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RPI-X@20

Regulating Energy Networks for the Future: RPI-X@20

Performance of the Energy Networks under RPI-X

Document type: Supporting Paper

Ref: 13c/09

Date of publication: 27 February 2009

Target audience: Consumers and their representatives, gas and electricity transmission and distribution companies, generators and offshore producers and other interested parties.

Overview:

In March 2008 we announced RPI-X@20, our review of our current approach to energy network regulation. The review is considering whether the existing regulatory regime remains appropriate for the likely new challenges facing the energy networks. These challenges include the need to accommodate targets for tackling climate change, maintaining security of supply, and undertake widespread maintenance and upgrading of our ageing networks.

We published the first in a series of consultation documents relating to RPI-X@20 today. This supporting paper complements the RPI-X@20 consultation by providing an overview of the performance of the electricity and gas distribution and transmission companies under the RPI-X regulatory regime.

This paper is not a consultation paper. No questions are posed in it and no comments are sought on it. The paper is being published as a high level information paper aimed at providing background to compliment as opposed to providing the main focus for the RPI-X@20 consultation.

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Executive summary

RPI-X regulation has delivered for consumers. Since the regulatory regime was introduced for the electricity and gas distribution and transmission companies, network charges have reduced because of the price control constraint on allowed revenue, increased capacity and investment have been delivered, and there has been higher reliability.

This paper provides an overview of the performance of the electricity and gas distribution and transmission companies under the RPI-X regulatory regime. The key points are as follows:

- Price controls have driven down the revenues that network companies are allowed earn from their network charges. Since the network companies were privatised allowed revenues have declined by approximately 60% in electricity distribution and 30% in electricity transmission (allowing for increases in the current period driven by increased capital investment). Allowed revenue for gas transmission and distribution declined by approximately 35% between 1995 and 2002, and by a further 10% between 2002 and 2007. Allowed revenue for gas transmission and distribution has increased in the current period, reflecting the large capital investment programmes in each sector. The reductions were possible despite ongoing capital investment across the sectors since privatisation.

- There is evidence to suggest that operating efficiency has increased, for example real unit operating expenditure has fallen by approximately 5.5% p.a. across the electricity distribution networks since privatisation, and we continue to set incentives to encourage the energy network companies to improve their operating efficiency.

- Capital investment in the electricity networks is higher on average than the period immediately prior to privatisation. There has also been significant investment in the gas distribution and transmission networks, including the recent programme to replace cast iron mains.

- The allowed pre-tax return has typically sat within the range of 6-7% in price control settlements and companies have, in response to the incentive regime in place, earned higher returns by beating the regulatory contract. This is also suggested by our recent analysis of the return on regulatory equity earned by electricity and gas distribution companies. For example, recent Ofgem analysis has estimated that returns across the electricity distribution networks over the current price control period may differ from the assumed norm by a variation of +3.5 to -1.5 percentage points. Applying this same technique to the gas distribution networks has returned a variation of +6.5 to +0.5 in potential returns

estimated to have been achieved over the past year relative to the assumed rates[1].

- The quality of service delivered to customers has improved, with a 30% reduction in both the number and duration of reported power outages between 1990 and 2008. The number of unplanned customer interruptions in gas has also remained at a low level (less than 0.5 per 100 customers annually) since 2003. Improvements have generally arisen in response to quality of service incentives put in place alongside, or within, the RPI-X framework.

In recent years, however, we have observed changes. At the most recent price reviews, we have allowed stable (RPI+0) or increasing (RPI+X) prices. Companies continue to have incentives to reduce costs, for example through the adoption of new business models, but the scope for further large-scale reductions may be limited. Networks, including the offshore regime, are also forecasting large investment requirements going forward. For example, in TPCR4 the transmission companies were allowed capital expenditure of £5.1m[2] for the period 2007 to 2012. This was a 100% increase on the previous period. The combination of increased investment, and potentially reduced operating efficiency savings, could place significant upward pressure on network charges.

[1] As emphasised in our DPCR5 documents, this analysis provides a holistic and indicative measure for assessing price control performance. It may not correspond to actual returns earned. The data presented here was that available at the time of publication and will be updated as new information becomes available and methodology may be refined.

[2] This is capital expenditure for gas and electricity transmission, including a £560m allowance for the Transmission Investment for Renewable Generation Regime, which is outside the price control. All figures are expressed in 2004/05 prices.

1. Introduction

1.1. In RPI-X@20 we are reviewing the current regulatory frameworks for energy networks and considering what changes may need to be made for the future. We recognise that, since privatisation, networks have delivered considerable benefits for consumers. These have partly been driven by the regulatory framework in place, particularly as "privatisation effects" diminished.

1.2. We have emphasised that we will not make changes for changes sake in RPI-X@20. We therefore need to recognise what has been delivered, understand what has worked well, and consider what is likely to be delivered going forward.

1.3. We present an overview of the performance of the regulated energy network industries under the RPI-X regulatory framework in this supporting paper. Specifically we look at trends in:

- network charges, driven by changes in allowed revenue (Chapter 2);
- operating efficiency (Chapter 3);
- capital investment (Chapter 4);
- the allowed return (Chapter 5);
- network reliability (Chapter 6); and
- company outperformance, measured as return on regulatory equity (Chapter 7).

1.4. Where evidence is available, we have looked at performance since the industries were privatised until 2007/08. Underlying data comes from a variety of sources, and adjustments have been made to control for the effects of inflation and atypical items where possible. However, we recognise that data has not been reported or collected on a consistent basis over time and this will have an impact on long-term analysis of this type[3]. We do not expect it to impact on the general messages emerging from our analysis. Some of the data presented also varies from that which has been published previously in price control documents. This is due to required adjustments having been made.

3 We have raised concerns about the consistency and comparability of company data, both over time and across operators, in a number of price reviews. These concerns remain highly relevant for setting price controls but are less of a concern when undertaking high level trend analysis of the type presented here.

2. Allowed revenue and network charges

2.1. Under RPI-X regulation, we set at each price review a fixed allowed revenue stream for the energy networks for a five-year period. The assessment of allowed revenue reflects assumptions relating to expected efficiency, required capital investment and the return needed to finance the network business.

2.2. Network companies use network charges to recover the allowed revenues from users of the network. For example, transmission use of system charges are set to recover the maximum allowed revenue of the Transmission Owners. Similarly, gas distribution use of system capacity and commodity charges are used to recover allowed revenue from users of the gas distribution networks[4]. The level and structure of individual network charges faced by network users is currently determined independently of the price control review process.

2.3. Trends in network charges have a significant impact on the bills of final consumers. Transmission charges have, on average, represented 2-3 per cent of the average domestic gas and electricity bill over the period 2001-2008. Over this same period, distribution charges have represented 21-23 per cent of the average domestic bill. Downward pressure on network charges, from the RPI-X regime, therefore delivers direct benefits to consumers when passed on by energy suppliers.

2.4. We consider the trends in network charges since privatisation by reviewing changes in allowed revenue since privatisation. The changes from one year to the next are captured by the price control in place. This is the most consistent measure available for the time period under review. The price control applies to overall allowed revenue, not to changes in individual charges. Trends in network charges may therefore deviate, to some extent, from the price controls themselves. However, over time and on average across charges, we would expect trends in network charges to broadly reflect trends in allowed revenue.

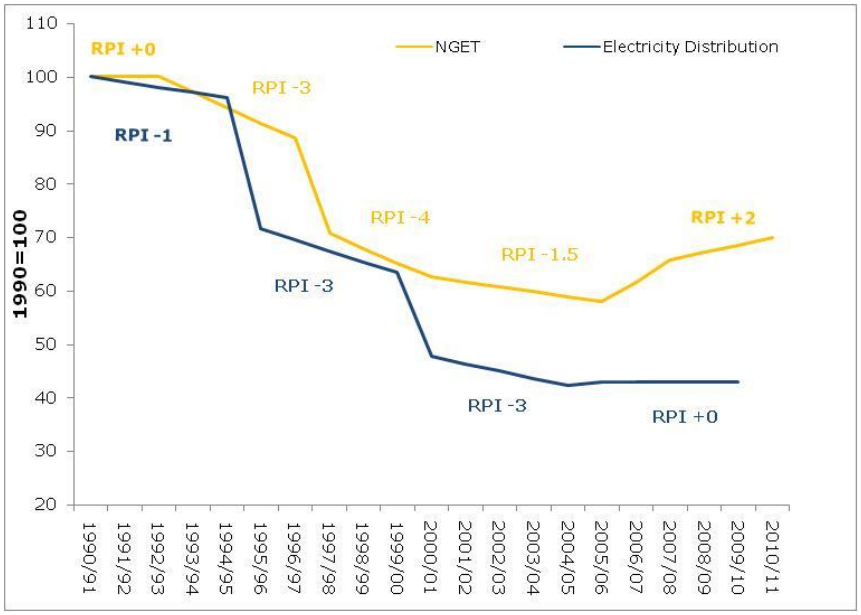
2.5. Figures 2.1 and 2.2 show changes in allowed revenue[5] over time for the electricity and gas[6] distribution and transmission networks since privatisation. In all cases, allowed revenue has decreased significantly since privatisation. However, there has been a levelling off or increase in the most recent price control periods.

[4] The split was historically 50:50 between capacity and commodity charges but has recently changed to 95:5.
[5] The trend has been calculated by setting allowed revenue in a base year to 100 and adjusting this for the allowed price controls (initial price cuts at the start of a period - the P0 cut - and X-factors). This does not reflect the overall change in allowed revenue which is also affected by other adjustment mechanisms such as revenue drivers.
[6] Because of changes in the structure of the business, and associated price controls, two periods are shown for the gas transportation and distribution networks (1994/95 to 2001/02, when the networks were integrated but separate from supply; and 2001/02 to 2010/11 when separate price controls were set for distribution and transmission).

This reflects increases in the required capital investment undertaken by the regulated energy network companies.

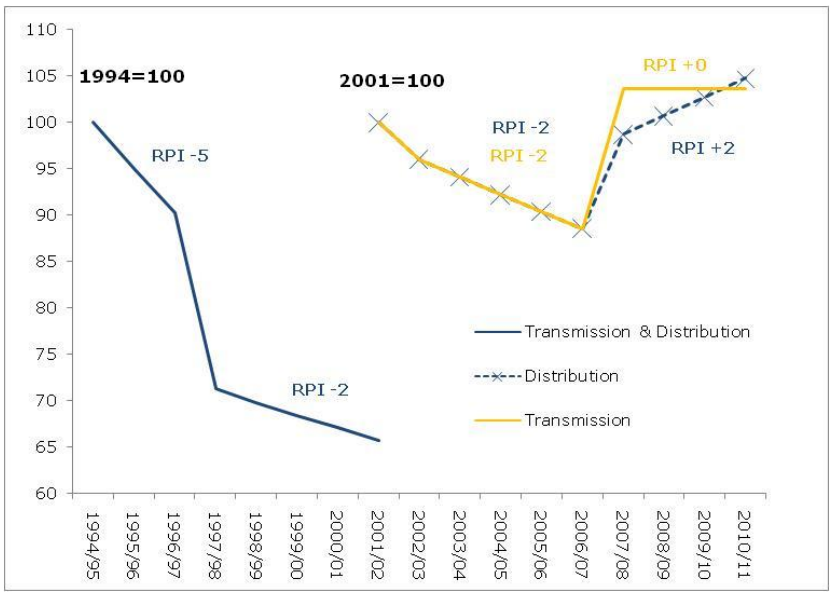
2.6. We expect that network charges will have displayed a similar trend over time on average, although we recognise that there will have been variability across different charges and across time periods.

Figure 2.1: Price control revenue allowance adjustments - Electricity networks



Source: Ofgem and Offer, various price control decision documents.

Figure 2.2: Price control revenue allowance adjustments - Gas networks



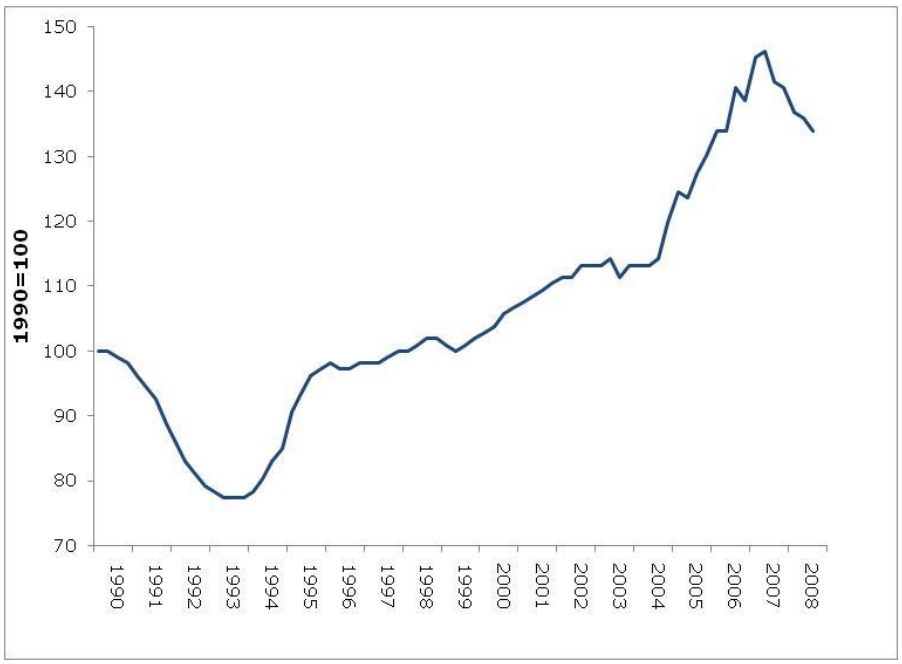
Source: Ofgem and Ofgas, various price control decision documents.

2.7. These trends have occurred alongside growth in the size of the electricity networks (measured by circuit lengths). Between 1994 and 2007 the GB electricity transmission networks have grown by 6% according to this measure and there has been a 10% increase in the size of the electricity distribution networks between 1992 and 2006. The size of the gas distribution network (measured in terms of the total length of pipes in the network) has remained generally stable since 2002[7]. This suggests that networks have at least essentially been "doing the same for less" or even "more for less", consistent with the incentive pressures in the RPI-X regulatory framework.

2.8. The significance of the downward trend in allowed revenue of the energy networks can be seen when we consider trends in other infrastructure costs over the period. Figure 2.3 shows that these costs declined in the early 1990s but have increased since. Trends in network charges, proxied by trends in allowed revenue, have reduced over the same period.

[7] Calculations based upon data from
http://www.nao.org.uk/publications/0506/ofgem_sale_of_gas_networks_by.aspx
and
http://www.ofgem.gov.uk/Networks/GasDistr/QoS/Documents1/2007%20to%2008%20QoS%20report.pdf

Figure 2.3: Trends in Infrastructure Output Costs Index



Source: Ofgem calculated using BERR data

2.9. As noted earlier, the level of allowed revenue is determined by assessing operating efficiency, capital investment and the allowed return. We consider each of these components to get a better understanding of what has driven the trends in allowed revenue, and hence network charges, over time.

3. Operating efficiency

3.1. The allowed revenues set in price controls rely on companies being able to make improvements in operating efficiency. Furthermore, the incentive regime encourages networks to outperform across all components of the price control. This includes outperforming the assumed yearly reductions in real unit operating costs.

3.2. We have estimated achieved operating efficiencies in the electricity distribution and transmission networks since the introduction of the RPI-X regime[8]. Our methodology is based on the approach taken in recent exercises undertaken in support of DPCR4 and TPCR4[9], although there are differences in the approach we have taken[10]. While there is variation in the scale of these estimates over time and for each individual company, results suggest that reductions in the order of 5.5% p.a. and 3.1% p.a. have been achieved across the electricity distribution and transmission networks, respectively, between 1990 and 2006.

3.3. These estimates compare favourably against targets set at price control reviews, indicating that companies have responded to the incentives in the RPI-X regime to outperform efficiency assumptions. The efficiency targets are shown in Figure 3.1.

[8] These estimates are derived from trends in compound annual reductions in real controllable operating costs per unit of energy distributed or transmitted. Controllable operating expenditure is defined as operating costs less depreciation and atypical items. Data on operating expenditure was drawn primarily from regulatory accounts and price control documents. Data on energy distributed was sourced from Electricity Industry Annual Review Documents and the Ofgem networks division. Data on energy transmitted was sourced from Electricity Industry Annual Review Documents and the Ofgem networks division.

[9] For further details see: http://www.ofgem.gov.uk/Pages/MoreInformation.aspx?file=5304-15603.pdf&refer=Networks/ElecDist/PriceCntrls/DPCR4

[10] No adjustment has been made for scale effects and output variables are based upon units of energy transmitted and distributed only.

Figure 3.1: Operating efficiency targets

Electricity Distribution	Electricity Transmission		Gas Distribution	Gas Transmission
	NGET	SPTL/SHETL		
3.0% (1995-99)	3.0% (1996-00)	2.0% (1994-00)	2.5% (1994-97)	2.5% (1994-97)
	4.0% (1997-01)	0.0%[11] (2000-06)	3.8% (1997-02)	3.8% (1997-02)
2.8-6.0%12 (2000-05)	3.5% (2001-07)	2.5% (2006-07)	2.5% (2002-07)	2.5% (2002-07)
1.5% (2005-10)	3.0% (2007-12)	1.5/1.1%[13] (2007-12)	2.5% (2008-13)	2.5% (2007-12)

Source: Ofgem, Offer, and Ofgas, various price control documents.

3.4. For the purposes of this paper, we focus on the general trend in operating efficiency over time rather than focusing on the calculated levels. Real unit operating expenditure is a partial measure of productivity and the precise level of efficiency calculated is sensitive to the definition of both operating expenditure and the units being considered. Scale effects will also have an impact, and these have been considered in previous price controls[14]. When we benchmark the electricity and gas distribution networks at price controls, we take account of these factors when assessing potential efficiency targets. We have not undertaken detailed analysis of this type here and we therefore focus on the story emerging at a high level and using a simple measure of operating efficiency.

3.5. Based on our high-level analysis, we have found that there have been significant and sustained reductions in real unit operating expenditure, since privatisation, across all networks, suggesting that one of the key expected benefits of RPI-X regulation is being delivered. At our industry workshops in autumn 2008[15], a number of stakeholders presented views that were broadly consistent with this analysis.

[11] Potential targets identified of 15 and 10%, respectively, but these were deemed to be off-set by increases in other costs.
[12] The high or low efficiency target was dependent on whether there was a higher allowance for separation costs.
[13] These relate to SPTL and SHETL, respectively.
[14] For further details see:
http://www.ofgem.gov.uk/Networks/ElecDist/PriceCntrls/DPCR4/Documents1/5304-15603.pdf
15 For further details see:
http://www.ofgem.gov.uk/Networks/rpix20/publications/Presentations/Pages/Presentations.aspx

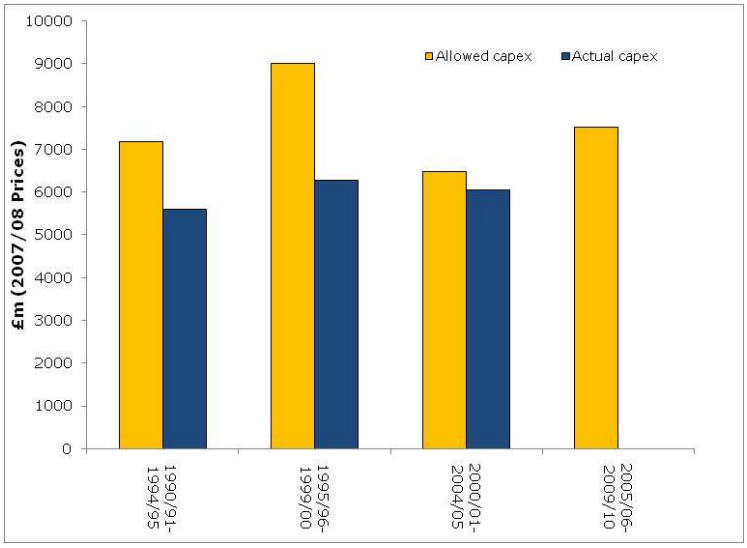
4. Capital expenditure

4.1. The regulated energy networks are capital-intensive businesses, with long-lived assets that require ongoing maintenance and periodic replacement and enhancement. Replacement and enhancement can be required to ensure the network assets continue to provide reliable service and it may also be required to deliver government policy objectives. For example, gas distribution networks are investing to replace the cast iron mains in response to a requirement from the Health and Safety Executive. The electricity transmission network has also increased capital investment significantly to facilitate connection of renewable generation, and the electricity distribution networks are provided with incentives to invest to connect distributed generation.

4.2. Under the RPI-X framework, we allow companies to earn a return on allowed capital investment (included in the regulatory asset value) and we include an allowance for depreciation charges in the allowed revenue calculation. The trends in allowed revenue discussed in Chapter 1 are therefore partly driven by changes in capital investment over time, although the impact of capital investment on consumer bills is spread over time through the profiling of depreciation and the rolling forward of the regulatory asset value.

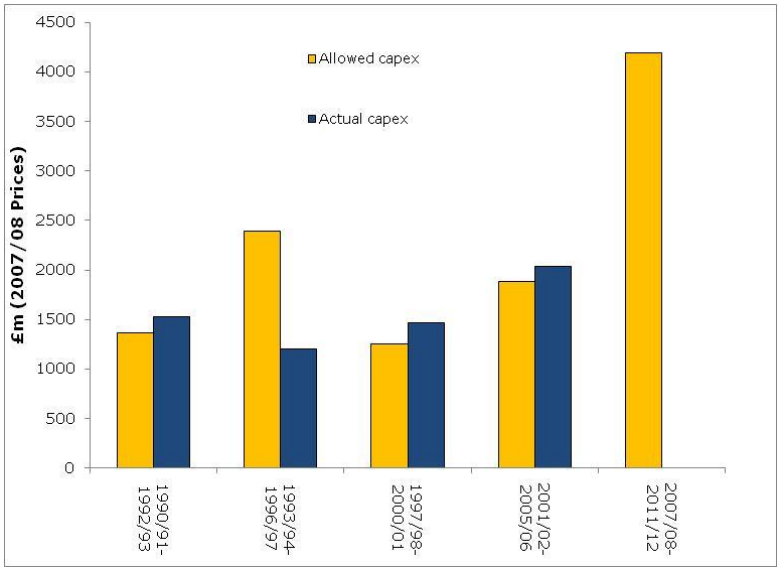
4.3. Trends in actual annual real capital expenditure across the electricity networks are shown in Figures 4.1 and 4.2, and across the gas networks, shown in Figures 4.3 and 4.4. These data are aggregated for each price control period. To allow greater ease of comparison we have removed data that relates to single-year price controls from these graphs, although the two non five-year price control periods have been retained for the electricity transmission networks.

Figure 4.1: Trends in real capital expenditure across the electricity distribution networks



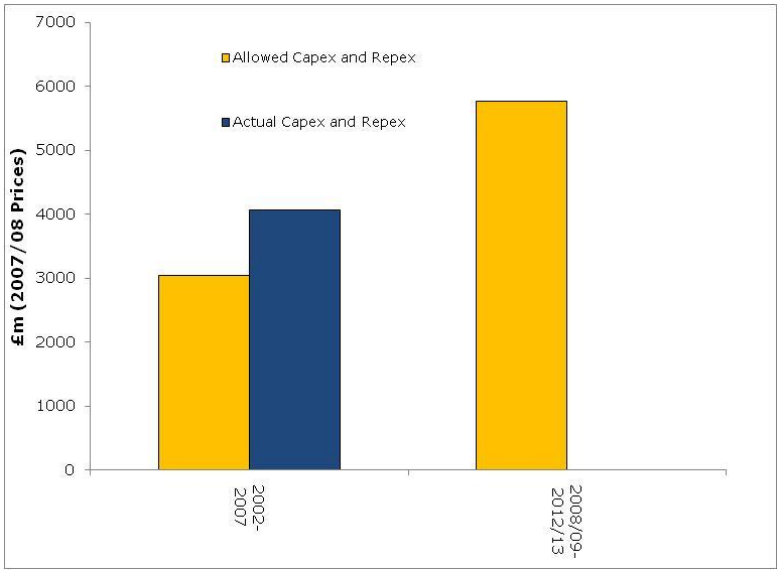
Source: Ofgem, various price control documents

Figure 4.2: Trends in real capital expenditure across the electricity transmission networks



Source: Ofgem, various price control documents.

Figure 4.3: Trends in real capital and replacement expenditure across the gas distribution networks

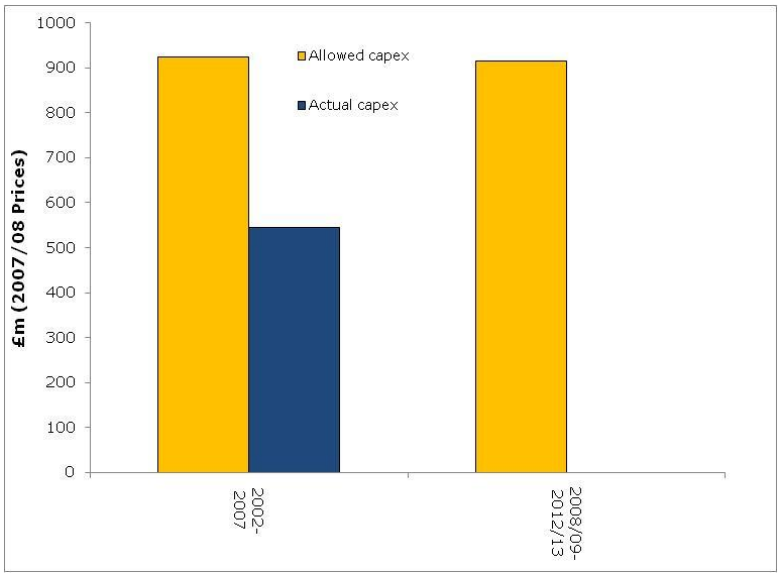


Source: Ofgem, various price control decision documents with adjustments made to allowances for load abandoned.

4.4. Figure 4.3 shows total capital expenditure and replacement expenditure combined. Replacement expenditure comprises 65% of the combined total for actual expenditure between 2002 and 2007 and 68% of the combined total for allowed expenditure over the period 2008 to 2013. Allowances have been adjusted to control for load abandoned, which means that the total allowance shown for the

period 2002 to 2007 differs from that which was presented in final price control documents.

Figure 4.4: Trends in real capital expenditure across the gas transmission networks



Source: Ofgem, various price control decision documents.

4.5. While the aggregate trends of Figures 4.1-4.4 above do not tell us anything of the quality of investment, they show that investment has, on average, been higher than the five-year period immediately prior to privatisation where investment totalled approximately £1.3bn in the electricity transmission networks and £3.8bn in the electricity distribution networks[16]. It is important to note, however, that these trends in investment in electricity distribution come on the back of significant annual investment which reached in the order of £2.5bn per year between 1964 and 1966[17].

4.6. The graphs also show that allowed capital expenditure has risen significantly for the current price control periods, with the exception of gas transmission. The associated allowances are shown in Table 4.1. In electricity transmission the increase largely reflects investment needed to increase capacity to connect renewable generation. For gas distribution networks, it reflects the cast iron mains replacement programme. Investment allowances as part of the current electricity distribution settlements reflected general recognition of a need to increase

[16] Source: http://www.ofgem.gov.uk/About%20us/CorpPlan/Documents1/13924-8206.pdf and http://www.parliament.uk/documents/upload/Ofgem310107.doc
17 Source: http://www.ofgem.gov.uk/About%20us/CorpPlan/Documents1/13924-8206.pdf

investment to replace network assets and to respond to the growth of renewables by facilitating the connection of renewable generation[18].

Table 4.1: Allowed capital investment in recent price controls (money of the day)

	Capital investment allowance	Real % increase from prior allowance
TPCR4	£5.1 billion[19]	100%
DPCR4	£5.7 billion	48%
GDPCR	£5.3 billion	41%

Source: Ofgem, various price control decision documents.

4.7. The above graphs show variation in the degree of alignment between the timeframes over which actual capital expenditure occurs relative to the time frames set out in price control allowances. The recent transmission price control final proposals document shows further details of these trends by focusing separately on load and non-load expenditure[20].

18 For further details see:
http://www.ofgem.gov.uk/Networks/ElecDist/PriceCntrls/DPCR4/Documents1/8944-26504.pdf
19 Refers to allowed investment across the gas and electricity transmission networks combined and includes £560 million of investment under the Transmission Investment for Renewable Generation Regime authorised outside of the price control
20 For further details see:
http://www.ofgem.gov.uk/Pages/MoreInformation.aspx?docid=190&refer=Networks/Trans/PriceControls/TPCR4/ConsultationDecisionsResponses

5. Allowed rate of return

5.1. When setting allowed revenue, we consider the appropriate return to allow companies to earn on their Regulatory Asset Value (RAV). Given the size of the asset values, the level of the allowed return has a significant impact on the prices paid by consumers. For instance, estimates based upon the value of the RAV calculated as part of the last transmission price control review shows that a 1% change in the weighted average cost of capital was worth £125 million to consumers[21].

5.2. The regulated energy networks are relatively low risk businesses. In particular, they do not face a volume risk and the regulatory framework ensures that efficient investment is remunerated. The allowed return has been set accordingly. The pre-tax allowed return has typically sat within the range of 6-7% in price control settlements, summarised in the table below:

Table 5.1: Trends in pre-tax allowed rate of return

Electricity Distribution	Electricity Transmission		Gas Distribution	Gas Transmission
	NGET	SPTL/SHETL		
			5-7.0%[22] (pre-95)	5-7.0%[23] (pre-95)
7.0% (1995-99)	7.0% (1996-00)	6.0% (1994-99)	6.5-7.5%[24] (1995-99)	6.5-7.5%[25] (1995-99)
			7.0%26 (1998-03)	7.0%27 (1998-03)
6.5% (2000-05)	6.25% (2001-07)	6.50% (2000-01)	6.25% (2002-07)	6.25% (2002-12)
6.9% (2005-10)	6.54% (2007-12)	6.54% (2007-12)	5.99% (2008-13)	6.54% (2007-12)

Source: Ofgem, various price control decision documents

5.3. Since privatisation, the allowed rate of return embedded in our price control reviews has been based on a medium- to long-term view of the weighted average cost of capital (WACC) of an efficient energy network. We have presented our view

[21] This is calculated based upon 1% of the final value of the aggregate RAV across electricity transmission and gas companies converted to 2012 prices.
[22] Cost of capital applied to new assets
[23] Refer above
[24] Refer above
[25] Refer above
[26] Refer above
[27] Refer above

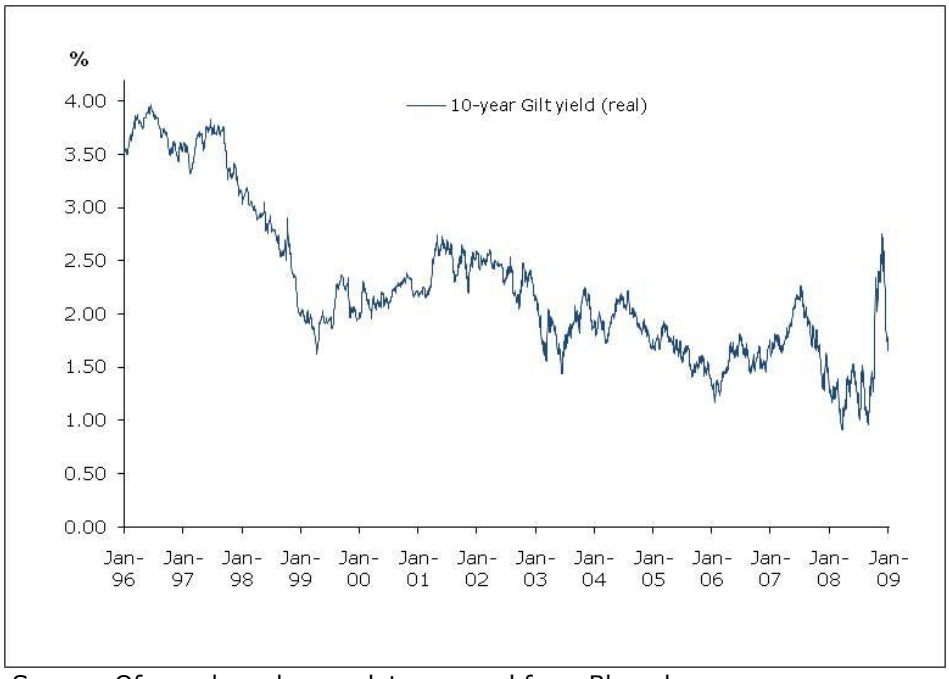
on the WACC in a Capital Asset Pricing Model (CAPM) framework, although increasingly a number of other approaches have also been used to inform our view.

5.4. The trends in the overall allowed return outlined in Table 5.1 above reflect changes in our estimates of the WACC components. Most notably there has been a decline in the assumed cost of debt in recent years, a move to using notional gearing rates (increasing from 50% to approximately 60%) rather than an assessment of expected actual gearing, and a modest increase in the assumed return on equity. The main changes in the WACC components are summarised here:

- **Gearing**: In the 1990s, the WACC tended to be calculated using an assessment of expected actual gearing (for example, a gearing of 20% was proposed by the DG for Transco in the 1997 MMC case). In recent years we have tended to use a notional gearing assumption. This assumption has increased from around 50% to around 60%, partly reflecting increases in actual gearing levels.

- **Risk free rate**: The risk-free rate has generally declined over time, although there was an increase in the most recent price reviews, reflecting general trends in index-linked gilts. These trends are depicted in Figure 5.1 below.

Figure 5.1: Trends in 10 year index linked gilts



Source: Ofgem, based upon data sourced from Bloomberg.

- **Debt premium**: The debt premium increased in the 1990s, but has declined in price reviews since 1999. For example, in the Scottish Hydro-Electric case the MMC suggested a range of 0.3% to 0.7% for the debt premium, in 2000 we assumed a debt premium of 1.70% for NGC and 1.90% for Transco in 2001, and in DPCR4 (2004) we used a debt premium of 1.35%. This decline reflects the general decline in the investment grade credit spreads for short and long

maturities in the periods reviewed for previous price controls. Variation across sectors largely reflects the timing at which reviews were carried out, and hence the available data used.

5.5. The above overview does not reflect our current work on the WACC for the Electricity Distribution Network Operators (DNOs) in DPCR5.

6. Network reliability

6.1. In 2002 specific incentives to improve quality of supply across the electricity distribution networks were incorporated into the RPI-X framework. Further incentives that apply to other parts of the energy networks have followed in recent times. These incentives involve allowed revenue being adjusted depending on performance relative to quality of service targets and have tended to focus on measures of network reliability. Prior to this, networks were incentivised to deliver quality of service through regimes that were separate from the price control framework (e.g. Guaranteed Standards). These regimes still exist alongside the price control framework for many of the regulated energy network companies.

6.2. We consider here how network companies have performed with respect to the main indicators of network reliability.

Reliability of the electricity networks

6.3. We consider three measures of network reliability to review the performance of the electricity networks since RPI-X regulation was introduced.

- Average number (per 100 customers) and duration of customer interruptions.
- Transmission system annual availability.
- Energy unsupplied due to faults in the electricity transmission network.

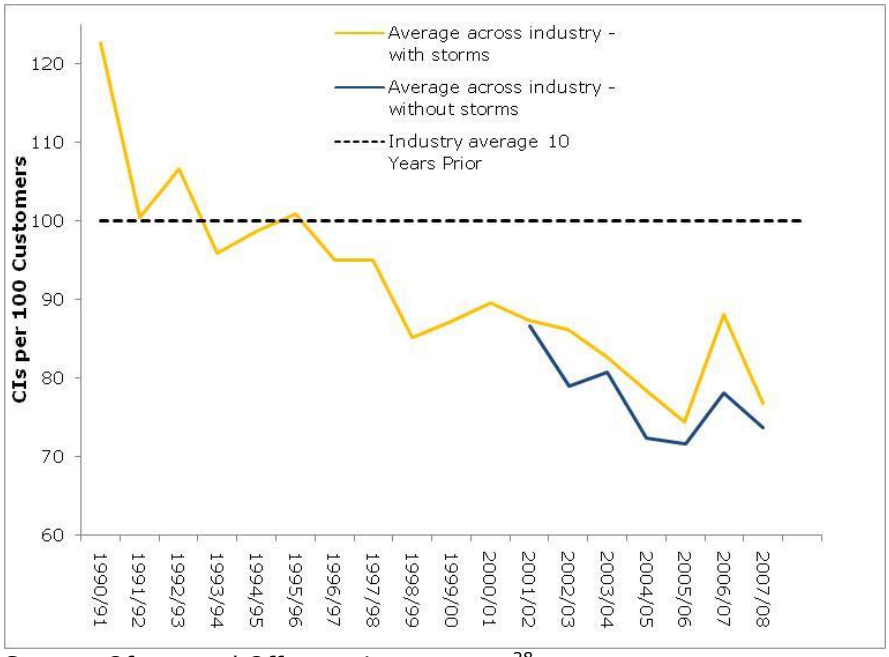
6.4. Combined, these measures provide a picture of the reliability of the network service provided to consumers. In 2002 a specific incentive mechanism was put in place attached to the first set of indicators referred to above. We consider trends in each here.

Customer interruptions

6.5. In electricity distribution, international benchmarking studies often focus on trends in indicators of "continuity" when evaluating quality of supply. For instance, this is the focus in Council of European Energy Regulators (CEER) benchmarking reports.

6.6. In line with this, we consider measure of continuity of supply in electricity here. We measure continuity by looking at the average number and duration of customer interruptions (power outages) that last longer than three minutes. Figures 6.1 and 6.2 show trends in this measure since 1990. The impact of exceptional events – such as storms – has been excluded where data is available. These data cover both planned and unplanned interruptions.

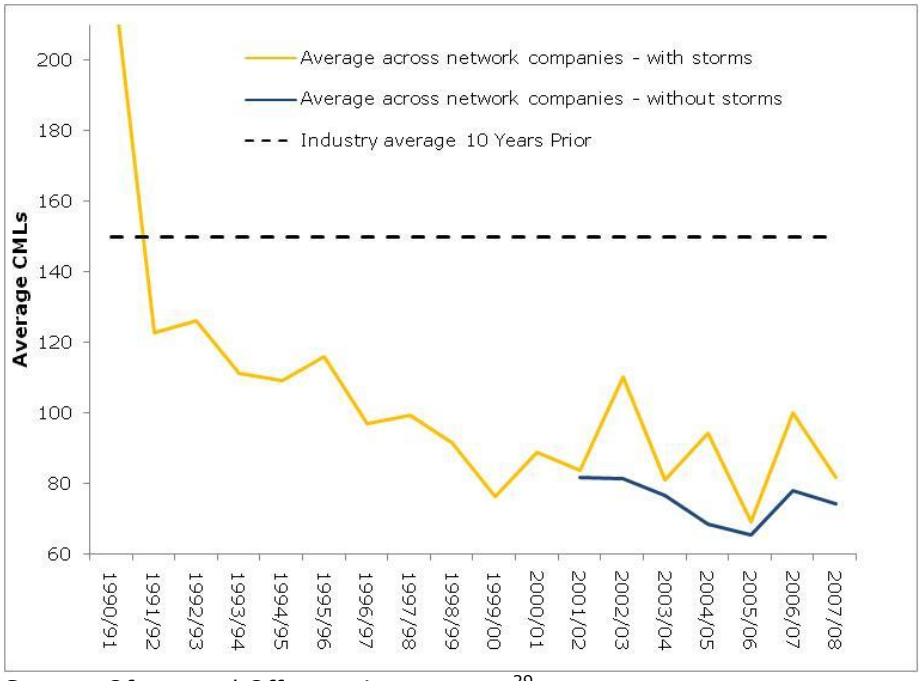
Figure 6.1: Average number of customer interruptions (CIs) per 100 customers excluding exceptional events where data is available



Source: Ofgem and Offer, various sources[28].

[28] Note: data pertaining to the 10 year averages has been estimated by Offer where data was not available.

Figure 6.2: Average duration of customer interruptions excluding exceptional events where data is available



Source: Ofgem and Offer, various sources[29].

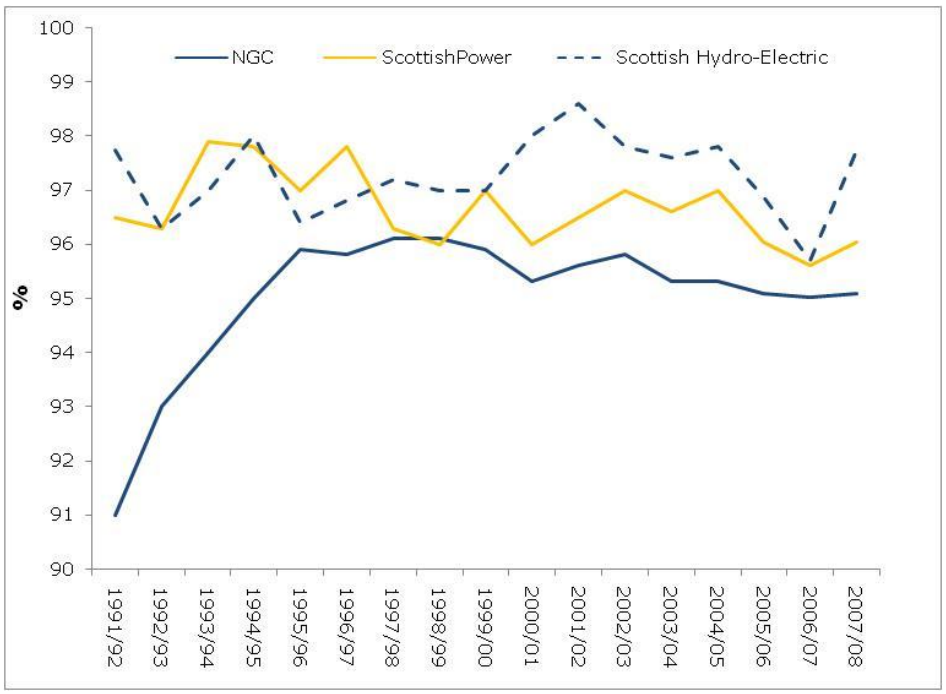
6.7. The graph shows a downward trend in the reported number of power outages and duration of outages since the time RPI-X was introduced. These reductions represent in the order of 30% in both the number and duration of cuts. These trends may, in part, reflect improvements in the accuracy and quality of data supplied but the scale of the trend suggests significant improvement. Since the introduction of specific incentive mechanisms in 2002 there has been an 11% improvement in the reported number of interruptions and a 26% improvement in the reported duration of interruptions.

Transmission system availability

6.8. We also assess the reliability of the electricity transmission system using a measure of availability (the percentage of time that the system is available for use). Unavailability may be due to planned events within the control of the company or may be the result of network failure. Trends in annual availability in the electricity transmission networks are shown in Figure 6.3 below.

[29] Note: data pertaining to the 10 year averages has been estimated by Offer where data was not available.

Figure 6.3: Transmission system annual availability



Source: Offer and Ofgem, various sources.

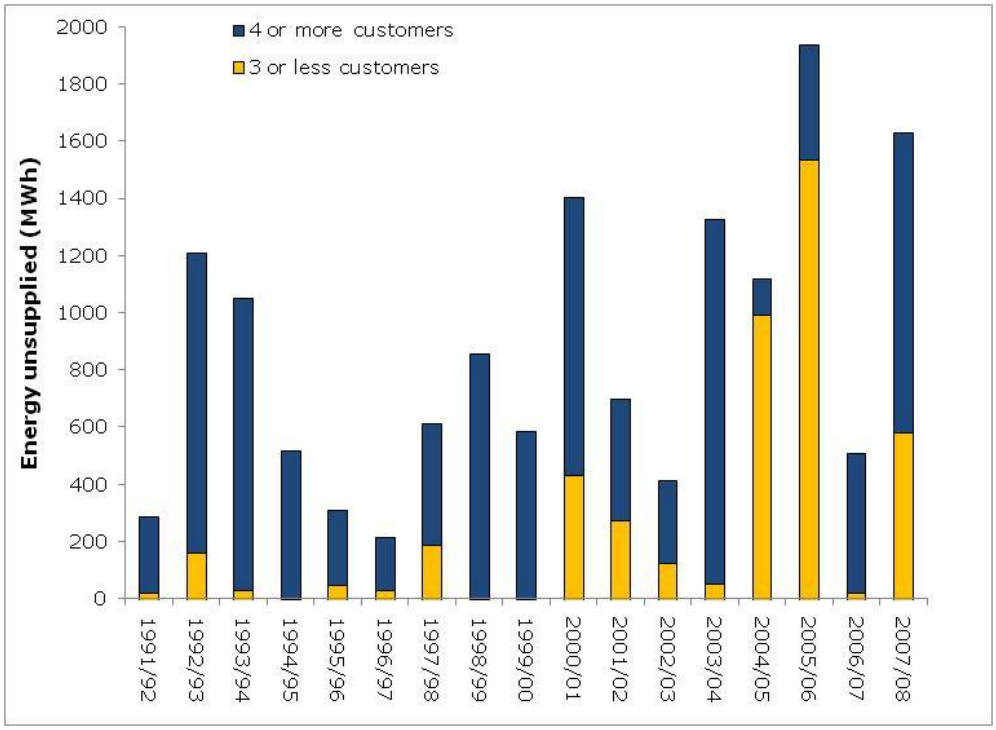
6.9. There was a significant improvement in the level of NGET's system availability between 1991 and 1995. National Grid has attributed this in past reporting to an initiative that was introduced to enable better planning of system outages[30]. Consistently high levels of availability across the transmission networks are apparent. All of the transmission network operators have consistently achieved availability within the range of 95-98% since 1995.

Energy unsupplied due to transmission network faults

6.10. We also assess performance of the electricity transmission networks by reviewing the amount of energy unsupplied due to transmission network faults. This is a measure that underpins overall network reliability. Figure 6.4 sets out trends which have occurred in this indicator.

[30] Source: http://www.ofgem.gov.uk/Networks/Archive/0201%20-%20Report%20on%20Distribution%20and%20Transmission%20Performance%201999-2000.pdf

Figure 6.4: Energy unsupplied due to faults in the electricity transmission networks



Source: Ofgem, using data from various sources.

6.11. Significant fluctuations over time are apparent from the above graph and no clear trends emerge. Part of this fluctuation over time can be explained by bad weather, which explains the majority of transmission faults. As a proportion of total energy supplied, the losses evident in the above graph are equivalent to less than 0.0001% and overall reliability for the GB transmission system over the past three years has been within a range of 99.99-100%[31].

Reliability of the gas networks

6.12. Customer interruptions also represent a key indicator of reliability of supply in the gas distribution networks. While the reported number of interruptions per 100 customers has increased in recent years, these trends are attributable to a range of factors including improvements in the accuracy and completeness of data supplied, and the impact of investment maintenance programmes on service, including the

[31] Source: http://www.nationalgrid.com/NR/rdonlyres/FC52DAA5-D377-4D2E-B8CF-CDCF5D7E342C/29005/GBTransmissionSystemPerformanceReportforweb.pdf

HSE-driven mains replacement programme[32]. There have been fewer than 0.5 unplanned interruptions per 100 customers per year since 2003[33].

6.13. We are working on developing a set of gas transmission output measures and these will be used to assess network reliability in the future. It is believed that the gas transmission network is generally highly reliable and interruptions for planned maintenance are managed through the capacity buyback arrangements[34].

32 For further details see http://www.ofgem.gov.uk/Networks/GasDistr/QoS/Documents1/2007%20to%2008%20QoS%20report.pdf.
33 Source: Ofgem Gas Distribution Quality of Service Reports, various years.
34 Source: http://www.ofgem.gov.uk/Pages/MoreInformation.aspx?docid=18&refer=Sustainability

7. Company outperformance of price controls

7.1. The RPI-X regulatory framework provides strong incentives for companies to strive to 'beat' the regulatory settlement. This can be achieved in a number of ways, including by achieving operating efficiencies in excess of the level targeted in the settlement, by improving incentivised measures of quality of supply, and by achieving average financing costs below the allowed rate of return. Companies that do manage to beat the regulatory settlement will realise returns on their equity in excess of that implicit in the regulatory settlement.

7.2. We anticipate that a number of companies will beat the regulatory settlement. Indeed, RPI-X is driven by the incentive it provides on companies to do so. However, if the incentives provided by the regime operate as they are intended to, there should be a strong correlation between those companies that do achieve significantly greater returns on equity than implied by the control and those that are demonstrably delivering a service of the highest quality to consumers.

7.3. We have undertaken an assessment of the returns on regulatory equity forecast to be achieved by electricity network companies over the DPCR4 period and achieved by gas network companies in 2007/08, respectively. This analysis suggests that, in aggregate, the gas distribution network companies have outperformed the regulatory settlement over the past year and that outperformance is forecast for the electricity distribution companies[35].

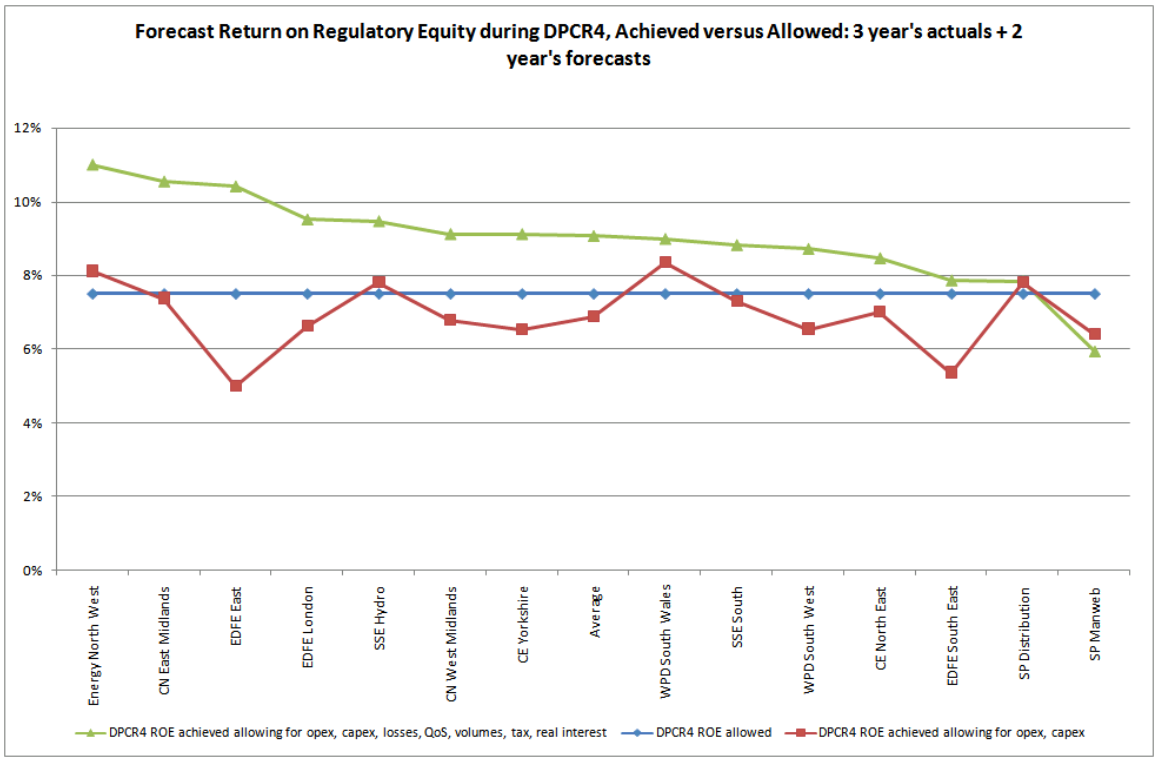
7.4. We present here provisional data available on DNOs available at the time of publication. The results of this exercise will be updated as new data comes available and the underpinning methodology may be refined over time. The results are indicative and suggest that actual shareholder returns across the electricity distribution networks may differ from the assumed norm by a variation of +3.5 to -1.5 percentage points with only one of the fourteen DNOs forecast to below the assumed equity return over the five year period[36]. These results are summarised in Figure 7.1 below. Further, the analysis raises questions as to whether those companies that are forecast to earn the highest returns are those that are obviously delivering the best service to customers. In the context of DPCR5, we are also

[35] As emphasised in our DPCR5 documents, this analysis provides a holistic and indicative measure for assessing price control performance. It may not correspond to actual returns earned. The data presented here was that available at the time of publication and will be updated as new information becomes available and methodology may be refined.

[36] For further details see: http://www.ofgem.gov.uk/NETWORKS/ELECDIST/PRICECNTRLS/DPCR5/Documents1/POLICY%20PAPER%20DOCUMENT%20File%20problem%20use%20this%20one%2020081126%20PR.pdf

working to understand more fully the relationship between performance relative to the regulatory package and the returns earned.

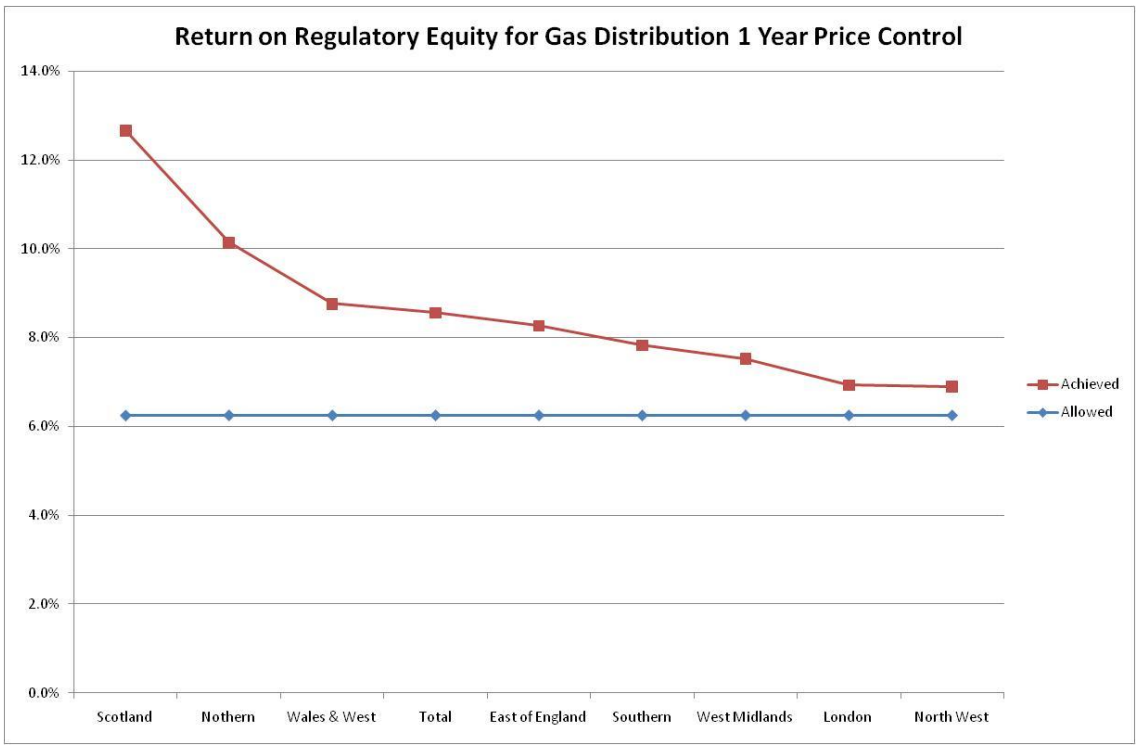
Figure 7.1: Forecast return on regulatory equity for each electricity DNO in DPCR4



Source: Ofgem, DPCR5 December 2008 Policy Document.

7.5. The provisional results of analysis which applies this technique to the gas distribution network companies show an even wider range in returns on regulatory equity, estimated to be in the order of +6.5 to +0.7 percentage points above the assumed rate. Results are summarised in Figure 7.2 below. Again, the analysis which underpins these results is provisional, based on a combination of actual data and regulatory assumptions. Analysis is subject to change. Going forward, it is intended that this analysis will be updated, incrementally improved where appropriate, and used as a measure to help inform assessments of overall price control performance.

Figure 7.2: Return on regulatory equity for each gas DNO 2007-2008



Source: Ofgem, soon to be published in the Ofgem 2007/08 Gas Distribution Annual Report

8. Conclusions

8.1. We have found that allowed revenue have declined since RPI-X regulation was introduced and we expect network charges to have followed a similar trend. Improvements in operating efficiency and stability in the allowed cost of capital have facilitated these declines. Capital investment has been increasing and the reliability of the supply to customers has improved. These have all been driven at least partly by the regulatory framework.

8.2. Our analysis reveals changes in recent years, however. Allowed revenue has stabilised or increased, reflecting increased investment. Operating efficiency improvements are expected to continue, but the scale may be limited compared to the period since RPI-X regulation (with the exception of the gas distribution networks[37], where separate ownership is expected to have an impact).

8.3. We have also found evidence that the regulated networks have generally managed to beat the regulatory settlement. Whilst this in itself is not necessarily cause for concern, there are questions about the extent to which companies are able to outperform and whether those companies earning the highest returns are indeed those that perform best for consumers.

[37] For further details see: http://www.nao.org.uk//idoc.ashx?docId=668997e8-2a09-4a12-9fbf-1ae424bd0abb&version=-1

Appendices

Index

Appendix 1 - Glossary

A

Allowed revenue

The revenue that a regulated business is allowed earn under a price control.

C

Capital Expenditure (Capex)

Expenditure on investment in long-lived distribution assets, such as underground cables, overhead electricity lines and substations.

Customer Interruptions (CIs)

The number of customers whose supplies have been interrupted per year over all incidents, where an interruption of supply lasts for three minutes or longer, excluding re-interruptions to the supply of customers previously interrupted during the same incident.

Customer Minutes Lost (CMLs)

The duration of interruptions to supply per year – average customer minutes lost per customer per year, where an interruption of supply to customer(s) lasts for three minutes or longer.

D

Depreciation

Depreciation is a measure of the consumption, use or wearing out of an asset over the period of its useful economic life.

DNO

A DNO is a company which operates the electricity distribution network which includes all parts of the network from 132kV down to 230V in England and Wales. In Scotland 132kV is considered to be a part of transmission rather than distribution so their operation is not included in the DNOs' activities.

Distribution Price Control Review 4 (DPCR4)

The price control applied to the electricity distribution network operators. This price control runs from 1 April 2005 until 31 March 2010.

Distribution Price Control Review 5 (DPCR5)

The next price control to be applied to the electricity distribution network operators. This price control is expected to run from 1 April 2010 until 31 March 2015.

E

Electricity DNO

An electricity DNO is a company which operates the electricity distribution network which includes all parts of the network from 132kV down to 230V in England and Wales. In Scotland 132kV is considered to be a part of transmission rather than distribution so their operation is not included in the DNOs' activities.

G

Gas distribution networks (GDNs)

GDNs transport gas from the National Transmission System to final consumers and to connected system exit points.

Gas Distribution Price Control Review (GDPCR)

The review of the price control applying to gas distribution networks. The review extended the existing price control for the year 2007-08 and reset the control for the period commencing 1 April 2008.

Guaranteed Standards of Performance

Guaranteed Standards set service levels to be met in each individual case and are established by a Statutory Instrument. If the licence holder fails to provide the level of service required, it must make a payment to the customer affected subject to certain exemptions.

Gearing

A company's net debt expressed as a percentage of its total capital.

Gas Transporter (GT)

The holder of a Gas Transporter's licence in accordance with the provisions of the Gas Act 1986.

Load related expenditure (LRE)

The installation of new assets to accommodate changes in the level or pattern of electricity or gas supply and demand.

National Grid Gas (NGG)

The gas transporter (GT) licence holder for the North West, West Midlands, East England and London GDNs. NGG also hold the GT licence for the gas transmission system.

National Grid Electricity Transmission (NGET)

NGET owns and maintains the high-voltage electricity transmission system in England and Wales.

National Transmission System (NTS)

The high pressure gas transmission system covering Great Britain, owned and operated by National Grid.

Non-Load related Capex

The costs of the day to day operation of the network such as staff costs, repairs and maintenance expenditures, and overheads.

Operating expenditure (OPEX)

Expenditure on operating and maintaining the network, e.g. fault repair, tree cutting, inspection and maintenance, engineering and business support costs.

P

P0

P0 refers to the level of cost reductions that regulated companies were required to pass on to customers at the beginning of new price control periods. The P0 figure was intended to reflect the change in allowances under the new price control as compared with the allowances that were available under the existing control.

R

Regulatory asset value (RAV)

The value ascribed by Ofgem to the capital employed in the licensee's regulated distribution or (as the case may be) transmission business (the 'regulated asset base').

Return on Regulatory Equity

An Ofgem calculation of the actual return on the company package.

RPI-X

The form of price control currently applied to energy network monopolies. Each company is given a revenue allowance in the first year of the price control period. The price control then specifies that in each subsequent year the allowance will move by 'X' per cent in real terms.

Scottish Hydro-Electric Transmission Limited (SHETL)

The electricity transmission licensee in northern Scotland.

Scottish Power Transmission Limited (SPTL)

The electricity transmission licensee in southern Scotland.

T

Transmission System

The system of high voltage electric lines providing for the bulk transfer of electricity across GB.

Transmission Price Control Review (TPCR)

The TPCR established the price controls for the transmission licensees which took effect in April 2007 for a 5-year period. The review applies to the three electricity transmission licensees, National Grid Electricity Transmission, Scottish Power Transmission Limited, Scottish Hydro-Electric Transmission Limited and to the licensed gas transporter responsible for the gas transmission system, NGG.

W

Weighted Average Cost of Capital (WACC)

This is the weighted average of the expected cost of equity and the expected cost of debt.