopener submission. We do not believe that North London has provided any further evidence in their business plan to justify the higher TMA costs in North London therefore we have scaled back RIIO-GD1 productivity forecasts to £18 per metre.

4.25. Our proposed efficient street works costs were scaled back in line with adjustments we have made to repex workload, these are shown in table 4.4. They have then been apportioned to the relevant activity area; work management, repairs, maintenance, repex, connections and mains reinforcement.

**Table 4.4 Street works allowance by activity efficient street works expenditure by activity area (£m, 2009-10 prices)**

| | NGGD | | | | NGN | SGN | | WWU | Industry |
|---|---|---|---|---|---|---|---|---|---|
| | EoE | Lon | NW | WM | | Sc | So | | |
| Opex | | | | | | | | | |
| Work management | 1.0 | 3.7 | - | - | - | - | 4.2 | - | **8.9** |
| Emergency | 0.0 | 0.0 | - | - | - | - | 0.0 | - | **0.0** |
| Repairs | 2.0 | 2.0 | - | - | - | - | 3.1 | - | **7.0** |
| Maintenance | 0.0 | 0.0 | - | - | - | - | 0.0 | - | **0.0** |
| Repex | | | - | - | - | - | | - | |
| Repex tier 1 | 6.2 | 27.8 | - | - | - | - | 34.0 | - | **68.0** |
| Repex tier 2 & 3 | 0.2 | 9.1 | - | - | - | - | 3.8 | - | **13.1** |
| Capex | | | - | - | - | - | | - | |
| Connections | 0.7 | 1.7 | - | - | - | - | 1.7 | - | **4.0** |
| Mains reinforcement | 0.0 | 0.0 | - | - | - | - | 2.4 | - | **2.4** |
| Total efficient street works allowance | 10.1 | 44.2 | - | - | - | - | 49.1 | - | **103.4** |

## Smart metering

4.26. We recognise that the rollout of smart metering will result in additional costs for the GDNs and some costs being brought forward. However, there is still significant uncertainty around what costs will be borne by the GDNs, the timing of any additional costs and the level of these costs. The GDNs have forecast total costs associated with smart metering for the RIIO-GD1 period of £141m, ranging from almost zero for NGGD up to £104m for WWU with the remaining GDNs between £10 and £15m each. Due to the uncertainties surrounding the rollout and future costs we are addressing these costs as part of an uncertainty mechanism and have excluded them from our cost assessment.

4.27. We recognise that the companies may incur certain set-up costs in preparation for the rollout of the programme and have proposed to provide a one-off additional allowance in the first year of the programme of £0.30 per smart meter forecasted to be installed. This gives a total proposed one-off allowance across the industry of £6.3m.

4.28. We also propose to develop an uncertainty mechanism to manage the actual rollout of the smart metering programme. This is discussed in the uncertainty chapter of the Finance document.

**Table 4.5 Smart metering costs submitted and Ofgem's proposed allowances (£m, 2009-10 prices)**

| | Submitted costs | | | | Ofgem's proposed allowance[1] |
|---|---|---|---|---|---|
| | Total | Capex | Repex | Opex | Opex (ODA) |
| EoE | **0.2** | - | - | 0.2 | 1.1 |
| Lon | **0.2** | - | - | 0.2 | 0.7 |
| NW | **0.1** | - | - | 0.1 | 0.8 |
| WM | **0.1** | - | - | 0.1 | 0.6 |
| NGN | **10.0** | - | - | 10.0 | 0.8 |
| SC | **10.4** | - | 4.1 | 6.3 | 0.5 |
| SO | **15.5** | - | 4.6 | 10.9 | 1.2 |
| WWU | **104.0** | 4.8 | 32.7 | 66.5 | 0.7 |
| **Total** | **140.6** | **4.8** | **41.4** | **94.4** | **6.3** |

[1] based on £0.30 per number of smart meter installations forecast by the GDNs

**Loss of metering**

4.29. The GDNs are likely to lose their remaining meterwork contracts during GDPCR1. These contracts have traditionally been used as infill work for their first call operatives (FCOs). While the loss of metering work may result in some additional costs, we are setting an efficiency challenge for the GDNs to find alternative work for any stranded labour.

4.30. As part of their April resubmissions, we asked the GDNs to provide the marginal costs associated with the loss of meterwork and the impact this would have on the emergency activity. The GDNs highlighted costs of £222m for the RIIO-GD1 period, ranging from £7.2m for NGN up to £52m for Southern. When assessing the relative efficiency of the emergency activity we have removed these costs and have assessed them separately.

4.31. We recognise that NGN has already been impacted by the loss of meterwork and has had to meet the challenge of managing the stranded labour. We consider NGN as the benchmark and used their costs of £0.9m per year to set the baseline for the other GDNs using customer numbers (2010-11) as the driver. Therefore, total loss of metering proposed allowance for the emergency activity is £62.2m for the RIIO-GD1 period as detailed in table 4.6 below.

4.32. When assessing historical performance we have recognised that all of the NGGD GDNs and NGN failed to meet the emergency standard in 2010-11. We have made an adjustment of £0.75m for each of these GDNs in 2010-11 to reflect this.

**Table 4.6: Loss of metering costs submitted and Ofgem's proposed allowances (£m, 2009-10 prices)**

| | GDN submitted | Ofgem's proposed allowance |
|---|---|---|
| EoE [2] | 37.8 | 11.4 |
| Lon [2] | 38.5 | 6.5 |
| NW [2] | 25.3 | 7.7 |
| WM [2] | 15.4 | 5.6 |
| NGN | 7.2 | 7.2 |
| SC | 25.0 | 5.1 |
| SO | 52.0 | 11.6 |
| WWU | 20.8 | 7.1 |
| **Total** | **222.0** | **62.2** |

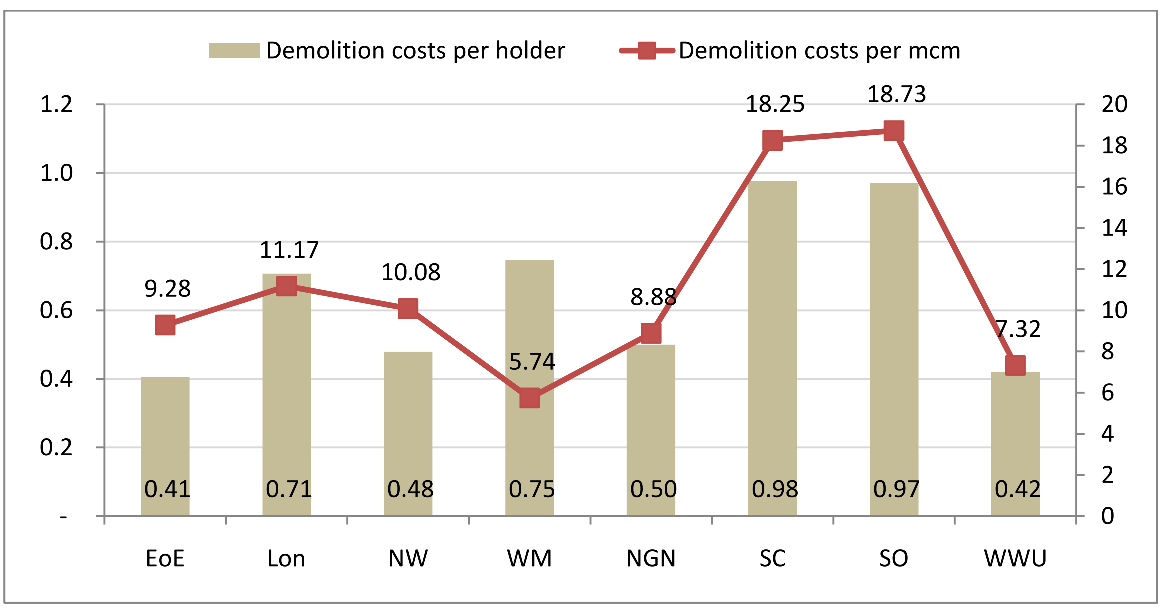
[1] £0.36 per customer number (based on 2010/11); phased on a straight-line basis over the RIIO period
[2] £28m for MOBs reallocated to maintenance

## Holder decommissioning

4.33. As set out in our Outputs Supporting Document, we propose to fund GDNs for the phased demolition of gasholders over a 16-year period commencing on 2013-14.

4.34. We determined an efficient cost of gasholders removal through benchmark analysis. Figure 4.1 demonstrates the variability of demolition cost per gasholder and per unit of storage capacity across GDNs.

**Figure 4.1: Gasholders removal programme - unit cost per holder and mcm (£m, 2009-10 prices)**



4.35. We examined data on gross demolition costs (including any one-off payments such as environmental impact assessment, consultancy fees, make-safe etc.) for different types of holders (above/below ground, spiral/column guided) and for different size of holders.

4.36. Evidence submitted by the GDNs suggests that gross demolition costs can range from £150k to £1m depending on the type and size of the holder. Further, while large holders are clearly dearer to demolish than small holders, the type of holder had much less impact on the demolition cost (the difference between demolition costs of different types of holders was not evident even when controlling for holder size). Based on our analysis we propose to allow an average cost of £0.5m for the demolition of a Low Pressure (LP) gasholder.

4.37. We recognise that the demolition of some holders may be greater than this amount while the demolition of others will be lower. We do not propose to allow a different average unit cost for different GDNs because we did not find evidence that different GDNs have significantly different portfolio of holders.

4.38. We adjusted GDNs maintenance costs where the number of holders we funded for demolition was different from the GDNs proposed number. Our adjustment was based on data from the CBAs and was benchmarked at £0.55m per holder per year.

Our proposal

4.39. We propose to include holder demolition costs as part of work maintenance baselines at a rate of £0.5m per holder. We are minded to allow a phased demolition over a 16-year period. This implies that over RIIO-GD1 half of the LP gasholder fleet of each GDN will be funded for demolition.

4.40. We expect the GDNs to prioritise their demolition works on the basis of cost, taking into account the condition and risk of the assets.

**Table 4.6: The gasholders demolition programme: GDNs' and Ofgem's proposal (£m, 2009-10 prices)**

| | Gasholders by start of RIIO-GD1 | GDNs proposed demolition in RIIO-GD1 | Forecast expenditure on demolition | Ofgem proposed demolition in RIIO-GD1[1] | Ofgem allowance for holder demolition |
|---|---|---|---|---|---|
| | (No.) | (No.) | (£m) | (No.) | (£m) |
| NGGD | 203 | 130 | 70.6 | c. 101 | 54.4 |
| NGN | 47 | 23 | 11.5 | c. 23-24 | 11.3 |
| SGN | 111 | 86 | 67.4 | c. 55 | 30.3 |
| WWU | 15 | 15 | 6.3 | c. 7-8 | 3.6 |
| **Total** | **376** | **254** | **155.8** | **c. 188** | **99.6** |

1 Our proposed number of holders to demolish is approximate. This is due to the fact that our proposals are in terms of a monetary allowance on the basis of an average holder demolition costs of £0.5m.

**Land remediation**

4.41. NGGD and WWU included land remediation costs associated with their gasholders demolition. Based on evidence from the other GDNs we think that these costs are not required. The environmental impact can be contained and then remediated as part of any future disposal of the site.

4.42. The GDNs have argued that the cost of other land remediation is largely outside their control as a lot of these sites were inherited and they have a statutory requirement to remediate the land. While we agree that the workload is to a large extent not in their control, we consider that they should only be allowed the efficient costs of this work. We plan to further review land remediation costs per site and we will subject the GDNs to an efficient unit cost where anomalies are found.

# 5. Overview of bottom-up assessment

**Question 1:** Do you consider our approach to bottom-up assessment is appropriate, and if not what changes would you propose?

5.1. This chapter sets out our overall approach to the detailed activity-level (bottom-up) benchmarking, the results of our regressions at this level and the overall adjustment to GDNs' proposed costs resulting from this analysis. As explained in Chapter 1, we are combining the results of our totex and bottom-up approaches to determine our final Initial Proposals allowances.

## Methodology

5.2. We use regression analysis for seven activities:

- Work management
- Emergency service
- Repairs
- Maintenance
- Mains reinforcement
- Connections, and
- Tier 1 repex.

5.3. The regressions are used to identify efficient base-year costs for 2010-11 for our historical analysis and 2013-14 for our assessment of the two-year forecasts.

5.4. Table 5.1 summarises the regression ranking for each of the seven bottom-up regressions.

5.5. We calculate the efficiency scores in a similar way to the middle-up approach, but using seven regressions instead of three, ie as a ratio of the sum of the controllable, normalised and adjusted costs for the seven disaggregated regression activities to the sum of the modelled costs for each of these activities. We have benchmarked the GDNs' costs at the upper quartile.

5.6. We have then rolled forward the efficient base year costs for changes in outputs and associated workload. We have made adjustments on forecast workloads in our qualitative assessment. These adjustments which have been made at the disaggregated cost activity level are discussed in detail in Chapters 6 to 8.

5.7. The workloads from our disaggregated regression cost activities (ie repex workload, mains reinforcement workload, connections workload and external condition reports) feed into the CSVs for our activity-level models. The CSVs increase/reduce when the workloads are adjusted upwards/downwards.

**Table 5.1: Summarised efficiency ranking for 2011 and 2014**

| Regression cost activity | National Grid Gas (NGG) | | | | NGN | SGN (SGN) | | WWU |
|---|---|---|---|---|---|---|---|---|
| | EoE | Lon | NW | WM | NGN | Sc | So | WWU |
| 2014 [2 years' forecast model] | | | | | | | | |
| Work Management | 8 | 3 | 7 | 4 | 5 | 2 | 1 | 6 |
| Emergency | 1 | 3 | 6 | 2 | 4 | 8 | 7 | 5 |
| Repairs | 3 | 8 | 2 | 1 | 5 | 7 | 4 | 6 |
| Maintenance | 4 | 1 | 6 | 2 | 5 | 8 | 3 | 7 |
| Mains Reinforcement | 7 | 5 | 3 | 1 | 6 | 4 | 2 | 8 |
| Connections | 5 | 8 | 1 | 6 | 4 | 2 | 7 | 3 |
| Repex (Tier 1) | 2 | 7 | 4 | 6 | 3 | 1 | 5 | 8 |
| 2011 [historical model] | | | | | | | | |
| Work Management | 8 | 4 | 7 | 6 | 3 | 5 | 2 | 1 |
| Emergency | 5 | 7 | 8 | 6 | 1 | 3 | 4 | 2 |
| Repairs | 3 | 8 | 7 | 1 | 4 | 6 | 5 | 2 |
| Maintenance | 6 | 4 | 8 | 1 | 3 | 7 | 5 | 2 |
| Mains Reinforcement | 1 | 2 | 8 | 4 | 6 | 5 | 3 | 7 |
| Connections | 8 | 7 | 2 | 1 | 4 | 5 | 6 | 3 |
| Repex (Tier 1) | 4 | 5 | 6 | 8 | 1 | 3 | 7 | 2 |

5.8. We then add in our assessment for costs considered outside the regression analysis for each of these activities and apply our assumptions for growth in real input prices and ongoing efficiencies for each activity.

5.9. We have carried out qualitative and technical assessment for all of the remaining cost activities supported by our consultants. This is explained further in the opex, capex and repex chapters and the appendices to this document.

## Results of the bottom-up analysis

5.10. To calculate our view of allowance for RIIO-GD1, we roll forward efficient base year costs for changes in outputs and workload volumes and apply our view of growth in input prices and ongoing efficiency. We also include additional costs relating to areas that were assessed separately such as streetwork costs and other costs assessed as part of our technical/engineering assessment.

5.11. The overall results of our bottom-up analysis are presented in Table 5.2 below as percentage efficiency adjustments to the companies' submitted costs. This is adjusted for changes in outputs.

**Table 5.2: GDN forecasts and our adjustments based on the bottom-up analysis**

| GDN | (A) Submitted normalised forecast | (B) Submitted normalised forecast with output adj | (E) H Bottom-up adj | (H)2YF Bottom-up adj |
|---|---|---|---|---|
| **EoE** | 280.5 | 266.3 | 15% | 12% |
| **Lon** | 276.6 | 238.1 | 19% | 19% |
| **NW** | 226.6 | 197.6 | 16% | 15% |
| **WM** | 172.8 | 155.1 | 14% | 14% |
| **NGN** | 228.6 | 209.3 | 7% | 5% |
| **Sc** | 176.9 | 159.4 | 11% | 9% |
| **So** | 345.8 | 333.2 | 12% | 8% |
| **WWU** | 242.2 | 206.8 | 18% | 15% |

5.12. Further details of our bottom-up assessment are set out in Chapters 6 to 8 for opex, capex and repex respectively.

# 6. Operating expenditure

**Question 1:** Do you agree with the assessment we have carried out and the results proposed for opex?

## Background

6.1. Operational expenditure (opex) is the costs associated with operating activities carried out by the GDNs. These include:

- Direct activities
  - Work management
  - Emergency
  - Repairs
  - Maintenance
  - Other direct activities (ODA)

- Indirect activities

  - Business support
  - Training and apprentices

6.2. Each activity has been assessed separately using a range of techniques such as regression analysis to assess unit cost efficiency, external benchmarking or technical review, and assessment of workload changes during RIIO-GD1. We have normalised costs for inconsistencies in reporting and applied regional adjustments as described in previous chapters. We explain key detail in terms of changes to the cost drivers or workload adjustments below with further detail for each activity set out in appendix 2. Where adjustments have been made to workload for the repex or asset integrity we have made associated adjustments to opex workloads/costs.

**Table 6.1 – GDNs' submitted Opex and Ofgem's proposed allowances (£m, 2009-10 prices)**

| Opex | Actual costs 2009-11 | GDN Submitted costs for RIIO-GD1[1] | Normalised submitted Costs[1] | Adjustments to normalised submitted costs | | | | | Ofgem Proposed Allowances | Ofgem Proposed v GDN normalised submitted costs |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Efficiency (Regression, RPEs, Ongoing efficiencies) | Efficiency (qualitative) | Workload (outputs) | Uncertainty[2] | Reconciliation between historical bottom-up and final allowance | | |
| EoE | 118.2 | 138.7 | 138.7 | (14.9) | (11.9) | (2.2) | (2.6) | 3.8 | 110.9 | (20.1%) |
| Lon | 88.0 | 100.1 | 100.1 | (8.2) | (9.1) | (4.0) | (2.7) | 1.2 | 77.3 | (22.8%) |
| NW | 96.0 | 103.7 | 103.7 | (10.6) | (9.9) | (1.8) | (2.5) | 5.0 | 84.0 | (19.1%) |
| WM | 65.3 | 72.9 | 72.9 | (4.1) | (6.2) | (0.9) | (0.7) | 4.3 | 65.3 | (10.4%) |
| NGN[3] | 79.6 | 96.4 | 97.9 | (7.5) | (0.6) | 0.1 | (0.7) | 0.8 | 90.0 | (8.1%) |
| SC | 68.3 | 84.7 | 84.7 | (8.4) | (3.4) | (3.0) | (0.2) | 0.7 | 70.3 | (17.0%) |
| SO | 121.4 | 149.8 | 149.8 | (12.1) | (9.7) | (8.1) | (1.0) | 2.1 | 121.0 | (19.2%) |
| WWU | 83.7 | 101.1 | 101.1 | (10.2) | (5.6) | (1.1) | (1.4) | 2.3 | 85.0 | (15.9%) |
| **Total** | **720.5** | **847.4** | **848.9** | **(76.0)** | **(56.5)** | **(21.0)** | **(11.8)** | **20.2** | **703.8** | **(17.1%)** |

1 inclusive of RPEs
2 All Smart Metering costs are excluded from the GDN submitted costs and Ofgem proposed allowance
3 £12m land remediation costs reallocated from Other Capex (£1.5m annualised)
4 The table format and content is explained in Appendix 1 Table A1.4

6.3. NGGD is forecasting a decrease of 7 to 15 per cent in their (normalised) direct opex for RIIO-GD1 compared to equivalent expenditure for 2009-10 to 2010-11 whilst the other GDNs have forecast increases. This should be considered in the context of their relatively high costs in our historical efficiency benchmarking. We consider that the efficiencies forecast by NGGD are due to combination of clear linkages with the repex programme and the current implementation of NGGD Gas Distribution Front Office (GDFO) system. We recognise that the other GDNs have implemented similar systems.

## Changes to the regression drivers

6.4. There has been extensive discussion over the most appropriate driver for the emergency activity. We had previously proposed to use the number of Publicly Reported Escapes (PREs). Some companies have argued that this does not adequately represent the fixed cost nature of the emergency activity (eg the GDNs have to maintain an emergency service irrespective of the number of reports) and the particular geographical make-up of GDNs. We consider that the geographical make-up of the GDN is addressed through our regional factors for urbanity and sparsity.

6.5. After consideration, we have revised the cost driver for the emergency activity proposing a combination of customer numbers and external condition reports. The new proposed composite scale value variable places an 80 per cent weight on customer numbers and a 20 per cent weight on external condition reports.

6.6. We consider that customer numbers are the most appropriate driver and broadly reflect how the GDNs set up their emergency activity. There is limited annual movement in customer numbers and this would reflect the fixed cost element of the emergency activity.

6.7. It is recognised that the number of PREs received is broadly split in an 80:20 ratio between internal and external fault related calls, where external calls normally result in repair work, either due to condition faults or third-party damage. We consider that the majority of external PREs are within the control of the GDN and are the result of condition mains and/or service reports. Where costs are incurred by third party damage we believe that it is the responsibility of the GDNs to recover any associated costs.

## Workload and costs adjustments

*Costs adjustments for failure to meet the emergency service standard*

6.8. Safety is the key priority for each of the GDNs. We have therefore added costs to each of the GDNs that have failed the emergency service standard prior to running the regression analysis. We have added £0.75m based on the additional costs NGN and NGGD have stated that they would have required to meet the standard in 2010-11.

*External condition reports*

6.9. From the GDNs' submitted plans we identified reported metallic lengths, non PE services and external condition reports (mains and services) from 2008-2009 to the end of RIIO-GD1 for mains and from 2010-2011 to the end of RIIO-GD1 for services. We produced an implied deterioration rate based on the number of condition reports per km or service. We had to make a judgement on the start point based on the average actuals which we believe smoothed out external factors such as differences in the severity of different winters. This produced an implied deterioration rate for each GDN which ranged from 1.6 to 6.2 per cent for mains and 2.6 to 9.5 per cent for services (see Table 6.2).

6.10. From this we identified upper quartile deterioration rates of 3.1 per cent for mains and 3.9 per cent for services. We then scaled back the implied deterioration rates to the maximum of the upper quartile rates. We believe that in developing a range of deterioration rates we have recognised the different characteristics of pipes that may exist between GDNs.

**Table 6.2: Annual deterioration rates**

| Deterioration rates | Mains | | Services | |
|---|---|---|---|---|
| | Implied GDN rates | Ofgem proposal | Implied GDN rates | Ofgem proposal |
| EoE | 1.6% | 1.6% | 2.6% | 2.6% |
| Lon | 4.4% | 2.5% | 5.1% | 3.1% |
| NW | 3.1% | 2.1% | 6.8% | 3.5% |
| WM | 3.1% | 2.1% | 3.0% | 2.7% |
| NGN | 3.3% | 2.2% | 9.2% | 4.0% |
| SC | 6.2% | 3.1% | 4.3% | 3.0% |
| SO | 3.1% | 2.1% | 5.6% | 3.2% |
| WWU | 4.8% | 2.6% | 9.5% | 4.0% |

6.11. The adjustment to the deterioration rates have been used to revise the number of external condition reports which is used as a workload driver in the emergency, repair, total opex and totex regressions. The adjustments are shown in Table 6.2.

6.12. We note that because the implied rates are estimated on a common basis across all GDNs to match both historical and forecast data, when using these estimates in our workload calculations these may show small variations of adjusted workload (up or down) even when the assumed deterioration rate would appear to match that reported by the GDN.

6.13. We have also made a further adjustment to reflect our disallowance of repex workload for tiers 1, 2 and 3 which is discussed in chapter 6 of our Outputs document . Where the proposed repex workloads have also been correspondingly revised, we have assumed that there is a higher amount of metallic mains remaining and the level of external condition reports has been increased in line with this. Table 6.3 shows the proposed adjustments to external condition reports for repex and the net impact of the two adjustments.

**Table 6.3: Workload adjustments – external condition reports**

| Mains condition reports | GDN submitted workload | Ofgem adjustment for deterioration rate | Ofgem adjustment for reduced repex workload | Proposed allowed workload | Deterioration rate adjustment % | Reduced repex workload adjustment % | Total movement in workload % |
|---|---|---|---|---|---|---|---|
| EoE | 72,325 | (1,955) | 336 | 70,706 | (2.7%) | 0.5% | (2.2%) |
| Lon | 62,764 | (8,548) | 576 | 54,792 | (13.6%) | 0.9% | (12.7%) |
| NW | 59,558 | (6,169) | 713 | 54,102 | (10.4%) | 1.2% | (9.2%) |
| WM | 42,318 | (3,467) | 309 | 39,160 | (8.2%) | 0.7% | (7.5%) |
| NGN | 64,366 | (4,300) | 386 | 60,452 | (6.7%) | 0.6% | (6.1%) |
| SC | 40,378 | (9,061) | 174 | 31,491 | (22.4%) | 0.4% | (22.0%) |
| SO | 85,765 | (6,732) | (32) | 79,001 | (7.8%) | (0.0%) | (7.9%) |
| WWU | 89,486 | (12,688) | 910 | 77,708 | (14.2%) | 1.0% | (13.2%) |
| **Total** | **516,960** | **(52,920)** | **3,372** | **467,412** | **(10.2%)** | **0.7%** | **(9.6%)** |

[1] GDN submitted workload is normalised for smart metering workload

| Service condition reports | GDN submitted workload | Ofgem adjustment for deterioration rate | Ofgem adjustment for reduced repex workload | Proposed allowed workload | Deterioration rate adjustment % | Reduced repex workload adjustment % | Total movement in workload % |
|---|---|---|---|---|---|---|---|
| EoE | 66,007 | 246 | 346 | 66,599 | 0.4% | 0.5% | 0.9% |
| Lon | 67,039 | (6,396) | 548 | 61,191 | (9.5%) | 0.8% | (8.7%) |
| NW | 69,670 | (11,748) | 1,127 | 59,049 | (16.9%) | 1.6% | (15.2%) |
| WM | 41,404 | 575 | 271 | 42,250 | 1.4% | 0.7% | 2.0% |
| NGN | 113,300 | (24,536) | 2,354 | 91,118 | (21.7%) | 2.1% | (19.6%) |
| SC | 53,893 | (4,665) | 81 | 49,309 | (8.7%) | 0.2% | (8.5%) |
| SO | 182,367 | (22,965) | 425 | 159,827 | (12.6%) | 0.2% | (12.4%) |
| WWU | 35,364 | (9,186) | 975 | 27,153 | (26.0%) | 2.8% | (23.2%) |
| **Total** | **629,045** | **(78,676)** | **6,127** | **556,496** | **(12.5%)** | **1.0%** | **(11.5%)** |

[1] GDN submitted workload is normalised for smart metering workload

*Modern Equivalent Asset Value (MEAV)*

6.14. The development of maintenance MEAV followed discussions with the GDNs and the recognition that maintenance cost are driven primarily by assets above ground. Maintenance MEAV therefore only includes above ground assets. Given evidence that non-operational holders require significant routine and non-routine maintenance, we included non-operational holders in maintenance MEAV, albeit at a lower weight than operational holders to reflect that they require less maintenance hours.

*Additional maintenance costs*

6.15. We have allowed additional maintenance costs to account for the difference between the scale of holder demolition programme proposed by the GDNs and the scale of programme funded by us. These adjustments are included under workload (outputs) in table A2.4 of Appendix 2.

6.16. As a consequence of the revised repex programme, NGN proposes to use maintenance measures to gather data on the condition of non-mandated tier 2 and tier 3 iron mains and manage the overall safety risks from such pipes. NGN forecasts £0.6m per year for this activity. We propose to adjust the baselines of the other GDNs to include provisions for surveying non-mandatory tier 2 and tier 3 iron mains. We think this is necessary particularly given that we disallowed some of the replacement workload proposed by the GDNs.

6.17. WWU forecast a substantial increase in the non-routine maintenance costs in RIIO-GD1 due to refurbishment activity. At this stage we have not made an adjustment to allow for an additional efficient refurbishment costs. However, we are considering such as adjustment to WWU's allowance to allow additional refurbishment costs where these reflect an efficient trade-off to asset replacement.

*Multiple occupancy buildings*

6.18. Following an HSE Improvement Notice, NGGD plans to initiate surveys of medium rise multi occupancy buildings (MOBs) to comply with the obligations of the Pipeline Safety Regulations. We excluded these costs from the regression analysis in order to assess them separately. While our current proposal is to allow these costs in full in NGGD's maintenance baselines, we note that we have yet to complete a full assessment of these costs and may make further adjustments in advance of Final Proposals.

*Interruptible contracts*

6.19. In general, our proposed allowances include interruption costs as submitted. However, where interruptible contracts defer the need to undertake network reinforcements, we set an allowance against interruptions equal to the annualised reinforcement costs over a 20-year asset life discounted at a rate of 5.8 per cent.[7] This is the case with NGN's interruptions allowance and with Scotland's allowance whose current interruption contracts defer a project.

6.20. Setting an allowance for interruptible contracts as an annuity based on the value of deferred investment ensures companies are incentivised to procure interruptible contracts where these can defer costly reinforcement works.

[7] We will adjust the discount rate to equal our proposed WACC.

6.21. SGN requested to fund four LTS reinforcement projects at a total cost of £25.2m to manage its capacity in Scotland.[8] As we mention above, a reinforcement project is currently avoided by seven interruptible contracts, due to expire in 2017, and we propose to set an allowance for these interruptible contracts based on the value of the deferred investment whilst disallowing the investment.

6.22. The other three projects could also be deferred if SGN managed to procure new interruptible contracts from customers. Our initial proposals are to disallow the full funding of these projects and instead allow an annuity based on the projects' costs discounted over a 20-year period at a rate of 5.8 per cent. This effectively amounts to an allowance of £13.8m over the RIIO-GD1 period versus the £25.2m requested for the four projects. In doing so our intention is to maintain an incentive on SGN to seek new interruption contracts from its customers whilst limiting the downside risk of having to fund these projects. We think that our proposed funding arrangement strikes a sensible balance between incentives and risk.

*Business support costs*

6.23. Our assessment of business support activity costs has been informed primarily by benchmarking all UK energy network companies (transmission, gas distribution, electricity distribution) against each other and against external benchmarks developed in collaboration with the Hackett Group. This assessment covered the following activities: IT & telecom; property management; finance, audit & regulation; HR & non-operational training; procurement; and CEO & group management. Insurance costs were assessed separately and added to the benchmark assessed costs.

6.24. Where network companies exist as part of a group their operating costs are mainly derived from central group functions with the costs allocated to the individual networks. The assessment of business support costs has been carried out at an overall group level with allowances allocated to networks in the same group in proportion to their forecasts.

6.25. RIIO-T1 and RIIO-GD1 business support cost assessments were carried out together as a single process. Appendix 6 contains more detail on the business support cost assessment.

*Training and apprentices*

6.26. We recognise that due to the high average age of their employees all GDNs will need to replace large proportions of their workforce over RIIO-GD1. GDNs worked with Energy & Utility Skills[9] (EU Skills) in development of their workforce

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[8] See SGN RIIO-GD1 business plan re-submission, Appendices, Appendix D, 27 April 2012.
[9] "Energy & Utility Skills (EU Skills) is the Sector Skills Council (SSC) for the gas, power, waste management and water industries, licensed by Government and working under the guidance of the UK Commission for Employment and Skills (UKCES)": www.euskills.co.uk

planning models and we are satisfied that GDNs have given reasonable long term estimates of their workforce renewal requirements in terms of the total number of positions to be filled (ie number of retirees and other leavers less the number of retirees not requiring replacement).

6.27. We have derived a view of the total number of qualifiers from training and apprentices programmes required to fill vacancies for each GDN on a consistent basis. We have made an assumption on when those completing programmes will be able to fill vacancies. From these calculations we have been able to come to a view of the apprentice requirements over the whole of the RIIO-GD1 period for each GDN.

6.28. We have adjusted the total requirements for apprentices for individual GDNs to take account of the fact that some of the GDNs recruited less than was assumed at the time of GDPCR1. We have assumed average unit costs for the salary and training cost of each apprentice of £35,000. Additionally we have added £0.5m per GDN per year for additional operational training costs

6.29. More details of our assessment are found in Appendix 7.

## Scottish independent undertakings (SIUs)

6.30. We have reviewed SGNs costs for its proposed solution which involves transporting by tanker supplies from Avonmouth and proximate mobile storage. We currently propose to allow their forecast of £8.4m per year (before RPEs). However, we consider that SGN should be able to supply the SIUs in line with its 2012-13 cost estimates. We will review the latest information on the costs SGN expects to incur in relation to SIU supply in 2012-13. We will also need to review our proposals for SGN in light of any adjustments we make to SGNs' cost allowance for the supply of SIUs for winter 2012-13, ie the last year of the current price review.

6.31. In the accompanying Finance and Uncertainty Supporting Document we set out our proposal not to allow a reopener for SGN in relation to the future supply for SIUs. We set out our proposals in relation to the future funding arrangements for SIUs.

# 7. Capital expenditure

**Question 1:** Do you agree with the assessment we have carried out and the results proposed for Capex?
**Question 2**: Do you agree with our approach for allowing costs in line with historical levels for investment where supporting evidence is lacking or not sufficiently supported by CBA?

## Background

7.1. Capital expenditure covers five cost areas; LTS and storage, network reinforcement, new connections, governor replacement and other. The total proposed industry spend in this category is £2.7bn[10].

7.2. We have used regression analysis for the high-volume, low unit-cost activities of connections and mains reinforcements and have carried out technical and qualitative assessment for the other areas of costs.

7.3. Table 7.1 sets out the GDNs' forecasts for total capex and our proposed Initial Proposals assumptions based on our historical bottom-up analysis.

**Table 7.1: Submitted Capex, adjustments and Ofgem's proposed allowances (annualised £m, 2009-10 prices)**

| Capex | Actual costs 2009-11 | GDN Submitted costs for RIIO-GD1[1] | Normalised submitted Costs[1] | Adjustments to normalised submitted costs | | | | | Ofgem Proposed Allowances | Ofgem Proposed v GDN normalised submitted costs |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Efficiency (Regression, RPEs, Ongoing efficiencies) | Efficiency (qualitative) | Workload (outputs) | Uncertainty[6] | Reconciliation between historical bottom-up and final allowance | | |
| EoE | 48.3 | 48.0 | 48.0 | (2.1) | (5.3) | (1.6) | (0.6) | 1.4 | 39.8 | (17.1%) |
| Lon[2] | 52.8 | 27.2 | 24.8 | (0.7) | (4.3) | (0.5) | (0.6) | 0.3 | 19.0 | (23.1%) |
| NW | 36.7 | 30.0 | 30.0 | 0.9 | (4.3) | (0.5) | (0.5) | 1.6 | 27.2 | (9.3%) |
| WM | 27.2 | 23.6 | 23.6 | 0.3 | (3.8) | (0.5) | (0.1) | 1.4 | 20.9 | (11.5%) |
| NGN[3] | 35.6 | 46.9 | 45.4 | (1.9) | (0.3) | (2.5) | (0.4) | 0.4 | 40.5 | (10.7%) |
| SC[4] | 54.0 | 52.9 | 48.6 | 0.2 | (4.3) | (10.2) | (0.1) | 0.4 | 34.5 | (28.9%) |
| SO[5] | 86.3 | 73.6 | 62.8 | (1.8) | (4.0) | (7.4) | (0.6) | 0.8 | 50.0 | (20.4%) |
| WWU[7] | 61.6 | 58.7 | 58.7 | (3.9) | (2.3) | (12.7) | (0.4) | 1.1 | 40.6 | (30.9%) |
| **Total** | **402.6** | **360.8** | **341.8** | **(8.9)** | **(28.6)** | **(35.8)** | **(3.3)** | **7.3** | **272.5** | **(20.3%)** |

[1] inclusive of RPEs
[2] £19.3m capitalised replacement mains from capex to repex *(£2.4m annualised)*
[3] £12m land remediation costs reallocated to Work Management *(£1.5m annualised)*

[10] Normalised costs, includes RPEs.

[4] £34.5m capitalised replacement mains from capex to repex *(£4.3m annualised)*

[5] £86m capitalised replacement mains from capex to repex *(£10.7m annualised)*
[6] All Smart Metering costs are excluded from the GDN submitted costs and Ofgem proposed allowances
[7] £62.5m of LTS repex reported as repex. GDNs were asked to report replacement LTS pipelines as LTS capex so £62.5m has been reallocated to capex LTS & storage *(£7.8m annualised).* This has been moved into WWU's submitted costs.

## Changes to our cost drivers and regression analysis

*Mains reinforcement*

7.4. We have determined the efficiency of the GDN proposed capex using regression analysis of mains reinforcement costs with weighted average workloads as the cost driver. The weighted average workload was calculated by multiplying the work volume for each pipe diameter by an average industry unit cost for each pipe diameter.

7.5. An initial assessment of the regression model based on three years of actual workload and cost data, using panel regression and 2010-11 to set an intercept indicated that the historical mains reinforcement model was not robust. Investigation of historical mains workload and cost data suggested there were a number of issues which reduced the robustness of the historical regression model;

- sporadic spend on mains reinforcement from one reporting period to the next.
- NGGD reported workload and expenditure for the same mains reinforcement projects in different reporting periods[11]. This meant unit costs reported on an annual basis were not accurately reflecting cost efficiency of the activity.
- NGGD reported very low levels of workload and expenditure for mains reinforcement compared to other networks.

7.6. We have used a regression model based on an average of workload and expenditure over three year from 2008-09 to 2010-11. This model reduces the impact of misaligned cost and workload during separate reporting periods and therefore provides a more accurate assessment of historical unit costs.

7.7. The issue of misaligned reporting of workload and cost was not evident in the company forecasts therefore there was no requirement to use average expenditure or workload for this regression model; annual data was used in accordance with the other two year forecast bottom-up regression models.

[11] Issue sourced from Regulatory reporting pack Cost Commentary, RRP 2010/11 submissions.

## Workload and costs adjustments

*LTS pipeline projects*

7.8. Three GDNs have proposed expenditure on new LTS pipelines: NGN and SGN (Scotland and Southern networks).

7.9. We note that four Scotland projects for the installation of new LTS pipelines have been proposed at a cost of £25.2m for pipelines to reinforce the below 7 bar distribution network. SGN has based their investment proposals on the assumption that the procurement of interruption contracts will not be available. Given the uncertainty that some or all of the investment may not be necessary if some or all the required interruption arrangements can be achieved, the costs for these four projects have not been allowed. We have allowed them costs of procuring interruption as part of their other direct opex, based on the annuitised cost of the investment.

7.10. WWU has proposed an investment totalling £62.5m to maintain and replace sections of their LTS pipeline network infrastructure. Little evidence of the need for this investment was provided in the business plan. However, following discussions with WWU at the cost visit WWU offered copies of the consultant's reports. These reports provided a useful insight in to the specific issues encountered on WWU's LTS pipe network, however they do not provide information on the most appropriate action to take to maintain suitable standards of safety and performance. Furthermore, we were unable to find evidence that a range of options had been considered, robust analysis carried out for feasible alternative solutions or documented risk assessments made to understand the implications of the defects and propose timely actions. We are not confident that the proposed costs accurately represent the need for work or offer optimal efficiency in terms of delivery and project timing. We have therefore disallowed the costs of this work.

*LTS diversion projects*

7.11. We note a significant increase in proposed costs for diversions over historical levels for NGGD and NGN.

7.12. There appears to be no evidence for the increase in workload and costs in the four NGGD networks. Table 7.2 below shows the proposed average annual LTS diversion costs for each network against the historical average. An allowance has been given based on historical levels.

**Table 7.2: Ofgem proposed average annual costs of LTS diversions (£m 2009-10 prices)**

| Network | Proposed costs RIIO-GD1 | Proposed average annual cost of LTS diversions | Historic annual average (2009-11) | Cost adjustment applied |
|---|---|---|---|---|
| EoE | 15.36 | 1.92 | 0.31 | (12.88) |
| Lon | 4.71 | 0.59 | 0.13 | (3.67) |
| NW | 5.82 | 0.73 | 0.22 | (4.06) |
| WM | 5.42 | 0.68 | 0.21 | (3.74) |

7.13. NGN have included costs for a potential high cost diversion (£4.4m) in 2016. This expenditure has been disallowed because of the uncertainty in the need for the project.

*Offtakes and Pressure Reduction Stations (PRSs)*

7.14. NGN Offtake and PRS investment is forecast to increase substantially from GDPCR1. In view of NGN's indication that peak day demand was expected to fall by 3% over the RIIO-GD1 period, £12.9m capacity related investment on Offtakes and PRSs has not been allowed.

7.15. PRS spend for SGN is very high compared with other GDNs, with proposed expenditure for Scotland and Southern being £75.7m and £100.6m respectively including capitalised overheads. The average proposed spend for the other GDNs is £35.8m. Particular concern surrounds the cost for unspecified projects, and an adjustment has been made to their proposed costs to bring their costs into line with historical levels. The allowance for Scotland has therefore been reduced by £38.4m and Southern by £25.7m[12]. SGN separately identified capitalised overheads in their business plan data table, and an adjustment has been made to this cost proportionate to the PRS adjustment. A reduction of £7.2m and £6.3m has been made to Scotland and Southern respectively.

[12] This been calculated by reducing the proposed annual PRS spend less named projects (not including capitalised overheads) from the proposed £6.98m (Scotland) and £8.54m (Southern) to GDPCR1 annual rates of £2.18m (Scotland) and £5.33m (Southern).

*Governors*

7.16. WWU's submitted investment costs for the replacement of above ground governors is significantly higher than that of other GDNs. WWU propose to replace 20 per cent of their governors, whilst other GDNs propose to replace between 3.9 to 10.8 per cent of their governor stock. We have therefore reduced the scope of WWU's workload, allowing the same proportion of the larger of the remaining GDNs which is 10.8 per cent of governor population. This represents a disallowance of 267 governors , reducing submitted costs by £17.1m.

7.17. Our consultants identified that NGN, SGN and WWU have an investment strategy that involved replacing all their above ground installations, whilst NGGD's investment strategy involved replacing 50 per cent and refurbishing 50 per cent of their above ground installations. In our analysis of submitted investment costs, we have adjusted NGN, SGN and WWU's investment for above ground governor installations in line with NGGD's investment strategy of 50 percent replacement and 50 percent refurbishment. We have consequently disallowed £2.5m from NGN, £6.2m from WWU and £25m from SGN; Scotland £6.7m, Southern £18.4m.

7.18. SGN has stated that its strategy for holder management programme is to mothball all holders by the end of RIIO GD1. Based on this we have disallowed the submitted costs of £11.6m for 30 Donkin holder governor replacements; £3.9m for Scotland and £7.7m for Southern.

7.19. SGN Southern identified that a number of ERS modules could be removed without the need for their replacement. This applies to 12 percent of SGN's ERS sites, 52 sites in total. We believe that the cost for the removal of these governors will be £5,000 per installation. We have therefore reduced allowance for this activity by £1.0m.

7.20. NGN's £75,000 unit cost for the replacement for ERS governors is high in comparison to the £65,000 achieved by SGN's Scotland and Southern networks. We have therefore disallowed £0.6m of costs for NGN on this activity.

7.21. WWU has included the cost of 30 additional district governors for security of supply reasons, at a cost of £14.5m. We do not believe that this investment is justified in the absence of specific performance history of these sites and consideration of other feasible alternatives. We have therefore disallowed all associated costs.

Table 7.3 summarise the disallowed governor workload and associated costs.

**Table 7.3: Ofgem adjustment to replacement governor workload**

| | Governor replacement workload adjustment RIIO GD1 (number of governors) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | NGGD | | | | NGN | SGN | | WWU |
| | EOE | Lon | WM | NW | NGN | Sc | So | WWU |
| Reduction in stock of governors that need intervention | - | - | - | - | - | - | - | (267) |
| Ofgem proposed reduction to submitted workload composition: 50% refurbishment of governors | - | - | - | - | (108) | (68) | (228) | (137) |
| Ofgem proposed reduction in the number of Donkin governors | - | - | - | - | - | (10) | (20) | - |
| Removal of ERS module governors without replacement | - | - | - | - | - | - | (17) | - |
| Removal of new district governors | - | - | - | - | - | - | - | (30) |

**Table 7.4: Ofgem adjustments to company submitted governor replacement costs (£m, 2009-10 prices excluding RPEs)**

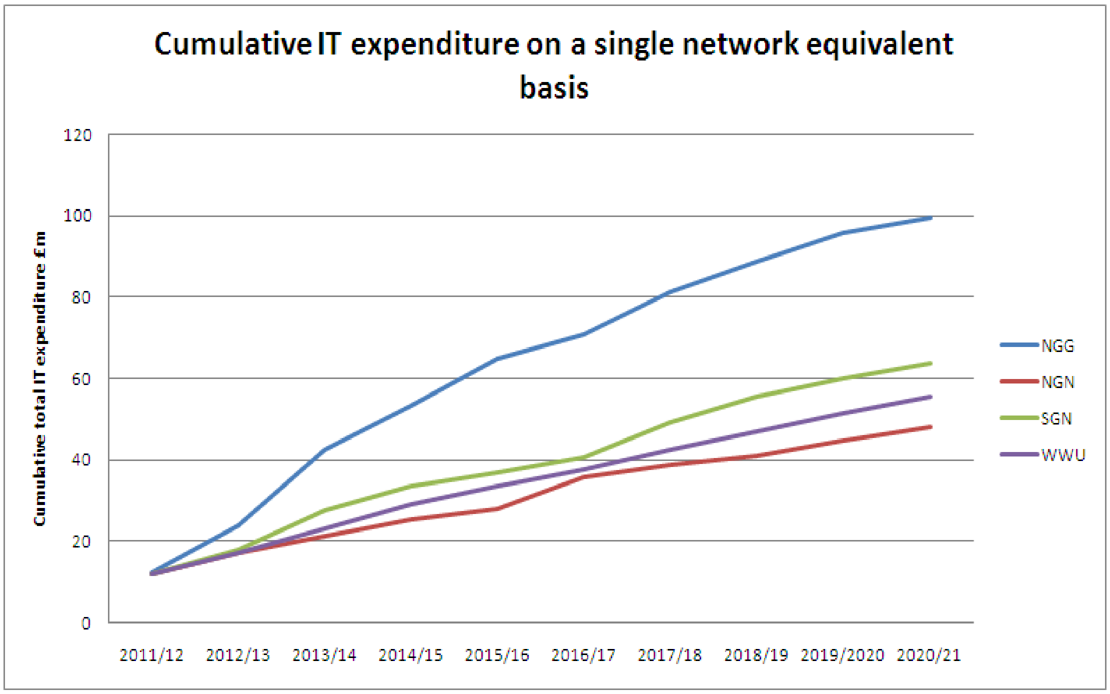
| | Mains replacement cost adjustment RIIO GD1, excludes RPEs | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | NGGD | | | | NGN | SGN | | WWU |
| | EOE | Lon | WM | NW | NGN | Sc | So | WWU |
| Reduction in scope of governors intervention | - | - | - | - | - | - | - | (17.1) |
| Ofgem proposed reduction to submitted workload composition: 50% refurbishment of governors | - | - | - | - | (2.5) | (6.7) | (18.4) | (6.2) |
| Ofgem proposed reduction in the number of holder governors | - | - | - | - | - | (3.9) | (7.7) | - |
| Removal of ERS module governors without replacement | - | - | - | - | - | - | (1.0) | - |
| Removal of new district governors (security of supply) | - | - | - | - | - | - | - | (14.5) |
| Cost adjustment to unit costs of ERS modules | - | - | - | - | (0.6) | - | - | - |
| Total cost adjustment | - | - | - | - | (3.2) | (10.5) | (27.1) | (37.7) |

*IT capex*

7.22. We have carried out a comparison of cumulative IT infrastructure and systems spend across the GDNs taking account of the split between development and implementation costs. We consider that development costs are independent of the number of networks and implementation costs are proportional to the number of networks per GDN owner. We have put each GDNs' costs onto a single network equivalent basis and then carried out comparison analysis.

7.23. Figure 7.1 shows comparative IT analysis based on a single equivalent network. It shows that NGGD's expenditure on IT is considerably above the other networks.

**Figure 7.1: GDN's IT expenditure**




7.24. We have compared NGGD's cost to the industry average and we have found that NGGD's IT costs were considerably above the industry average. We estimate this inefficiency to be £3m per year per network and have disallowed this amount of IT expenditure.

*Vehicle expenditure*

7.25. The submitted vehicle expenditure costs for each of the GDNs is higher than the historical average. The submitted business plans do not fully justify the reason for the need for increased expenditure. Annual vehicle expenditure is cyclical and we have therefore considered five years of GDPCR1 expenditure; three year actual expenditure from 2009 to 2011 and forecast expenditure for 2012 and 2013. We have adjusted vehicle expenditure back to individual network's average cost over these five years and disallowed forecast expenditure by £11.4m for East of England, £2.1m for London, £6.4m for North West, £3.5m for West Midlands , £2.5m for NGN, £7.6m for Scotland, £1.9m for Southern, and £15.4m for WWU.

*Security*

7.26. NGGD and NGN's submitted expenditure for security is significantly high in comparison to other GDNs. NGGD and NGN have included a number of specific security investments for particular sites. We propose that these costs will be subject to an uncertainty mechanism.

7.27. For the remaining security expenditure, NGGD forecast high levels in comparison to the other GDNs. Whilst we recognise the reasons NGGD give for the need for investment in security measures, this is a national issue and does not therefore require additional investment in NGGD's geographical areas. We have therefore disallowed NGGD expenditure by equalling their expenditure with the remaining four networks.

**Table 7.5: Comparison of security expenditure (£m, 2009-10 excluding RPEs)**

| | Security cost adjustment RIIO GD1 (£m, excludes RPEs) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | NGGD | | | | NGN | SGN | | WWU |
| | EoE | Lon | NW | WM | NGN | Sc | So | WWU |
| Submitted costs (excluding physical security investment) | 10.9 | 10.5 | 7.9 | 7.7 | 5.7 | 3.6 | 5.8 | 4.1 |
| Ofgem adjusted | (6.5) | (6.1) | (3.4) | (3.2) | 0.0 | 0.0 | 0.0 | 0.0 |
| Ofgem proposal | 4.5 | 4.5 | 4.5 | 4.5 | 5.7 | 3.6 | 5.8 | 4.1 |

*Land and buildings*

7.28. SGN's submitted expenditure on land and buildings is high in comparison to other GDNs. This is likely to be attributable to the costs for relocation of depot premises. There is little information in SGN's business case to support this additional forecast capital expenditure, and no CBA. Also, the historical costs of land and buildings will have been allowed within the operational activities and the two year historic regression analysis will provide for such expenditure. We have therefore disallowed £15.6m from SGN's costs; £8.6m for Scotland and £6.9m for Southern. The disallowed expenditure brings SGN's costs in line with other GDNs proposed expenditure.

7.29. NGGD has included a cost of £2.9m to build a new training centre to accommodate apprenticeships. We have disallowed this cost as we expect this forecast expenditure to be included as part of the allowance we have proposed for training and apprentices.

*Capex other*

7.30. SGN's forecast costs for furniture and fittings are significantly higher than other GDNs and SGN's own historical levels. There is little information in SGN's business case to support this additional capital expenditure and no CBA. We have adjusted SGN's submitted costs back to the historical levels, disallowing £6.6m for Scotland and £12.6m for Southern.

7.31. SGN's forecast costs for tools and equipment is also high in comparison to other GDNs and SGN's own historical figures. We have consequently adjusted SGN's submitted costs in line with other GDN's submitted expenditure, disallowing £7.7m for Scotland and £5.8m for Southern.

# 8. Replacement expenditure

**Question 1:** Do you agree with the assessment we have carried out and the results proposed for repex?
**Question 2**: Do you agree with our approach for the assessment of tier 1 repex costs?
Question 3: Do you agree with our approach for the assessment of tier 2 and tier 3 repex costs

## Background

8.1. In June 2011, the Health and Safety Executive (HSE) announced a change in the approach to managing risk on the iron distribution mains network. The HSE enforcement policy for the Iron Mains Risk Reduction Programme (IMRRP) addresses the failure of 'at risk' iron gas mains (ie those pipes within 30 metres of buildings) and the consequent risk of injuries, fatalities and damage to buildings. The new enforcement policy includes three tiers for pipe replacement. The three tier approach allows a greater focus on risk and larger diameter 'at risk' iron pipes will only be subject to decommissioning if either condition or risk assessment indicates that this is justified.

8.2. There is greater flexibility to allow the GDN operators to exploit innovative solutions such as pipe lining technologies to either replace pipes or extend pipe life. It also ensures efficiency, environmental and reliability benefits associated with the programme are accounted for. We set out further detail on the HSE's revised repex approach and our adjustment to companies' tier 1, tier 2 and tier 3 outputs and associated workload in our accompanying Outputs Supporting Document. This chapter sets out our unit cost benchmarking and consequential changes in GDNs' allowed costs arising from the output and workload adjustments.

8.3. Table 8.1 sets out the GDNs' submitted costs for repex and our Initial Proposals' assumptions.

**Table 8.1: Submitted Repex costs, adjustments and Ofgem's proposed allowances (annualised £m, 2009-10 prices)**

| Repex | GDN Submitted costs for RIIO-GD1[1] | Normalised submitted Costs[1] | Adjustments to normalised submitted costs: Efficiency (Regression, RPEs, Ongoing efficiencies) | Efficiency (qualitative) | Workload (outputs) | Uncertainty[2] | Reconciliation between historical bottom-up and final allowance | Ofgem Proposed Allowances | Ofgem Proposed v GDN normalised submitted costs |
|---|---|---|---|---|---|---|---|---|---|
| EoE | 118.6 | 118.6 | (8.9) | (0.0) | (13.6) | (4.9) | 3.2 | 94.5 | (20.3%) |
| Lon[3] | 167.3 | 169.7 | (18.5) | (5.4) | (37.9) | (4.6) | 1.7 | 104.9 | (38.2%) |
| NW | 113.4 | 113.4 | (10.3) | 0.3 | (28.6) | (5.6) | 4.4 | 73.6 | (35.1%) |
| WM | 86.6 | 86.6 | (9.5) | 0.1 | (17.5) | (0.4) | 4.2 | 63.6 | (26.6%) |
| NGN | 97.0 | 97.0 | (5.1) | 0.3 | (16.5) | (1.4) | 0.7 | 74.9 | (22.8%) |
| SC[4] | 48.4 | 52.7 | (1.5) | (0.7) | (7.2) | (0.9) | 0.4 | 42.8 | (18.7%) |
| SO[5] | 148.9 | 159.7 | (14.3) | (0.3) | (3.5) | (5.4) | 2.3 | 138.5 | (13.2%) |
| WWU[6] | 91.5 | 91.5 | (11.0) | 0.1 | (25.3) | (0.2) | 1.5 | 56.6 | (38.1%) |
| **Total** | **871.7** | **889.1** | **(79.1)** | **(5.7)** | **(150.1)** | **(23.3)** | **18.5** | **649.5** | **(27.0%)** |

[1] inclusive of RPEs
[2] All Smart Metering costs are excluded from the GDN submitted costs and Ofgem proposed allowances
[3] £19.3m capitalised replacement mains from capex to repex *(£2.4m annualised)*
[4] £34.5m capitalised replacement mains from capex to repex *(£4.3m annualised)*
[5] £86m capitalised replacement mains from capex to repex *(£10.7m annualised)*
[6] Excludes £62.5m of replacement LTS pipelines repex, transferred to LTS capex *(£7.8m annualised)*

## Changes to the cost drivers and regression approach

*Historical tier 1 regression model*

8.4. The distinction between tiers 1, 2 and 3 does not exist for the current price control period. We modelled two options in order to carry out analysis of tier 1 mains and associated services costs:

- a regression of the metallic mains less than or equal to 250mm in diameter. The 250mm cut-off point was chosen on the basis that 250mm was the closest to the cut-off point for future tier 1 activities (the cut-down approach).
- a regression was undertaken of the total metallic mains population relating to all diameters.

8.5. In both cases we included a volume and cost of services proportionate to the length of main included within the regression. This included service renewal, service test and transfers and non-domestic services.

8.6. We have rejected the cut-down version of the regression on the basis that it has generated inconsistent results to the total repex regression used as part of our middle-up approach and the regression results are sensitive to our choice of cut-off point. We have used the regression of the full metallic mains population but only included those services which are related to mains replacement activities (those mentioned above).

8.7. The results of the historical 'mains driven' regression analysis have then been rolled forwards based on the adjusted GDN tier 1 mains workload and associated services to ensure appropriate costs are recovered in the RIIO-GD1 period.

## Workload and cost adjustments

*Tier 1 workload*

8.8. We have disallowed some of the workload GDNs proposed for tier 1 iron mains replacement, and the associated safety and environmental outputs. In calculating the amount of main which we consider should be replaced each year we have divided the length of iron mains qualifying for abandonment under the HSE mandated iron mains risk reduction programme by the 19 years remaining. There are two principal reasons for the networks to have forecast a higher level of abandonment. Firstly, some have used their own assumptions for growth in iron mains covered by the programme due to encroachment and the discovery of non-recorded iron mains, whereas we have assumed a standard assumption[13]. Secondly, some have a tapered work rate at the end of the programme which we have disallowed, since it was not justified by the GDNs under CBA for example.

8.9. A corresponding adjustment is made in services replacement and service transfer workload associated with the mains replacement activity. This has been applied in the same proportion as the reduction in allowed mains workload.

8.10. Appendix 4 sets out the impact on costs of the reduction in the tier 1 workload based on our historical bottom-up analysis.

*Tier 1 diversions*

8.11. For tier 1 non-rechargeable diversions the forecast volumes have been included within the regression analysis for that category. We have assumed that any work in this category will contribute to the target to replace the iron mains as required by the HSE and therefore has been considered in this context. For rechargeable diversions it is not clear how much of their workload will contribute to the HSE iron mains programme as some workload could be non-qualifying mains. This workload has been allowed and it is acknowledged that this may mean that some additional mains may be replaced during this period.

[13] We have use an annual growth level of 3.9% of GDN's non-qualifying iron mains population for all networks, based on values proposed by NGGD.

*Tier 2 above threshold*

8.12. Tier 2 mains falling above an agreed threshold value are mandated for replacement under the HSE's revised iron mains risk management programme.

8.13. Ofgem has been involved in discussions between the GDNs and the HSE to agree a methodology for defining the risk threshold level at which mains should be considered for abandonment or other means of risk management. These are set out in the Outputs Supporting Document . We propose to allow all GDNs, apart from WWU, their forecast workloads for tier 2 mains above the threshold, and associated services. These are set out in table 8.2.

**Table 8.2: RIIO-GD1 - T2 mains and service lay costs (£m, 2009-10 prices)**

| Costs & workload over RIIO-GD1 | EoE | Lon | NW | WM | NGN | Sc | So | WWU |
|---|---|---|---|---|---|---|---|---|
| Mains cost requested (£m) | 9.6 | 28.0 | 28.8 | 17.2 | 14.8 | 0.9 | 7.6 | 14.9 |
| Services cost requested (£m) | 0.4 | 1.5 | 1.2 | 0.7 | 3.0 | 0.2 | 1.2 | 2.0 |
| Total cost requested (£m) | **9.9** | **29.5** | **30.0** | **17.9** | **17.8** | **1.1** | **8.9** | **17.0** |
| Mains cost allowed (£m) | 8.4 | 24.8 | 28.1 | 17.1 | 14.1 | 0.8 | 5.6 | 7.6 |
| Services cost allowed (£m) | 0.4 | 1.5 | 1.2 | 0.7 | 3.0 | 0.2 | 1.2 | 1.0 |
| Total cost allowed (£m) | **8.8** | **26.3** | **29.3** | **17.8** | **17.1** | **1.1** | **6.9** | **8.6** |
| Mains workload requested (km) | 16.4 | 39.4 | 50.7 | 28.4 | 81.7 | 4.3 | 30.1 | 73.8 |
| Mains workload allowed (km) | 16.4 | 39.4 | 50.7 | 28.4 | 81.7 | 4.3 | 30.1 | 37.5 |
| Services workload requested (number) | 732 | 1,762 | 2,271 | 1,273 | 6,488 | 442 | 2,644 | 4,723 |
| Services workload allowed (number) | 732 | 1,762 | 2,271 | 1,273 | 6,488 | 442 | 2,644 | 2,399 |

8.14. Table 8.2 sets out the lay costs and workload proposed by the GDNs for the above tier 2 threshold work. Apart from streetworks costs and the adjustment due to the impact of the assessment of the threshold level for WWU set out in paragraph 8.18, we have not proposed any other adjustments to the GDNs' mandatory workload and costs from a bottom up perspective. Hence the only adjustments that have been made to the allowances are where we have different views on streetworks costs or the impact of the totex assessment on the costs.

8.15. In their November 2011 submissions, all GDNs proposed different approaches to calculating a risk threshold for mains in tier 2. WWU proposed an approach to setting risk thresholds for mains in tier 2 that was different to the other GDNs, which took into account building density, population density and incident fatality rates in four different location categories based on building density, ranging from very high to low. Ofgem supported this approach in principle, because it appeared to be a more targeted approach at identifying risk.

8.16. Following dialogue with all GDNs and HSE to move to a common methodology for setting the risk thresholds, a common approach was adopted by SGN, NGN and NGGD, including the use of an occupancy factor of one person per building. WWU maintained their original approach and updated their methodology with revised risk thresholds for each location category. We do not consider that WWU has presented sufficient empirical evidence to substantiate their revised thresholds. We have no objection to their approach in principle, however we believe that their thresholds are low and we have therefore adjusted the thresholds accordingly. Additionally we do not consider that the other GDNs have substantiated their assumption used for occupancy. Nevertheless, we recognise that there is an absence of data that is necessary to transition from the use of MRPS as a means of predicting the risk of an incident to an approach for estimating the overall risk to people from iron mains.

8.17. Ofgem is also mindful of the obligations of the GDNs as duty holders and of the role of HSE in ensuring that the arrangements for risk management proposed by the GDNs satisfy those duties. In view of the fact that the methodologies proposed by each of the GDNs were acceptable to HSE, Ofgem has used the proposed risk thresholds as the basis for setting allowances. However, in the case of WWU, it was necessary to adjust the risk thresholds proposed because the methodology effectively used higher figures for the number of fatalities per incident than were used by all of the other GDNs.

8.18. WWU provided the lengths of mains that correspond to the adjusted risk thresholds and these have been used as the basis for setting allowances. The adjustments we are proposing to the risk thresholds for WWU are shown in table 8.3.

**Table 8.3: WWU tier 2 threshold with Ofgem proposed adjustments**

| WWU Location Categories | Properties per km | Fatality Ratios | Risk Threshold | Ofgem adjusted fatality ratio | Ofgem adjusted risk threshold |
|---|---|---|---|---|---|
| Very High | 167 | 2.64 | 63 | 1.84 | 90 |
| High | 103 | 1.13 | 91 | 0.79 | 130 |
| Medium | 89 | 0.45 | 197 | 0.31 | 282 |
| Low | 30 | 0.032 | 295 | 0.02 | 1466 |
| Average | 72.2 | | | 0.45 | 160 |

8.19. We recognise there is uncertainty as to the exact workload that may be generated by mains passing beyond the risk action threshold as a result of the dynamic nature of the iron pipe network and risk model enhancements. We propose to set a revenue driver based on the unit costs in table 8.4.

8.20. As part of their business plan submissions the GDNs have included a forecast for mains replacement of tier 2 mains that either have a risk score already above the HSE agreed threshold level or are likely to exceed the threshold level within the RIIO-GD1 period. Their forecasts also included the workload and costs of replacing the services associated with these above threshold mains.

8.21. We stated in our March Decision Document we would set an ex-ante allowance for GDNs for these mains based on the GDNs' forecast and incorporate a revenue driver to adjust for the actual workload completed.

8.22. The revenue driver is set out as a cost per length of main abandoned and unit cost per service replaced rather than laid. This provides the right incentive to the GDNs to look to abandon the assets in the most efficient way.

8.23. To derive the abandonment unit cost we have used the GDNs' stated abandonment volumes and the Ofgem allowed costs to develop unit costs based on the GDN's workload submission that delivers the overall proposed allowed revenue.

8.24. Table 8.4 presents the allowed unit costs for T2 workload scoring above the threshold level. The table presents the post-IQI unit costs we propose to allow for the first year of RIIO-GD1. For the latter years of the price control the assumptions we have made on RPEs will apply to this unit cost.

**Table 8.4: T2 mains and service unit cost allowances for 2014 (£m, 2009-10 prices)**

| Mains abandonment unit cost (£/m) | EoE | Lon | NW | WM | NGN | Sc | So | WWU |
|---|---|---|---|---|---|---|---|---|
| 9" or less | 238 | 336 | 297 | 307 | 86 | 126 | 72 | 127 |
| 10"-12" | 384 | 504 | 457 | 487 | 152 | 176 | 155 | 195 |
| 13"-17" | 638 | 723 | 591 | 635 | 204 | 217 | 197 | 262 |
| | | | | | | | | |
| Service unit cost (£/service) | EoE | Lon | NW | WM | NGN | Sc | So | WWU |
| Service Renew | 617 | 1,040 | 625 | 570 | 547 | 477 | 498 | 486 |
| Service Test & transfer | 353 | 575 | 399 | 513 | 311 | 286 | 325 | 361 |
| Service Non-Domestic | 2,345 | 1,648 | 1,659 | 4,785 | 2,116 | 2,462 | 1,273 | 580 |

8.25. Therefore if the GDN abandons more or less main than was proposed in the RIIO-GD1 submissions the allowance set in the price control will be adjusted accordingly.

8.26. The allowances set are based on the declared threshold levels and proposed workloads developed by the GDNs using the existing Mains Replacement Prioritisation System (MRPS), which assists the GDNs in selecting the highest risk mains on their networks. In light of the HSE's policy change on iron mains the GDNs are currently looking at reviewing MRPS. If the process or system results in adjustments to the threshold level or volumes of work proposed by the GDNs we would need to reconsider the revenue driver.

## Tier 2 below threshold & tier 3

8.27. We recognise there may be a need for GDNs to abandon pipes which do not necessarily fall within a mandated workload. However, we expected any expenditure for tier 2 below the risk threshold and tier 3 to be justified by CBA at a separable project level and should meet Ofgem's investment criteria as set out in Appendix 6 of the Outputs Supporting Document. We have reviewed the GDNs' cost-benefit assessment to determine outputs and associated workloads that are sufficiently justified. This assessment is discussed in detail in the safety chapter of the Outputs Supporting Document. The associated adjustments to costs are shown below in Table 8.5.

**Table 8.5: Ofgem adjustments to tier 2 (below threshold) & tier 3 costs (£m, 2009-10 prices)**

| | **Normalised Submitted** | | **Disallowed** | | **% cost disallowed** | **Allowed** | |
|---|---|---|---|---|---|---|---|
| | **Workload (km)** | **Costs* (£)** | **Workload (km)** | **Costs* (£)** | | **Workload (km)** | **Costs* (£)** |
| EoE | 163.1 | 60.57 | 158.6 | 58.89 | 97% | 4.53 | 1.68 |
| Lon | 441.3 | 304.96 | 387.5 | 267.79 | 88% | 53.79 | 37.17 |
| NW | 368.2 | 141.88 | 340.3 | 131.13 | 92% | 27.89 | 10.75 |
| WM | 281.5 | 113.90 | 281.5 | 113.90 | 100% | - | - |
| **NGGD total** | **1,254.1** | **621.3** | **1,167.9** | **571.7** | **92%** | **86.20** | **49.60** |
| **NGN** | **190.7** | **42.24** | **-** | **-** | **0%** | **190.75** | **42.24** |
| Sc | 30.0 | 21.19 | 15.0 | 10.60 | 50% | 14.99 | 10.60 |
| So | 84.9 | 32.96 | 84.9 | 32.96 | 100% | - | - |
| **SGN total** | **114.9** | **54.2** | **99.9** | **43.6** | **80%** | **14.99** | **10.60** |
| **WWU** | **213.7** | **48.87** | **213.7** | **48.87** | **100%** | **-** | **-** |
| **Total** | **1,773.5** | **766.6** | **1,481.5** | **664.1** | **87%** | **291.9** | **102.4** |

* Includes costs for associated services

*Bulk service replacement and service relays associated with service alteration*

8.28. We consider that where bulk service replacement falls outside the HSE's revised iron mains risk management policy, it should be justified by appropriate CBA analysis. We agree with the continued practice of replacing services when services are altered as a result of consumer led requests for service work.

8.29. We have benchmarked the workload against the number of customers for each GDN and applied a consistent benchmark ratio of 0.031 per cent. Our proposed adjustments to the service workloads are shown in table 8.6.

**Table 8.6: Bulk service relay adjustments**

| | EoE | Lon | NW | WM | NGN | Sc | So | WWU |
|---|---|---|---|---|---|---|---|---|
| Bulk service relays and relay associated with service alterations-proposed volumes | 12,720 | 6,008 | 12,984 | 4,784 | 43,711 | 8,448 | 10,441 | 4,800 |
| Adjustment | (2,720) | (8) | (6,184) | 416 | (37,311) | (4,048) | (41) | (42,001) |
| Allowed workload | 10,000 | 6,000 | 6,800 | 5,200 | 6,400 | 4,400 | 10,400 | 6,000 |

*Relay service after escape*

8.30. We have applied adjustments to the volume of external service condition reports (see chapter 6). We have assumed one service relay after escape for each external service condition report; we have therefore applied a corresponding adjustment in the allowed volume of service relays after escape.

**Table 8.7: Renew after escape**

| | EoE | Lon | NW | WM | NGN | Sc | So | WWU |
|---|---|---|---|---|---|---|---|---|
| Renew after escape requested | 28,428 | 33,688 | 41,428 | 23,874 | 61,776 | 19,386 | 73,106 | 47,561 |
| Workload adjustment | 253 | (2,945) | (6,322) | 484 | (12,344) | (1,602) | (8,592) | (11,199) |
| Allowed workload | 28,681 | 30,743 | 35,106 | 24,358 | 49,432 | 17,784 | 64,514 | 36,362 |

*Relay service after escape*

8.31. We have applied reductions to the volume of external condition reports of between 5 and 20 per cent. We have applied a corresponding reduction in the allowed volume of service relays after escape.

# 9. Combining the elements of our cost assessment and applying the IQI

**Question 1:** Do you agree with how we have applied IQI, and if not what would you propose to change? Do you agree with our approach to combining elements of the cost analysis?

9.1. This chapter provides further detail on how we have applied the Information Quality Incentive (IQI) and how we have drawn together the various elements of our cost assessment to set our cost baselines.

## Application of the IQI mechanism

9.2. The Information Quality Incentive (IQI) mechanism is designed to provide incentives to network companies to provide robust expenditure forecasts in their business plans. We use the IQI to set the strength of the upfront efficiency incentives each company faces according to the difference between the company's forecast and our assessment of its efficient expenditure requirements.

9.3. In our March 2011 decision document, we stated that we would calibrate the IQI matrix such that the cost sharing factor or efficiency incentive rate for GDNs was in the range of 50-60%, ie with the most efficient GDNs receiving an efficiency incentive towards the top-end of this range. We also stated that we would calibrate the IQI such that companies who submitted efficient cost forecasts would earn a positive financial reward.[14]

9.4. In order to determine the IQI efficiency incentive rate and reward/penalty, we stated in our March strategy document that we would compare companies' first cost submissions with our last assessment. However, in our February assessment of companies' first plans, we stated that our comparison would be on the basis of companies' second plans.[15] We have revised our approach given the absence of any fast-tracked GDN to provide the reference point (in terms of efficient costs) in calibrating the IQI matrix. Our approach also provided incentives for GDNs' to submit high quality revised plans.

[14] See: Ofgem (March 2012) http://www.ofgem.gov.uk/Networks/GasDistr/RIIO-GD1/ConRes/Documents1/GD1decisionbusplan.pdf para 6.27

[15] See: Ofgem (February 2012) RIIO-GD1 Initial Assessment, para. 3.3 http://www.ofgem.gov.uk/Networks/GasDistr/RIIO-GD1/ConRes/Documents1/120217_GDN_initial_assessment_annex.pdf

*GDNs' proposals*

9.5. In general, the GDNs proposed an increase in the IQI incentive rate/sharing factor, as well as set out proposals for calibrating the IQI reward/penalty.

- NGGD, NGN and SGN considered that we should increase the IQI incentive rate from the March strategy decision of 50-60 per cent to 60-70 Per cent. However, NGGD states that it supports the adoption of a higher IQI incentive rate of 60-70 per cent for its non-London GDNs but proposed to retain 50-60 per cent range for the London GDN to reflect its greater "delivery risk".[16]

- NGGD proposed that GDNs with assessed efficiency better than average should earn a positive reward. NGN proposed that the reward for a company set at 100 should be 2.5 per cent (of totex) equal to the reward to fast-track transmission companies.

9.6. NGGD also contested our decision to use GDNs' second business plan submission as the basis for our IQI assessment. It considers that this change penalises GDNs' that submitted well justified first plans.

*Our decision*

9.7. We disagree with NGGD's view that our decision to calculate GDNs' IQI score based on GDNs second submission disadvantages GDNs that submitted well justified first plans. We accept the *relative* reward/penalty (or ranking) for GDNs may change. However, we would expect all GDNs to submit costs as part of their second business plan more in line with our assessment of efficient costs, drawing on the feedback we provided GDNs on their first plans. Thus, all GDNs receive a higher *absolute* reward (or lower penalty).

9.8. In relation to the sharing factor, we propose to increase the IQI incentive rate/ sharing factor from 50-60% to 60-65%. The reason for increasing the range is to ensure comparability with the incentive rate GDNs currently face in GDPCR1. GDNs currently face a 100% incentive rate on opex, and 33-36% on capex/repex, and a composite incentive rate above 60%.[17]

9.9. We propose to define the incentive rate as post-tax. That is, if the GDN outperforms by 100, with a sharing factor of 62.5 per cent, the GDN incurs a benefit of 62.5 post-tax, and the remaining 37.5 will comprise additional tax payments (in relation to the outperformance), and a reduction in costs to consumers. Likewise, if the GDN underperforms by 100, it incurs a cost of 62.5 (post-tax), and the remaining amount represents a reduction in tax payments, and the additional cost recovered from the consumer. Taking as a simple example, a marginal tax rate of

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[16] NGGD (April 2012) Business plan submission, Incentives, H1, para. 4.6.

[17] For example, NGGD state that its composite incentive rate is 62%. See NGGD (April 2012), App. H1 p 12

15 per cent, and a sharing factor of 62.5 per cent, the sharing amounts for out/under performance of 100 would be around: 62.5 (company); 11 (tax adjustment); and, 27 (consumer).[18] In practice, the adjustments to totex and allowed revenues will be undertaken through the financial model as part of the annual iteration process (see Finance and Uncertainty Supporting Document).

9.10. Table 9.1 sets out our proposed IQI matrix. For consistency with the T1 matrix, we propose an income adjustment associated with 100 (where company bid = Ofgem assessment = upper quartile costs) of 2.5 per cent. We propose a sharing factor of 65% for NWO bid: benchmark ratio of 100.

**Table 9.1: Proposed IQI matrix**

| 1. NWO bid: benchmark ratio | 90.0 | 95.0 | 100.0 | 105.0 | 107.0 | 110.0 | 115.0 | 118.0 | 122.0 |
|---|---|---|---|---|---|---|---|---|---|
| 2. Efficiency Incentive | 67% | 66% | 65% | 64% | 64% | 63% | 63% | 62% | 61% |
| 3. Allowed expenditure | 97.5 | 98.8 | 100.0 | 101.3 | 101.8 | 102.5 | 103.8 | 104.5 | 105.5 |
| 4. Additional income | 4.1 | 3.3 | 2.5 | 1.7 | 1.3 | 0.8 | 0.0 | -0.6 | -1.3 |
| **Actual expenditure** | **Total Reward** | | | | | | | | |
| 85 | 12.4 | 12.4 | 12.3 | 12.1 | 12.0 | 11.9 | 11.7 | 11.5 | 11.3 |
| 90 | 9.1 | 9.1 | 9.0 | 8.9 | 8.8 | 8.8 | 8.6 | 8.4 | 8.2 |
| 95 | 5.8 | 5.8 | 5.8 | 5.7 | 5.7 | 5.6 | 5.4 | 5.3 | 5.2 |
| 100 | 2.4 | 2.5 | 2.5 | 2.5 | 2.5 | 2.4 | 2.3 | 2.2 | 2.1 |
| 105 | -0.9 | -0.8 | -0.7 | -0.7 | -0.7 | -0.7 | -0.8 | -0.9 | -1.0 |
| 107 | -2.3 | -2.1 | -2.1 | -2.0 | -2.0 | -2.0 | -2.1 | -2.1 | -2.2 |
| 110 | -4.3 | -4.1 | -4.0 | -3.9 | -3.9 | -3.9 | -3.9 | -4.0 | -4.0 |
| 115 | -7.6 | -7.4 | -7.3 | -7.1 | -7.1 | -7.1 | -7.1 | -7.1 | -7.1 |
| 118 | -9.6 | -9.4 | -9.2 | -9.1 | -9.0 | -9.0 | -8.9 | -8.9 | -8.9 |
| 122 | -12.3 | -12.0 | -11.8 | -11.6 | -11.6 | -11.5 | -11.4 | -11.4 | -11.4 |

*Calculating GDNs' IQI ratios*

9.11. In order to calculate GDNs' IQI ratios (ie GDN bid relative to our assessment of costs), we have made a number of adjustments to forecast data for consistency with our assessed costs. In particular, we exclude the following costs from GDNs' bids (and our baseline):

- non-controllable costs including network rates, licence fees, NTS exit capacity, shrinkage and NTS pensions
- costs which we propose to fund through uncertainty mechanisms, such as extra costs of permitting schemes applied by additional Highways Authorities, lane rental costs and smart metering
- cost associated with disallowed outputs, ie where we do not consider the outputs are in the consumer interest. For example, disallowed output related costs excluded from our assessment include: additional repex volumes that we consider are inconsistent with the new HSE policy; investment in asset integrity such as LTS replacement expenditure, which impacts on asset health and criticality measures; gas holder decommissioning etc. SGN has stated to us that disallowed outputs associated with repex should be taken into account in the IQI.

[18] Tax calculation: (Company retained post tax amount*marginal tax rate)/ (1- marginal tax rate) = (62.5*15%)/(1-15%) = 11.

- Our proposed approach to compare GDNs' bids and our baseline on a like-for-like basis (in relation to outputs delivered) is consistent with our March strategy document.[19] This approach advantages all GDNs in terms of their IQI score in absolute terms.

9.12. Consistent with our March strategy, we have included GDNs' proposed real price effects (RPEs) within their bid, and we have included our forecast of RPEs net of ongoing productivity within our baseline.

## Combining the elements of our cost assessment

9.13. As explained in Chapter 1, we have used a broad range of tools and techniques to develop our Initial Proposals baselines including totex work and bottom-up activity-level analysis. In our analysis we have assessed approximately 50 per cent of costs by using regression analysis to determine efficient costs in the base year and then rolling these costs forwards based on changes in workload from our technical/engineering assessment. The remaining 50 per cent of costs has been assessed purely using a detailed technical/engineering assessment. In our totex assessment the majority of costs have been assessed using regression analysis to determine efficient costs in the base year and then rolling forwards these costs for are view of the appropriate workloads. In each case our assessment for streetwork costs, loss of metering, holder decommissioning costs and land remediation costs is the same as it is based on a qualitative/technical assessment and applied after the results of our regressions.

9.14. Our qualitative/engineering analysis has been informed by both the initial business plan submissions made by the GDNs in November 2011 and their resubmissions at the end of April 2012.

9.15. As set out in chapter 1, we have relied on four main benchmarking approaches in determining the appropriate cost baselines for the GDNs:

- Totex benchmarking based on 3-year historical and 2-year forecast data rolled forwards to take account of qualitative analysis on changes in outputs and workload volumes; and
- Bottom-up qualitative and regression analysis based on 3-year historical and 2year forecast data to determine the base year costs and rolled forward to take account of changes in outputs and volumes.

9.16. The totex and bottom-up approaches effectively provide a range for the companies' overall efficiency. We have determined our baselines based on an unweighted average of the results of the four approaches. We have not placed

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[19] Ofgem (March 2011) Decision on strategy for the next transmission and gas distribution price controls - RIIO-T1 and GD1 Business plans, innovation and efficiency incentives, pp.44-47 http://www.ofgem.gov.uk/Networks/GasDistr/RIIO-GD1/ConRes/Documents1/GD1decisionbusplan.pdf p.

weight on our middle-up analysis as this has very similar results to the totex work. Including it would effectively put additional weight on the totex results.

9.17. Table 9.2 explains the calculation of our Initial Proposals' totex allowances (pre-IQI). Column (A) shows the GDNs' submitted forecasts with non-controllable costs and costs funded through uncertainty mechanisms excluded. We have also excluded costs associated with loss of metering and replaced it with our assumptions for each of the GDNs.

9.18. Column (B) sets out the companies' forecasts adjusted for our output disallowances. Columns (C) to (G) set out our proposed adjustments to the forecasts under each of the four assessment approaches and the average of these. Columns (H) and (I) set out our totex allowances pre-IQI and the percentage adjustments to the companies' forecasts (pre-IQI).

9.19. Column (J) shows the reconciliation between our allowances based purely on our bottom-up approach and the allowances based on the average of the four methods. Most of our results in this document are presented on the bottom-up basis to provide greater transparency and to split out the elements of our adjustments. This additional reconciliation adjustment is then needed to reconcile with our final allowance based on the four approaches.

**Table 9.2: Combining the elements of the cost analysis to determine our totex allowances (£m, 2009-10 prices pre-IQI)**

| GDN | (A) Submitted normalised forecast (£m p.a.) | (B) Submitted normalised forecast with output adj (£m p.a.) | (C) % adjust-ment under historical totex model | (D) % adjustment under historical Bottom-up | (E) % adjustment under 2 year forecast totex | (F)% adjustment under 2 year forecast Bottom-up | (I) Average of 4 approaches - % reduction | (J) Ofgem totex allowance pre-IQI = (B)*(I) (£m p.a.) | % reduction to GDN forecasts (pre-IQI) =(A-J)/A | Reconciliation between allowances based purely on bottom-up and allowances based on average of the 4 approaches |
|---|---|---|---|---|---|---|---|---|---|---|
| **EoE** | 280.5 | 266.3 | 13.1% | 15.2% | 8.2% | 12.5% | 12.3% | 233.7 | 17% | 3.5% |
| **Lon** | 276.6 | 238.1 | 18.9% | 19.2% | 15.1% | 18.5% | 17.9% | 195.4 | 29% | 1.6% |
| **NW** | 226.6 | 197.6 | 8.7% | 16.3% | 3.8% | 15.0% | 10.9% | 176.0 | 22% | 6.4% |
| **WM** | 172.8 | 155.1 | 4.7% | 14.1% | (0.2%) | 13.6% | 8.0% | 142.6 | 17% | 7.1% |
| **NGN** | 228.6 | 209.3 | 9.0% | 7.2% | 4.1% | 5.1% | 6.3% | 196.1 | 14% | 0.9% |
| **Sc** | 176.9 | 159.4 | 11.8% | 10.7% | 7.6% | 9.2% | 9.8% | 143.7 | 19% | 1.0% |
| **So** | 345.8 | 333.2 | 12.7% | 11.7% | 8.0% | 8.3% | 10.2% | 299.3 | 13% | 1.7% |
| **WWU** | 242.2 | 206.8 | 17.5% | 18.3% | 13.1% | 15.3% | 16.0% | 173.6 | 28% | 2.8% |

9.20. We propose to set allowances based on the expectation that GDNs could close 75 per cent of the assessed gap between their forecasts and the UQ. Our final allowances (post-IQI) and the adjustments to the companies' forecasts are shown in table 9.3 below.

**Table 9.3: Calculation of Totex allowances: post-IQI (£m, 2009-10 prices)**

| Average Annual Costs | | | | |
|---|---|---|---|---|
| | **GDPCR1 Actuals** | **GDN Plan RIIO-GD1** (no output adjustments) | **Ofgem allowance (post IQI)** | **% change between GD1 plan and our allowances** |
| **Industry** | **1,903** | **1,950** | **1,612** | **(17%)** |
| Capex | 403 | 358 | 285 | (20%) |
| Repex | 826 | 848 | 662 | (22%) |
| Opex | 674 | 744 | 665 | (11%) |
| **NGG EoE** | **280** | **281** | **242** | **(14%)** |
| Capex | 48 | 47 | 41 | (13%) |
| Repex | 120 | 114 | 96 | (16%) |
| Opex | 112 | 119 | 105 | (12%) |
| **NGG Lon** | **256** | **277** | **206** | **(26%)** |
| Capex | 53 | 27 | 21 | (22%) |
| Repex | 120 | 163 | 110 | (32%) |
| Opex | 84 | 87 | 75 | (14%) |
| **NGG NW** | **240** | **227** | **181** | **(20%)** |
| Capex | 37 | 29 | 28 | (6%) |
| Repex | 113 | 108 | 75 | (30%) |
| Opex | 91 | 89 | 79 | (12%) |
| **NGG WM** | **171** | **173** | **146** | **(16%)** |
| Capex | 27 | 23 | 21 | (9%) |
| Repex | 83 | 86 | 65 | (25%) |
| Opex | 61 | 63 | 60 | (6%) |
| **NGN** | **192** | **229** | **199** | **(13%)** |
| Capex | 36 | 46 | 41 | (11%) |
| Repex | 84 | 96 | 76 | (21%) |
| Opex | 73 | 87 | 82 | (5%) |
| **SGN SC** | **181** | **177** | **148** | **(17%)** |
| Capex | 54 | 53 | 37 | (31%) |
| Repex | 62 | 48 | 42 | (12%) |
| Opex | 65 | 76 | 69 | (10%) |
| **SGN SO** | **369** | **346** | **308** | **(11%)** |
| Capex | 86 | 74 | 54 | (27%) |
| Repex | 170 | 143 | 139 | (3%) |
| Opex | 113 | 129 | 115 | (11%) |
| **WWU** | **214** | **242** | **182** | **(25%)** |
| Capex | 62 | 58 | 42 | (27%) |
| Repex | 75 | 91 | 59 | (35%) |
| Opex | 77 | 93 | 81 | (13%) |

(1) The annual costs are controllable costs excluding shrinkage, NTS charges, pension deficit costs and licence rates.
(2)The GDN forecast numbers and our allowances are normalised for loss of meterwork and exclude smart metering and streetwork costs associated with the implementation of permitting by new Highways Authorities and lane rental costs.

9.21. The proposed IQI scores for each GDN are set out in Table 9.4. This shows a range in scores from 107 (for NGN) to 122 (for London GDN). We have calculated the income reward/penalty based on each individual GDN; however, we propose to set a single sharing factor for NGGD and SGNs based on the average score for their respective GDNs. In both cases, the average group sharing factor is 63%. The reason for setting a single sharing factor for each group is to address any concerns about cost allocation between GDNs within the same group (if the GDNs were to have different sharing factors)

**Table 9.4: Proposed IQI scores, income reward/penalty and sharing factor**

| | NGGD (East) | NGGD (London) | NGGD (North West) | NGGD (West Midlands) | NGN | SGN (Scotland) | SGN (Southern) | WWU |
|---|---|---|---|---|---|---|---|---|
| IQI score | 114 | 122 | 112 | 109 | 107 | 111 | 111 | 119 |
| Income reward/penalty (% of totex) | 0.14 | -1.24 | 0.44 | 1.05 | 1.38 | 0.68 | 0.61 | -0.76 |
| Sharing factor | 63% | 61% | 63% | 64% | 64% | 63% | 63% | 62% |

# Appendix 1 - Further explanation of our toolkit approach

### Controllable and non-controllable costs

1.1. We have benchmarked costs that we have identified to be within the companies' control (ie controllable costs), and excluded costs we recognised to be outside the companies' control (ie non-controllable costs). Table A1.1 summarises the controllable and non-controllable costs for RIIO-GD1.

**Table A1.1: Costs included/excluded from RIIO-GD1 efficiency assessment**

| Cost | RIIO-GD1 | Cost | RIIO-GD1 |
|---|---|---|---|
| Net Staff Costs (including agency costs) | √ | Non-Salary Recharge to Capex / Repex | √ |
| Materials | √ | LTS (repex topdown) | √ |
| Subcontractors | √ | Risers (repex topdown) | √ |
| Professional and Consultancy Fees | √ | Wayleaves/servitudes/easements | √ |
| Non Salary Staff Costs (including T+S) | √ | Income Received/ Cost Recoveries | √ |
| Rent and Buildings | √ | Shrinkage | √ |
| TMA/NRSWA | √ | R&D | √ |
| Re-instatement costs | √ | xoserve | √ |
| Environmental remediation | √ | Smart Metering | √ |
| Transport and Plant | √ | LNG to SIUs (Scotland only) | √ |
| Other | √ | Ofgem Licence | X |
| Non Formula Staff Overheads | √ | Network Rates | X |
| Meter Reading | √ | Pension deficit / surplus | X |
| Advantica | √ | Bad debt | X |
| SHE | √ | NTS Pension | X |
| Training costs within line of business | √ | Other | X |
| Allocated Costs | √ | Contributions (capex and repex) | X |
| Other | √ | | |
| Note: √ - costs included in analysis; X costs excluded from analysis | | | |

### Normalisation transfers

1.2. There are some inconsistencies in where costs and workload have been reported in the GDNs' business plan submissions. Where these have arisen we have transferred the costs and/or workload to the appropriate activities costs prior to any further assessments being made. We have made clear which costs have been transferred in this in the initial table for each category of costs.

### Other Ofgem adjustments

1.3. We have made additional comparative adjustments by removing costs such as streetworks, Xoserve and SIU costs (Scotland only) which we have assessed separately, and by removing atypical costs which we considered unsuitable for benchmarking. We put back these costs after the comparative regression assessment and therefore include them in our final baselines.

1.4. We have considered additional adjustments to correct for differences in regional labour costs, the extent to which companies incur additional costs associated with working in highly dense urban areas or very sparse rural areas and other differences in companies' operating environments, and ensure that we benchmark companies on a comparable cost basis. The adjustments are only used to determine the comparative efficiency costs and the associated costs are reversed after the comparative assessment so that the final cost baselines reflect these differences.

## Regression analysis

1.5. We have run a wide range of plausible econometric models to assess the efficiency of GDNs' delivery based on our internal analysis, proposals put forward by the companies and discussions at industry working groups. We have consulted our academic advisor, Dr Melvyn Weeks from Cambridge University, to ensure that our regression methodology is appropriate for the analysis we are undertaking.

*Functional form and estimated model*

1.6. We have used one of the most common cost functions employed in empirical cost research, the Cobb-Douglas function, in line with both DPCR5 and GDPCR1. Its simplest form is represented as:

$$\text{Log}(Y) = C + \beta * \log(X) + \varepsilon$$

Where: Y is the measure of costs – eg totex or opex; X is the cost driver – eg network length; β is the slope value; ε is the error term (unexplained costs); and log is the natural logarithm.

1.7. This function accounts for economies of scale, and also transforms the distribution of the data to approximate the normal distribution better than when the data are in their level format. We have applied the above functional form on all our regression cost activities' models except connections[20].

1.8. We have estimated a panel time fixed-effects model using the ordinary least squares technique to improve the sample size and robustness of our analysis. We explained in the March 2011 strategy paper[21] that when a time fixed-effects model is estimated, one can calculate the expected/average cost of performing an activity

[20] The statistical tests suggest that the connections model with data in their level format gives more robust results than the model with data transformed into logarithmic format.
[21] See page 27 at: http://www.ofgem.gov.uk/Networks/GasDistr/RIIO-GD1/ConRes/Documents1/GD1decisioncosts.pdf

in a given year. Where companies' actual costs lie relative to this average level provides an indication of their relative efficiency.

*Forecasts and historical costs models*

1.9. We have estimated models using 3 years' (2009-2011) historical data, and 2 years' (2014-2015) and 8 years' (2014-2015) forecast data for RIIO-GD1. The detailed statistical tests results are presented in the SSGCA supporting Appendix.

1.10. We have rejected the models using the 8 years of forecast data as they fail our key statistical tests. One of the reasons why the model diagnostics are much poorer for the models estimated using 8 year forecast data is that the GDNs have made different assumptions in relation to some costs items and it is difficult to accurately normalise for this in forecast data. For example, the GDNs have made a wide range of assumptions regarding the expected impact of loss of metering and smart metering on emergency service costs. Some GDNs have assumed a large impact on costs from loss of metering contracts in terms of additional idle time for their first call operatives. Their incremental costs of smart metering are then relatively small as the additional workload is largely borne by existing staff. Other GDNs have estimated a relatively small impact of loss of metering and much larger incremental costs associated with smart metering. We consider that it is most appropriate to assess a consistent base year level of costs based on historical information and then apply common assumptions for loss of metering and an uncertainty mechanism for smart metering.

1.11. There are significant differences in the forecast trends for reports, publicly reported escapes (PREs) and repex workload across the GDNs. NGGD and NGN are forecasting reductions in PREs of between 5 and 12 per cent (excluding London), whereas SGN and WWU are forecasting increases of between 2 and 5 per cent across the control period. SGN and WWU are also forecasting an increase in the number of external reports of between 2 and 14 per cent, compared with NGGD and NGN forecasting a decrease of between 13 and 23 per cent, linked to their repex programmes. For some of the major GDN activities there is a significant step up in GDNs' costs between 2010-11 reported costs and the RIIO period after taking into account incremental costs associated with the application of permit schemes by additional local highways authorities, expected lane rental costs and costs associated with smart metering. The GDNs have not adequately explained this increase in costs. For example, a number of GDN plans indicate a 13 per cent increase in the unit cost of laying new mains and a 17 per cent increase in the costs of service work between GDPCR1 actuals and RIIO-GD1.

*Cost drivers*

1.12. Our December 2010 consultation emphasised the need for benchmarking models to take account of the key cost drivers of the business[22]. After further

[22] See page 15 at: http://www.ofgem.gov.uk/Networks/GasDistr/RIIO-GD1/ConRes/Documents1/GD1%20costs%20assess.pdf

consultation with the GDNs and other stakeholders, we have used the criteria discussed in the SSGCA supporting Appendix, which will be published on 3 August, to identify and select our preferred set of cost drivers for the disaggregated activities' models and our total opex, capex, repex and totex models (see Table A1.2). However, we have also investigated models with alternative functional forms/cost drivers. Our analysis presented in the SSGCA supporting Appendix (ie Appendix Tables AA.1.1 and AA.1.2) shows that the GDNs' efficiency rankings and scores are broadly consistent for different model specifications, including NGGD's suggested alternative cost drivers.

**Table A1.2: Costs drivers and CSV weights for RIIO-GD1 regression models**

| | Cost drivers | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Cost Activity** | MEAV | Repex topdown workload | Repex [Tier 1) workload | Capex connections workload | Capex mains-reinforcement workload | Total number of external condition reports | Maintenance MEAV | Customer numbers | Emergency CSV |
| Totex | 38% | 43% | | 2% | 2% | 6% | 5% | | 4% |
| Opex – Topdown | 60% | | | | | 15% | 14% | | 12% |
| Work Management | 100% | | | | | | | | |
| Emergency | | | | | | 20% | | 80% | |
| Repairs | | | | | | 100% | | | |
| Maintenance | | | | | | | 100% | | |
| Capex – Topdown | 80% | | | 10% | 10% | | | | |
| Mains Reinforcement | | | | | 100% | | | | |
| Connections | | | | 100% | | | | | |
| Repex – Topdown | | 100% | | | | | | | |
| Repex (Tier 1) | | | 100% | | | | | | |

Note: A CSV has been calculated for multiple cost drivers.

1.13. Our sensitivity analysis shows no significant difference between the relative performance of the GDNs using NGGD's choice of cost drivers as well as our own. Table A1.3 presents 2011 and 2014 totex performance rankings for historical (2009-2011) and forecast (2014-2015) panel regression models respectively. It shows a minor improvement in the rankings for East of England and worsening in the rankings for West Midlands in the 2011 rankings. The rest of the rankings are identical.

**Table A1.3: GDN's 2011 and 2014 totex performance rankings for Ofgem's and NGGD's models**

| Regression | EoE | | Lon | | NW | | WM | |
|---|---|---|---|---|---|---|---|---|
| | Ofgem | NGG | Ofgem | NGG | Ofgem | NGG | Ofgem | NGG |
| 2011 | 4 | 3 | 8 | 8 | 6 | 6 | 3 | 4 |
| 2014 | 2 | 2 | 8 | 8 | 4 | 4 | 1 | 1 |
| Regression | NGN | | Sc | | So | | WWU | |
| | Ofgem | NGG | Ofgem | NGG | Ofgem | NGG | Ofgem | NGG |
| 2011 | 1 | 1 | 5 | 5 | 7 | 7 | 2 | 2 |
| 2014 | 3 | 3 | 5 | 5 | 6 | 6 | 7 | 7 |
| Note: Ofgem - ofgem's totex model; NGG - NGG's totex model | | | | | | | | |

1.14. We have consulted the GDNs extensively on the development and use of a modern equivalent asset value (MEAV) as a scale driver for various cost activities. This not only reflects size, asset base and complexity of a network, but also captures the three variables (number of customers, network length and throughput) which were used as scale variables during GDPCR1 and DPCR4.

1.15. We consider combining MEAV (when engineering knowledge suggests that the scale of operation drives costs) with workload drivers as an appropriate approach which reflects a balance of fixed and variable costs. We have used workload drivers from each of the broadly aggregated costs (opex, capex and repex) for the single totex model.

1.16. We recognise NGGD's argument that the use of workload drivers may mean that efficiencies in workload volumes are not adequately captured. However, we are reflecting different elements of scale in our composite scale variables (CSVs) and have carried out separate analysis to determine the necessary workload adjustments. This ensures that any workload inefficiencies are identified and addressed.

1.17. We have used CSVs in models with multiple cost drivers. We have consulted and recognised the GDNs' concerns on the calculation CSVs and have adopted an approach of basing the CSV weights on industry spend proportions for the disaggregated cost activities to which the drivers apply. The residual (where applicable) is then applied to the scale variable, MEAV. We consider that this approach is both intuitive and takes into account the relative importance of each cost driver based on the knowledge of the GDNs' costs. The CSV weights are reported in Table A1.2 and the methodology for calculating the weights is discussed in the SSGCA supporting Appendix.

1.18. WWU has suggested that a range of additional factors need to be included in our disaggregated regression analysis including the maintenance philosophy, the amount of non-routine work carried out, the age and condition of infrastructure, taking greater account of fixed costs and variable costs by geography.

1.19. We have made amendments to the emergency cost driver to address some of the concerns that have been raised. The new composite scale variable places an 80 per cent weight on customer numbers and a 20 per cent weight on external condition reports. We consider that fixed costs are taken into account as part of the regression analysis and that differences due to geography are taken into account through sparsity adjustments. Differences in age and condition are also proxied through the use of workload drivers. It is impractical to take the full range of factors into account as some are not quantifiable and there are limited degrees of freedom due to the number of years' data that we have.

*Other regression analysis issues*

1.20. A number of GDNs have argued that compliance with licence condition, standards of performance etc need to be considered in assessing whether a company provides a suitable benchmark.

1.21. As part of our qualitative assessment we consider whether the benchmarks are suitable and, if not, apply adjustments to them. This includes whether the companies setting the benchmark have performed satisfactorily under standards of performance and their other licence conditions. We have included additional historical emergency costs of £0.75m in 2010-11 for NGN and each of the four NGGD GDNs where they have failed the emergency service standard.

**Non-regressed activities**

1.22. We consider that certain activities are more suitable for technical assessment in our disaggregated analysis because their costs are irregular, projects are more bespoke in nature or suitable cost drivers have not been identified. Table 1.1 of Chapter 1 shows the 13 non-regression cost activities which we have identified for technical assessment.

1.23. However, with the exception of Xoserve and SIUs (Scotland only), the non-regression cost activities are included in our higher level total opex, capex, repex and totex regressions.

**Qualitative assessment of the GDNs' forecasts**

1.24. We have together with our consultants carried out qualitative assessment of the companies' forecast information to determine how costs should be rolled forward to take account of changes in workload drivers, ie changes in the volumes of publicly reported escapes, external condition reports, tier 1 repex mains and associated service volumes etc. We have used this to inform our roll forward of efficient base year costs based on regression analysis for movements in workload drivers and also to assess the efficiency of costs in our non-regression cost activities.

1.25. The qualitative work has been extensive considering both the November business plan submissions and revised submissions in April. Both we and our consultants have also used undertaken visits to the companies and issued more detailed specific questions to aid our understanding of the business plan submissions.

1.26. We have focussed on the evidence submitted by the GDNs to justify workload volumes and output proposals. For example we have looked at the length of tier 1 iron mains (</=8” diameter) remaining on the network at the start of RIIO-GD1 to understand the volumes that would need to be completed in RIIO-GD1 to meet the target of decommissioning all iron mains within 30 metres of a property by 2032.

1.27. In particular where GDNs have proposed rates different to this assessment we have considered further the evidence included in their plan to justify a higher workload. Similarly on company specific factors and regional factors we have considered the evidence put forward by the GDNs to reach our view on proposed factors. We have considered the work done by both the GDNs and our consultants in determining our view of allowances.

**Presentation of costs**

1.28. We set out tables in the following appendices which summarise the company cost submissions and our Initial Proposals. The table format is set out below, and explains the difference between GDN submitted costs and our proposed allowances.

**Table A1.4: Explanation of adjustments**

| GDN Submitted costs for RIIO-GD11 | Normalised submitted Costs | Adjustments to normalised submitted costs | | | | | Ofgem Proposed Allowances |
|---|---|---|---|---|---|---|---|
| | | Efficiency (Regression, RPEs, Ongoing efficiencies) | Efficiency (qualitative) | Workload (outputs) | Uncertainty | Reconciliation between historical bottom-up and final allowance | |
| (a) | (b) | (c) | (d) | (e) | (f) | (g) | (h) |
| This figure shows the annualised average forecast expenditure reported by the GDNs in their BPDT for the RIIO period (eight years 2014-2021), and includes assumptions for Real Price Effects (RPEs) | This figure shows the annualised average GDN submitted costs after the transfer of costs Ofgem considers should be assessed under a different cost category. (For each network the sums transferred between activities sum to zero on a totex basis.) | Efficiency covers several areas - annualised regression, RPEs and ongoing efficiencies adjustments.<br><br>Regression - the annualised adjustment to costs resulting from regression benchmarking, and assumes no change in outputs/workloads to those proposed by the GDNs.<br><br>RPEs and ongoing efficiencies - the annualised net figures of the GDN assumptions and Ofgem's assumptions for both RPEs and ongoing efficiencies. | This figure shows the annualised adjustment to costs determined by other efficiency analysis (eg qualitative assessment of non-operational capex or business support costs, adjustments to opex workload associated with relatively high assumptions for deterioration).<br><br>This figure assumes no changes in outputs/workloads to those proposed by the GDNs. | This figure shows the adjustment to costs associated with outputs/workload disallowed that has not been adequately justified, eg where there is inadequate evidence to support investment in LTS asset integrity or we do not consider that tier 2 or 3 repex workload is adequately justified through cost-benefit analysis. | This figure shows the adjustment to costs where Ofgem has transferred the costs to an uncertainty mechanism outside of the price control baselines (this figure excludes all submitted smart metering costs) | This figure shows the percentage annualised adjustment between our cost allowances based purely on the results of our historical bottom-up analysis and our cost allowances based on the average of the four cost assessment approaches. | This figure shows the annualised initial proposals allowance (pre IQI) |

# Appendix 2 – Further detail of our opex analysis

1.1. This appendix sets out further detail on our operating cost analysis.

## Work management

*Regression analysis*

1.2. We have used MEAV as the cost driver for the regression consistent with what we indicated in our March strategy decision. We consider that work management costs are driven by a combination of factors that relate to the scale of the network operation, and that MEAV captures these factors well. The regression diagnostics indicated a strong relationship between the work management costs and MEAV.

1.3. We have excluded costs associated with gas holder decommission, land remediation, streetworks and smart metering. These have been addressed separately as set out in chapter 4.

*Allowances*

1.4. Allowances for work management are based on our benchmark (regression) analysis plus our assessment of efficient land remediation, gasholder demolition, streetwork costs and our view of RPEs and ongoing efficiencies.

**Table A2.1: Submitted work management costs, adjustments and Ofgem's proposed allowances (annualised £m, 2009-10 prices)**

| Work Management | Actual costs 2009-11 | GDN Submitted costs for RIIO-GD1[1] | Normalised submitted Costs[1] | Adjustments to normalised submitted costs | | | | | Ofgem Proposed Allowances | Ofgem Proposed v GDN normalised submitted costs |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Efficiency (Regression, RPEs, Ongoing efficiencies) | Efficiency (qualitative) | Workload (outputs) | Uncertainty | Reconciliation between historical bottom-up and final allowance | | |
| EoE | 23.4 | 29.3 | 29.3 | (5.6) | (2.0) | (0.3) | (0.8) | 0.7 | 21.3 | (27.5%) |
| Lon | 17.0 | 22.8 | 22.8 | (2.6) | (1.8) | (0.8) | (0.1) | 0.3 | 17.8 | (22.1%) |
| NW | 20.8 | 23.7 | 23.7 | (4.2) | (0.9) | (0.5) | (1.0) | 1.1 | 18.1 | (23.7%) |
| WM | 15.0 | 16.5 | 16.5 | (2.5) | (0.1) | (0.3) | 0.0 | 1.0 | 14.5 | (12.3%) |
| NGN[2] | 16.9 | 18.0 | 19.5 | (2.8) | 0.0 | (0.0) | 0.0 | 0.2 | 16.9 | (13.6%) |
| SC | 14.3 | 18.3 | 18.3 | (1.7) | (0.3) | (1.0) | (0.2) | 0.2 | 15.2 | (16.5%) |
| SO | 23.0 | 32.8 | 32.8 | (2.6) | (0.2) | (3.7) | (0.4) | 0.4 | 26.3 | (19.7%) |
| WWU | 18.9 | 21.1 | 21.1 | (2.5) | (0.6) | (0.3) | 0.0 | 0.5 | 18.2 | (14.0%) |
| **Total** | **149.4** | **182.6** | **184.1** | **(24.6)** | **(5.9)** | **(7.0)** | **(2.5)** | **4.3** | **148.2** | **(19.5%)** |

[1]inclusive of RPEs

[2] £12m land remediation costs reallocated from Other Capex *(£1.5m annualised)*

## Emergency

*Regression analysis*

1.5. We have used our newly proposed cost driver for the emergency activity, a composite scale variable based on customer numbers and external condition reports with weightings of 80 and 20 per cent respectively (and as discussed in chapter 2). The emergency efficiency adjustment is positive for all companies except North West and Southern, where this is negligibly negative.

1.6. Given that we based our allowances on the unit cost derived from the historical regression, the results suggest that the companies are forecasting lower costs for the RIIO period relative to the actual costs they incurred for 2009-2011, per unit of the CSV cost driver.

1.7. We have excluded costs for loss of meterwork and smart metering and included workload adjustments for external condition reports (as discussed in chapter 4).

1.8. We also normalised £55m of NGGD's costs, identified within the emergency activity, for the survey of medium rise multi-occupancy buildings (MOBs). We have reallocated these costs to maintenance, which is discussed in chapter 6.

*Allowances*

1.9. Allowances for emergency services are based on our benchmark (regression) analysis plus our assessment of loss of meterwork and our view of RPEs and ongoing efficiencies.

1.10. Our proposed annual allowances for the emergency activity are shown in Table A2.2.

**Table A2.2: Submitted emergency costs, adjustments and Ofgem's proposed allowances (annualised £m, 2009-10 prices)**

| Emergency | Actual costs 2009-11 | GDN Submitted costs for RIIO-GD1[1] | Normalised submitted Costs[1] | Adjustments to normalised submitted costs | | | | | Ofgem Proposed Allowances | Ofgem Proposed v GDN normalised submitted costs |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Efficiency (Regression, RPEs, Ongoing efficiencies) | Efficiency (qualitative)[2] | Workload (outputs)[3] | Uncertainty | Reconciliation between historical bottom-up and final allowance | | |
| EoE[4] | 14.5 | 19.8 | 17.8 | (0.1) | (0.0) | (3.3) | 0.0 | 0.5 | 14.9 | (16.3%) |
| Lon[4] | 11.3 | 16.8 | 13.9 | (0.2) | (0.2) | (4.0) | 0.0 | 0.2 | 9.6 | (30.5%) |
| NW[4] | 10.8 | 14.3 | 13.2 | (1.5) | (0.3) | (2.2) | 0.0 | 0.6 | 9.9 | (25.2%) |
| WM[4] | 7.1 | 9.8 | 8.8 | (0.2) | (0.0) | (1.2) | 0.0 | 0.5 | 7.9 | (11.2%) |
| NGN | 8.9 | 10.7 | 10.7 | (0.2) | (0.3) | 0.0 | 0.0 | 0.1 | 10.4 | (3.5%) |
| SC | 7.3 | 11.4 | 11.4 | (1.2) | (0.2) | (2.5) | 0.0 | 0.1 | 7.6 | (33.6%) |
| SO | 15.9 | 25.0 | 25.0 | (3.5) | (0.3) | (5.0) | 0.0 | 0.3 | 16.4 | (34.5%) |
| WWU | 9.0 | 12.0 | 12.0 | 0.6 | (0.4) | (1.7) | 0.0 | 0.3 | 10.9 | (9.2%) |
| **Total** | **84.9** | **119.7** | **112.8** | **(6.3)** | **(1.8)** | **(19.8)** | **0.0** | **2.5** | **87.4** | **(22.5%)** |

[1] inclusive of RPEs

[2] efficiency (qualitative) is made up of revised deterioration rates (£14m) *(£1.8m annualised)*

[3] workload adjustment is made up of loss of metering (£160m) and repex programme adjustment £1.7m *(loss of metering annualised (£20m) and repex related workload adjustment £0.2m)*

[4] £55m NGGD costs for MOBs reallocated from emergency to maintenance *(£6.9m annualised)*

1.11. NGGD's has forecast a decrease in costs of between 12 and 28 per cent between their normalised historical average annual expenditure for 2009-2011 and their normalised forecast average costs for the RIIO-GD1 period. The assumptions and drivers behind this are discussed in chapter 6, paragraph 6.3.

## Repairs

*Background*

1.12. The repair activity is the process set up to repair gas escapes from gas distribution assets. Repair costs are the costs of the team attending site locating, excavating and repairing a leaking main and reinstating the highway or road. We believe that the repair activity is driven by the number of external condition reports received and in turn the number of external condition reports is driven by the length of remaining metallic mains.

*Regression analysis*

1.13. Our regression analysis calculates an efficient unit cost on the basis of actual expenditure from 2008-09 to 2010-11. RIIO-GD1 forecast data shows that East of

England, North West and West Midlands are efficient relative to the historical unit cost, mainly because of their significant reduction in forecast expenditure for RIIO-GD1. On the other hand London, despite a reduction in its expenditure forecasts, and NGN, due to an increase in its expenditure forecasts combined with a decrease in workload forecasts, is relatively inefficient.

1.14. We have excluded costs for streetworks and included workload adjustments for external condition reports (as discussed in chapters 4 and 6 respectively) as part of our regression analysis.

1.15. The GDNs' submitted costs and our proposed cost allowances are shown in Table A2.3.

**Table A2.3: Submitted repairs costs, adjustments and Ofgem's proposed allowances (annualised £m, 2009-10 prices)**

| Repair | Actual costs 2009-11 | GDN Submitted costs for RIIO-GD1[1] | Normalised submitted Costs[1] | Adjustments to normalised submitted costs | | | | | Ofgem Proposed Allowances | Ofgem Proposed v GDN normalised submitted costs |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Efficiency (Regression, RPEs, Ongoing efficiencies) | Efficiency (qualitative) | Workload (outputs) | Uncertainty[2] | Reconciliation between historical bottom-up and final allowance | | |
| EoE | 13.7 | 12.8 | 12.8 | (0.0) | 0.1 | 0.1 | (1.8) | 0.4 | 11.4 | (10.4%) |
| Lon | 16.9 | 17.7 | 17.7 | (3.5) | (1.4) | 0.1 | (2.6) | 0.2 | 10.4 | (41.1%) |
| NW | 13.4 | 10.8 | 10.8 | 0.5 | (1.3) | 0.1 | (1.5) | 0.6 | 9.2 | (14.7%) |
| WM | 7.2 | 6.6 | 6.6 | 0.8 | (0.2) | 0.0 | (0.7) | 0.5 | 7.0 | 5.9% |
| NGN | 15.3 | 17.4 | 17.4 | (3.3) | (2.1) | 0.2 | (0.6) | 0.1 | 11.8 | (32.4%) |
| SC | 8.2 | 9.8 | 9.8 | (1.6) | (1.3) | 0.0 | (0.1) | 0.1 | 7.0 | (28.7%) |
| SO | 23.8 | 23.8 | 23.8 | (2.0) | (2.1) | 0.0 | (0.6) | 0.3 | 19.4 | (18.2%) |
| WWU | 10.8 | 12.7 | 12.7 | (1.7) | (2.0) | 0.1 | 0.0 | 0.3 | 9.4 | (26.2%) |
| **Total** | **109.2** | **111.6** | **111.6** | **(10.8)** | **(10.4)** | **0.7** | **(7.8)** | **2.3** | **85.7** | **(23.2%)** |

[1] inclusive of RPEs

1.16. Our deterioration and repex related workload adjustments are discussed in detail in chapter 6. The deterioration workload adjustment falls under the efficiency (qualitative) variance in the above table and workloads revised in line with the proposed repex workloads fall under the workload (outputs) variance.

1.17. We have noted when comparing NGGD normalised historical average annual expenditure for 2009-2011 against their normalised forecast average costs for the RIIO-GD1 period that they are forecasting a decrease in costs of between 19-35 per cent for their GDNs in the repair activity. The assumptions and drivers behind this are discussed in chapter 6, paragraph 6.3.

## Maintenance

*Background*

1.18. The maintenance activity includes routine and non-routine examination and overhaul of network assets to ensure that all the assets operate safely and efficiently.

*Cost drivers and efficiency*

1.19. For the maintenance activity we based our efficiency analysis on a regression of total maintenance costs (routine and non-routine) using 'maintenance MEAV' as a cost driver.

1.20. We determined an efficient unit (and fixed) cost based on actual data from 2008-09 to 2010-11 as well as efficient costs based on two years of forecast data. The efficient unit cost implies an efficiency adjustment that reduces GDNs' forecast except in the case of London and NGN. This suggests the GDNs forecast per maintenance MEAV for the RIIO-GD1 period are higher than historical levels.

*Allowances*

1.21. Allowances are based on our benchmark (regression) analysis plus adjustments for gasholders maintenance, non-mandatory iron mains surveys, RPEs and ongoing efficiencies. For NGGD the allowances include MOBs survey costs.

**Table A2.4: Maintenance costs, adjustments and Ofgem's proposed allowances (annualised £m, 2009-10 prices)**

| Maintenance | Actual costs 2009-11 | GDN Submitted costs for RIIO-GD1[1] | Normalised submitted Costs[1] | Adjustments to normalised submitted costs | | | | | Ofgem Proposed Allowances | Ofgem Proposed v GDN normalised submitted costs |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Efficiency (Regression, RPEs, Ongoing efficiencies) | Efficiency (qualitative) | Workload (outputs) | Uncertainty | Reconciliation between historical bottom-up and final allowance | | |
| EoE[2] | 15.0 | 19.9 | 21.9 | (7.9) | (0.0) | 1.4 | 0.0 | 0.5 | 15.8 | (27.6%) |
| Lon[2] | 8.9 | 9.0 | 11.9 | (1.1) | 0.0 | 0.6 | 0.0 | 0.2 | 11.6 | (2.5%) |
| NW[2] | 12.2 | 12.9 | 14.0 | (4.5) | 0.0 | 0.6 | 0.0 | 0.6 | 10.8 | (22.8%) |
| WM[2] | 7.1 | 8.3 | 9.3 | (1.4) | 0.0 | 0.5 | 0.0 | 0.6 | 9.0 | (3.6%) |
| NGN | 8.3 | 9.1 | 9.1 | (0.8) | 0.0 | (0.2) | (0.1) | 0.1 | 8.1 | (11.4%) |
| SC | 9.9 | 10.7 | 10.7 | (3.7) | 0.0 | 0.8 | 0.0 | 0.1 | 7.9 | (26.2%) |
| SO | 17.4 | 16.9 | 16.9 | (3.4) | 0.0 | 1.9 | 0.0 | 0.3 | 15.6 | (7.4%) |
| WWU | 9.6 | 15.2 | 15.2 | (4.9) | 0.0 | 1.0 | (0.0) | 0.3 | 11.5 | (24.1%) |
| **Total** | **88.4** | **102.0** | **108.9** | **(27.8)** | **0.0** | **6.6** | **(0.1)** | **2.7** | **90.4** | **(17.1%)** |

[1] inclusive of RPEs
[2] £55m NGGD costs for MOBs reallocated from emergency to maintenance *(£6.9m annualised)*

## Other direct activities

1.22. Other direct activities cover a wide range of areas from tools and equipment to interruption payments. We analysed these costs mainly by comparing forecast levels submitted by the GDNs with actual spend in 2008-9 to 2010-11. We also examined results from other benchmark analyses, including a regression analysis on a scale variable (eg MEAV) and ODA costs as a percentage of total costs.

1.23. Our analysis showed that the GDNs forecast costs for RIIO-GD1 are consistent with historical levels. Given the relatively low materiality of ODA costs, our proposal is, therefore, to set ODA allowances equal to the GDNs forecasts, but replace their forecast of RPEs with ours. We do not propose to apply further ongoing efficiency assumptions given that we base the allowances on GDNs' cost forecasts, which, in turn, incorporate their view of ongoing efficiency.

1.24. Our ODA allowances include a provision for smart metering set up costs. See discussion in chapter 4 under "Smart metering and loss of meterwork".

1.25. Table A2.5 shows our proposed ODA annual allowances versus annual costs incurred from 2008-9 to 2010-11 and versus GDN submitted costs for the RIIO-GD1 period. As the table demonstrates, the higher allowance for NGN and Scotland Gas Networks is due to qualitative efficiency adjustment related to interruption costs. The lower allowance (relative to submitted normalised costs) for WWU is mainly due to the removal of streetworks costs into an uncertainty mechanism.

**Table A2.5: ODA costs, adjustments and Ofgem's proposed allowances (annualised £m, 2009-10 prices)**

| ODA | Actual costs 2009-11 | GDN Submitted costs for RIIO-GD1[1 2] | Normalised submitted Costs[1 2] | Adjustments to normalised submitted costs | | | | | Ofgem Proposed Allowances[2] | Ofgem Proposed v GDN normalised submitted costs |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Efficiency (Regression, RPEs, Ongoing efficiencies) | Efficiency (qualitative) | Workload (outputs) | Uncertainty | Reconciliation between historical bottom-up and final allowance | | |
| EoE | 9.1 | 10.1 | 10.1 | (0.3) | 0.2 | 0.0 | 0.0 | 0.4 | 10.4 | 2.6% |
| Lon | 6.0 | 6.5 | 6.5 | (0.2) | 0.1 | 0.0 | 0.0 | 0.1 | 6.5 | 0.2% |
| NW | 6.0 | 6.8 | 6.8 | (0.2) | 0.4 | 0.0 | 0.0 | 0.4 | 7.5 | 8.9% |
| WM | 4.4 | 5.3 | 5.3 | (0.1) | 0.1 | 0.0 | 0.0 | 0.4 | 5.6 | 7.2% |
| NGN | 5.2 | 10.8 | 10.8 | (0.0) | 3.7 | 0.0 | 0.0 | 0.1 | 14.6 | 35.7% |
| SC | 5.1 | 6.1 | 6.1 | (0.0) | 1.8 | 0.0 | 0.0 | 0.1 | 7.9 | 30.3% |
| SO | 8.6 | 10.7 | 10.7 | (0.1) | 0.1 | 0.0 | 0.0 | 0.2 | 11.0 | 2.6% |
| WWU | 10.0 | 8.5 | 8.5 | (0.5) | 0.1 | 0.0 | (1.4) | 0.2 | 6.9 | (18.6%) |
| **Total** | **54.5** | **64.8** | **64.8** | **(1.3)** | **6.6** | **0.0** | **(1.4)** | **1.9** | **70.4** | **8.7%** |

[1] inclusive of RPEs
[2] inclusive of xoserve costs

1.26. Our proposed approach to dealing with the expected change to Xoserve's funding arrangements is discussed in the Finance and Uncertainty Supporting Document (uncertainty chapter). Also, NTS flat costs are not included in the above table. Where NTS flat costs were reported as a controllable cost under ODA we normalised these costs out to be treated as uncontrollable.

## Business Support

Business support costs are the costs that support the overall business and include: information systems and telecoms, property management, finance, audit and regulation, HR and non operational training, CEO and other corporate functions. Table A2.6 summarises our initial proposals for all GDNs and shows how these differ from GDNs forecasts.

**Table A2.6: Business Support (excluding training, apprentices and R&D) and Ofgem's proposed allowances (annualised £m, 2009-10 prices)**

| Business Support (excl Training & Apprentices and R&D) | Actual costs 2009-11 | GDN Submitted costs for RIIO-GD1[1] | Normalised submitted Costs[1] | Adjustments to normalised submitted costs | | | | | Ofgem Proposed Allowances | Ofgem Proposed v GDN normalised submitted costs |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Efficiency (Regression, RPEs, Ongoing efficiencies) | Efficiency (qualitative) | Workload (outputs) | Uncertainty | Reconciliation between historical bottom-up and final allowance | | |
| EoE | 24.1 | 29.4 | 29.4 | (0.8) | (6.9) | 0.0 | 0.0 | 0.8 | 22.5 | (23.7%) |
| Lon | 14.6 | 19.0 | 19.0 | (0.6) | (4.4) | 0.0 | 0.0 | 0.2 | 14.2 | (25.3%) |
| NW | 19.6 | 22.7 | 22.7 | (0.6) | (5.3) | 0.0 | 0.0 | 1.1 | 17.8 | (21.5%) |
| WM | 14.9 | 16.7 | 16.7 | (0.5) | (3.9) | 0.0 | 0.0 | 0.9 | 13.1 | (21.1%) |
| NGN | 14.0 | 18.3 | 18.3 | (0.5) | (3.1) | 0.0 | 0.0 | 0.1 | 14.9 | (18.4%) |
| SC | 9.7 | 12.3 | 12.3 | (0.2) | (2.3) | 0.0 | 0.0 | 0.1 | 10.0 | (19.2%) |
| SO | 17.5 | 22.6 | 22.6 | (0.5) | (4.2) | 0.0 | 0.0 | 0.3 | 18.3 | (19.1%) |
| WWU | 12.1 | 20.2 | 20.2 | (1.2) | (2.1) | 0.0 | 0.0 | 0.5 | 17.4 | (13.9%) |
| **Total** | **126.4** | **161.2** | **161.2** | **(4.8)** | **(32.2)** | **0.0** | **0.0** | **3.9** | **128.2** | **(20.5%)** |

[1] inclusive of RPEs

## Training and apprentices

1.27. All GDNs forecast to recruit significant numbers of apprentices and other trainees in their business plans. This is due to a need to replace an ageing workforce, as discussed in chapter 6, 6.26. Table A2.8 sets out the GDNs' forecasts and our proposed allowances for training and apprentices.

**Table A2.8: Training and apprenticeships and Ofgem's proposed allowances (annualised £m, 2009-10 prices)**

| Training & Apprentices | Actual costs 2009-11 | GDN Submitted costs for RIIO-GD1[1] | Normalised submitted Costs[1] | Adjustments to normalised submitted costs | | | | | Ofgem Proposed Allowances (incl uplift) | Ofgem Proposed v GDN Normalisation |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Efficiency (Regression, RPEs, Ongoing efficiencies) | Efficiency (qualitative) | Workload (outputs) | Uncertainty | Reconciliation between historical bottom-up and final allowance | | |
| EoE | 10.3 | 5.7 | 5.7 | (0.2) | (2.5) | 0.0 | 0.0 | 0.1 | 3.1 | (45.2%) |
| Lon | 8.6 | 2.3 | 2.3 | (0.1) | (1.0) | 0.0 | 0.0 | 0.0 | 1.3 | (45.4%) |
| NW | 7.1 | 3.8 | 3.8 | (0.1) | (1.9) | 0.0 | 0.0 | 0.1 | 1.8 | (51.4%) |
| WM | 4.5 | 2.7 | 2.7 | (0.1) | (1.6) | 0.0 | 0.0 | 0.1 | 1.1 | (58.9%) |
| NGN | 3.7 | 4.1 | 4.1 | (0.1) | 0.0 | 0.0 | 0.0 | 0.0 | 4.0 | (1.5%) |
| SC | 3.2 | 2.7 | 2.7 | (0.1) | (0.4) | 0.0 | 0.0 | 0.0 | 2.3 | (16.2%) |
| SO | 5.8 | 4.9 | 4.9 | (0.1) | (1.1) | 0.0 | 0.0 | 0.1 | 3.8 | (22.6%) |
| WWU | 6.8 | 3.9 | 3.9 | (0.1) | (1.7) | 0.0 | 0.0 | 0.1 | 2.2 | (43.4%) |
| **Total** | **50.0** | **30.1** | **30.1** | **(0.9)** | **(10.1)** | **0.0** | **0.0** | **0.5** | **19.6** | **(34.8%)** |

[1] inclusive of RPEs

# Appendix 3 – Further detail of our capex analysis

1.28. This appendix sets out further detail on our Capex analysis.

## LTS & storage

1.29. LTS and storage capital expenditure includes activities on LTS pipelines, offtake stations from the NTS, pressure reduction stations within the LTS and diurnal storage facilities on both the LTS and distribution systems.

1.30. Three normalisations have been applied to WWUs submitted costs. These are £0.95m associated with the demolition of gas holders (for separate assessment), £9.14m associated with pressure management on the distribution network and £7.24m associated with cathodic protection on the distribution network. The two distribution network costs (£16.38m) have been re-allocated to the "other capex" category. No normalisations were applied to other networks.

**Table A3.1: LTS Capex costs, adjustments and Ofgem's proposed allowances (annualised £m, 2009-10 prices)**

| LTS and Storage | Actual costs 2009-11 | GDN Submitted costs for RIIO-GD1[1] | Normalised submitted Costs[1] | Adjustments to normalised submitted costs | | | | | Ofgem Proposed Allowances | Ofgem Proposed v GDN normalised submitted costs |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Efficiency (Regression, RPEs, Ongoing efficiencies) | Efficiency (qualitative) | Workload (outputs) | Uncertainty | Reconciliation between historical bottom-up and final allowance | | |
| EoE | 5.2 | 8.6 | 8.6 | (0.3) | 0.0 | (1.6) | 0.0 | 0.2 | 6.9 | (19.7%) |
| Lon | 28.0 | 3.6 | 3.6 | (0.1) | 0.0 | (0.5) | 0.0 | 0.0 | 3.0 | (14.9%) |
| NW | 3.1 | 5.4 | 5.4 | (0.2) | 0.0 | (0.5) | 0.0 | 0.3 | 5.0 | (7.9%) |
| WM | 2.0 | 4.0 | 4.0 | (0.1) | 0.0 | (0.5) | 0.0 | 0.2 | 3.7 | (8.8%) |
| NGN | 4.0 | 13.2 | 13.2 | (0.2) | 0.0 | (2.2) | 0.0 | 0.1 | 10.9 | (17.5%) |
| SC | 12.5 | 21.0 | 21.0 | (0.1) | 0.0 | (8.8) | 0.0 | 0.1 | 12.1 | (42.2%) |
| SO | 26.2 | 20.1 | 20.1 | (0.2) | 0.0 | (4.0) | 0.0 | 0.3 | 16.2 | (19.4%) |
| WWU[2,3] | 18.8 | 18.1 | 16.0 | (0.6) | 0.0 | (7.9) | 0.0 | 0.2 | 7.7 | (52.0%) |
| **Total** | **99.6** | **94.0** | **92.0** | **(2.0)** | **0.0** | **(26.0)** | **0.0** | **1.5** | **65.6** | **(28.7%)** |

[1] inclusive of RPEs
[2] £62.5m of LTS repex reported as repex. GDNs were asked to report replacement LTS pipelines as LTS capex so £62.5m has been reallocated to capex LTS & storage *(£7.8m annualised).* This has been moved into the WWU's submitted costs
[3] £9.1m pressure management costs and £7.2m cathodic protection costs for distribution mains transferred from LTS and Storage to Other Capex *(£2m annualised)*

## Mains reinforcement and growth governors

1.31. GDNs are required to design and manage their network to meet the 1 in 20 peak demand requirement, which is the level of demand that would be exceeded in 1 out of 20 winters. This requirement often results in the GDNs carrying out localised reinforcement on the <7barg network. Usually this involves the installation of new gas mains, the installation of new pressure reduction equipment or a combination of the two, to provide increased capacity at specific locations.

*Allowances*

1.32. A summary of the GDNs normalised forecast capex reinforcement compared to our proposed allowances is set out in table A3.2.

**Table A3.2: Capex mains reinforcement costs, adjustments and Ofgem's proposed allowances (annualised £m, 2009-10 prices)**

| Capex - Mains | Actual costs 2009-11[1] | GDN Submitted costs for RIIO-GD1[2] | Normalised submitted Costs[2] | Adjustments to normalised submitted costs: Efficiency (Regression, RPEs, Ongoing efficiencies) | Efficiency (qualitative) | Workload (outputs) | Uncertainty | Reconciliation between historical bottom-up and final allowance | Ofgem Proposed Allowances | Ofgem Proposed v GDN normalised submitted costs |
|---|---|---|---|---|---|---|---|---|---|---|
| EoE | 2.3 | 4.7 | 4.7 | (1.0) | 0.0 | 0.0 | 0.0 | 0.1 | 3.8 | (19.7%) |
| Lon[3] | 0.6 | 5.2 | 2.8 | (0.8) | 0.0 | 0.0 | 0.0 | 0.0 | 2.1 | (26.7%) |
| NW | 2.4 | 3.0 | 3.0 | (0.5) | 0.0 | 0.0 | 0.0 | 0.2 | 2.7 | (10.0%) |
| WM | 2.8 | 1.7 | 1.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 1.9 | 8.0% |
| NGN | 4.8 | 5.0 | 5.0 | (1.5) | 0.0 | 0.0 | (0.0) | 0.0 | 3.5 | (29.6%) |
| SC[4] | 13.9 | 9.3 | 5.0 | (0.4) | (0.2) | 0.0 | 0.0 | 0.0 | 4.4 | (11.3%) |
| SO[5] | 21.0 | 17.9 | 7.2 | (0.1) | (0.2) | 0.0 | (0.2) | 0.1 | 6.8 | (5.1%) |
| WWU | 8.3 | 9.3 | 9.3 | (3.0) | 0.0 | 0.0 | 0.0 | 0.2 | 6.6 | (29.8%) |
| **Total** | **56.0** | **56.1** | **38.7** | **(7.3)** | **(0.3)** | **0.0** | **(0.2)** | **0.8** | **31.6** | **(18.2%)** |

[1] includes growth governor expenditure

[2] inclusive of RPEs

[3] £19.3m capitalised replacement mains from capex to repex *(£2.4m annualised)*

[4] £34.5m capitalised replacement mains from capex to repex *(£4.3m annualised)*

[5] £86m capitalised replacement mains from capex to repex *(£10.7m annualised)*

1.33. We consider mains reinforcement and growth (new) governors as a single category. However when we set the allowances we assessed these activities separately using regression as the principal assessment for mains reinforcement and specialist technical assessment to assess proposed expenditure for growth governors.

1.34. Our methodology for setting allowances for replacement/renewal of existing governors is set out under the governor replacement section below.

*Normalisations*

Upsized mains replacement (capitalised replacement)

1.35. North London, Southern and Scotland networks reported a total of £139.8m of upsized mains replacement. For these networks we have transferred the proposed mains reinforcement workload and costs associated with upsizing of mains from capex mains reinforcement to repex mains replacement. For this data normalisation we assumed the following:

- All upsized mains replacement is enabling work for tier 1 repex work.
- Mains reinforcement expenditure and workload reported at <=180mm diameter band equates to the >125mm to 180mm repex diameter band.
- Mains reinforcement expenditure and workload >180mm diameter band was equates to the 250mm repex diameter band.

1.36. Historically SGN also reported upsizing of mains replacement in 2010-11 under capex mains reinforcement. For the historical regression analysis, the workload and costs were transferred to mains replacement repex in line with the normalisations made for forecast upsized mains replacement activity.

Streetworks

1.37. For benchmarking purposes £6.7m of street works expenditure was excluded from mains reinforcement expenditure.

Growth district governors

1.38. Historically growth governor workload and expenditure were classified as governor activity along with replacement and service governors. However for RIIO-GD1 reporting growth governors were re-classified as reinforcement activity.

1.39. For benchmarking purposes the expenditure associated with growth governors were excluded from mains reinforcement costs and assessed separately. Efficient costs associated with growth governors were added back to mains reinforcement baseline post-regression analysis.

*Cost drivers and efficiency assessment*

1.40. The results of the regression analysis were rolled forward based on adjusted GDN workload and our assumptions for real price effects, regional factors and ongoing efficiencies.

*Workload adjustments*

1.41. We have compared forecast mains reinforcement workload with historical levels for each GDN data back to 2003.

1.42. We reviewed company demand forecasts and assessed mains reinforcement workload assumptions made by the GDNs in relation to their demand forecasts. See table A3.3 for a summary of company demand forecasts.

**Table A3.3: Summary company demand forecast**

| Company | Demand forecast |
|---|---|
| **NGGD** | Peak day gas demand to fall by 8% over RIIO-GD1 period |
| **NGN** | Peak day gas demand to fall by 3% over RIIO-GD1 period (annual demand forecast to fall by 5%) |
| **SGN** | Peak day gas demand will increase by 1% for So and increase by 1.9% for Sc over 10 year period. |
| **WWU** | Overall predict decrease in peak demand; 0.7% increase for Wales South Dist Zone, 2.3% decrease in SW Dist Zone, 1.3% decrease in Wales North Dist Zone. |

1.43. Mains reinforcement workload forecasts across all GDNs have remained broadly flat since GDPCR1 levels and are declining compared to historical levels (2003-2011).

1.44. We accept the GDNs' workload forecasts which are broadly in line with their demand forecasts, historic spend and assumptions set out in their business plans. We have therefore not proposed any workload adjustments for the reinforcement activity.

*Additional costs included after the regression analysis*

1.45. We allowed £2.4m of efficient street works expenditure associated with mains reinforcement for Southern. See Chapter 4, which outlines our methodology for assessing efficient levels of street works expenditure. We allowed GDN forecast expenditure for growth district governors. No further adjustments were made to growth governor workload.

## Connections

1.46. Connections activity involves the quotation, design and physical construction of mains and services to connect domestic and non-domestic or industrial premises to the gas network.

1.47. Connections fall into three categories; new housing, existing housing and non-domestic properties. The expenditure categories cover the total costs of connecting a premise and include all elements of the back-office costs associated with providing quotations to customers and the design and planning of connections works, whether the customer ultimately accepts a quotation and continues with the physical connection, or not.

1.48. We have assessed the efficient level of gross connections costs using regression analysis and then applied the GDNs own figures for net capex as a percentage of gross capex to derive net allowances.

1.49. A summary of the GDNs normalised forecast capex connections compared to our proposed allowances is set out in table 3.4.

**Table A3.4: Capex connections adjustments and Ofgem's proposed allowances (annualised £m, 2009-10 prices)**

| Capex - Connections (net) | Actual costs 2009-11 | GDN Submitted costs for RIIO-GD1[1] | Normalised submitted Costs[1] | Adjustments to normalised submitted costs | | | | | Ofgem Proposed Allowances | Ofgem Proposed v GDN normalised submitted costs |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Efficiency (Regression, RPEs, Ongoing efficiencies) | Efficiency (qualitative) | Workload (outputs) | Uncertainty | Reconciliation between historical bottom-up and final allowance | | |
| EoE | 7.2 | 7.9 | 7.9 | 0.4 | 0.0 | 0.0 | (0.6) | 0.3 | 8.0 | 1.6% |
| Lon | 3.8 | 4.1 | 4.1 | 0.8 | (0.2) | 0.0 | (0.6) | 0.1 | 4.2 | 2.1% |
| NW | 3.8 | 4.1 | 4.1 | 2.3 | 0.0 | 0.0 | (0.5) | 0.4 | 6.2 | 52.6% |
| WM | 3.3 | 4.5 | 4.5 | 1.0 | 0.0 | 0.0 | (0.1) | 0.4 | 5.8 | 29.0% |
| NGN | 6.6 | 6.3 | 6.3 | 0.3 | 0.0 | 0.0 | (0.4) | 0.1 | 6.2 | (1.5%) |
| SC | 9.1 | 7.2 | 7.2 | 0.8 | (0.3) | 0.0 | (0.1) | 0.1 | 7.7 | 6.6% |
| SO | 10.2 | 7.8 | 7.8 | (1.0) | (0.4) | 0.0 | (0.4) | 0.1 | 6.1 | (21.2%) |
| WWU | 6.7 | 9.0 | 9.0 | 0.2 | (0.4) | 0.0 | (0.4) | 0.2 | 8.6 | (3.7%) |
| **Total** | **50.8** | **50.8** | **50.8** | **4.8** | **(1.3)** | **0.0** | **(3.1)** | **1.6** | **52.9** | **4.0%** |

[1] inclusive of RPEs

*Normalisations*

Street works

1.50. For benchmarking purposes £32.7m of street works expenditure was excluded from connections expenditure.

Fuel poor connections

1.51. Fuel poor connections were not included in the connections regression analysis but were assessed separately to ensure levels proposed by GDNs where appropriate. Efficient fuel poor expenditure was added back in as an Ofgem adjusted cost post regression.

*Cost drivers and efficiency assessment*

1.52. The efficiency of GDNs gross connections costs was assessed using regression analysis of total connections costs and weighted average workloads as the cost driver which included a combination of the length of mains installed and number of services connected (excluding fuel poor services).

1.53. We assess efficiency of connections activity using gross not net expenditure. This is because the workload driver used in the regression analysis relates to activity carried out at a gross level ie total kilometres of mains installed per connection regardless of whether the work is being funded directly by the consumer.

1.54. Using net costs will identify the efficiency of GDNs in recovering connections contributions, but would not reflect the efficiency in executing the operational activity. Additionally, there may be regional differences in the connections work mix which could affect a GDNs eligibility to make contribution charges; gross expenditure eliminates such issues.

1.55. The results of the regression analysis were rolled forward based on GDN workload and our assumptions for real price effects, regional factors and ongoing efficiencies.

1.56. We have calculated the GDNs net capex allowance based on our assessment of efficient gross connections costs for each year. We then applied the GDNs own figures for net capex as a percentage of gross capex to derive a net allowance figure. See table A3.5 for summary of customer contribution costs over RIIO-GD1 period.

**Table A3.5: Capex connections expenditure**

| **Connections expenditure RIIO-GD1 (£m)** | | **NGGD** | | | | | **SGN** | | |
|---|---|---|---|---|---|---|---|---|---|
| | **Industry** | EoE | Lon | NW | WM | **NGN** | Sc | So | **WWU** |
| Gross expenditure | 732.6 | 81.3 | 40.1 | 39.1 | 41.4 | 115.1 | 96.9 | 175.4 | 143.2 |
| Net expenditure | 390.4 | 59.8 | 31.5 | 31 | 33.9 | 48.6 | 56.7 | 60.3 | 68.7 |
| Customer contributions of gross (%) | 47% | 27% | 21% | 21% | 18% | 58% | 41% | 66% | 52% |

*Fuel poor connections*

1.57. Unit costs for fuel poor connections were assessed separately both in terms of forecast workload and unit costs.

1.58. Fuel poor connection workload proposed by all networks looked sensible and companies provided evidence in their business plans to support these forecasts. Therefore we made no adjustment to the number of fuel poor connections proposed.

1.59. Fuel poor unit costs from GDNs were broadly in line however costs for SGN looked high compared to other GDNs; £2,033 and £1,794 per fuel poor connection for Southern and Scotland networks respectively compared to industry average of £1,288 per fuel poor connection.

1.60. SGN fuel poor connection expenditure was scaled back to £1,600 per fuel poor connection (the maximum possible voucher value).

*Workload adjustments*

1.61. There has been declining investment by the GDNs in connections over the last few years. The recent downturn in economic activity and increased competition has meant the number of connections forecast by most GDNs is lower than historical levels. This is partly off-set by Fuel Poor Schemes (see table A3.6).

1.62. SGN connections forecast were high compared to GDPCR1 levels. This forecast was not consistent with other GDNs which forecast declining or flat levels of connections over the RIIO-GD1 period. This issue was raised during a cost visit with SGN and they agreed to revisit their forecasts for connections and submitted revised connections data.

**Table A3.6: Submitted connections workload over RIIO-GD1 period**

| Connections workload | NGG | | | | NGN | SGN | | WWU | |
|---|---|---|---|---|---|---|---|---|---|
| | EoE | Lon | NW | WM | | Sc | So | | Industry |
| Services (no.) | | | | | | | | | |
| New housing | 21,140 | 4,815 | 6,254 | 6,641 | 15,049 | 5,865 | 38,828 | 21,355 | 11,9946 |
| Existing housing (incl FP) | 54,080 | 14,880 | 37,330 | 26,760 | 58,594 | 57,018 | 56,978 | 70,560 | 37,6200 |
| non-domestic | - | - | - | - | 5,281 | 2,861 | 7,187 | 6,145 | 21,474 |
| **Total services** | 75,220 | 19,695 | 43,584 | 33,401 | 78,924 | 55,4744 | 10,2993 | 98,060 | 517,620 |
| of which fuel poor connections | 10,180 | 2,900 | 13,340 | 8,730 | 12,000 | 11,000 | 9,000 | 10,800 | 77,590 |
| Connections mains (Km) | | | | | | | | | |
| New housing | - | - | - | - | 88.9 | 63.9 | 114.2 | 92.5 | 359.5 |
| Existing housing (incl FP) | - | - | - | - | 87.2 | 101 | 83.4 | 152 | 423.6 |
| non-domestic | - | - | - | - | 35.5 | 29.2 | 42.4 | 80.8 | 187.9 |
| **Total mains** | - | - | - | - | 211.7 | 194.1 | 240 | 325.3 | 971.1 |
| of which fuel poor connections | 0 | 0 | 0 | 0 | 8 | 55 | 30.6 | 3 | 96.6 |

1.63. Overall the number of gas connection proposed by GDNs during RIIO-GD1 has declined since 2003. Connections forecasts look sensible compared to GDPCR1 levels and commentary provided in company business plans. Therefore no workload adjustments were made to connections for existing, new housing and non-domestic connections.

*Additional cost included after the regression analysis*

1.64. We added back a total of £4m of efficient street works expenditure associated with connections; East of England £0.7m, London £1.7m, Southern £1.7m. See chapter 4 which outlines our methodology for assessing efficient levels of street works expenditure.

## Governor replacement

1.65. Governors provide sources of gas in to the low and medium pressure networks from upstream networks operating at higher pressures. Governors are classified as either 'district' where the downstream system feeds a mixture of domestic and commercial customers, or industrial and commercial, where the governor feeds specific commercial customers. In our analysis of governors, we have presented our findings as an aggregate of these categories.

1.66. We have additionally considered GDNs forecasts for service governor replacement and have allowed companies' forecast costs for this activity.

1.67. The need for investment in replacement governors has been assessed by our technical consultants, who have reviewed the reasons provided in GDNs' business plans.

1.68. Table A3.7 below summarises governor costs, adjustments and proposed allowances.

**Table A3.7 Capex Governors costs, adjustments and Ofgem's proposed allowances (annualised £m, 2009-10 prices)**

| Governors | Actual costs 2009-11[1] | GDN Submitted costs for RIIO-GD1[2] | Normalised submitted Costs[2] | Adjustments to normalised submitted costs | | | | | Ofgem Proposed Allowances | Ofgem Proposed v GDN normalised submitted costs |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Efficiency (Regression, RPEs, Ongoing efficiencies) | Efficiency (qualitative) | Workload (outputs) | Uncertainty | Reconciliation between historical bottom-up and final allowance | | |
| EoE | 0.2 | 2.0 | 2.0 | (0.1) | 0.0 | 0.0 | 0.0 | 0.1 | 2.0 | 0.8% |
| Lon | 2.4 | 1.9 | 1.9 | (0.0) | 0.0 | 0.0 | 0.0 | 0.0 | 1.9 | (0.8%) |
| NW | 1.7 | 1.4 | 1.4 | (0.0) | 0.0 | 0.0 | 0.0 | 0.1 | 1.5 | 3.7% |
| WM | 0.3 | 0.6 | 0.6 | (0.0) | 0.0 | 0.0 | 0.0 | 0.0 | 0.6 | 4.2% |
| NGN | 0.4 | 1.8 | 1.8 | (0.0) | 0.0 | (0.4) | 0.0 | 0.0 | 1.3 | (24.0%) |
| SC | 1.1 | 2.6 | 2.6 | (0.0) | 0.0 | (1.3) | 0.0 | 0.0 | 1.3 | (50.4%) |
| SO | 3.4 | 7.3 | 7.3 | (0.1) | 0.0 | (3.4) | 0.0 | 0.1 | 3.8 | (47.5%) |
| WWU | 1.9 | 7.7 | 7.7 | (0.2) | 0.0 | (4.7) | 0.0 | 0.1 | 2.8 | (63.5%) |
| **Total** | **11.4** | **25.2** | **25.2** | **(0.6)** | **0.0** | **(9.8)** | **0.0** | **0.4** | **15.2** | **(39.6%)** |

[1] excludes growth governor expenditure

[2] inclusive of RPEs

## Other Capex

1.69. Other Capex represents the expenditure GDNs make on purchases of new or replacement assets that are not recognised as part of a Network's assets. Office IT, pressure profiling, leakage control equipment, gas conditioning, liquefied natural gas (LNG) facilities, system operations, IT Systems & Infrastructure, Xoserve, land and buildings, telecoms, security, furniture and fittings, tools and equipment, Other, plant and equipment and vehicles. The largest spend is in the IT and vehicles category.

**Table A3.8: Other capex adjustments and Ofgem's proposed allowances (annualised £m, 2009-10 prices)**

| Capex Other | Actual costs 2009-11 | GDN Submitted costs for RIIO-GD1[1] | Normalised submitted Costs[1] | Adjustments to normalised submitted costs | | | | | Ofgem Proposed Allowances | Ofgem Proposed v GDN normalised submitted costs |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Efficiency (Regression, RPEs, Ongoing efficiencies) | Efficiency (qualitative) | Workload (outputs) | Uncertainty | Reconciliation between historical bottom-up and final allowance | | |
| EoE | 33.4 | 24.8 | 24.8 | (1.0) | (5.3) | 0.0 | 0.0 | 0.6 | 19.1 | (23.1%) |
| Lon | 18.0 | 12.3 | 12.3 | (0.5) | (4.1) | 0.0 | 0.0 | 0.1 | 7.8 | (36.5%) |
| NW | 25.8 | 16.2 | 16.2 | (0.7) | (4.3) | 0.0 | 0.0 | 0.7 | 11.9 | (26.4%) |
| WM | 18.7 | 12.8 | 12.8 | (0.6) | (3.9) | 0.0 | 0.0 | 0.6 | 8.9 | (30.7%) |
| NGN[2] | 19.9 | 20.6 | 19.1 | (0.4) | (0.3) | 0.0 | 0.0 | 0.2 | 18.6 | (3.0%) |
| SC | 17.5 | 12.7 | 12.7 | (0.1) | (3.8) | 0.0 | 0.0 | 0.1 | 9.0 | (29.5%) |
| SO | 25.5 | 20.5 | 20.5 | (0.3) | (3.4) | 0.0 | 0.0 | 0.3 | 17.0 | (17.0%) |
| WWU[3] | 25.8 | 14.7 | 16.7 | (0.3) | (1.9) | 0.0 | 0.0 | 0.4 | 14.9 | (11.1%) |
| **Total** | **184.6** | **134.6** | **135.1** | **(3.9)** | **(27.2)** | **0.0** | **0.0** | **3.0** | **107.0** | **(20.8%)** |

1 inclusive of RPEs
2 £12m land remediation costs reallocated to Work Management (£1.5m annualised)
3 £9.1m pressure management costs and £7.2m cathodic protection costs for distribution mains transferred from LTS and Storage to Other Capex (£2m annualised)

1.70. We have assessed the efficient capital expenditure required by network companies by comparing historical and forecast submitted costs and making inter-GDN comparisons.

*IT system and infrastructure*

1.71. IT spend is a major controllable spend area in the Other Capex category. We asked our technical consultants to examine IT expenditure focusing on IT systems and Infrastructure. In 2010 Rune associates modelled IT expenditure by normalising expenditure on the basis of the implementation costs for a single network. We have re-run this analysis as part of our review.

1.72. The IT Infrastructure and systems costs have split between IT development and IT implementation activities.

1.73. We consider that development costs are independent of the number of networks and implementation costs are proportional to the number of networks per GDN owner.

1.74. The breakdown of actual costs between development and implementation has not been captured on a cumulative basis before and therefore we have has carried out analysis based on a 30 per cent – 70 per cent split between development and implementation costs respectively.

1.75. We have normalised expenditure on IT by different GDNs by comparing expenditure on the basis of a single network equivalent.

1.76. We have compared NGGD's cost to the industry average and we have disallowed most of the differences in costs. This amounts to a £96m adjustment for the RIIO-GD1 period. This is shown in table below alongside the other GDNs forecast costs.

**Table A3.9: Showing IT costs over the RIIO-GD1 period**

| | IT Costs over RIIO GD1 period (£m) | | |
|---|---|---|---|
| | GDN forecast expenditure | Ofgem adjustment | Allowance |
| NGGD | 156.7 | (96) | 60.7 |
| NGN | 36 | 0 | 36 |
| SGN | 66.9 | 0 | 66.9 |
| WWU | 44.5 | 0 | 44.5 |

1.77. Sensitivity analysis has been carried out using different splits of 60-40, & 55-45 between development and implementation costs. In each case, the gap between NGGD's cost and the other GDNs cost was greater.

# Appendix 4 Further detail of our repex analysis

## Tier 1 repex

1.1. Tier 1 mains are defined as those having nominal diameters up to and including 8 inches. Ductile iron and cast iron mains within 30m of a property are still required to be decommissioned by 2032. The GDNs are required to decommission an agreed length of these mains each year, with 20 per cent of the length prioritised according to the highest risk mains. The remaining 80 per cent can be prioritised in order to achieve the most efficient programme taking into account a broader range of factors such as reductions in repairs and leakage.

1.2. GDNs have proposed a total expenditure of £5.2bn[23] (annualised cost of £655.4m) to undertake this activity over the RIIO-GD1 period making it the highest cost single activity area over the review period. Table A4.1 sets out the GDNs' submitted costs and our proposed allowances.

**Table A4.1: Repex tier 1 and Ofgem's proposed allowances (annualised £m, 2009-10 prices)**

| Repex 'mains driven' (Tier 1) | GDN Submitted costs for RIIO-GD1[1] | Normalised submitted Costs[1] | Adjustments to normalised submitted costs | | | | | Ofgem Proposed Allowances | Ofgem Proposed v GDN normalised submitted costs |
|---|---|---|---|---|---|---|---|---|---|
| | | | Efficiency (Regression, RPEs, Ongoing efficiencies) | Efficiency (qualitative) | Workload (outputs) | Uncertainty | Reconciliation between historical bottom-up and final allowance | | |
| EoE | 100.1 | 100.1 | (7.9) | (0.3) | (5.4) | (3.7) | 2.9 | 85.8 | (14.3%) |
| Lon[2] | 96.2 | 98.6 | (14.9) | (4.3) | (3.8) | (0.6) | 1.2 | 76.3 | (22.7%) |
| NW | 81.5 | 81.5 | (8.6) | 0.3 | (9.3) | (5.0) | 3.8 | 62.7 | (23.1%) |
| WM | 62.4 | 62.4 | (8.2) | 0.1 | (3.5) | (0.3) | 3.6 | 54.0 | (13.4%) |
| NGN | 75.2 | 75.2 | (4.3) | 0.3 | (7.9) | (1.0) | 0.6 | 62.9 | (16.4%) |
| SC[3] | 37.9 | 42.2 | (1.1) | (0.6) | (4.6) | (0.9) | 0.4 | 35.4 | (16.1%) |
| SO[4] | 116.7 | 127.4 | (13.3) | (0.2) | 2.2 | (4.9) | 1.9 | 113.2 | (11.2%) |
| WWU | 67.9 | 67.9 | (9.9) | 0.1 | (9.0) | (0.2) | 1.4 | 50.3 | (26.0%) |
| **Total** | **637.9** | **655.4** | **(68.1)** | **(4.7)** | **(41.2)** | **(16.6)** | **15.7** | **540.4** | **(17.5%)** |

[1] inclusive of RPEs

[2] £19.3m capitalised replacement mains from capex to repex *(£2.4m annualised)*

[3] £34.5m capitalised replacement mains from capex to repex *(£4.3m annualised)*

[4] £86m capitalised replacement mains from capex to repex *(£10.7m annualised)*

[23] Normalised costs, includes RPEs.

**Normalisations**

*Capitalised replacement*

1.3. London, SGN Southern and Scotland networks reported a total of £138.9m of upsizing of mains replacement. For these networks we have transferred the proposed workload and costs associated with upsizing of mains replacement from capex mains reinforcement to repex mains replacement. For this data normalisation we assumed the following:

- All upsized mains replacement is classified as tier 1 repex.
- Mains reinforcement expenditure and workload reported at <=180mm diameter band was transferred to >125mm to 180mm repex diameter band.
- Mains reinforcement expenditure and workload >180mm in >180mm diameter band was transferred to 250mm repex diameter band.

1.4. SGN also reported upsizing of mains replacement in 2010-11 under capex mains reinforcement. The workload and costs were transferred to mains replacement repex in line with the normalisations made for forecast upsized mains replacement activity.

*Street works*

1.5. For benchmarking purposes £239.9m of street works expenditure was excluded from repex tier 1 expenditure (see Chapter 4.) Street works was assessed separately and efficient street works expenditure associated with repex tier 1 activity was added back to repex tier 1 baseline.

**Cost drivers and efficiency assessment**

1.6. The efficiency of GDNs repex tier 1 costs was assessed using regression analysis of repex tier 1 costs and weighted average tier 1 workloads as the cost driver which included a combination of the kilometres of mains and number of services decommissioned.

1.7. Our analysis identified a step change in the unit costs associated with repex activity between GDPCR1 and the RIIO-GD1 forecasts. Therefore we developed a historical regression model as well as a 2-year forecast model. This has helped to ensure our assessment of tier 1 repex efficiency is robust.

1.8. A corresponding adjustment is made in services replacement and service transfer workload associated with the mains replacement activity. This has been applied in the same proportion as the reduction in allowed mains workload.

### Additional costs allowed after the regressions

1.9. We have added back £68m of street works expenditure associated with tier 1 repex. See Chapter 4 which outlines our methodology for assessing efficient levels of street works expenditure.

### Baselines for non-regressed repex (tier 2 and tier 3 mains, other policy and condition mains, services not associated with tier 1, MOB's and non-rechargable diversions)

1.10. A summary of GDNs' normalised forecast repex compared to our proposed allowances is set out in table A4.2.

**Table A4.2 Repex non-regression and Ofgem's proposed allowances (annualised £m, 2009-10 prices)**

| Repex Non Regression | GDN Submitted costs for RIIO-GD1[1] | Normalised submitted Costs[1] | Adjustments to normalised submitted costs | | | | | Ofgem Proposed Allowances | Ofgem Proposed v GDN normalised submitted costs |
|---|---|---|---|---|---|---|---|---|---|
| | | | Efficiency (Regression, RPEs, Ongoing efficiencies) | Efficiency (qualitative) | Workload (outputs) | Uncertainty | Reconciliation between historical bottom-up and final allowance | | |
| EoE | 18.5 | 18.5 | (1.0) | 0.3 | (8.1) | (1.2) | 0.3 | 8.7 | (52.8%) |
| Lon | 71.1 | 71.1 | (3.6) | (1.1) | (34.1) | (4.0) | 0.5 | 28.7 | (59.6%) |
| NW | 31.9 | 31.9 | (1.8) | 0.0 | (19.3) | (0.6) | 0.7 | 10.9 | (65.7%) |
| WM | 24.3 | 24.3 | (1.3) | 0.0 | (14.0) | (0.0) | 0.6 | 9.6 | (60.5%) |
| NGN | 21.8 | 21.8 | (0.8) | 0.0 | (8.7) | (0.4) | 0.1 | 12.0 | (44.8%) |
| SC | 10.5 | 10.5 | (0.4) | (0.1) | (2.6) | 0.0 | 0.1 | 7.4 | (29.2%) |
| SO | 32.2 | 32.2 | (1.0) | (0.1) | (5.8) | (0.5) | 0.4 | 25.3 | (21.4%) |
| WWU | 23.5 | 23.5 | (1.1) | 0.0 | (16.3) | 0.0 | 0.2 | 6.3 | (73.1%) |
| **Total** | **233.8** | **233.8** | **(11.0)** | **(0.9)** | **(108.9)** | **(6.7)** | **2.8** | **109.0** | **(53.4%)** |

[1] inclusive of RPEs

# Appendix 5 – Regional and company specific factors

1.1. In our March 2011 strategy decision document we proposed adjustments to remove Xoserve costs, Scottish Independent Undertakings (SIU) costs from SGN's opex and totex, and to adjust for direct labour and contract labour regional factors. We did not propose any adjustments for company-specific factors. We instead requested the GDNs provide appropriate evidence for their company-specific factors, if any, along with their forecast business plan submissions.

1.2. We defined regional factors for both direct and contract labour in different operational locations to mean differences in labour costs which are beyond the control of an individual GDN, and that impact upon its costs disproportionately compared to other GDNs in the industry. In particular we recognised that labour rates in the London region are higher than the rest of GB. We took these differences into account as part of the GDPCR1 benchmarking, and are continuing to apply them for our RIIO-GD1 benchmarking.

1.3. We defined company-specific factors as factors, other than direct and contract labour costs, which are beyond the control of an individual GDN, and that impact upon its costs disproportionately compared to other GDNs in the industry. For example, GDNs operating in dispersed rural areas may face additional costs to meet the one hour emergency response standard or face additional logistical costs for delivering materials to remote locations. Likewise, GDNs operating in high density areas may face additional costs for longer travelling times or greater complexity of excavation. In GDPCR1 we provided additional baselines, recognising sparsity factors for Wales & West and Scotland, and acknowledging urbanity factors for London and Southern.

1.4. The GDNs responded and put forward a range of special factors for their networks which they suggested should be taken into account in carrying out benchmarking costs and setting baselines. In reviewing their proposals we noted a number of similar issues across the GDNs indicating they were not company specific issues. With the exception of salt cavity costs for North West, we have concluded that company specific factors relate either to working in dense urban areas (urbanity) or working in more remote rural areas (sparsity), which are discussed in the sections below.

## Regional factors

1.5. We have taken GDNs' responses into account and reviewed and finalised our approach to calculating the direct and contract labour regional indices for RIIO-GD1. We are:

- using the ONS Annual Survey of Hours and Earnings (ASHE) data to calculate regional factors for both direct and contract labour,

- using the labour component of opex, capex and repex costs to calculate the percentage of work required to be done locally,
- assuming 40 per cent of work management will be carried out locally,
- using both Northern Ireland and British information in the calculation of regional factors as they are based on information on UK annual gross wages,
- using industry-specific occupational category weights based on averaging information submitted by the GDNs, and
- using the latest information on the areas of East of England's GDN area that falls within the M25.

1.6. There were mixed views between the GDNs on whether it was appropriate to base our adjustments on eight GDN specific regional indices or base them on one index for the London area within the M25 and one for elsewhere. We have reviewed the salary structures across the GDNs and they are broadly similar outside London. Contractor labour is mobile across the UK and we consider that the only additional costs arise from working in London. We have therefore decided that it is appropriate to retain the approach of using one index for London and one for other areas in the country.

1.7. Some of the GDNs have argued that it is more appropriate to base both the regional adjustments for direct and contract labour on Annual Survey of Hourly Earnings (ASHE) data from the ONS rather than to use data from the Building Cost Information Service (BCIS) indices to calculate contract labour regional factors. We have accepted this point as BCIS costs contain a large proportion of materials costs, that are generally paid for directly by the GDNs rather than contractors.

1.8. We have accepted NGGD's argument that some areas of East of England fall within the M25 area and therefore should receive the London weighting. We have taken account of the latest information from NGGD that demonstrates that a wider area of East of England than Tottenham falls within the M25.

1.9. Based on the information submitted by the GDNs and our subsequent analysis we have decided to leave the level of work management's work required to be done locally at 40 percent.

1.10. Our final regional factor indices for London, Southern, East of England and other GDNs are set out below. As illustrated in Table A3.1, we for example apply an index of 0.97 to 95.4 per cent of East of England's direct labour costs and an index of 1.23 to the remaining 4.6 per cent of direct labour costs. The 2011 adjustments would amount to a 23 per cent adjustment for a GDN that is working 100 per cent within the M25. The methodology for calculating the regional labour indices is presented in the SSGCA supporting Appendix.

**Table A3.1: Regional labour indices for RIIO-GD1**

| **GDN(s)** | **Direct Labour** | | | **Contract Labour** | | |
|---|---|---|---|---|---|---|
| | 2009 | 2010 | 2011 | 2009 | 2010 | 2011 |
| **London** | 1.14 | 1.13 | 1.15 | 1.18 | 1.16 | 1.18 |
| **Southern** | 1.09 | 1.07 | 1.07 | 1.10 | 1.09 | 1.08 |
| **East of England** (95.4%) | 0.97 | 0.97 | 0.97 | 0.96 | 0.96 | 0.96 |
| **East of England** (4.6%) | 1.22 | 1.19 | 1.23 | 1.22 | 1.19 | 1.23 |
| **Elsewhere** | 0.97 | 0.97 | 0.97 | 0.96 | 0.96 | 0.96 |

## Urbanity

1.11. Some of the GDNs have suggested that there are additional costs associated with working in urban areas. These costs include street works issues such as additional requirements to close roads or put in place traffic controls, premium time working, requirements for full reinstatement of roads and congestion of underground assets. The additional costs can be split into higher than average salaries and other costs that arise from working in an urban environment.

1.12. We do not consider that there is a need for additional urbanity adjustment for regional labour rates as the ONS ASHE data for gross annual pay already includes basic, overtime and shift premium pay. However we accept arguments that in practice there are lower levels of productivity in London associated with more congested infrastructure, depth of infrastructure and reduced access. We have considered both the information from NGGD that suggests contractors cost 25 per cent more in London and evidence from SGN comparing productivity across depots which suggests that there is a 15 to 20 per cent loss of productivity from working in London. We consider SGN's evidence to be better justified than NGGD's, but invite NGGD to further justify theirs as well.

1.13. We have decided to apply a 15 per cent one way productivity adjustment for London and Southern GDNs' capex and repex mains and services, and capex connections work carried out within the M25. 15 per cent is the minimum value of the productivity range submitted by SGN in a study undertaken for them by Morrison Utility Services. We have adopted the minimum value because we believe that an efficient company minimises its productivity impact. This results in an 11 per cent or £83.2m adjustment for London GDN and a 3 per cent or £32.9m adjustment for Southern.

1.14. We also accept that there are regional labour effects associated with reinstatement costs and transport. We are addressing these by treating reinstatement as 100 per cent labour costs and applying a two way adjustment to repairs and maintenance costs using the regional contract labour indices. We have eliminated the transport costs from the adjustments to compensate for the assumption that reinstatement costs are 100 per cent labour costs

1.15. We recognise the urbanity impact resulting from TMA costs. In our cost assessment work we separately assess the impact of TMA on the GDNs' costs. In our recent TMA assessment we noted the GDNs' comments on Local Authorities operating independently and hence impacting on GDNs in different ways. SGN has put forward cost of materials as an additional London region factor which they argue uplifts their urbanity repex productivity factor from 17.5 to 21 percent.

1.16. We note that the productivity factor applies only to labour costs. It is possible to combine the labour index with the materials index only if the combined weighted index is applied to total costs (ie labour plus materials). Because the cost of materials index (ie 6 per cent) is smaller than the labour productivity index (ie 17.5 per cent) the combined weighted index should be greater than 6 per cent but less than 17.5 per cent. For example assume that the productivity index of 17.5 is applied to labour costs which account for 90% of total costs, and the cost of materials' index of 6 per cent applied to cost of materials which account for the remaining 10% of the total costs. The weighted index is (17.5 x 90%) + (6 x 10%) = 16.35.

1.17. We also note that one of the GDNs' responses that led us to consider abandoning using BCIS indices was the argument that GDNs pay for contract labour, but supply the materials themselves. In a typical repex project, nationally/internationally sourced materials including pipes account for most of the materials' costs. If the supply of the nationally/internationally sourced materials is subjected to tender, there should be no significant difference between London and other areas.

## Sparsity

1.18. The productivity impact of sparsity relates to the productive time lost during the additional time spent on travelling in a sparse area when attending emergency and repairs, ie the extra non-productive time spent on the journey instead of attending to the job.

1.19. Some GDNs argue that there are additional costs of working in a sparse area including poorer critical infrastructure than the rest of the UK that impacts on operational activity. We accept that more resources are required to meet the emergency and repairs requirements in a more sparse area given limited travel patterns and the consequent increase in travel time required to cover operations.

1.20. Our initial approach to estimating sparsity was set out in our March 30 2012 memo[24] to the GDNs estimated the relative sparsity of GDNs by considering the population density of counties in which they operate. Any counties which were less dense than the national average and have gas coverage were included in the calculations. A weighted average population density for sparse areas within each

[24] See pages 7 to 10 of March 30 2012 memo: RIIO-GD1 Regional Labour, Urbanity and Sparsity Factors.

GDN was then calculated based on both population and geographical area and converted to a relative index across the GDNs.

1.21. The GDNs have raised a number of concerns regarding our approach to the sparsity adjustments including that our analysis uses too large geographical units, and that the adjustments should not be applied to all regression activities and that the spread of adjustments that apply is too large.

**Table 3.2: Sparsity indices for RIIO-GD1**

| | |
|---|---|
| East of England | 1.05 |
| London | 0.91 |
| North West | 0.94 |
| West Midlands | 0.99 |
| Northern | 1.03 |
| Scotland | 1.11 |
| Southern | 0.97 |
| Wales & West | 1.15 |

1.22. Our revised sparsity methodology uses population based district data. We have also used different definitions of sparsity to calculate GDNs' sparsity rankings as a cross-check for our methodology. We make an additional adjustment to ensure that the maximum absolute adjustment of £2.23m for 2011 applies only to the GDN with the highest sparsity index. We halve the deviations (from the industry median of 1) of sparsity indices that are less than 1. For example if the index is 0.80, we recalculate it as 1-[(1-0.8)/2] = 1-0.1 = 0.9.

1.23. We are applying indices presented in Table 3.2 to make adjustments to only the emergency and repair cost activities. The methodology for calculating the sparsity indices is presented in the SSGCA supporting Appendix.

# Appendix 6 - Business support cost assessment

1.1. The purpose of this appendix is to explain the methodology we have used in setting our proposed allowances for the seven business support activities (IT & telecom; property management; finance, audit & regulation; HR & non-operational training; procurement; CEO & group management and insurance). It sets out the results of our analysis and explains variations between our allowances and network companies' submitted forecasts. The following table summarises the allowances for gas distribution networks.

**Table A6.1 – Ofgem proposed allowance for business support costs (including RPEs and reconciliation adjustment to average of the 4 approaches uplift) (£m, 2009-10 prices)**

| | Gas Distribution | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | NGGD | | | | NGN | SGN | | WWU | Total |
| Average per year | EoE | Lon | NW | WM | | Sc | So | | |
| GDPCR1* Forecasts | 30.5 | 19.8 | 23.8 | 17.5 | 16.9 | 11.7 | 21.2 | 16.8 | 158.3 |
| RIIO-GD1 Forecasts | 29.4 | 19.0 | 22.7 | 16.7 | 18.3 | 12.3 | 22.6 | 20.2 | 161.2 |
| Initial proposals | 22.4 | 14.2 | 17.8 | 13.2 | 14.9 | 9.9 | 18.3 | 17.4 | 128.2 |
| Difference: forecasts to IP | -23.7% | -25.3% | 21.5% | -21.1% | -18.4% | -19.2% | -19.1% | -13.9% | -20.5% |

* GDPCR1: three years actuals + 2 years forecasts

1.2. We have primarily used benchmarking analysis of all UK energy network companies (transmission, gas distribution, electricity distribution) against each other and against external benchmarks developed in collaboration with the Hackett Group in assessing business support costs. This benchmarking assessment covered all business support activity costs with the exception of insurance costs, which were assessed separately and added to the benchmark assessed costs.

1.3. Where a network company is part of a group its operating costs are generally derived from central group functions with costs allocated to the individual network. The assessment of business support costs has been carried out at an overall group level with allowances allocated to networks in the same group in proportion to their forecasts.

1.4. The RIIO-T1 and RIIO-GD1 assessments were carried out as a single process and therefore this Appendix is identical to Appendix 4 to the Cost & Uncertainties RIIO-T1 Initial Proposals supporting document.

## Overview of assessment process

1.5. Our main aim in assessing business support costs was to set appropriate allowances for business support as a whole and we designed and applied our assessment methodologies accordingly. While we benchmarked costs at an activity level, certain adjustments and additions have been applied at a total business support level. It is therefore not appropriate to detail the results of our assessment on a disaggregated activity basis.

1.6. With the exception of insurance costs, each activity was benchmarked separately. Insurance costs were excluded from the benchmarking exercise as differences in risk appetite and appropriate levels of coverage between companies and sectors make it difficult to ensure a like-for-like comparison.

## External benchmark development

1.7. The external benchmarks were provided by the Hackett Group based on current data held in its database. We worked closely with Hackett to select appropriate benchmarks that we are confident provide good comparators against which network companies' costs can be compared.

1.8. Hackett's database contains data collected and validated by Hackett using robust and consistent processes. The database is kept up to date and is held at sufficiently granular level to enable Hackett to calculate metrics that align with our business support activity cost definitions.

1.9. The same comparator group was used for each activity. Our objective when designing the comparator group was to enable us to calculate benchmark metrics that as closely as possible reflect the costs of an efficient company operating in a competitive market environment. For this reason we excluded any government owned or operated organisations, any charitable organisations, and any price control regulated companies. To improve comparability with network companies we restricted the comparator group to companies with revenues of less than £2 billion and with fewer than 20,000 FTEs.

1.10. The comparator group contained 85 companies across 9 sectors[25]. The companies are within the UK and overseas. We have specifically verified that the geographical differences have no effect on the overall benchmarks.

1.11. For each activity Hackett provided one headline cost metric plus two to three supplementary metrics in order to aid our analysis. The headline metrics cost

[25] Sectors were defined in accordance with the Global Industry Classification Standard (GICS). The GICS separates organisations into ten sectors in total. The only sector not represented in our comparator group was the utilities sector. The reason for this is that most companies in this sector are either government owned or are highly revenue regulated.

drivers were chosen on Hackett's advice on the basis that (of the cost drivers they have examined) they have the highest statistical relationship to total cost for the relevant activities and they are regularly used by Hackett and its clients for cost efficiency assessment purposes.

## Networks benchmark

1.12. In addition to the Hackett benchmarks, we calculated equivalent metrics for the nine network company/groups[26] using 2010-11 data submitted by the companies in their RIIO-T1/GD1 data tables and in their annual regulatory returns. These metrics were calculated based on gross costs. Where a company has allocated a proportion of its business support costs to direct opex, capex, or repex or to non-network businesses then these are added back to the submitted net costs as pre-benchmark normalisations. This is reversed at the end of the assessment to return to net costs. The reversal (gross to net conversion) is done in the same proportion as in the companies/groups submitted forecasts.

**Table A6.2 – Weighted average gross to net conversion ratio**

| RIIO-T1/GD1 weighted average gross to net conversion ratio | |
|---|---|
| National Grid | 4.4% |
| NGN | 8.0% |
| SSE | 20.1% |
| WWU | 17.2% |

1.13. Other pre-benchmark normalisations were applied to 2010-11 (base year) submitted costs where a network company identified movements in any of its activity costs over RIIO-T1/GD1 or where the 2010-11 costs contain elements that would not be continued throughout RIIO-T1/GD1. We applied judgement on the proportion of costs that should be applied as pre-benchmark normalisations based on the information provided by the companies. Table A6.3 below details the pre-benchmark normalisations we applied.

[26] National Grid, Northern Gas Networks, Scottish & Southern Energy, Wales and West Utilities, Northern Powergrid, UK Power Networks, Western Power Distribution, Electricity North West, Scottish Power

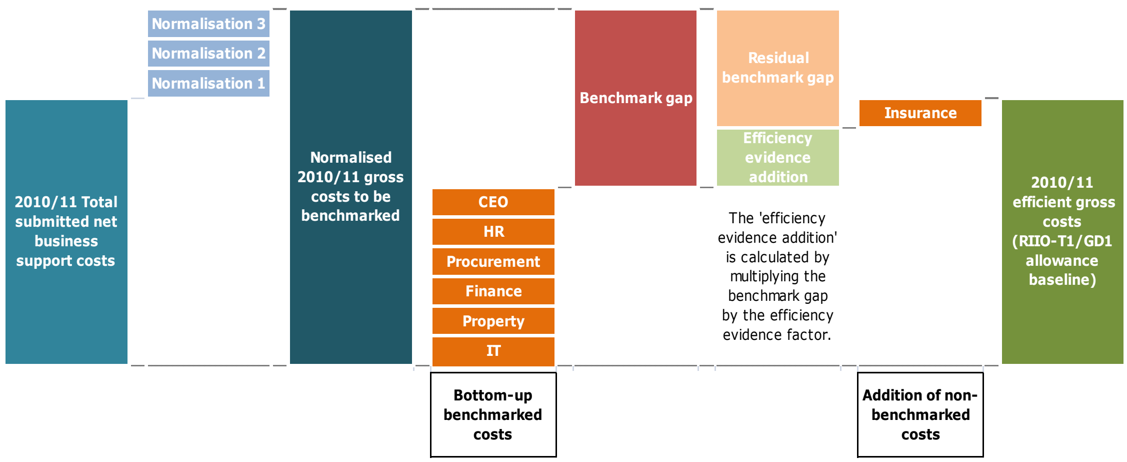
**Table A6.3 – Pre-benchmarking normalisations (£m 2009-10 prices)**

| **National Grid** | **2010-11** |
|---|---|
| Net to gross add-back costs | +25.51 |
| IT: GDFO support costs | +1.80 |
| IT: Tactical Reversal | +0.83 |
| IT: Non-regulated scope change | +1.05 |
| Property: Timing Workload (R&M increases) | +0.92 |
| Procurement: Stores & logistics | -2.02 |
| **Total** | +28.09 |
| | |
| **NGN** | **2010-11** |
| Net to gross add-back costs | +1.35 |
| Net pain/fee (various activities) | +0.30 |
| Finance: pensions deficit and actuarial review | +0.10 |
| Procurement: Stores & logistics | - |
| IT: New system support | +0.40 |
| Property team recruitment | +0.10 |
| CEO: Stakeholder/community awareness | +0.20 |
| **Total** | +2.45 |
| | |
| **SSE** | **2010-11** |
| Net to gross add-back costs | +10.14 |
| Procurement: Stores & logistics | -0.67 |
| **Total** | +9.47 |
| | |
| **WWU** | **2010-11** |
| Net to gross add-back costs | +3.76 |
| Finance: Grade changes | +0.10 |
| HR: Grade changes | +0.10 |
| Procurement: Stores & logistics | -0.44 |
| IT cost increase Offset by reduction in Asset SOMSA costs | +0.55 |
| IT & Telecom: Support costs | +1.07 |
| Property: Facilities maintenance annual workload fluctuations | +0.60 |
| CEO: Staff vacancy not filled | +0.10 |
| CEO: Recruitment of strategy manager | +0.10 |
| **Total** | +5.94 |

1.14. It should be noted that identified cost movements were applied as pre-benchmark normalisations only where the company provided sufficient justification for them and where they affect business as usual costs. Where a company identified and justified exceptional costs over RIIO-T1/GD1 then these were applied post benchmarking as justified above benchmark increases.

## Application of benchmarks to cost assessment

**Figure A6.1 – Process for calculating allowance baseline**




1.15. A network company's 2010-11 benchmarked total business support cost was built up by calculating and aggregating the individual activity benchmarked cost components plus non-benchmark assessed insurance costs. These costs were then projected forward on a flat line over RIIO-T1/GD1 as the baseline.

1.16. In order to calculate the 2010-11 activity benchmarked cost (component of allowance baseline) for each company, the value of its relevant 'activity cost driver' was multiplied by the appropriate 'benchmark comparator' (eg for IT & telecoms the 'activity cost driver' is the number of end-users and the 'benchmark comparator' is the networks upper quartile total cost per employee metric). The benchmark comparator used was either the 'networks upper quartile' or the 'external benchmark upper quartile'. For consistency with benchmarking in other areas the network upper quartile was used for all activities as default except for those activities where the external benchmarking indicated cost inefficiency in the UK networks industry as a whole. The actual benchmark used for each activity is shown in the benchmarking results charts at the end of this appendix.

1.17. The result of this analysis is that for activities where the benchmark comparator is higher than a network company's equivalent metric value (indicating cost efficiency) then the company's benchmarked cost will be above its actual 2010-11 cost and conversely where the benchmark comparator is lower than the equivalent company metric (indicating cost inefficiency) the benchmarked cost will be lower than 2010-11 actual.

## Post benchmark additions

1.18. We added additional costs following the benchmarking for the years in which they apply, eg to cover additional insurance costs. We added these at group level prior to allocation of costs to individual networks. The only exception to this is increases to NGET SO and NGGT SO to reflect additional costs associated with transmission system operation. These were added after the allocation to the individual network's allowances (see 1.21 below).

*Efficiency evidence additions*

1.19. Where a company has provided robust evidence of cost efficiency, through for example its own benchmarking studies, we have assessed the quality of the evidence and have made allowance for it through an upward only 'efficiency evidence addition'. Our quality of evidence assessment took account of (1) the results/conclusions of the evidence ie the extent to which the study/evidence indicates cost efficiency, (2) the robustness of the methodology employed, (3) the quality and reliability of the data used in the study (4) the extent to which the results of the study can be verified or whether the study was carried out by a reputable independent third party. By scoring against each of these criteria we derived an efficiency evidence factor score (of between zero and 100 per cent for each activity and a total efficiency evidence factor by taking the cost weighted average activity score. The total efficiency evidence factor was then multiplied by the calculated benchmark gap (see Figure A6.1 above) to give the efficiency evidence addition and our overall view of the 2010/11 efficient costs. The efficiency evidence addition is calculated for each year of RIIO-T1/GD1 and added to the baseline.

**Table A6.4 – Efficiency evidence factors and efficiency evidence additions**

| **Efficiency evidence factor** | **Company activity factors** | | | |
|---|---|---|---|---|
| | **National Grid** | **NGN** | **SSE** | **WWU** |
| IT & telecom | 21.8% | 4.6% | 10.8% | 14.2% |
| Property management | 32.1% | 3.6% | 0.0% | 68.9% |
| Finance, audit & regulation | 0.0% | 4.6% | 0.0% | 0.0% |
| HR & non-operational training | 0.0% | 4.6% | 0.0% | 0.0% |
| Procurement | 0.0% | 5.5% | 0.0% | 0.0% |
| CEO & group management | 0.0% | 2.7% | 0.0% | 0.0% |
| Overall (cost weighted average) | **14.5%** | **4.0%** | **4.7%** | **17.7%** |
| **RIIO-T1/GD1 efficiency evidence addition, £m 2009/10 prices** | | | | |
| Gross efficiency evidence addition | 91.53 | 2.15 | 4.79 | 11.38 |
| Net efficiency evidence addition | **87.50** | **1.98** | **3.83** | **9.43** |

*Other justified movements*

1.20. Where a company identified and justified exceptional costs over RIIO-T1/GD1 then these are also added to allowance baseline.

**Table A6.5 – Post benchmark additions (£m, 2009-10 prices)**

| Post benchmark additions to baseline allowance | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| **National Grid** | | | | | | | | |
| Transmission insurance increases | 3.61 | 3.68 | 3.88 | 3.88 | 3.89 | 3.91 | 3.86 | 3.82 |
| Gas distribution: stores and logistics | 1.82 | 1.83 | 1.84 | 1.85 | 1.86 | 1.86 | 1.86 | 1.88 |
| PPA Assessment of SO costs (applied to NGET_SO only) | 1.94 | 2.21 | 2.17 | 1.64 | 1.31 | 1.41 | 1.79 | 1.92 |
| PPA Assessment of SO costs (applied to NGGT_SO only) | 1.53 | 1.92 | 1.89 | 1.65 | 1.47 | 1.53 | 1.77 | 1.91 |
| | | | | | | | | |
| **NGN** | | | | | | | | |
| CEO: change in governance | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 |
| | | | | | | | | |
| **SSE** | | | | | | | | |
| Stores & logistics | 1.31 | 1.31 | 1.32 | 1.32 | 1.32 | 1.32 | 1.32 | 1.32 |
| SHETL fast track increases (applied to SHETL only) | 1.50 | 2.50 | 3.30 | 3.70 | 4.60 | 5.10 | 5.40 | 5.70 |

1.21. While National Grid's transmission system operator businesses were included in our overall assessment, they were also subject to an independent detailed assessment by consultants PPA Energy. As PPA's assessment represents the total package for the SO business and recognises the IT intensive nature of system operation we expected it to come out above our benchmarked assessment. We are therefore proposing allowances to NGET SO and NGGT SO in accordance with PPA's assessment.

## Allocation of allowance to individual networks

1.22. The calculated net allowances have been allocated to individual transmission and gas distribution networks in proportion to submitted cost forecasts for RIIO-T1/GD1 period. Table A6.6 below gives the percent split between transmission (T), gas distribution (GD), and electricity distribution (ED) networks for submitted costs and allocated allowances. The differences between the two sets of percentages are due to:

- Fast track allowances to SHETL: SHETL's fast-track allowances were subtracted from SSE's calculated allowance with the remaining allowance allocated to the other SSE network companies.
- Post benchmark increases to NGET SO and NGGT SO (PPA assessed increases), which are added post allocation.

1.23. The percentages shown for ED networks are notional amounts. An assessment will be carried out on electricity distribution networks' business support costs as part of RIIO-ED1.

**Table A6.6 – Network split of group business support costs**

| Network | | Group | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | National Grid | NGN | SSE | WWU | National Grid | NGN | SSE | WWU |
| | | RIIO-T1/GD1 Submitted cost % split | | | | RIIO-T1/GD1 calculated total allowance % allocation | | | |
| T | NGET TO | 24.29% | | | | 23.78% | | | |
| T | NGET SO | 18.74% | | | | 19.42% | | | |
| T | NGGT TO | 8.59% | | | | 8.41% | | | |
| T | NGGT SO | 9.31% | | | | 10.14% | | | |
| T | SHETL | | | 8.65% | | | | 10.45% | |
| GD | East of England | 13.11% | | | | 12.83% | | | |
| GD | London | 8.43% | | | | 8.25% | | | |
| GD | North West | 10.13% | | | | 9.91% | | | |
| GD | West Midlands | 7.41% | | | | 7.26% | | | |
| GD | Northern | | 100.00% | | | | 100.00% | | |
| GD | Scotland | | | 14.31% | | | | 14.03% | |
| GD | Southern | | | 26.08% | | | | 25.57% | |
| GD | Wales & West | | | | 100.00% | | | | 100.00% |
| ED | SSE Hydro | | | 21.39% | | | | 20.96% | |
| ED | SSE Southern | | | 29.58% | | | | 28.99% | |

## Activity cost drivers

**Table A6.7 – Business support business support benchmarking cost drivers**

| 2010-11 business support benchmarking cost drivers | | | | |
|---|---|---|---|---|
| | **National Grid** | **NGN** | **SSE** | **WWU** |
| **Revenue (£m 2009-10 prices)** | 3,719.3 | 314.6 | 1,470.5 | 294.0 |
| **End-users (number)** | 10,618.1 | 1,075.1 | 8,479.1 | 1,824.7 |
| **Employees (number)** | 7,605.3 | 1,070.1 | 4,962.2 | 1,363.0 |
| **Spend (£m 2009-10 prices)** | 3,266.0 | 160.9 | 856.0 | 173.2 |

*Revenue*

1.24. Revenue was used as the cost driver for three activities: Finance, audit and regulation; property management; CEO and group management.

1.25. Network companies' 2010-11 revenue figures have been calculated as follows: we included base revenue and incentive revenue but excluded income adjusting events, pass through costs and adjustments relating to prior years.

*End-users*

1.26. End-user numbers were used as the cost driver for IT and telecoms.

1.27. For this purpose an end-user was defined as "an individual (typically either an employee or contractor) that spends at least 10 per cent of his or her time using company provided, funded, supported computing devices that are part of the company's IT infrastructure (ie desktops, laptops, hand held devices, etc.) to support his or her business function. The user must have direct access to internal applications/systems to execute specific transactions on behalf of the company".

1.28. Where we do not have precise 2010-11 end-user figures we have estimated them based on FTE and employee numbers.

*Employees*

1.29. Employee numbers were used as the cost driver for HR & telecoms.

*Spend*

1.30. Total spend was used as the cost driver for procurement.

1.31. 2010-11 total spend has been calculated by adding total opex and capex and deducting related party and employee costs.

## Business support benchmarking results

1.32. The following figures (A6.2 to A6.7) show the business support benchmarking results for different activities.

**Figure A6.2 – IT & telecommunications benchmarking comparison**

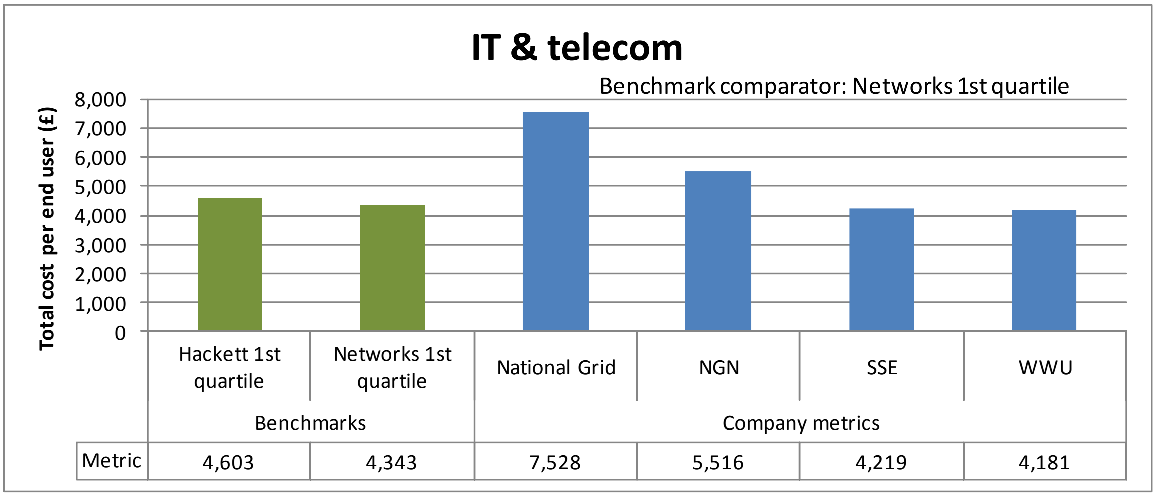



**Figure A6.3 – Property management benchmarking comparison**

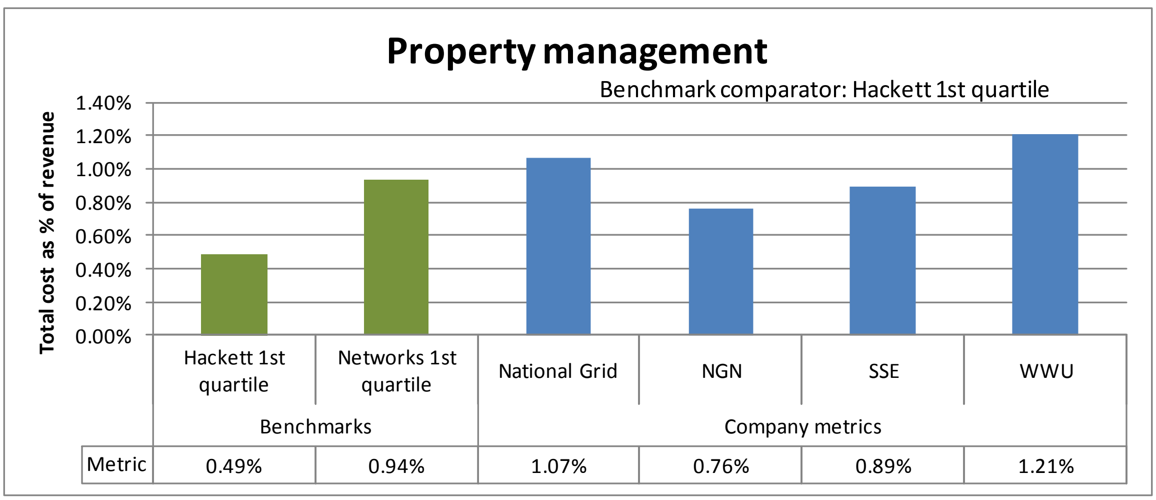


**Figure A6.4 – Finance, audit and regulation benchmarking comparison**

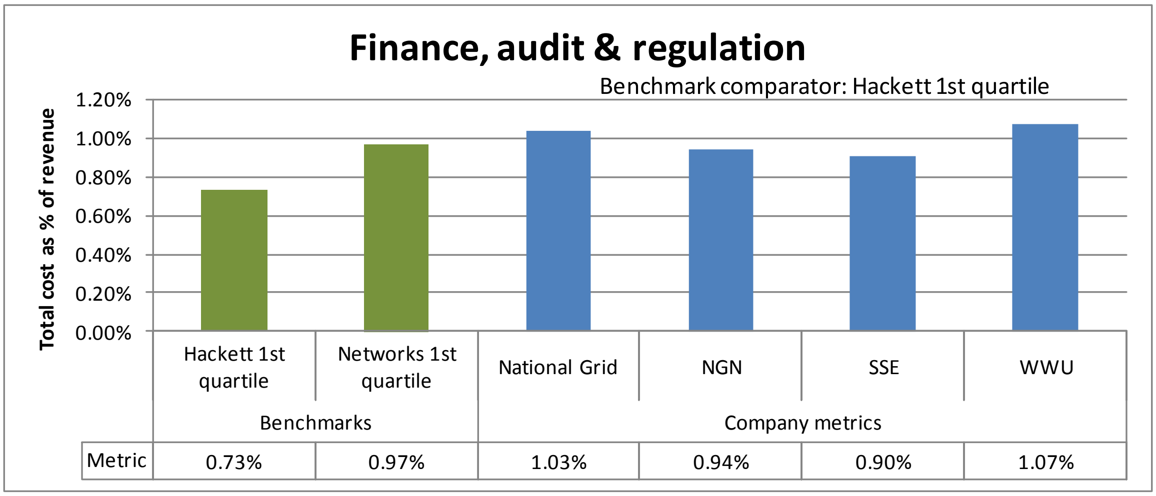



**Figure A6.5 – HR and non-operational training benchmarking comparison**

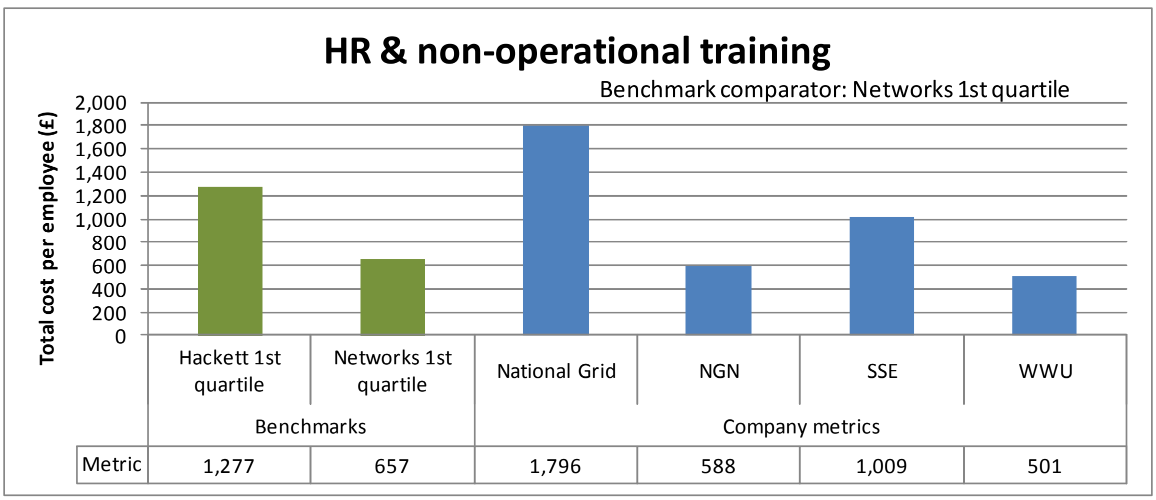
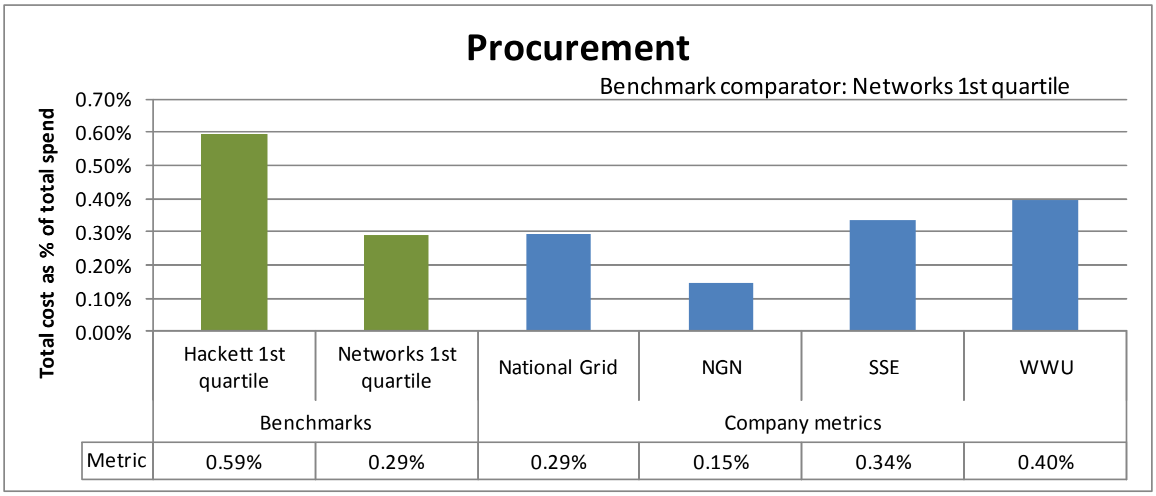


**Figure A6.6 – Procurement management benchmarking comparison**



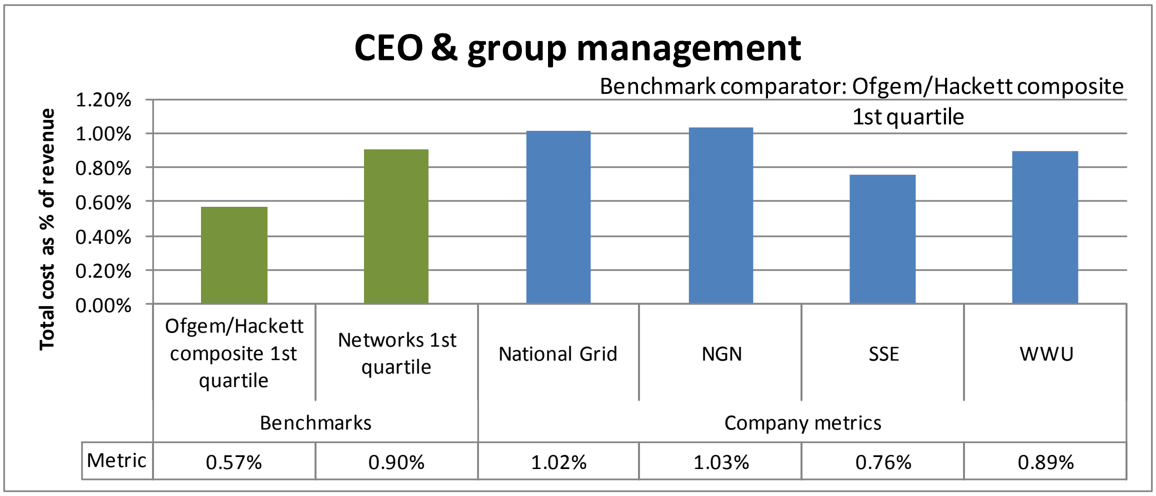

1.33. GDNs' business support costs include stores and logistics, which transmission treats as a direct cost. Procurement, stores and logistics was a single activity in GDPCR1 and GDNs reported these costs in aggregate. GDNs have not separated costs on a consistent basis: NGN and WWU have placed all costs into procurement, while SGN have placed them all in stores and logistics. For benchmarking we assumed a split as shown in Table A6.8 below.

**Table A6.8 – Procurement, stores and logistics cost split (£m, 2009-10 prices)**

| | NGG | | | | NGN | SGN | | WWU |
|---|---|---|---|---|---|---|---|---|
| | East of England | London | North West | West Midlands | Northern | Scotland | Southern | Wales & West |
| **2010-11 actual costs** | | | | | | | | |
| Procurement | 0.59 | 0.43 | 0.50 | 0.35 | 0.19 | 0.22 | 0.45 | 0.44 |
| Stores & logistics | 0.63 | 0.46 | 0.54 | 0.38 | 0.00 | 0.22 | 0.45 | 0.44 |
| Total | 1.23 | 0.90 | 1.04 | 0.73 | 0.19 | 0.45 | 0.90 | 0.87 |
| **RIIO-GD1 forecast average** | | | | | | | | |
| Procurement | 0.65 | 0.47 | 0.54 | 0.38 | 0.20 | 0.28 | 1.03 | 0.42 |
| Stores & logistics | 0.59 | 0.42 | 0.49 | 0.35 | 0.00 | 0.28 | 1.03 | 0.42 |
| Total | 1.24 | 0.89 | 1.03 | 0.73 | 0.20 | 0.57 | 2.06 | 0.84 |

1.34. The above stores and logistics costs were removed as pre-benchmark normalisations and then added back as post-benchmark additions to the allowance baseline.

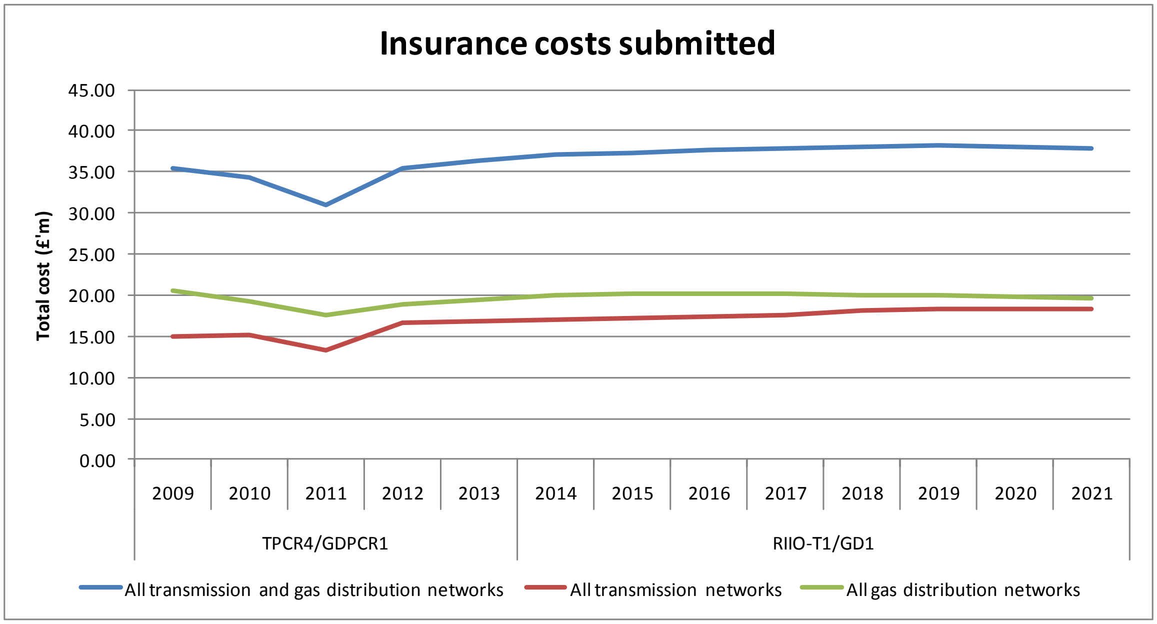
**Figure A6.7 - CEO and group management benchmarking comparison**




1.35. The benchmark comparator group excludes revenue regulated organisations and therefore, in order to reflect the possible increased cost associated with meeting regulatory burdens on network companies relative to the comparator, we constructed a composite upper quartile metric using data provided by Hackett as well as our own analysis of network company costs. The composite benchmark was constructed by summing the total cost as % of revenue upper quartile for corporate communications and for legal from Hackett with the networks upper quartile for executive office.

## Non-benchmarked costs: Insurance

**Figure A6.8 – Insurance costs actuals (2009-2011) and network company forecasts (2012 – 2021) (£m, 2009-10 prices)**




1.36. Insurance costs were excluded from the benchmarking exercise as differences in risk appetite and appropriate levels of coverage between companies and sectors make it difficult to ensure like-for-like comparison.

1.37. Our assessment of insurance looked at overall industry trends over TPCR4/GDPCR1 and RIIO-T1/GD1. We have seen a general decrease in insurance costs for transmission and gas distribution networks in the first three years of GDPCR1 for which we have actual data. Over RIIO-T1/GD1 forecast costs are approximately flat for gas distribution networks and show moderate increases for transmission. The increase in transmission costs is justified on the grounds of increasing value of asset requiring insurance cover over RIIO-T1.

1.38. We therefore propose baseline allowances at 2010-11 actual cost levels for all networks with additions for National Grid's transmission business in line with forecast increases.

# Appendix 7 – Calculation of training and apprentices allowances

1.1. This appendix explains the details behind the calculation of training and apprentice allowances for GDNs

1.2. We recognise that due to the high average age of their employees all GDNs will need to replace large proportions of their workforce over RIIO-GD1. GDNs worked with Energy & Utility Skills[27] (EU Skills) in development of their workforce planning models and we are satisfied that GDNs have given reasonable long term estimates of their workforce renewal requirements in regards to the total number of positions to be filled (ie number of retirees and other leavers less the number of retirees not requiring replacement).

1.3. We have derived our view of the total numbers of qualifiers from training and apprentice programmes required to fill vacancies for each GDN on a consistent basis, by applying the following assumptions to their forecasts:

- The period 2011-12 to 2023-24 is sufficiently long for the total number of trainees/apprentices qualifying to equate to the total number of positions to be filled.
- trainees and apprentices will qualify to fill a vacancy arising in either the year of qualification or one of the two years immediately following qualification. The number of qualifiers $Q_y$ in any given year (y) can be calculated from the following expression, where $V_y$ represents the vacancies to be filled:

$$Q_y = \beta_0 V_y + \beta_1 V_{y+1} + \beta_2 V_{y+2}$$

The weightings ($\beta$) were arrived at through iteration to give the closest match to each GDN's submitted qualifier forecasts.

1.4. It should be noted that as the training and apprentice data submitted by WWU was incomplete we used our own estimates to fill in some of the data gaps. We are satisfied that our estimates do not lead to an over assessment of WWU's requirement for qualified staff.

[27] "Energy & Utility Skills (EU Skills) is the Sector Skills Council (SSC) for the gas, power, waste management and water industries, licensed by Government and working under the guidance of the UK Commission for Employment and Skills (UKCES)": www.euskills.co.uk

1.5. The total qualified staff numbers were then allocated across individual training and apprentice programmes in proportion to GDN forecasts, and by factoring in the individual programme lengths we were able to arrive at our view for each GDN of trainee and apprentice numbers over RIIO-GD1.

*Additional adjustments to allowed trainee and apprentice numbers*

1.6. GDNs were given specific allowances in GDPCR1 to train 50 apprentices/trainees per annum. With the exception of Wales & West and Scotia's Southern GDN, all GDNs are forecasting that by the end of GDPCR1 they will have under-recruited against allowed numbers over GDPCR1. Our proposals take account of this under-recruitment and we have adjusted allowed recruitment numbers for RIIO-GD1 by corresponding amounts.

**Table A7.1 – GDN forecast under-recruitment of trainees and apprentices in GDPCR1 against allowed numbers**

| **GDPCR1 forecast overall under-recruitment (number of trainees/apprentices in any year)** | |
|---|---|
| East of England | 3 |
| London | 25 |
| North West | 116 |
| West Midlands | 175 |
| Northern | 65 |
| Scotland | 56 |
| Southern | - |
| Wales & West | - |

**Table A7.2 – Proposed allowed number of trainees and apprentices**

| | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | Total | Reduction on GDN forecasts |
|---|---|---|---|---|---|---|---|---|---|---|
| East of England | 23.6 | 54.4 | 78.1 | 91.8 | 94.0 | 108.6 | 112.2 | 94.9 | 657.7 | (17.6%) |
| London | 8.0 | 18.1 | 23.8 | 25.1 | 19.0 | 23.8 | 35.4 | 41.1 | 194.3 | (28.3%) |
| North West | 7.0 | 18.5 | 28.9 | 41.3 | 47.7 | 56.9 | 60.0 | 61.2 | 321.5 | (35.7%) |
| West Midlands | 2.5 | 6.1 | 13.0 | 19.1 | 22.9 | 26.5 | 25.5 | 26.1 | 141.8 | (59.6%) |
| Northern | 85.3 | 110.4 | 106.6 | 105.7 | 103.9 | 104.8 | 114.1 | 99.2 | 830.0 | (21.3%) |
| Scotland | 43.1 | 46.5 | 50.1 | 49.4 | 51.1 | 52.2 | 53.9 | 51.1 | 397.3 | (21.5%) |
| Southern | 79.1 | 86.2 | 92.5 | 90.4 | 91.6 | 93.6 | 96.9 | 92.6 | 722.9 | (10.3%) |
| Wales & West | 37.6 | 42.9 | 41.3 | 46.5 | 52.0 | 51.3 | 50.4 | 48.8 | 370.8 | (32.9%) |

*Trainee & apprentice programme unit costs*

1.7. As in GDPCR1 we have applied the same unit cost to all trainee and apprentice programmes (craftsperson apprentices, engineer apprentices, and graduate & other staff/management trainees). We propose a unit cost of £35,000 per trainee/apprentice per annum. This is an increase on GDPCR1 allowances and takes into account all salary and training centre costs, and other likely sources of funding available to GDNs (eg through the Skills Funding Agency).

1.8. Our unit cost chosen is approximately equal to the average of the GDNs submitted programme costs and we feel that it provides adequate allowance to enable GDNs to fully meet their training and apprentice programme needs and does not unfairly penalise or reward any GDN. The unit cost covers all operating costs associated with training and apprentice programmes.

We also recognise that in addition to programme costs GDNs are likely to incur other operational training costs and we propose an additional allowance of £0.5m per annum per GDN to meet these costs.