ofgem

Making a positive difference
for energy consumers

RIIO-GD1
Annual Report
2015-16

ofgem Making a positive difference for energy consumers

RIIO-GD1 Annual Report 2015-16

Publication date: 24 February 2017

Contact: Pete Wightman

Team: RIIO Gas Networks

Tel: 0141 331 6031

Email: pete.wightman@ofgem.gov.uk

Overview

RIIO-GD1 is the first gas distribution price control, along with its transmission equivalent, that uses the RIIO price control model. RIIO stands for Revenue = Incentives + Innovation + Outputs.

This price control began on 1 April 2013 and runs for eight years, to 2021.

This report reviews the activities of gas distribution network companies in 2015-16. It also covers company progress in the first three years of RIIO-GD1 and company forecasts for the remainder of the eight-year period. It reviews company performance on the outputs we set and the costs incurred against allowed revenues.

Context

Gas distribution networks (GDNs) are responsible for operating, maintaining and extending the gas distribution network and for providing a 24-hour gas emergency service. There are eight GDNs operating in Great Britain, managed by four companies.

To ensure value for money for consumers, we regulate GDNs through periodic price controls that limit the amount by which costs can rise, and that stipulate levels of performance.

To set our price controls we use the RIIO (Revenue = Incentives + Innovation + Outputs) framework. The latest price control was set in December 2012 and lasts for an eight-year period from April 2013 until March 2021.

We set the baseline revenues that GDNs can earn at the start of the price control. There are mechanisms to adjust revenues year-on-year depending on GDNs' performance against pre-set targets. There are outputs associated with baseline revenues that GDNs must deliver either on an annual or eight year basis.

Using data and supporting information submitted by the GDNs, this report reviews how they are delivering against the financial and output requirements of the price control.

Associated documents

Reports on GDN performance during RIIO-GD1

RIIO-GD1 Annual Report 2014-15

RIIO-GD1 Annual Report 2013-14

RIIO-GD1 Financial Model (Annual Iteration Processes)

Decision on mid-period review for RIIO-T1 and RIIO-GD1

Price control documents

RIIO-GD1 Final Proposals

GDPCR1 End of Period Review

RIIO-T1 and RIIO-ED1 reports

RIIO-GT1 Annual Report 2015-16

RIIO-ED1 Annual Report 2015-16

RIIO-ET1 Annual Report 2015-16

Contents

Executive Summary

2015-16 was the third year of the RIIO-GD1 price control. In RIIO the focus is on outputs, incentives and innovation, as well as total expenditure (totex).

This report outlines our key findings of the eight gas distribution networks' (GDNs) performance under each of these areas to date and during 2015-16. It also outlines updated financial and output delivery forecasts for the whole RIIO-GD1 period.

Output performance

GDNs have made good progress in delivering against their outputs so far in the price control. All GDNs met their annual output targets in 2015-16, with the exception of the four National Grid GDNs which did not meet all of their customer satisfaction targets. All GDNs are forecasting to meet their eight year output targets by the end of the RIIO-GD1 period.

- Safety – all safety outputs are being achieved. This is an improvement on previous years where some networks failed to meet the safety (repair risk) output.

- Reliability – the availability of the distribution network was 99.998%. For the loss of supply (interruptions) output, several issues came to light during the first two years' reporting and we are reviewing this output.

- Customer service – customer satisfaction, as measured by customer survey scores, improved again in 2015-16. However, the four National Grid (NGGD) GDNs failed to meet some of their customer service targets for the year. GDNs also improved their performance in resolving complaints.

- Connections **–** all GDNs have met their guaranteed standards of performance for the timely delivery of connections.

- Social obligations – GDNs have committed to connecting over 90,000 fuel poor households to the gas network over RIIO-GD1. So far, the GDNs have connected nearly 40,000 fuel poor households, just over 43% of the eight-year commitment.

- Environmental outputs – all GDNs met the primary output of reducing transportation losses (shrinkage) for the third year running and predict that they will exceed their targets over the eight-year period. The installed capacity of biomethane connections also increased in 2015-16.

Expenditure performance

Under the RIIO framework, GDNs are encouraged to deliver their outputs in a cost-effective manner, using innovation and efficiency improvements to deliver savings compared to their spending allowances. GDNs are allowed to retain a part of any savings achieved, with the rest being passed on to consumers.

Collectively, the GDNs have an allowance of £17.3 billion over the RIIO-GD1 period to deliver their outputs. They are now forecasting to spend £15.2 billion, which is £2.1 billion (12.3%) less than their allowances. Through the totex incentive mechanism, GDNs will retain approximately 63% of this underspend and the remainder will go back to consumers after allowing for corporation tax. GDNs have identified a number of factors that have contributed to this level of outperformance, including innovation and efficiency, as well as external factors such as mild weather and decreasing demand.

Financial performance

The financial performance of GDNs is presented using the return on regulatory equity (RoRE) measure. Based on GDNs' forecast performance for RIIO-GD1, we have calculated that RORE will range from 8.9% to 12%. This estimate depends on current forecasts and future delivery of outputs and may change during the remaining years of RIIO-GD1.

Customer bill impact

Network costs are one element of the gas bill customers receive from their energy supplier. Gas distribution network costs for an average domestic customer were £119 in 2015-16 and we estimate a decrease to £118 in 2017-18.

1. Introduction

1.1. Each year we report on how GDNs have performed against the outputs and allowances set for the RIIO-GD1 price control. This is part of our annual process of monitoring network companies, and holding them to account for the money they spend and collect from consumer bills.

1.2. In July of each year each GDN must submit information to us that outlines the actual costs they have incurred up to 31 March of that year and forecast costs to the end of RIIO-GD1. They also provide a written commentary with further detail behind the costs, including reasons for differences between costs, allowances and forecasts.[1]

1.3. We analyse this information and examine any variances in GDN performance against their annual and eight-year output targets. We also meet with the companies to discuss technical and financial aspects of their submissions.

1.4. This report outlines the performance of Gas Distribution Networks (GDNs) against their price control obligations and incentives for the third year of the price control. It also provides information on GDNs' updated forecasts for the remaining five years.

1.5. The following chapters provide more detail:

- **Chapter 2: Expenditure** – explains the financial aspects of GDN performance. This covers their total expenditure, allowed revenue, Return on Regulatory Equity (RoRE) and the impact on consumer bills.

- **Chapter 3: Outputs** – explains how the GDNs have performed against their outputs during the reporting year and so far in the price control. It also gives information on forecast performance going forward.

- **Chapter 4: Innovation** – explains the costs incurred for the Network Innovation Allowance (NIA) and Network Innovation Competition (NIC).

- **Chapter 5: Analysis of expenditure** - explains reasons for variances between GDN expenditure compared with what was allowed at the start of the price control.

1.6. Unless otherwise stated, all financial values in this report are in 2015-16 prices.

[1] GDNs publish their own stakeholder reports to demonstrate their RIIO-GD1 performance.

The GDNs are listed below in figure 1.1 together with the companies that manage them.[2] We refer to the GDNs by their abbreviated names throughout the report.

Figure 1:1 Gas Distribution Networks

Company	Gas Distribution Network (GDN)	GDN abbreviation
National Grid Gas Distribution Limited (NGGD)	East of England	EoE
	North London	Lon
	North West	NW
	West Midlands	WM
Northern Gas Networks Limited	Northern	NGN
SGN	Scotland	Sc
	Southern	So
Wales & West Utilities Limited	Wales and West	WWU

[2] National Grid announced in November 2015 its intention to sell a majority stake its gas distribution networks. As result, a subsidiary company, National Grid Gas Distribution (NGGD) Limited, was created with the transfer of all relevant distribution assets and licences from National Grid Gas Plc. The preferred bidder for this business was announced on 8 December 2016. At the time of writing the company is still known as NGGD.

2. Expenditure, revenue, consumer bills and company returns

Chapter Summary

This chapter explains how the financial performance of GDNs in RIIO-GD1 translates into their actual revenue. Within this chapter we report on total controllable expenditure (totex) and other aspects of expenditure, allowed revenue to date, an estimate of GDNs' return on regulatory equity (RoRE) and the impact on consumer bills.

Total Controllable Expenditure (Totex)

2.1. At the start of RIIO-GD1, we provided GDNs a total expenditure (totex)[3] allowance of £17.1 billion. Additional allowances were given to the GDNs in 2015 for relevant costs under the uncertainty mechanism.[4] For the purpose of this report, performance will be measured against the adjusted allowances of £17.3bn.

2.2. GDNs are incentivised to outperform their totex allowance as part of the totex incentive mechanism (TIM). Through the TIM, any underspend compared to the allowed totex is shared between the GDN and its customers, according to the sharing factor. The sharing factor for each GDN is shown in table 2.1. Any outperformance should lead to lower gas bills for consumers.

2.3. The totex allowance for 2015-16 was £2,159 million and actual expenditure was £1,870 million resulting in an underspend of £289 million or 13%.

2.4. The GDNs forecast to underspend against their adjusted allowances by £2.1 billion (12.3%) over the eight-year period. All eight GDNs forecast underspends. Chapter 5 gives more detail on the expenditure against allowances.

2.5. Table 2.1 sets out the allowed totex for each GDN and their actual expenditure in 2015-16.

[3] Totex is the GDNs' total controllable costs, which exclude business rates, license fees, pension's contributions and shrinkage (non-controllable costs). The totex allowance has been adjusted to reflect the uncertainty of some aspects of spend.

[4] At the time of setting allowed expenditure for RIIO-GD1, there was uncertainty around some costs. Because of this, the price control allows the GDNs to apply for adjustments to their allowed expenditure by means of a reopener mechanism, in order to accommodate particular uncertain costs.

Table 2.1: pre-tax totex allowed vs actual in 2015-16

£m 2015/16 Prices	NGGD			
	EoE	Lon	NW	WM
Total allowed expenditure	316	303	237	186
Actual expenditure	297	238	226	172
Overspend (underspend)	-19	-65	-11	-14
Sharing Factor[1]	37.0%	37.0%	37.0%	37.0%
Allowed expenditure after sharing	309	279	233	181
		SGN		
	NGN	Sc	So	WWU
Total allowed expenditure	261	196	406	254
Actual expenditure	227	165	336	209
Overspend (underspend)	-34	-31	-70	-45
Sharing Factor	36.0%	36.3%	36.3%	36.8%
Allowed expenditure after sharing	249	185	380	238

[1]This is the proportion of the underspend or overspend that the company benefits from or incurs, respectively.

Forecast expenditure

2.6. Table 2.2 shows the variance between allowed and actual cumulative totex in the first three years of the price control and forecast expenditure for the RIIO-GD1 period against allowances. Figure 2.1 shows trends of forecasts, allowances and expenditure. These can be viewed for each GDN in appendix 7.

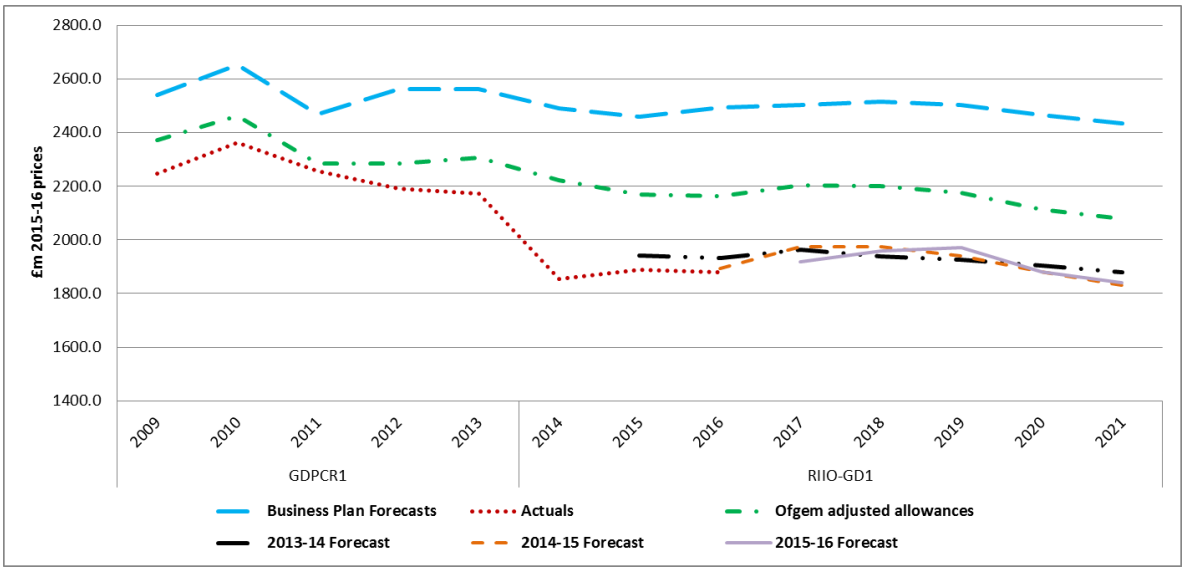
2.7. The allowed totex reported for the years 2013-14 to 2015-16 is not yet final and may be revised in future. The view presently held for 2015-16 will, through the TIM adjustment, be used when setting the 2017-18 allowed revenue. Forecasts for the remainder of the price control (2016-17 to 2020-21) have been conducted by the GDNs based on their expectations.

Table 2.2: Totex allowed vs actual three year cumulative[5] and RIIO-GD1 forecast

GDN		3 year cumulative				RIIO-GD1 Forecast			
		Adj'd Allowance[1]	Actual	Variance		Adj'd Allowance[1]	Actual (forecast)	Variance	
		£m	£m	£m	%	£m	£m	£m	%
NGGD	EoE	970.6	912.5	(58.1)	*(6.0%)*	2557.1	2463.7	(93.4)	*(3.7%)*
	Lon	871.7	707.5	(164.2)	*(18.8%)*	2365.0	2071.4	(293.6)	*(12.4%)*
	NW	735.3	712.8	(22.5)	*(3.1%)*	1920.6	1769.4	(151.2)	*(7.9%)*
	WM	567.6	494.7	(72.9)	*(12.8%)*	1491.9	1309.0	(183.0)	*(12.3%)*
NGN	NGN	770.2	672.6	(97.6)	*(12.7%)*	2001.7	1746.3	(255.5)	*(12.8%)*
SGN	Sc	608.9	483.4	(125.5)	*(20.6%)*	1629.3	1332.7	(296.6)	*(18.2%)*
	So	1254.5	996.9	(257.6)	*(20.5%)*	3330.6	2785.6	(545.1)	*(16.4%)*
WWU	WWU	775.7	644.7	(131.0)	*(16.9%)*	2030.8	1718.6	(312.2)	*(15.4%)*
Industry		**6554.4**	**5625.0**	**(929.4)**	***(14.2%)***	**17327.0**	**15196.6**	**(2,130.5)**	***(12.3%)***

[1] Adjusted allowance - includes adjustment for Tier 2A and Xoserve, and additional allowances for Physical Site Security, Streetworks (incl. forecasted) and Fuel Poor

Figure 2.1: Industry controllable totex forecasts, adjusted allowances and actuals trends[6]



[5] The actual and allowed totex shown in this table are representative of pre-adjusted total controllable costs and do not include the policy adjustments included in the price control financial model (PCFM).

[6] The business plan forecasts line does not directly compare with the Ofgem adjusted allowances line due to changes to requirements following business plan submissions.

Other aspects of expenditure

Non-controllable pass through costs

2.8. In addition to the totex described above, GDNs incur costs that are not directly within their control. We allow the GDNs to pass these costs through. These include:

- Licence fees
- Network rates
- NTS exit charges
- The price of gas used to calculate the cost of shrinkage[7]
- NTS pension contributions.

2.9. Revenue is updated annually to reflect the actual cost of these areas. Table 2.3 sets out allowed costs compared with updated actuals/forecasts.

Table 2.3: Non-controllable costs

	2015-16 Year				3 year cumulative				RIIO-GD1 Forecast			
	Allowance	Actual	Variance		Allowance	Actual	Variance		Allowance	Actual	Variance	
	£m	£m	£m	%	£m	£m	£m	%	£m	£m	£m	%
Total	**644.1**	**671.6**	**27.5**	**4.3%**	**1,934.7**	**2,006.5**	**71.7**	**3.7%**	**5,130.6**	**5,504.3**	**373.7**	**7.3%**
of which												
Licence fee/network rates/other[1]	315.1	388.1	73.0	23.2%	945.0	1,140.0	195.0	20.6%	2520.5	3167.4	647.0	25.7%
NTS exit costs	202.9	187.0	(15.9)	(7.8%)	608.0	565.7	(42.3)	(7.0%)	1622.3	1576.2	(46.1)	(2.8%)
Shrinkage	83.6	36.6	(46.9)	(56.2%)	254.0	155.6	(98.4)	(38.7%)	647.3	318.2	(329.0)	(50.8%)
Pensions	42.6	59.8	17.3	40.6%	127.7	145.2	17.5	13.7%	340.5	442.4	101.8	29.9%

[1] Costs split on average: Licence Fee 4%, Network business rates 92% and Other costs 4%

Uncertainty Mechanisms

2.10. RIIO-GD1 allows the GDNs to apply for relevant adjustments to their allowed expenditure by means of a reopener mechanism. The GDNs may apply for relevant adjustments during two defined reopener windows, May 2015 and May 2018, with the exception of smart metering adjustments, which may be applied for at any time.

2.11. In May 2015, several GDNs applied for adjustments to their allowed expenditure. NGGD and SGN applied for adjustments to enhanced physical site security and NGGD applied for adjustments to specified streetworks. We allowed total efficient costs of £122 million of the £160 million that was applied for. In September 2015, we completed the Fuel Poor Network Extension Scheme review which resulted in the GDNs committing to an increase to their fuel poor connection

[7] The volume of gas lost through shrinkage is within GDNs' control and is therefore not subject to pass-through.

targets, from 77,450 to 91,203 (increased volumes ranging from 6% for NGGD to 37% for SGN), for which we allowed additional funding of £18 million (all figures in 14/15 prices).

Gas Theft

2.12. Gas theft increases the energy costs paid by consumers as their bills cover the costs of gas taken illegally.

2.13. GDNs must investigate cases of gas theft and use reasonable endeavours to recover the value of gas taken. In doing this they must remain revenue-neutral and so any net gain, after the cost of investigation, must be returned to consumers.

2.14. In 2015-16, NGGD, NGN and WWU have all reported a net recovery of cost (surplus), totalling over £1.2 million, which will be passed back to consumers. This is a significant increase on the value recovered in 2014-15.

Allowed Revenue

2.15. Allowed Revenue is the total amount of money that GDNs can collect from users of the distribution system. We report their yearly values in 2009-10 prices. Further details can be found in Appendix 1.

2.16. Allowed Revenue for 2017-18 is calculated following our price control Annual Iteration Process (AIP), which was completed on 30 November 2016. The AIP:

- determines the TIM reward/penalty based on the latest available actual expenditure information;
- accounts for changes to other factors that are updated, for example the allowance for borrowing associated with corporate debt, tax and updates through re-opener windows; and
- determines an annual modification term (the "MOD"), which modifies the opening base revenue (set at the start of the price control)

2.17. Table 2.4 shows the allowed revenue we have determined may be collected during the price control so far. This is exclusive of the reconciled revenue collection correction factor to improve cross-year comparisons of the consumer cost for the services provided. Also provided are details of what comprises allowed revenue in 2017-18. Note that minor constituent parts of the allowed revenue are still subject to uncertainty or are not forecast in advance (these cases are indicated in the table).

Table 2.4: Allowed Revenue.[8]

		NGGD			NGN	SGN		WWU
	EoE	Lon	NW	WM	NGN	Sc	So	WWU
Allowed Revenue[9]				**£m 2009/10 Prices**				
2013-14	527	354	382	282	343	269	615	346
2014-15	506	345	363	275	342	262	592	342
2015-16	510	371	365	275	346	247	588	325
2016-17	486	353	365	262	332	270	595	324
2017-18	487	333	346	256	317	257	575	323
2017-18 Allowed Revenue				**£m nominal prices[10]**				
Opening Base Revenue	634	450	462	345	420	344	774	442
MOD	(16)	(26)	(20)	(17)	(14)	(12)	(30)	(22)
Non-Controllable Costs[11]	6	3	4	3	3	(0)	(2)	3
Capacity and Shrinkage Rollers	(2)	1	(3)	(3)	(7)	(3)	(7)	(10)
Incentive Payments	6	3	4	3	6	2	8	5
Network Innovation Allowance[12]	4	3	3	2	3	2	4	2
Correction Factors[13]								
Revenue collection	0	(3)	(8)	1	7	(9)	(9)	(6)
Inflation forecast true-up	(14)	(10)	(10)	(8)	(9)	(6)	(16)	(9)
Corrected Allowed Revenue	620	420	433	327	410	317	722	404
Network Innovation Competition[14]	2.9	2.9	2.9	2.9	-	-	-	-

[8] The unit of money reported is our view of nominal prices as at November prior to the revenue year beginning. The corrected allowed revenue is the actual amount of money we allow to be collected.
[9] Allowed revenue values reported in this section of the table are exclusive of the "revenue collection" correction factor (licence term: k) and years are reported in a consistent price base, the method of calculation is otherwise identical to the method in the lower part of the table.
[10] This unit of money is our view of 2017-18 prices as of November 2016.
[11] Non-controllable costs are cost items over which the company has no control. Examples include the charge levied on the company to cover the cost relating to Ofgem carrying out its regulation activities and; adjustments to business rates, such as tax, that a company cannot influence.
[12] We have assumed that the allowance for Network Innovation Allowance is the adjusted base revenue for 2017-18 multiplied by the NIA percentage.
[13] These reconcile previous years' actual revenue to the allowed revenue of those years. These are the differences between actual inflation and our forecast; and revenue collection (it is not practical to collect the exact revenue allowed owing to tariffs being set before network usage is known).
[14] This is allowed revenue, but this revenue allowance is levied on users of the GB national transmission system, not the distribution systems.

2.18. Revenues related to incentive payments and innovation funding are discussed in Chapter 3 and Chapter 4 of this document. These revenues are additional to the core revenue allowance.

2.19. For any given year a correction factor is applied to allowed revenue. This reconciles previous years' actual revenue to the allowed revenue of those years. Common examples of this are: the revenue difference driven by the difference between actual inflation and our forecast; and actual revenue collected and revenue allowed to be collected (as it is not practical to collect the exact allowed revenue owing to tariffs being set before network usage is known).

Customer Bills Impact

2.20. We have used assumptions consistent with those that underpin our Supplier Cost Index (SCI)[15,16] to provide an estimate of the cost to typical domestic energy bills due to Allowed Revenues for each region of GB.

2.21. Actual customer costs are sensitive to geographic region, meter type, consumption volume and the timing and duration of contracts. Our methodology is based on typical domestic consumption values (the median domestic consumer in GB). Individual consumer costs may differ significantly from these values. We report costs on an annualised basis using our latest assumptions[17]. Bill estimates are reported in figure 2.2 and table 2.5; values are reported in nominal prices and so reflect the actual typical bills rather than the real terms cost to customers. The values we are reporting use our published typical domestic consumption values[18]. We have used these values uniformly for all reported years, with no correction made for recent trends in energy consumption.

2.22. We estimate that the typical GB domestic customer will pay £121 in 2016-17 for gas distribution costs. This is estimated to decrease by 2% to £118 in 2017-18. Charges differ considerably depending on the region that a consumer resides in. For a typical consumer 2017-18 charges are expected to range from £110 in the East of England and up to £127 in all of London, see table 2.5 for details.

[15] SCI: https://www.ofgem.gov.uk/data-portal/retail-market-indicators
[16] SCI Method: https://www.ofgem.gov.uk/publications-and-updates/supplier-cost-index-methodology
[17] We used the January 2017 version of our Supplier Cost Index model. Note that the SCI uses a consistent view of a typical consumer for all years; in recent years this consumption has been reducing. This and future trends in consumption are not accounted for by this analysis.
[18] https://www.ofgem.gov.uk/gas/retail-market/monitoring-data-and-statistics/typical-domestic-consumption-values

Figure 2.2: Estimate of typical 12-month fixed price contract billing to cover the allowed revenue payments.

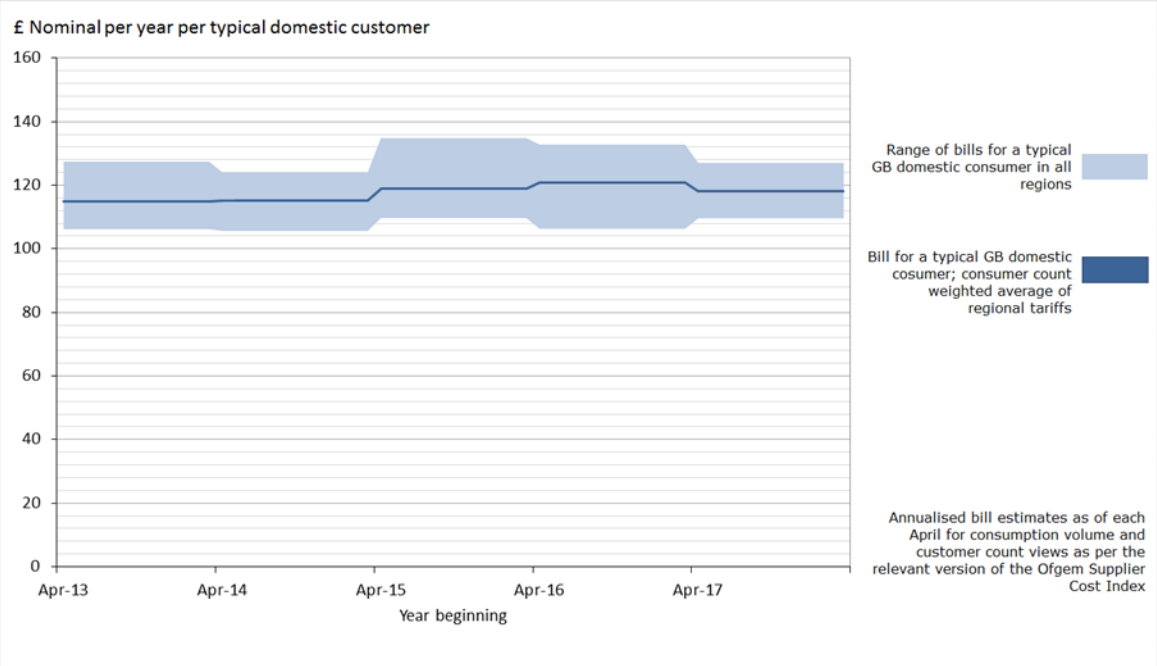


Table 2.5: Regional estimates of typical GB consumer cost to meet allowed revenue.

£ nominal prices per domestic consumer						
	Year:	Apr-13	Apr-14	Apr-15	Apr-16	Apr-17
GB consumer count weighted average:		115	115	119	121	118
Region	**Licensee**					
East of England	EoE	107	106	110	106	110
London	Lon	123	123	135	133	127
North West	NW	113	110	120	121	114
West Midlands	WM	112	115	114	114	115
North	NGN	106	111	115	117	115
Scotland	Sc	107	111	112	124	117
Southern	So	127	124	125	129	126
Wales and West	WWU	119	121	121	126	123

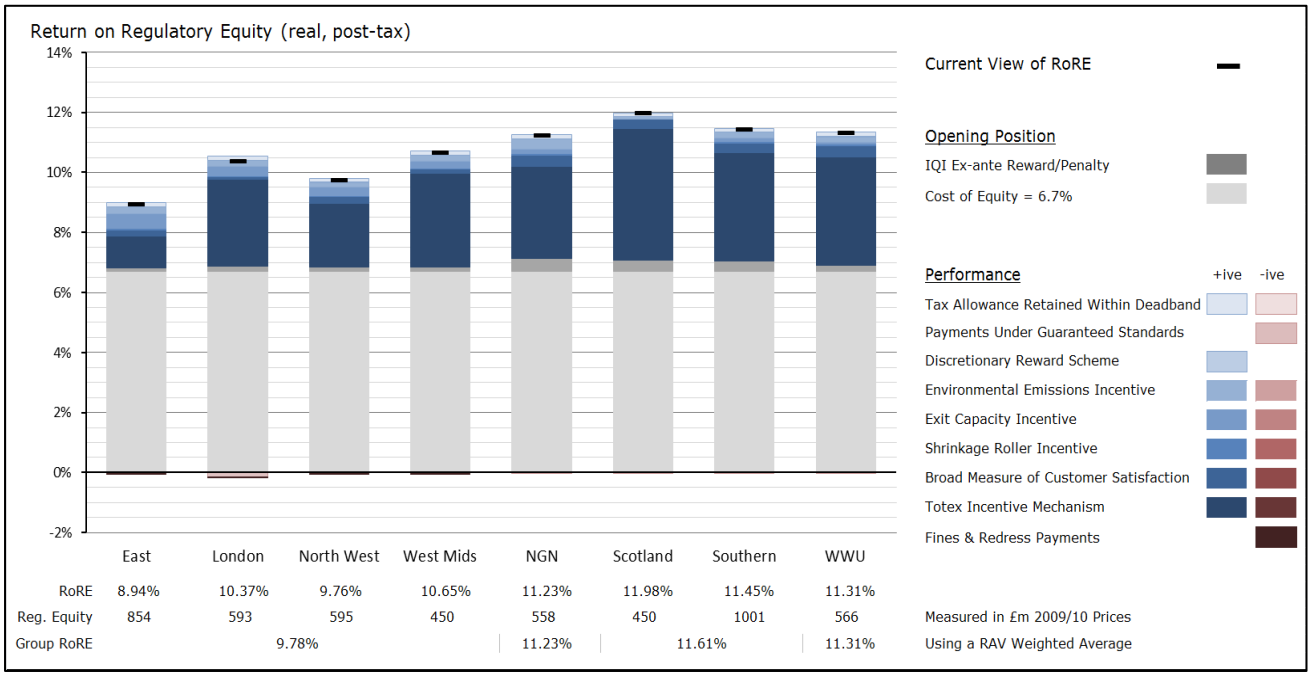
Return on Regulatory Equity (RoRE)

2.23. We assess the overall financial performance of network companies using a measure called the Return on Regulatory Equity (RoRE). RoRE is calculated post-tax and its estimation includes the use of certain regulatory assumptions, such as the assumed gearing ratio of the companies, to ensure comparability across the sector. To eliminate phasing impacts over the course of the price control, we use a mix of actual and forecast performance to calculate eight year average returns. These returns may not equal the actual returns seen by shareholders.

2.24. For the TIM component of RoRE, we have used company provided forecasts for the entire control period.

2.25. For the incentive rewards we have used actual post-tax values where known.[19] We have assumed a simple average of known (pre-tax) rewards for the remaining years, taxed at future Corporation Tax rates. Note that in some cases, holding rewards constant assumes that the underlying performance will increase over time.

Figure 1: Eight Year Average RoRE



2.26. Our RoRE should be compared to the cost of equity allowed at the start of the price control. For gas distribution, the cost of equity was set at 6.7%. Each company was also given an ex-ante reward or penalty based on business plan quality.

2.27. Underspending against allowed totex and incentive outperformance (shaded blue) both increase companies' return, while overspending and penalties resulting from underperformance (shaded red) decrease their return.

2.28. Returns are predominately driven by all GDNs forecasting underspends through the TIM. All GDNs have also gained through the incentive mechanisms. Performance against each incentive is discussed in the remainder of this report.

2.29. Based on current forecasts, the highest performing group is SGN. The RAV-weighted RoRE across the sector is 10.6%. No companies are forecast to earn returns below their cost of equity.

2.30. There are a number of factors which are not reflected in our RoRE calculations, but which may impact the return realised by shareholders. The largest

[19] Time value of money adjustments and forecast inflation effects have been stripped out of the value of incentives. They have been taxed at the actual Corporation Tax rate applicable to the year in which the company recovers the money, which is (usually) two years after the performance.

of these are the potential end of period clawbacks for under delivery on Network Output Measures. The methodologies for these are still under development. The current calculation assumes delivery of all RIIO-GD1 Outputs.

2.31. Our RoRE analysis also excludes companies' actual debt costs relative to our regulatory assumption, innovation funding, legacy adjustments from prior control periods and unfunded pension deficits. We may include some of these items in the future as we continue to develop our methodology.

3. Outputs

Chapter Summary

This chapter examines GDNs' performance against their RIIO-GD1 output commitments. Where GDNs have failed to achieve an output, or are forecasting to do so, we explain the reasons and what is being done in response.

General

3.1. GDNs must deliver a range of outputs during RIIO-GD1. Some outputs must be met each year of the price control, while others must be met over the eight-year RIIO-GD1 period. Outputs fall into six categories:

3.2. Our view of GDN performance of outputs is shown in tables 3.1 and 3.2. The tables are colour-coded[20] to indicate performance in 2015-16, or forecast performance over the RIIO-GD1 period.

3.3. The majority of the outputs are being met annually or are expected to be met over the eight years. The only output not being met by some of the NGGD networks is customer satisfaction, and as a result NGGD was penalised £1.6 million in 2015-16.

3.4. We take the failure of GDNs to meet outputs seriously and will consider the appropriate action if failure occurs.

[20] **Red** – the GDN has failed to achieve an annual output, or we forecast that it will not meet an eight-year output.
Amber – the GDN is at risk of not meeting an eight-year output.
Green – the GDN has met the annual output, or are on-target to meet the eight-year output commitment.
Grey – output under review and a full report of performance may not be given.

Table 3.1: 2015-16 one-year outputs

Primary output	Deliverable	Incentives [1]	Unit	EoE	Lon	NW	WM	NGN	Sc	So	WWU
Connections	Guaranteed standards performance	n/a		✓	✓	✓	✓	✓	✓	✓	✓
Environmental	Shrinkage (leakage)	⇔	GWh	420	229	320	276	360	196	526	363
Safety (emergency response)	97% Controlled gas escapes	n/a	%	98.77%	98.64%	99.14%	99.10%	99.96%	99.61%	99.20%	99.60%
	97% Un-controlled gas escapes	n/a	%	97.94%	98.04%	98.52%	98.63%	99.76%	98.65%	98.27%	98.59%
Safety (management of repairs)	GS(M)R 12 hour escape repair requirement	n/a		✓	✓	✓	✓	✓	✓	✓	✓
	Management of repairs (Repair risk)	n/a		✓	✓	✓	✓	✓	✓	✓	✓
Safety (major accident hazard prevention)	GS(M)R safety case acceptance by HSE	n/a		✓	✓	✓	✓	✓	✓	✓	✓
	COMAH safety report reviewed by HSE	n/a		✓	✓	✓	✓	✓	✓	✓	✓
Customer service	Planned interruptions survey	⇔	Scores out of 10	8.07	7.96	7.97	7.73	8.86	8.88	8.65	8.72
	Emergency response and repair survey	⇔		9.38	9.03	9.38	9.26	9.52	9.52	9.36	9.55
	Connections survey	⇔		8.13	6.88	8.67	7.83	9.12	9.01	8.47	8.88
	Complaints metric	⇩	Metric score	9.46	10.59	9.77	9.52	3.08	3.08	3.01	4.11
	Stakeholder engagement	⇧	Score out of 10	6.9				6.8	5.75		6.05

[1] **Incentive keys:** ⇧ = incentive reward only; ⇩ = incentive penalty only; ⇔ = incentive reward and penalty.

Table 3.2: Forecast eight-year outputs

Primary output	Deliverable	Incentives [1]	Unit	EoE	Lon	NW	WM	NGN	Sc	So	WWU
Connections	Introduce distributed gas entry standards	n/a	scmh connections	4,350	-	100	500	7,500	5,062	3,875	7,950
Social obligation	Fuel poor connections [2]	⇔	number	12,046	2,880	13,330	8,360	14,577	17,143	10,393	12,590
	Carbon monoxide awareness	n/a		✓	✓	✓	✓	✓	✓	✓	✓
Environmental	Shrinkage (leakage)	⇔	GWh	420	229	320	276	360	196	526	363
	Provide biomethane connections information	n/a		✓	✓	✓	✓	✓	✓	✓	✓
Reliability (loss of supply)	Duration of planned supply interruptions	n/a		This area is under review - refer to chapter 3 Outputs, "Reliability"							
	Duration of unplanned supply interruptio	n/a									
	Number of planned supply interruptions	n/a									
	Number of unplanned supply interruptions	n/a									
Reliability (network capacity)	Achieving 1 in 20 obligation [3]	⇔		✓	✓	✓	✓	✓	✓	✓	✓
Reliability(network reliabili	Maintaining operational performance	n/a		✓	✓	✓	✓	✓	✓	✓	✓
Safety (mains replacement)	Iron mains risk reduction (based on MPRS)	n/a		✓	✓	✓	✓	✓	✓	✓	✓
	Sub-deducts networks off-risk	n/a		✓	✓	✓	✓	✓	✓	✓	✓

[1] **Incentive keys:** ⇧ = incentive reward only; ⇩ = incentive penalty only; ⇔ = incentive reward and penalty.
[2] The incentive at the end of RIIO-GD1 is dependent on any over/under delivery of the fuel poor connections commitment
[3] Achieving the 1 in 20 obligation is related to the provision of NTS exit capacity at the GDN's offtakes

Secondary deliverables relating to safety and reliability outputs are discussed in appendices 2 and 3.

Network safety

3.5. There are five primary safety outputs:

- **iron mains risk reduction (mains replacement) – eight-year output**
- **emergency response – annual output**
- **management of repairs (repair risk) – annual output**
- **major accident hazard prevention – annual output**
- **sub-deduct networks off-risk – eight-year output.**

3.6. GDNs also have several secondary deliverables related to safety. These are discussed in appendix 2.

Iron mains risk reduction (mains replacement)

3.7. To comply with safety legislation and requirements, GDNs are engaged in a long term programme to replace risky iron mains[21] on their networks. The mains replacement programme is mandated by the Health and Safety Executive (HSE).[22]

3.8. Under RIIO-GD1, the 'iron mains risk reduction' output sets the level of iron mains risk that GDNs must remove from their networks. This is measured through the Mains Replacement Prioritisation System (MRPS), which is a model used by all GDNs for assessing the risk of an incident caused by individual iron mains.[23]

3.9. By the end of 2015-16, GDNs were collectively on track to meet or exceed this eight-year output. All GDNs explained in their annual reports that they are targeting higher risk mains first as a way to achieve this output early. As a consequence, since the start of RIIO-GD1, the iron mains risk has reduced from 2.52 incidents per year to 1.83 incidents per year.

3.10. Table 3.3 summarises company performance of this output. To monitor progress annually an assumed linear allocation is calculated across each of the eight years and we have reported GDN performance against this annualised target.

---

[21] The gas distribution network consists of 65,000 km of iron mains, representing 25% of the total mains population. The remainder is constructed mainly from polyethylene and steel. Iron mains are known to fail in service and can potentially cause major incidents (fires and explosions), which can injure or kill people and damage property.

[22] More info on the HSE's programme can be found on their website: http://www.hse.gov.uk/gas/supply/mainsreplacement/enforcement-policy-2013-2021.htm

[23] Length of mains off-risk is the secondary deliverable associated with mains replacement. Performance against this secondary deliverable can be found in appendix 2.

3.11. There were variations in performance between GDNs but in 2015-16 all networks removed more risk than would be required to achieve the proportionate linear annual risk reduction. Both NGN and SGN's Sc network have already removed more risk than their eight-year risk reduction target, which they attribute to an early focus on removal of mains with the highest risk scores.

Table 3.3: Iron mains risk reduction 2015-16

Company	GDN	Risk reduction 8 year commitment	Proportionate annual risk reduction for one year	3 Year target risk reduction	Actual risk reduction achieved		Risk removal outperformance		% of the 8 year commitment removed to date
					2016	3-year total	2016	3-year total	
		Incidents/year x 10^6							
NGGD	EoE	192,567	24,071	72,213	34,913	114,269	45%	58%	59%
	Lon	102,281	12,785	38,355	13,664	40,026	7%	4%	39%
	NW	154,428	19,304	57,911	30,640	100,978	59%	74%	65%
	WM	131,394	16,424	49,273	24,857	63,490	51%	29%	48%
NGN	NGN	111,191	13,899	41,697	29,893	114,225	115%	174%	103%
SGN	Sc	44,277	5,535	16,604	12,677	48,001	129%	189%	108%
	So	137,287	17,161	51,483	24,211	104,363	41%	103%	76%
WWU	WWU	98,727	12,341	37,023	16,724	49,032	36%	78%	50%

3.12. Iron mains are categorised into 'tiers' based on diameter. Iron mains with the smallest diameters are called tier 1 mains.[24] Within the tier 1 category there are several sub-categories based on the diameter of the main. Most GDNs are prioritising replacement of the smaller diameter tier 1 iron mains. These tend to have a higher level of risk but tend to be less expensive to replace than larger mains. This focus on removing smaller diameter pipes first has contributed to the financial outperformance of the GDNs.

Emergency response

3.13. Emergencies fall into two categories:

- Uncontrolled escapes: where the source of the leak cannot be confirmed as having been isolated by turning off an emergency control valve. GDNs must attend at least 97% of uncontrolled escapes within one hour of them being reported.
- Controlled escapes: where the source of the leak is confirmed as having been isolated by turning off the emergency control valve. GDNs must attend 97% of controlled escapes within two hours of them being reported.

3.14. Table 3.4 shows that all GDNs met these standards in 2015-16.

[24] Tier 1 pipes are those with a nominal internal diameter of up to eight inches. Tier 1 iron pipes represent approximately 85% of all the at-risk iron mains population.

Table 3.4: Percentage of gas emergencies attended within standard

GDN		Percentage of **uncontrolled** gas emergencies attended within the one hour standard			Percentage of **controlled** gas emergencies attended within the two hour standard		
		2014	**2015**	**2016**	**2014**	**2015**	**2016**
NGGD	EoE	97.91%	97.60%	97.94%	98.99%	98.47%	98.77%
	Lon	97.72%	97.39%	98.04%	98.53%	97.73%	98.64%
	NW	98.52%	98.20%	98.52%	99.23%	98.93%	99.14%
	WM	97.91%	97.52%	98.63%	98.83%	98.29%	99.10%
NGN	NGN	99.85%	99.85%	99.76%	99.97%	99.99%	99.96%
SGN	Sc	99.02%	98.75%	98.65%	99.80%	99.59%	99.61%
	So	98.52%	98.50%	98.27%	99.51%	99.37%	99.20%
WWU	WWU	98.33%	98.48%	98.59%	99.49%	99.60%	99.60%

Management of repairs

3.15. GDNs are required by legislation[25] to prevent reported gas escapes within 12 hours, unless they can prove it is not reasonably practicable to do so (in which case the escape must be monitored and repaired as soon as it is practicable). In addition to the legislative requirements, we set targets under RIIO-GD1 for GDNs to deliver the 12-hour standard.

3.16. Table 3.5 shows that all GDNs exceeded this target, and all GDNs, with the exception of NGGD's EoE network, improved its performance compared to 2014-15.

Table 3.5: Gas escapes prevented within 12 hours

Company	**GDN**	**2013-14**		**2014-15**		**2015-16**	
		Target	**Actual**	**Target**	**Actual**	**Target**	**Actual**
NGGD	EoE	42%	50%	42%	54%	42%	52%
	Lon	43%	44%	43%	48%	43%	52%
	NW	34%	45%	34%	48%	34%	51%
	WM	36%	43%	36%	50%	36%	51%
NGN	NGN	60%	62%	60%	63%	57%	64%
SGN	Sc	60%	73%	60%	69%	60%	72%
	So	60%	64%	60%	63%	60%	64%
WWU	WWU	40%	47%	40%	49%	40%	53%

Repair risk

3.17. The repair risk output requires companies to manage the risk of gas escapes that have been assessed as not requiring emergency action. GDNs monitor these escapes until it is reasonable and proportionate to carry out the necessary repair work. This enables the GDNs to risk assess their repair work and factor in considerations such as labour, material availability and public impact of completing the repair.

[25] Requirement set by the Gas Safety (Management) Regulations 1996 (GS(M)R), regulations 7(4) and (10), with further clarification in HSE's circular SPC/ENFORCEMENT/140.

3.18. GDNs' annual repair risk score is the risk associated with all gas escapes that require repair. It is recorded on a daily basis and totalled over a year. The repair risk primary output measure is based on meeting or exceeding the total actual risk scores for 2012-13.[26] An actual score that is below the output requirement means the company is exceeding the target.

3.19. In 2015-16 all GDNs met the safety repair output, as shown in table 3.6.[27]

Table 3.6: Repair risk performance[28]

Company	GDN	Output requirement	2014-15		2015-16	
			Actual	Variance	Actual	Variance
NGGD	EoE	5.2	5.0	3.3%	4.7	9.5%
	Lon	4.6	8.9	(93.6%)	4.3	6.5%
	NW	4.9	7.8	(58.2%)	4.7	4.1%
	WM	2.5	3.3	(33.0%)	2.3	7.7%
NGN	NGN	34.5	24.8	28.1%	18.6	46.1%
SGN	Sc	2.5	2.0	18.2%	1.6	34.1%
	So	17.7	10.0	43.3%	11.1	37.4%
WWU	WWU	24.2	18.6	23.0%	11.6	52.2%

3.20. In our 2014-15 annual report we highlighted that NGGD did not meet the output in the first two years of RIIO-GD1. NGGD acknowledged this and made a voluntary payment of £3 million to National Energy Action. All of the NGGD GDNs have met this output in 2015-16. All GDNs forecast to meet this output for the remainder of RIIO-GD1, but have stated that this could be affected by severe winter weather.

3.21. We are reviewing this output as part of the MPR parallel work. This review was prompted by concerns over the performance of some GDNs in the first two years of the price control.[29] We want to ensure that the output remains effective and delivers the right outcome for consumers. We will be consulting on our preferred approach in early 2017.

Major accident hazard prevention

3.22. This output requires GDNs to prepare a safety case as required by GS(M)R[30] for approval by HSE, and to submit a safety report for approval by HSE in accordance with the Control of Major Accident Hazards Regulations 2015.[31] All GDNs have complied with this obligation in 2015-16.

[26] The GDNs have different methodologies and the output requirements were set based on the methodology employed by the individual GDNs.
[27] Higher scores than the output requirement indicate that the repair risk target has not been met.
[28] Where the variance is shown in red, targets have not been met.
[29] NGGD and WWU failed to meet this output in 2013-14 and NGGD failed in 2014-15.
[30] Regulations 3 and 4 of the GS(M)R require GDNs to have up-to-date safety cases that explain how they ensure the safe conveyance of gas, which must be accepted by HSE.
[31] See regulations 8 to 10 of the Control of Major Accident Hazards Regulations 2015.

Sub-deduct networks off-risk

3.23. A sub-deduct network has an unusual configuration consisting of a primary meter and one or more secondary meters. The ownership of such networks is sometimes unclear, presenting a safety issue.

3.24. GDNs are required to remove the safety risk associated with these networks by the end of RIIO-GD1. They can do this by either identifying a third party that formally accepts full responsibility for them, or by carrying out alterations to make the ownership clear.

3.25. All GDNs forecast to meet this output, as shown in table 3.7. All GDNs found alternative ways to remove the risks associated with sub-deduct networks without the need for physical works. This has resulted in significant financial outperformance in this area.

Table 3.7: Cumulative % of sub-deduct networks taken off risk (actual and forecast).[32]

GDN	2014	2015	2016	2017	2018	2019	2020	2021
EoE	50%	78%	83%	105%	105%	105%	105%	105%
Lon	52%	75%	81%	87%	101%	101%	101%	101%
NW	44%	54%	67%	85%	102%	102%	102%	102%
WM	42%	54%	63%	82%	100%	100%	100%	100%
NGN	7%	65%	90%	95%	97%	98%	99%	100%
Sc	35%	52%	61%	90%	100%	100%	100%	100%
So	41%	71%	82%	92%	100%	100%	100%	100%
WWU	8%	10%	48%	75%	90%	100%	100%	100%

3.26. There are three primary outputs for network reliability:

- **Loss of supply (duration and number of interruptions) – eight-year output**
- **Achieving the 1-in-20 supply capacity obligation – annual output**
- **Maintaining operational performance – eight-year output.**

[32] Since the start of the price control a number of additional sub-deduct networks have been identified. The risk these additional networks present also needs to be removed during the RIIO-GD1 price control. Where these networks have been identified, the GDN forecasts to remove in excess of 100% of the original target.

3.27. These output commitments require GDNs to achieve minimum levels of network reliability performance for consumers. Network availability (availability of supply) to GB consumers has increased from 99.997% in the first two years of RIIO-GD1 to 99.998% in 2015-16.

Loss of supply (duration and number of interruptions)

3.28. There are four measures for this output:

- Number of planned interruptions
- Duration of planned interruptions
- Number of unplanned interruptions
- Duration of unplanned interruptions

3.29. Each GDN has targets in each of the above measures. As part of our parallel work to the mid-period review we have been reviewing these targets to ensure that they are driving the right behaviour by GDNs and that they are leading to the best outcome for consumers. We will be consulting on our preferred option for the loss of supply output for the remainder of RIIO-GD1 in early 2017.

Summary of interruptions performance

3.30. Although this output has been under review, it is still essential for GDNs to report on and explain the reasons behind their performance. Table 3.8 shows how each GDN has achieved the linear annual average of the eight-year targets.

3.31. In some cases it is reasonable to expect annual performance to differ from the linear average. For example, if a GDN has completed more planned mains or service replacement work than forecast they are likely to experience a higher number of planned interruptions.

Planned interruptions

3.32. The number of planned interruptions depends largely on the level of mains replacement workload and the number of services replaced or transferred. Planned interruptions often enable such work, which leads to improvements in safety and reliability for consumers.

3.33. The number of planned interruptions in NGGD's NW and WM networks increased in 2015-16 because there was more mains replacement work. WWU and SGN reported that they continue to use live mains insertion to reduce the number of planned interruptions. NGN experienced an increase in planned interruptions despite a reduced workload. It has found that some of its customers prefer two shorter interruptions to one longer one. This leads to a shorter overall duration, which is evidenced in its 2015-16 duration performance. Performance is shown in tables 3.8 and 3.9 below.

Table 3.8: Number of planned interruptions[33]

Company	GDN	2015-16			RIIO-GD1
		Current target	Actual	Variance	Forecast
NGGD	EoE	82,188	76,135	7.4%	588,683
	Lon	51,195	58,032	(13.4%)	479,559
	NW	68,967	67,426	2.2%	475,572
	WM	50,132	61,702	(23.1%)	377,256
NGN	NGN	50,961	58,925	(15.6%)	474,000
SGN	Sc	35,292	31,459	10.9%	237,074
	So	85,816	76,738	10.6%	688,815
WWU	WWU	56,404	45,173	19.9%	402,690
Industry		**480,955**	**475,590**	**1.1%**	**3,161,388**

Table 3.9: Duration of planned interruptions (millions of minutes)

Company	GDN	2015-16			RIIO-GD1
		Current target	Actual	Variance	Forecast
NGGD	EoE	38.4	26.6	30.7%	215.7
	Lon	32.0	21.6	32.5%	194.4
	NW	35.8	22.6	36.9%	172.5
	WM	25.0	22.2	11.0%	154.6
NGN	NGN	27.3	13.7	50.0%	139.2
SGN	Sc	12.2	11.7	4.6%	89.9
	So	30.6	26.6	13.3%	254.4
WWU	WWU	11.5	10.4	9.8%	88.9
Industry		**213**	**155**	**27.0%**	**1,118**

Unplanned interruptions

3.34. Performance of unplanned interruptions depends on the emergency response to network failures, damage to network assets, capacity-related network failures and upstream gas supply failures. GDNs do have some influence over the incidence of unplanned interruptions, for example, control over the mains replacement programme. As the mains replacement programme progresses, we expect to see fewer unplanned interruptions.

3.35. As reported last year, NGN, NGGD and SGN are all forecasting to miss the targets set for unplanned interruptions at the start of RIIO-GD1. This is mainly due to errors in setting these targets, which we are currently reviewing.

3.36. Tables 3.10 and 3.11 show each GDN's performance for both number and duration of unplanned interruptions. NGGD (Lon) has a higher duration per interruption than the other GDNs. NGGD considers that this is due to the high

[33] Current targets are based on those set at the start of RIIO-GD1 which are currently being reviewed. Due to this review, we have not included a target for the entire RIIO-GD1 period.

number of multi-occupancy buildings (MOBs) in its network. When unplanned interruptions occur in these buildings, it can take a long time for the GDN to put the appropriate measures in place ie apply for access permits and supply equipment, in order to carry out the work. This is especially difficult if the riser is internal. NGGD explained that it is now introducing innovative solutions to reduce unplanned durations in MOBs and in the future we expect this to be a high priority for NGGD. SGN reported that it has carried out planned work to risers in MOBs to prevent unplanned interruptions.

Table 3.10: Number of unplanned interruptions[34]

Company	GDN	2015-16			RIIO-GD1
		Current target	Actual	Variance	Forecast
NGGD	EoE	13,365	13,451	(0.6%)	97,767
	Lon	11,076	12,661	(14.3%)	97,282
	NW	12,699	12,887	(1.5%)	97,734
	WM	8,822	8,338	5.5%	62,662
NGN	NGN	8,380	14,289	(70.5%)	112,354
SGN	Sc	2,152	5,028	(133.6%)	17,216
	So	8,677	17,652	(103.4%)	66,997
WWU	WWU	11,271	10,768	4.5%	78,656
Industry		**76,442**	**95,074**	**(24.4%)**	**626,023**

Table 3.11: Duration of unplanned interruptions (millions of minutes)

Company	GDN	2015-16			RIIO-GD1
		Current target	Actual	Variance	Forecast
NGGD	EoE	6.2	10.4	(67.7%)	73.3
	Lon	13.8	68.6	(396.3%)	412.6
	NW	9.7	7.8	19.6%	60.0
	WM	6.0	5.2	12.8%	47.3
NGN	NGN	7.8	11.8	(51.0%)	59.6
SGN	Sc	15.1	3.6	76.0%	31.7
	So	22.6	20.4	9.9%	166.3
WWU	WWU	5.6	4.8	14.2%	43.6
Industry		**87**	**133**	**(52.7%)**	**771**

Achieving the one-in-20 supply capacity obligation

3.37. GDNs are required to maintain supplies for the daily demand conditions that are statistically experienced in the worst winter in 20 years. This ensures GDNs will safely and securely distribute gas to consumers even when demand is high.

[34] Includes major incidents, which is when there is a loss of supply to more than 250 customers following a single incident.

3.38. We set the primary output to ensure any work carried out on above ground installations increases or maintains the overall capacity. The output compares the capacity capability of above-ground installation sites with the demand required under a one-in-20 winter condition.

3.39. Tables 3.12 and 3.13 show the number of above-ground installations that fall within various capacity bands[35] at the start of RIIO-GD1 and after the third year of the price control.

Table 3.12: Position at the start of RIIO-GD1 (number of installations)

	EoE	Lon	NW	WM	NGGD	NGN	Sc	So	WWU
</= 50%	No individual GDN commitments for NGGD				182	54	96	88	167
>50% to </=70%					142	55	29	49	97
>70% to </=80%					81	29	5	15	30
>80% to </=100%					164	40	14	11	52
>100%					41	13	3	0	0
Total no. of sites					**610**	**191**	**147**	**163**	**346**

Table 3.13: Position at the end of 2015-16 (number of installations)

	EoE	***Lon***	***NW***	***WM***	**NGGD**	**NGN**	**Sc**	**So**	**WWU**
</= 50%	*106*	*29*	*53*	*50*	238	64	94	120	161
>50% to </=70%	*89*	*27*	*38*	*35*	189	59	31	24	76
>70% to </=80%	*41*	*8*	*14*	*14*	77	22	7	15	41
>80% to </=100%	*31*	*12*	*14*	*17*	74	41	12	5	55
>100%	*10*	*7*	*9*	*8*	34	8	4	0	1
Total no. of sites	***277***	***83***	***128***	***124***	**612**	**194**	**148**	**164**	**334**

[35] The offtake volume for each above-ground asset is updated to reflect the latest capacity booking. Where a site appears in the >100% category a special management plan is required to ensure supplies are maintained under one-in-20 conditions.

Maintaining operational performance

3.40. Maintaining operational performance is measured through five secondary deliverables:

- Number and value of offtake meter errors – annual commitment
- Duration of telemetry faults – annual commitment
- Pressure systems safety regulations (PSSR) fault rate – annual commitment
- Gas holder demolition – eight-year commitment
- Health, criticality and risk metrics – eight-year commitment

3.41. Achievement of each of these deliverables confirms that the network is operating within agreed criteria. Appendix 3 provides information on performance in each of these areas by each GDN. All GDNs have met their annual commitments this year and are forecasting to meet their eight-year output targets in this area.

3.42. We use a 'broad measure of customer service'[36] incentive in RIIO-GD1 to incentivise GDNs to deliver good customer service, deal effectively with complaints and engage with stakeholders. Under this incentive mechanism, GDNs can earn financial rewards or face financial penalties based on how well they perform in each of the outputs that make up the broad measure. The performance of each GDN against the outputs associated with this incentive is described below.

3.43. These annual outputs make up the incentive:

- **Customer satisfaction survey**
- **Complaints metric**
- **Stakeholder engagement**

[36] More information on the broad measure of customer service can be found in final proposals https://www.ofgem.gov.uk/ofgem-publications/48155/2riiogd1fpoutputsincentivesdec12.pdf

Customer satisfaction survey

3.44. The customer satisfaction survey asks customers to score GDNs' service out of 10.[37] GDNs can be rewarded or penalised by up to 0.5% of base revenue, depending on how well they perform against their target. Customers are surveyed following:

- **Planned interruptions**: planned work carried out by the GDN on service pipes, which is likely to have caused an interruption to their gas supply.
- **Emergency response and repair work**: after gas escape or loss of supply is reported.
- **Connections**: work completed on a new or existing gas connection.

3.45. The customer satisfaction scores and financial incentives for 2015-16 are in table 3.14. The average customer satisfaction scores for RIIO-GD1 so far are in table 3.15.

3.46. Average industry performance for customer satisfaction has continued to increase and most GDNs improved on their average score from last year. NGN achieved the highest average score in 2015-16 and has the highest average customer satisfaction in RIIO-GD1 so far. WWU and SGN are also outperforming their targets.

3.47. Despite the increase in overall performance across the networks, all four of NGGD's GDNs failed to meet the target score for planned interruptions in 2015-16. NGGD Lon and WM networks also failed to meet the connections target score, as they had done in the previous two years. NGGD was penalised £1.6 million for its performance in these areas in 2015-16. NGGD outperformed its emergency response and repair targets.

Improving the number of survey returns

3.48. We are currently working with the GDNs to identify ways of increasing the number of surveys returned, so that we get the best possible representation of customer experiences. It's possible that the current paper survey is limiting the amount of responses and is no longer suitable. The GDNs are testing the popularity of different survey methods and which demographic to reach by these methods. We are yet to decide on a way forward, but seek to ensure that any change to surveying is robust, future-proof where possible, and does not affect the incentive.

[37] The final question ('overall, how satisfied were you with the service provided') is used to measure performance for this incentive.

Table 3.14: GDN customer satisfaction survey data 2015-16[38]

Company	GDN	Scores out of 10					Ranking on average score	Financial Reward/(Penalty) (£m)			
		Planned Interruption	Emergency Response and Repair	Connection	Average (2015-16)	Average (2014-15)		Planned Interruption	Emergency Response and Repair	Connection	Total Financial Reward/ (Penalty)
NGGD	EoE	8.07	9.38	8.13	8.52	8.35	6	(0.04)	1.05	0.26	**1.28**
	Lon	7.96	9.03	6.88	7.96	7.78	8	(0.17)	0.77	(0.77)	**(0.17)**
	NW	7.97	9.38	8.67	8.67	8.46	5	(0.15)	0.75	0.75	**1.35**
	WM	7.73	9.26	7.83	8.27	8.32	7	(0.35)	0.57	(0.16)	**0.06**
NGN	NGN	8.86	9.52	9.12	9.17	9.01	1	0.72	0.72	0.72	**2.16**
SGN	Sc	8.88	9.52	9.01	9.13	8.79	2	0.49	0.49	0.49	**1.47**
	So	8.65	9.36	8.47	8.83	8.64	4	1.22	1.22	1.22	**3.67**
WWU	WWU	8.72	9.55	8.88	9.05	9.04	3	0.68	0.25	0.68	**1.61**
Target		**8.09**	**8.81**	**8.04**	**8.31**		**Total**	**2.41**	**5.82**	**3.20**	**11.43**

Table 3.15: GDN customer satisfaction survey data – three year average cumulative

Company	GDN	Scores out of 10				Ranking on average score
		Planned Interruption	Emergency Response and Repair	Connection	Average	
NGGD	EoE	8.09	9.28	7.82	8.40	6
	Lon	7.92	8.92	6.68	7.84	8
	NW	7.85	9.26	8.34	8.48	5
	WM	7.85	9.16	7.76	8.26	7
NGN	NGN	8.63	9.38	8.91	8.98	1
SGN	Sc	8.76	9.33	8.56	8.88	3
	So	8.52	9.19	8.32	8.68	4
WWU	WWU	8.66	9.38	8.74	8.93	2
Target		**8.09**	**8.81**	**8.04**		

[38] Financial rewards/ penalty payments are reported in 2017-18 nominal prices as 2015-16 performance will impact allowed revenue in 2017-18.

Customer complaints

3.49. GDNs can be penalised up to 0.5% of base revenue for not meeting target scores for customer complaints. Complaints performance is measured against four indicators based on the percentage of:

- complaints resolved in one day
- complaints resolved in 31 days
- repeat complaints
- Energy Ombudsman (EO) decisions against the GDN.

3.50. Performance against each indicator is combined to derive an overall score. The lower the score, the more effective the GDN is at resolving complaints.

3.51. All GDNs are performing better than the target and therefore no financial penalties were incurred in 2015-16. The industry average has improved significantly on 2014-15, going from 8.67 to 6.75 as shown in table 3.16. NGN and WWU are the best performing GDNs so far in RIIO-GD1. SGN has made large improvements in its performance since the start of the price control.

Table 3.16: GDN number of complaints for 2015-16

Company	GDN	Unresolved at day +1 (%)	Unresolved at day +31 (%)	Repeat complaint (%)	Energy ombudsman decision against GDN (%)	Complaint metric score 2015-16	Complaint metric score 2014-15	2015-16 Ranking	RIIO- GD1 ranking
NGGD	EoE	71	7	0	0	9.46	9.90	5	5
	Lon	77	9	0	0	10.59	11.45	8	8
	NW	76	7	0	0	9.77	10.08	7	7
	WM	75	6	0	0	9.52	9.88	6	6
NGN	NGN	17	3	1	0	3.08	2.66	2	1
SGN	Sc	29	0	0	0	3.01	8.81	1	3
	So	37	1	0	0	4.11	9.63	3	4
WWU	WWU	31	4	1	0	4.43	6.93	4	2
Industry average		52	5	0	0	6.75	8.67		
Target						11.57			

Stakeholder engagement

3.52. The stakeholder engagement incentive encourages GDNs to engage with stakeholders to inform their business decisions. GDNs can be rewarded up to 0.5% of base revenue where they meet the minimum standard.[39] Performance under this incentive is then assessed by an independent panel. The panel is comprised of experts in communications and stakeholder engagement.[40] The

[39]The minimum criteria are outlined in the Stakeholder Engagement Incentive Guidance Document; https://www.ofgem.gov.uk/ofgem-publications/87495/gdseincentive-guidancedoc.pdf

[40] Details of the panel members can be found at: https://www.ofgem.gov.uk/publications-and-updates/stakeholder-engagement-panel-members-2015-16

scores and financial rewards for 2015-16 are outlined in table 3.17. A detailed report can be found on our website.[41]

Table 3.17: GDN stakeholder engagement results[42]

Company	GDN	Minimum criteria	Panel score (out of 10) 2015-16	Panel score (out of 10) 2014-15	Reward (£m) 2015-16	Reward (£m) 2014-15
NGGD	EoE	√	6.90	5.90	1.79	1.17
	Lon	√			1.31	0.81
	NW	√			1.28	0.84
	WM	√			0.97	0.64
NGN	NGN	√	6.80	5.50	1.18	0.62
SGN	Sc	√	5.75	6.40	0.50	0.73
	So	√			1.26	1.73
WWU	WWU	√	6.05	7.05	0.82	1.26

3.53. The panel acknowledged the progress made by the GDNs in 2015-16 compared to the previous year, with NGGD scoring the highest. GDNs can improve their scores with continued innovation and development and by clearly demonstrating progress from the previous year. Companies that performed the best in 2015-16, NGGD and NGN, were able to demonstrate this to the panel this year to achieve the highest scores.

Emergency telephone service

3.54. All GDNs have an obligation to maintain a continuously-manned telephone service. 90% of calls to a GDN's emergency telephone line must be answered within 30 seconds. Response time has worsened since 2014-15, but performance remained above 90%, at 92.59%. This is reported in appendix 6 along with other guaranteed standards of performance.

New connections

3.55. There are two primary outputs for connections:

- **Introduction of voluntary distributed gas entry standards**
- **Guaranteed standards of performance (for connections)**

[41] The decision on the stakeholder engagement incentive 2015-16: Gas Distribution can be found at: https://www.ofgem.gov.uk/publications-and-updates/decision-stakeholder-engagement-incentive-2015-16-gas-distribution.

[42] In 2015-16 prices, as reported in the decision on the stakeholder engagement incentive.

3.56. There is no target for the number of new connections but GDNs have to meet guaranteed standards as part of the connections process. These are shown in table 3.18. There are also customer service standards for connections (discussed in appendix 6), obligations on fuel poor connections (under Social Obligations) and objectives for facilitating biomethane connections (under Protection of the Environment).

Introduction of voluntary distributed gas entry standards

3.57. Gas entering the network from alternative sources is known as distributed gas, for example from a biomethane plant. GDNs have developed voluntary standards for distributed gas connections which they report on annually. All GDNs are reporting to have met these standards in 2015-16. There is more information on these voluntary standards in the Protection of the Environment section.

Guaranteed standards of performance

3.58. Customers seeking a new connection rely on the GDNs to provide a good service. Guaranteed standards of performance relate to the timely delivery of connections services. GDNs must meet the standards at least 90% of the time. They all achieved this in 2015-16.

3.59. When GDNs fail to meet the required standard for a particular consumer they must make a payment to them. The GDNs paid over £537,000 to customers during 2015-16 for not meeting guaranteed standards of performance for connections, and of this NGGD paid £418,000, up from the £284,000 reported last year. The payments made by the other GDNs were similar to those last year. A summary of GDNs' performance against the guaranteed standards and the compensation paid is in appendix 6.

New connections[43]

3.60. In the third year of RIIO-GD1 the GDNs made just over 60,000 new gas connections. Of these, approximately 30% were for new housing, 45% were to existing housing, 5% were non-domestic and 20% were fuel poor[44] connections. Table 3.18 provides a breakdown by type of connection.

[43] All GDNs provide a connection service. Alternative connection service providers operate in all gas distribution areas and connections provided by these organisations are in addition to the connections made by the GDNs.
[44] Connections to help vulnerable and fuel poor households that are off the gas grid switch to natural gas by offering funding towards the cost of connecting to the gas network.

Table 3.18: Breakdown of new gas connections activity by GDN 2015-16

Company	GDN	New Housing	Existing Housing	Fuel Poor			Non-domestic	Total
				One-offs	Community Schemes	Other scheme types		
NGGD	EoE	2,671	4,734	1,045	439	0	188	9,077
	Lon	1,143	1,984	243	0	0	141	3,511
	NW	700	1,959	1,274	283	0	107	4,323
	WM	810	1,640	579	512	0	85	3,626
NGN	NGN	2,062	2,366	915	1,543	0	593	7,479
SGN	Sc	1,222	4,219	1,518	1,098	70	390	8,517
	So	6,090	5,437	685	475	0	629	13,316
WWU	WWU	3,878	5,563	872	687	0	640	11,640
Industry		**18,576**	**27,902**	**7,131**	**5,037**	**70**	**2,773**	**61,489**

3.61. The social outputs are:

- **Fuel poor connections**
- **Carbon monoxide awareness**

Fuel Poor Network Extension Scheme

3.62. Gas can often be the most cost-effective fuel for heating.

3.63. The Fuel Poor Network Extension Scheme (FPNES) helps vulnerable and fuel poor households that are off the gas grid to switch to natural gas by offering funding towards the cost of connecting to the gas network.

3.64. So far in RIIO-GD1 the GDNs have connected 39,521 fuel poor households, just over 43% of the eight-year target of 91,203 as shown in table 3.19. This is slightly ahead of their three-year linear target, taking into account the revised targets.

Table 3.19: Fuel poor connections – actual and RIIO-GD1 forecast

Number of fuel poor connections	Three-year cumulative			RIIO-GD1 eight-year		
	Commitment	Actual	% variance	Commitment	Forecast	% variance
EoE	3818	4414	13.5%	12,046	12,046	*0.0%*
Lon	1020	742	(37.5%)	2,880	2,880	*0.0%*
NW	5020	5053	0.7%	13,330	13,330	*0.0%*
WM	3130	3170	1.3%	8,360	8,360	*0.0%*
NGN	4917	5329	7.7%	14,500	14,577	*0.5%*
Sc	5522	11418	51.6%	17,130	17,143	*0.1%*
So	3323	3543	6.2%	10,367	10,393	*0.2%*
WWU	4798	5852	18.0%	12,590	12,590	*0.0%*
Industry	**31,547**	**39,521**	**20.2%**	**91,203**	**91,319**	***0.1%***

3.65. NGGD's Lon network is currently behind schedule compared to the three-year linear forecast, but NGGD still expects to meet the eight-year target. NGGD has commented that there has been low uptake in one-off connections and that it has been difficult to develop community schemes, largely due to difficulties in sourcing funding for the installation of a gas heating system. It intends to engage more proactively, through channels like social media, in order to identify eligible households and meet their targets. We will continue to monitor progress towards its eight-year target.

Carbon monoxide (CO) awareness

3.66. We consider it vital that GDNs contribute to increasing awareness of the effects of CO.

3.67. Some examples of the activities that the GDNs have reported this year include:

- NGGD has provided over 17,000 CO alarms this reporting year. It has also partnered with organisations such as fire authorities and food banks to increase awareness among those it would not otherwise have contacted.
- NGN has led on developing the iFEST mobile game, promoting CO awareness among festival goers, as well as expanding the CO poster competition in its own network. .
- SGN has donated over 5,800 CO alarms this year. It has also focused on educating children on the dangers of CO.

- WWU has given out 5,200 CO alarms this reporting year, mostly to vulnerable consumers. It has also had its "Business in the Community (BitC) Wales: Building Stronger Communities" award re-accredited and received the "BitC Wales: Responsible Business Award 2016" as a result of its work on increasing awareness of CO.

3.68. To incentivise GDNs to go above and beyond these outputs, we also have a gas discretionary reward (DRS) scheme. This will run every three years with a maximum reward available of £12 million, awarded in three tranches of up to £4 million. The first assessment took place in 2015, covering 2013-2015.[45] The next DRS assessment will take place in 2018.

3.69. There are two primary outputs for protection of the environment:

- **To provide biomethane connections information**
- **To meet shrinkage (leakage) commitments.**

3.70. These outputs are split into two categories. These categories are 'broad environmental objectives' (the contribution of GDNs to meet GB carbon reduction targets) and 'narrow environmental objectives' which incentivise GDNs to reduce their own carbon footprint.

3.71. Providing biomethane connections information falls under the broad objective and meeting shrinkage (leakage) commitments falls under the narrow objective.

Biomethane connections information (broad measure)

3.72. There are two aspects to this output:

- Introducing a voluntary standard of service for biomethane connections
- Reporting on the progress of connecting biomethane gas entry facilities.

[45] Decision on the 2013-2015 reward can be found here: https://www.ofgem.gov.uk/publications-and-updates/decision-riio-gd1-gas-discretionary-reward-scheme-2013-15

Introducing a voluntary standard of service for biomethane connections

3.73. Biomethane is a renewably-sourced substitute for natural gas, which can be injected into the gas network, bringing environmental benefits. GDNs introduced a set of voluntary connection standards that they would meet when connecting biomethane, which we monitor annually. We will also take into account how well the GDNs have facilitated the connection of distributed gas as part of our evaluation of the DRS submissions.

3.74. All GDNs have adopted the voluntary standards, though the quality and accessibility of information for customers varies.

Reporting on the progress of connecting biomethane gas entry facilities

3.75. There are no targets set for the capacity of biomethane each GDN must connect but GDNs must report on the following areas:

- the total capacity of biomethane enquiries and applications currently in progress, but not yet connected, and
- the total capacity of biomethane connected.

3.76. These figures are shown in table 3.20. The total capacity connected in 2015-16 was greater than that connected in 2014-15. We note particular success in the NGN and WWU networks where 7,500 and 7,950 standard cubic meters (m^3) per hour (scmh) respectively were connected in 2015-16.

Table 3.20: Number and capacity of biomethane studies and capacity connected in 2015-16

Biomethane Connections	GDN	Enquiries	Connection Studies	Connections	Capacity of studies(scmh)	Capacity connected(scmh) 2015-16	Capacity connected(scmh) 2014-15
NGGD	EoE	282	10	9	4,875	4,350	4,160
	Lon	6	1	0	1,500	-	-
	NW	18	2	1	350	100	1,423
	WM	66	10	2	6,700	500	900
NGN	NGN	45	7	8	3,850	7,500	1,200
SGN	Sc	92	16	7	5,062	5,062	3,760
	So	52	12	5	3,875	3,875	4,650
WWU	WWU	66	20	7	14,172	7,950	3,250
All GDNs		627	78	39	40,384	29,337	19,343

Shrinkage (leakage) commitments (narrow measure)

3.77. Shrinkage refers to gas which is lost from the transportation network, of which leakage is the main contributor. GDNs must meet annual leakage targets. There are two incentives for reducing shrinkage (leakage).[46] The two incentives are:

- The Shrinkage Incentive
- The Environmental Emissions Incentive (EEI)

3.78. The shrinkage incentive is an annual rolling incentive based on the reference gas commodity price. In 2015-16 the GDNs earned £3.1 million through the shrinkage incentive.

3.79. The EEI incentivises GDNs to further reduce environmental emissions below their leakage targets and rewards them with a financial value based on the government's non-traded carbon value. GDNs continued to reduce their environmental emissions in 2015-16, leading to an incentive revenue of £17 million through the EEI.

3.80. Table 3.21 shows that all GDNs outperformed their shrinkage and leakage output commitments this year and will receive incentive payments.

Table 3.21: Shrinkage and leakage volumes in 2015-16[47]

Company	GDN	Shrinkage			Leakage		
		2015/16 target	2015/16 Actual	Shrinkage Incentive Revenue	2015/16 target	2015/16 Actual	Environmental Emissions Incentive Revenue
		GWh	GWh	£m	GWh	GWh	£m
NGGD	EoE	503	449	0.56	470	420	3.14
	Lon	274	244	0.30	257	229	1.68
	NW	367	341	0.28	346	320	1.65
	WM	316	290	0.29	303	276	1.77
NGN	NGN	432	382	0.56	407	360	3.08
SGN	Sc	220	212	0.08	204	196	0.45
	So	606	554	0.55	573	526	2.95
WWU	WWU	421	381	0.45	396	363	2.27
Industry		**3,139**	**2,853**	**3.1**	**2,956**	**2,690**	**17.0**

3.81. All GDNs predict that they will outperform their leakage output commitment over RIIO-GD1. We expect GDNs to continue using and adopting techniques to reduce leakage.

[46] Shrinkage is the dominant element of GDNs business carbon footprint and accounts for more than 0.75% of GB's greenhouse gas emissions. Shrinkage is comprised of leakage from pipelines (approximately 95%), theft from the GDN network (approximately 3%) and own-use gas (approximately 2%).

[47] Incentive revenues shown are in 2017-18 nominal prices as 2015-16 performance will impact allowed revenue in 2017-18.

Business carbon footprint

3.82. The GDNs' reported business carbon footprint (BCF) for 2015-16 is summarised in table 3.22.

3.83. There has been an increase in BCF in 2015-16, which GDNs attribute to improvements in reporting (ie contractor emissions have been included) and the increase in replacement expenditure (repex) workload. Some GDNs (WWU and NGN) have reduced their footprint. There is no financial incentive associated with this metric.

Table 3.22 - Total annual business carbon footprint

Company	GDN	2015-16 BCF (Excluding shrinkage) (tCO2e)	2014-15 BCF (Excluding shrinkage) (tCO2e)	% Change 2015-2016	Change 2015-2016	Rank (based on % change)
NGGD	EoE	25,180	24,731	1.8%	449	3
	Lon	15,417	14,896	3.4%	521	4
	NW	17,007	16,248	4.5%	759	5
	WM	12,259	10,843	11.6%	1,416	7
NGN	NGN	23,764	25,542	(7.5%)	(1,778)	2
SGN	Sc	13,787	11,770	14.6%	2,018	8
	So	26,092	23,138	11.3%	2,953	6
WWU	WWU	16,472	18,719	(13.6%)	(2,247)	1
Industry		**149,978**	**145,887**	**3.3%**	**4,091**	

3.84. GDNs also reported on other environmental aspects, which are set out in appendix 5. These include:

- Land remediation
- The quantity of virgin aggregate used
- The amount of spoil sent to landfill
- ISO 14001 major non-conformities.

4. Innovation

Chapter Summary

This chapter presents an overview of the GDNs' expenditure associated with the innovation projects undertaken as part of RIIO-GD1 and summarises the work that GDNs have undertaken to identify innovation that aims to deliver a more efficient operation of their networks.

Introduction

4.1. As part of RIIO-GD1 and RIIO-T1 we introduced the Network Innovation Allowance (NIA) and the gas Network Innovation Competition (NIC). These incentives were designed to encourage gas network licensees to innovate in the design, build and operation of their networks to facilitate the transition into a low carbon economy.

4.2. The innovation incentives have been in place for three years and, as the projects undertaken so far come to completion, we expect the learning to be incorporated into the core part of the GDN business. Information regarding trials financed through the innovation incentives is available to all interested parties on the Energy Network Association's (ENA's) smarter networks portal.[48] A key aim of the incentives is for GDNs to learn from each other's innovation projects, as well as their own.

4.3. We recently consulted on proposed changes to the governance arrangements of the NIC and NIA.[49] We will issue our decision in the coming months.

Network Innovation Allowance

4.4. The NIA is designed to fund small scale research, development and demonstration projects. Each GDN has a use it or lose it NIA allowance and projects funded under the NIA must comply with the NIA Governance document.[50] Details of all the registered NIA projects can be found on the ENA's Smarter Networks Portal.

4.5. In the future we want:

[48] http://www.smarternetworks.org/
[49] https://www.ofgem.gov.uk/publications-and-updates/network-innovation-review-our-consultation-proposals
[50] https://www.ofgem.gov.uk/publications-and-updates/version-two-network-innovation-allowance-nia-governance-documents

- GDNs to explain, as part of the registration process, why their projects are eligible for NIA funding rather than simply stating that they are, and

- Provide information on the benefits of rolling out innovative solutions in to business as usual.

4.6. In 2015-16 there were 206 active NIA projects costing a total of £18.2 million. Table 4.1 below provides a summary of the number of NIA projects undertaken by the GDNs, how much each company has spent on NIA projects and the percentage of their NIA allowance used since the start of RIIO-GD1.

Table 4.1: Network Innovation Allowance projects and expenditure in 2015-16 prices[51] [52]

Company	GDN	2013-14			2014-15			2015-16		
		NIA expenditure (£m)	Number of projects (by company)	Percentage of allowance used (%)	NIA expenditure (£m)	Number of projects (by company)	Percentage of allowance used (%)	NIA expenditure (£m)	Number of projects (by company)	Percentage of allowance used (%)
NGGD	EoE	1.45	40	33%	2.83	61	66%	3.45	61	80%
	Lon	0.82		28%	1.61		55%	1.96		62%
	NW	0.97		30%	1.90		62%	2.32		75%
	WM	0.68		29%	1.38		59%	1.69		72%
NGN	NGN	1.42	27	50%	2.39	43	83%	2.95	44	100%
SGN	Sc	1.28	35	83%	1.03	46	68%	1.49	64	104%
	So	2.89		79%	2.34		65%	3.37		94%
WWU	WWU	0.43	14	21%	1.61	22	78%	0.97	33	48%
Total NIA Expenditure		**9.94**			**15.08**			**18.21**		

Network Innovation Competition

4.7. The gas NIC is an annual competition to which GDNs can apply. Up to £18 million of funding is available for a small number of large scale innovation projects.

4.8. In 2016 three gas distribution projects were selected by us to receive a total of £13.2 million of funding. Two projects received full funding and one project received partial funding. Table 4.2 below sets out a summary of the gas distribution projects funded through the 2016 NIC. Further information on these projects can be found in our funding brochure[53] and the GDNs' full submissions, which are published on our website.[54]

[51] Each companies' NIA summaries can be found through the following links:
NGGD - http://www2.nationalgrid.com/UK/Our-company/Innovation/Annual-Reports/Annual-Summaries/
NGN - http://www.northerngasnetworks.co.uk/innovation-2016/#/24
SGN - https://www.sgn.co.uk/uploadedFiles/Marketing/Pages/Publications/Docs-Innovation-NIA/SGN-NIA-Annual-Summary-2015-16.pdf
WWU - http://www.wwutilities.co.uk/media/2161/nia_summary_2016-submission.pdf
[52] In 2015-16 the percentage of NIA allowance used by SGN Scotland was 104% but SGN stated that it did not claim more than it's allowance which was recovered in line with the recovery mechanism.
[53] https://www.ofgem.gov.uk/publications-and-updates/2015-innovation-competitions-brochure
[54] https://www.ofgem.gov.uk/network-regulation-riio-model/network-innovation/gas-network-innovation-competition?page=1#block-views-publications-and-updates-block

Table 4.2: Projects selected for funding in the 2016 NIC

Project Title	Lead GDN	Description	NIC funding awarded (£million)	Total project costs (£million)	Project end date
Commercial BioSNG Demonstration Plant	NGGD	This project aims to demonstrate the gasification of waste at scale and in a commercial environment to produce methane (BioSNG) and inject it into the gas grid. BioSNG has a far smaller carbon footprint than fossil natural gas and, if successful, BioSNG could meet up to 40% of UK domestic gas demand. The project builds on the NIC-funded 'BioSNG Demonstration Plant' project, which focused on technical feasibility.	£5.4m	£23m	2018
Real-Time Networks	SGN	This project seeks to challenge industry orthodoxy and rewrite network design fundamentals through a 'real-time' network demonstration. The project will install sensing technologies, associated hardware and software, and infrastructure in a representative section of the gas network. If successful, the project will demonstrate the gas network's ability to: accept a wider range of gas compositions and calorific values, review network design assumptions, optimise network investments through enhanced network management, provide flexibility to integrate downstream renewables and respond to the emerging challenges in the industry.	£7.1m	£8m	2019
City CNG	NGN	The aim of the project is to facilitate the building of a city-scale compressed natural gas (CNG) vehicle fuelling station through a novel commercial agreement. The station will connect to NGN's high pressure system and the project partner, Leeds City Council, have committed to converting all the refuse collection vehicles in the city to CNG. The project aims to be a proof of concept for other UK cities and to accelerate private sector investment in CNG infrastructure.	£0.7m (partial funding)	£1.2m	2019

5. Analysis of expenditure against allowances

Chapter Summary

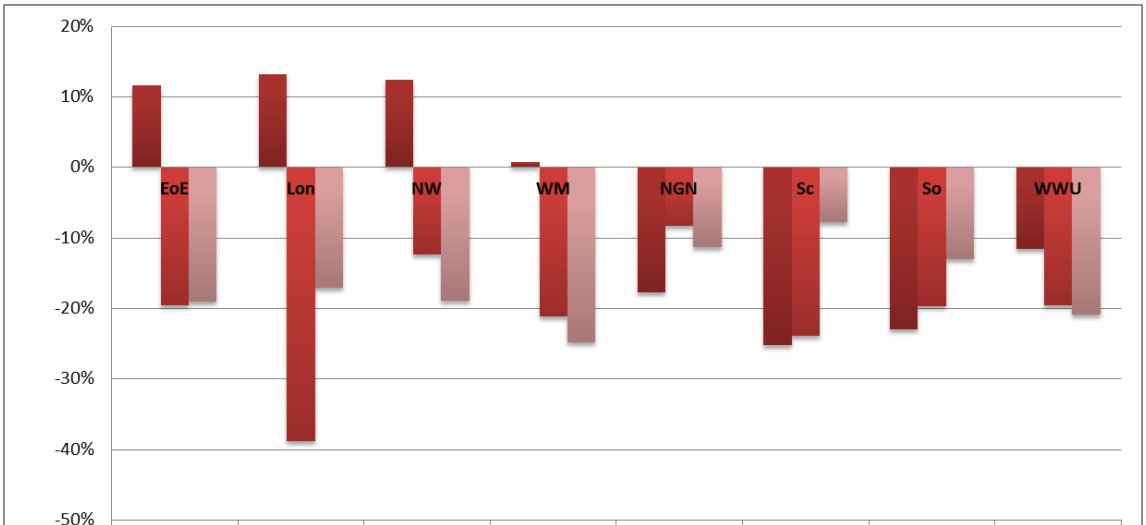
Chapter 2 provided a high level view of totex across all GDNs and their forecasts to the end of RIIO-GD1. This chapter looks in more detail at the variances seen between allowances and actual expenditure.

Analysis of expenditure agasint allowances

5.1. The totex approach to setting price controls aims to incentivise companies to deliver outputs at the lowest total cost, without preferring either operating expenditure (opex) or capital expenditure (capex) solutions. This approach encourages GDNs to choose the most efficient way of meeting their outputs. Table 2.2 in chapter 2 shows how GDNs have underspent against totex allowances to date, and forecast to for the remainder of the price control period.

5.2. To help show and explain areas of underspend, figure 5.1 breaks totex down into overspends/underspends for the three cost categories; capex, repex (replacement expenditure) and opex, for the first three years of RIIO-GD1. Although we have set out expenditure against allowances at the disaggregated cost category level, GDNs were given a totex allowance to spend as appropriate to meet their outputs. They were not given an allowance for each cost category and can therefore reallocate costs across categories.

Figure 5.1: Three-year cumulative underspend/overspend against allowances[55]



	EoE	Lon	NW	WM	NGN	Sc	So	WWU
Opex	12%	13%	12%	1%	-18%	-25%	-23%	-12%
Repex	-20%	-39%	-12%	-21%	-8%	-24%	-20%	-20%
Capex	-19%	-17%	-19%	-25%	-11%	-8%	-13%	-21%

5.3. While all companies are underspending to date, each is doing so for different reasons. NGGD is overspending on opex, but has larger proportional underspends on capex and repex. SGN has larger opex underspends. NGN has a relatively low underspend on repex, while WWU's underspends are weighted towards capex and repex.

5.4. The outperformance against allowances is mainly attributed to the following:

- **More flexible risk reduction strategies:** GDNs have agreed a flexible iron mains risk reduction strategy with the HSE, which allows them to prioritise abandonment of the riskiest mains. The riskiest pipes tend to be of smaller diameter and cheaper to replace than average, resulting in lower repex costs. Additionally, GDNs report that the iron mains risk reduction programme has started delivering benefits faster than expected, which has resulted in fewer leaks, fractures and repairs, leading to savings on capex and opex. We will closely monitor GDNs' progress in this area and check that GDNs meet all targets set for the RIIO-GD1 period.

- **Milder than expected winters:** recent winters haven't been as harsh as the GDNs had expected. This has meant that GDNs have spent less on dealing with emergencies, gas leaks and repairs.

[55] Exclude adjustments for uncertainty mechanisms.

- **Slower economic recovery:** expectations for GB's recovery from the financial crisis was slower than expected, which has resulted in lower connections activity, particularly from larger industrial and commercial users. This in turn has led to less capex expenditure on mains and other asset reinforcement.

- **RPEs:** in setting totex allowances for RIIO-GD1, we included an assumption about growth in Real Price Effects (RPEs). This is a measure of the difference between the economy-wide RPI inflation index and inflation in inputs specific to GDNs. Actual growth in input prices has been slower than expected, and GDNs have benefitted from this. We estimate this to be around £150 million for the first three years across the industry.

- **Efficiencies:** GDNs have reported cost saving efficiencies in running their businesses. For example, some of the GDNs have said they have outsourced more and renegotiated their existing contracts while others have flexibly deployed their existing workforce across multiple business areas.

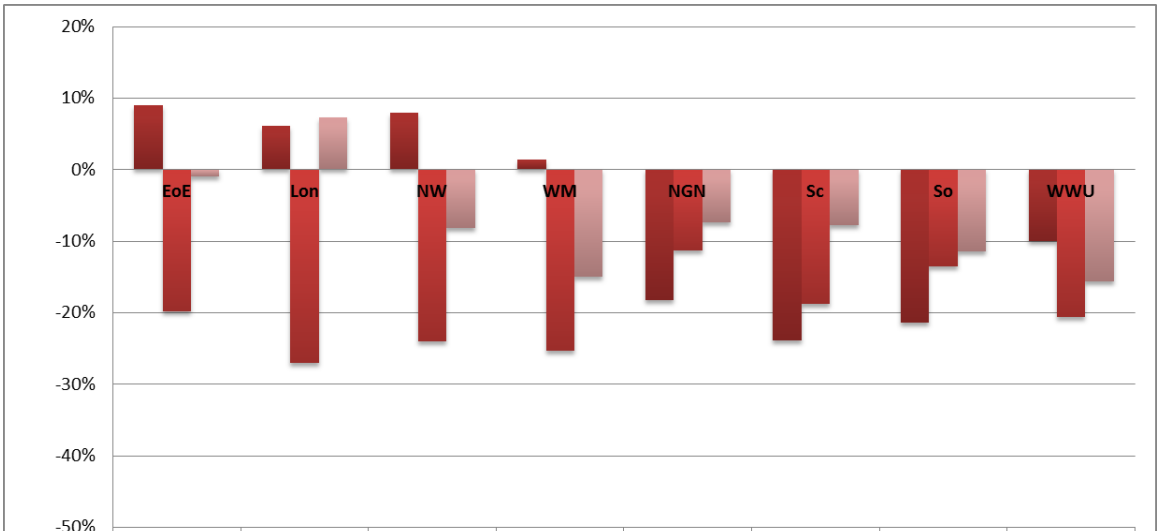
- **Innovation:** GDNs have reported that this has been important in driving down costs and allowing them to be more efficient and cost effective in how they carry out their work. This has had an impact on all areas of work, but GDNs expect to see the biggest savings in the mains replacement programme area. For instance, the use of robots has reduced costs associated with digging and reinstatement.

5.5. Specific business expenditure areas were impacted differently by the factors outlined above. In 2015-16, the majority of the total outperformance (£290 million) can be attributed to repex (£173 million) and four other areas: emergency (£42 million), mains reinforcement (£32 million), work management[56](£14 million) and repair (£17 million).

5.6. Figure 5.2 depicts companies' expenditure profile at the end of RIIO-GD1.

[56] Work management covers asset management, operations management, customers management and system control areas.

Figure 5.2: Companies' projected eight year underspend/overspend against allowances



	EoE	Lon	NW	WM	NGN	Sc	So	WWU
Opex	9%	6%	8%	1%	-18%	-24%	-21%	-10%
Repex	-20%	-27%	-24%	-25%	-11%	-19%	-14%	-21%
Capex	-1%	7%	-8%	-15%	-7%	-8%	-11%	-16%

5.7. Figure 5.2 demonstrates that companies expect to continue to underspend through RIIO-GD1. However, these forecast underspends are lower than they have been to date.

5.8. The key reason for this forecast increase in expenditure later on in RIIO-GD1 is the GDNs' repex workload strategy. Some GDNs have chosen to delay some of the more expensive work to the end of the price control to allow time for cost saving innovative technology to develop. Additionally, some GDNs also carried out a reduced repex workload in the first couple of years of RIIO-GD1 due to issues with negotiating contracts.

Appendices

Index

Appendix 1 - Determining Allowed Revenue

Chapter summary

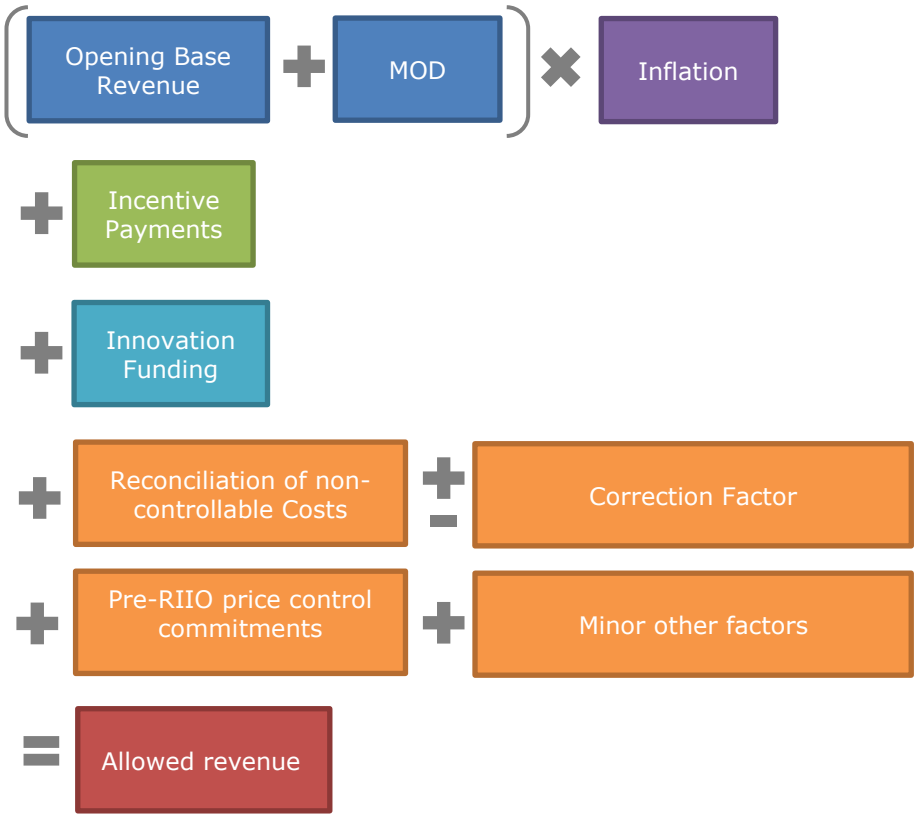
This chapter describes how allowed revenue values are determined. This includes an explanation of how totex performance relates to allowed revenue; a breakdown of the allowed revenue, showing the components that relate to pre-RIIO and RIIO spending; the use of Regulatory Asset Value (RAV) as a tool to spread revenue collection associated with totex and a history of the MOD directions that we have made under RIIO.

Allowed Revenue and MOD

1.1. Allowed Revenue is the amount of money that a network company can earn on its regulated business.[57] Figure A1.1 sets out at high-level, how we determine the Allowed Revenue in any given year of the price control.

[57] Due to the timing of receiving actual expenditure data and that customer tariffs are set in advance of regulatory years totex spending assessments only begin to impact allowed revenue with a minimum two year lag. Therefore, totex performance in 2015-16 will first impact allowed revenue in 2017-18. Detailed calculations are contained in the Price Control Financial Model (PCFM), which is available on our website: https://www.ofgem.gov.uk/network-regulation-riio-model/price-controls-financial-model-pcfm

Figure A1.1: Constituent parts of Allowed Revenue



1.2. Of all constituent parts of allowed revenue, opening base revenue comprises the significant majority. Opening base revenue is a best view of the amount of money a network company needs to earn on its regulated business to recover the efficient cost of carrying out its core activities. It is determined through ex-ante forecasts conducted by Ofgem and the licensee.

1.3. Opening base revenue is modified annually during the price control by the "MOD" term from the licences. This takes place as part of our Annual Iteration Process (AIP). The AIP process takes account of uncontrollable market uncertainties as they become known, such as the cost of debt and changes to taxation rules. It also measures financial performance against pre-determined output incentives. Where a company under / over performs relative to the ex-ante expectation a percentage of the difference is shared with consumers through the MOD.

1.4. The MOD term is the difference between the updated base revenue (recalculated using the latest available performance data, including revisions to that data for previous years) and the opening base revenue. Two key variables to the MOD value are totex performance and Regulatory Asset Value (RAV), discussed below.

1.5. Allowed revenue is also adjusted for output incentive payments, innovation funding and other costs such as differences between previous years' allowed revenue and the actual amount that has been collected. True up of non-controllable costs, and the correction factor are explained in the main body of the report (Chapter 2).

1.6. The remaining items included in base revenue are an allowance for taxation, legacy factors, pension deficits, equity issuance costs, costs that cannot be controlled and other minor adjustments.

1.7. Table A1.1 displays MOD values from all the AIPs to date. Across these, total base revenue has decreased by £277 million relative to the forecast at Final Proposals. For all GDNs a reduction in the cost of debt allowance has made a significant impact to MOD for 2017-18.[58]

Table A1.1: MOD values.

£m 2015-16 Prices	2013-14	2014-15	2015-16	2016-17	2017-18
EoE	-	-3.9	-9.1	-16.3	-14.8
Lon	-	-3.4	-2.0	-5.5	-24.8
NW	-	-3.5	-10.3	4.9	-18.5
WM	-	-2.6	-6.3	-6.5	-16.0
NGN	-	1.2	-6.6	-7.5	-13.3
Sc	-	-0.3	-11.4	7.2	-11.7
So	-	-3.3	-22.1	-1.3	-28.2
WWU	-	-0.1	-11.3	-8.7	-20.7
Total	-	-16.0	-79.2	-33.6	-148.1

Allowed Totex and other factors that impact base revenue

1.8. The difference between actual totex and allowed totex (whether the actual totex is an underspend or overspend) is shared between the company (via modifying base revenue) and with consumers and tax obligations. This process forms the TIM (explained in Chapter 2). To change company base revenue there is a revision to allowed totex that takes into account the sharing. As illustrated in Figure A1.2, this revised allowed totex is used in place of the original value. The revised allowed totex and the calculations that follow (described below) revise the base revenue that the company is allowed to recover as part of its overall allowed revenue.

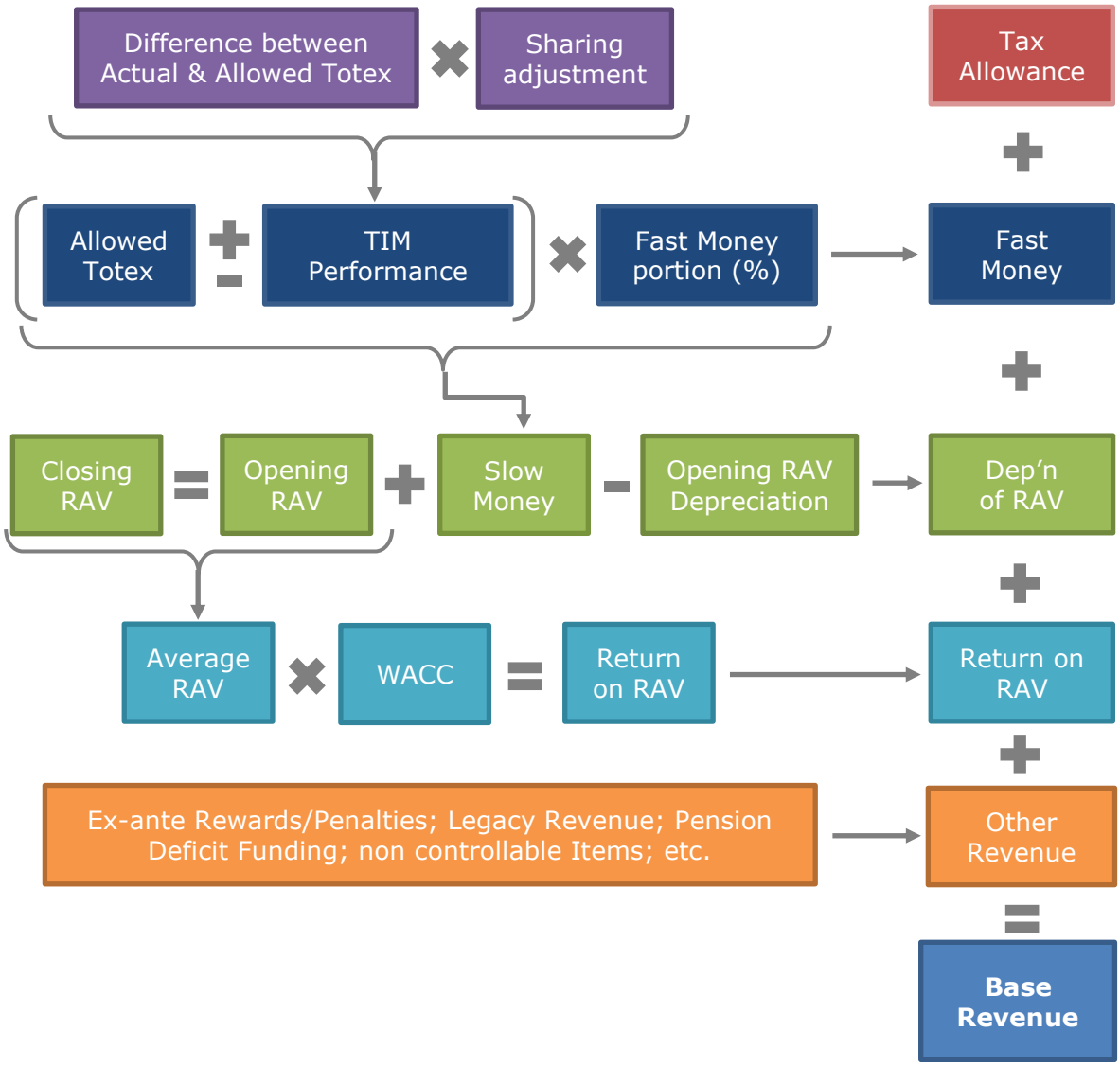
1.9. For base revenue calculations a portion of allowed totex is directly added to the base revenue (this is known as fast money as the company is allowed to collect revenue equal to this value during the next allowed revenue year).

[58] The cost of debt allowance changes the WACC value. The cost of debt allowance itself is derived from the average of two indices (with serial numbers DE000A0JY811 and DE000A0JZAF5 as provided by IHS Markit) that report historic borrowing costs for GB non-financial "A" and "BBB" rated bonds. A 10 year rolling average of these costs is determined. The average currently includes periods that predate the 2008 financial crisis, during which time borrowing costs were greater than they are today (borrowing costs that are newly entering the calculation period are lower than these older costs that are exiting it).

1.10. The remainder of allowed totex (known as slow money) is added to the opening Regulatory Asset Value (RAV). RAV is the long-term financial value of the capital employed in the regulated business.

1.11. RAV is based on the initial market value of the regulated asset base at privatisation, plus all subsequent additions. In accordance with established regulatory methods, RAV gradually reflecting base revenue over multiple decades, reflecting the average lifetime of network assets. Amounts are deducted annually from opening RAV (this is depreciation). The depreciation value is then added to base revenue in the next allowed revenue year. The average of opening and closing RAV for the year also earns a return (at the Weighted Average Cost of Capital (WACC)).

Figure A1.2: Determination of Base Revenue



1.12. As TIM performance becomes known, the RAV is recalculated using the updated slow money value. The latest view of RAV positions are shown in table A1.2.

Table A1.2: RAV Balance

	NGGD				NGN	SGN		WWU
£m 2015-16 Prices	EoE	Lon	NW	WM	NGN	Sc	So	WWU
RAV at 1st April 2013	3,048	1,976	2,096	1,589	1,897	1,536	3,443	1,936
Slow Money	372	330	284	204	304	247	505	318
Depreciation	-439	-291	-307	-232	-280	-232	-507	-295
RAV at 31st March 2016	2,980	2,015	2,073	1,561	1,920	1,552	3,441	1,959

1.13. For gas distribution, revenue collected with respect to the depreciation of assets follows a "sum-of-digits" methodology. Other sectors (gas transmission, electricity transmission and electricity distribution) use linear depreciation. Compared to linear depreciation the sum-of-digits depreciation starts faster, but then slows year-on-year over the course of the agreed average asset lifetime (45 years).

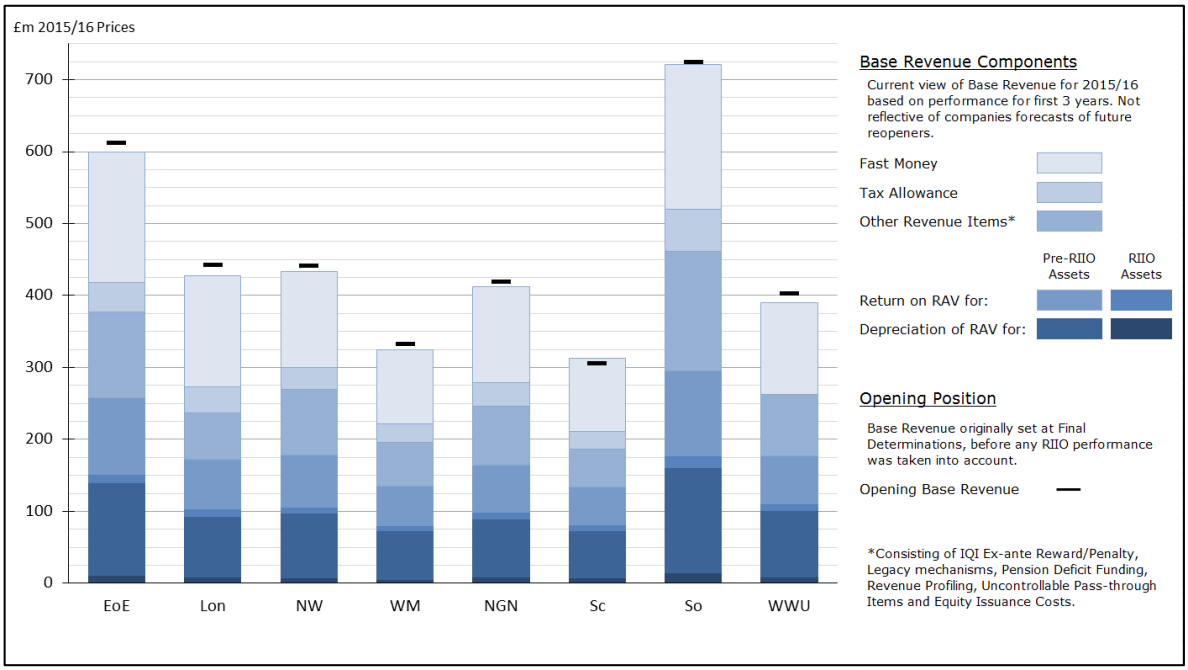
1.14. Using the sum-of-digits method complicates the relationship between the rate of RAV growth due to slow money and the rate at which revenue may later be collected through the depreciation of the RAV. The net change in the RAV position of during the price control so far is small.

Recalculated Base Revenue

1.15. We recalculate base revenue taking into account items in Figure A1.1.

1.16. Figure A1.3 shows the constituent parts of recalculated base revenue (stacked blue bars). The black lines are opening base revenue.

Figure A1.3: Recalculated base revenue using actual performance data up to 2015-16



1.17. Important to understanding the gas distribution revenues is that the capitalisation % for replacement expenditure during RIIO-GD1 is high, set at 64.3% for 2015-16 and increasing to 100% by the end of the price control. Of non-replacement expenditure 70.2% is treated as fast money and only 29.8% as slow money. Revenue from the return on and depreciation of RIIO assets is currently an average of only 4% of base revenue. Due to current underspends on repex work, there hasn't been much RIIO-asset slow money added to RAV to earn returns. Conversely, fast money makes up a higher than usual percentage of revenue, currently accounting for 31%. Return and depreciation for pre-RIIO assets, however, comprises 38% of base revenue.

Glossary of financial terms

Allowed revenue

The amount of money that a network company can earn on its regulated business.

Capital expenditure (capex)

Expenditure on investment in long-lived network assets, such as gas pipelines or electricity overhead lines.

Capitalisation policy

The approach that the regulator follows in deciding the percentage of total expenditure added to the RAV (and thus remunerated over time) and the percentage of expenditure remunerated in the year it is incurred.

Cost of debt

The effective interest rate that a company pays on its current debt. Ofgem calculates the cost of debt on a pre-tax basis.

Cost of equity

The rate of return on investment that is required by a company's shareholders. The return consists both of dividend and capital gains. Ofgem calculates the cost of equity on a post-tax basis.

Opening Base Revenue

The best view at the start of the price control on the amount of money a network company needs to earn on its regulated business to recover the efficient cost of carrying out its core activities.

Operating Expenditure (Opex)

Expenditure on the day to day operation of a network such as staff costs, repairs and maintenance, and overheads.

Regulatory Asset Value (RAV)

A financial balance representing expenditure by the licensee which has been capitalised under regulatory rules. The licensee receives a return and depreciation on its RAV in its price control allowed revenues.

Return on Regulatory Equity (RoRE)

The financial return achieved by shareholders in a licensee during a price control period from it's out-turn performance under the price control.

Sharing Factor

Represents the percentage that the licensee bears in respect of an overspend against allowances or retains in respect of an underspend against allowances.

Total expenditure (Totex)

Totex consists of all the expenditure relating to a licensee's regulated activities with some specified exceptions. See the RIGs for a list of these exceptions.[59]

Weighted Average Cost of Capital (WACC)

The Weighted Average Cost of Capital is Ofgem's preferred way of expressing the rate of return allowed on the Regulatory Asset Values (RAV) of price controlled network companies.

[59] https://www.ofgem.gov.uk/publications-and-updates/notice-modification-relation-riio-gd1-gas-distribution-price-control-regulatory-instructions-and-guidance-version-3-0

Appendix 2 – Safety secondary deliverables

1.1. Safety secondary deliverables help to confirm that activities undertaken to reduce the safety risk of the network's iron mains infrastructure are working in practice. The secondary deliverables relate to:

- length of mains off risk (km)
- numbers of pipe fractures and corrosion failures from iron mains
- number of occurrences of 'gas in buildings' events caused by iron mains
- number of incidents
- number of steel service pipes decommissioned.

1.2. Ultimately, safety-driven activities on network assets are undertaken to prevent incidents that can lead to building damage, injuries and fatalities. We use a range of indicators related to the safety of the network to demonstrate the extent of safety improvement trends.

1.3. GDN forecasted trends for these indicators in their RIIO-GD1 business plans and the safety secondary deliverables are based on these indicators. We expect these deliverables to be met by the end of the RIIO-GD1 period, supporting the achievement of GDNs' primary risk reduction commitments.

Length of iron mains off-risk

1.4. The amount of safety risk connected with the integrity of iron mains is broadly proportional to the length of iron mains in service within a network. It is fundamentally the decommissioning of iron mains that reduces the safety risk.

1.5. In line with the HSE iron mains reduction policy[60], the GDNs must decommission all tier 1 (smaller diameter) iron mains that are within 30 metres of a property by 2032. At the start of RIIO-GD1 the tier 1 mains represented approximately 85% of the 'at risk' iron mains population.

1.6. NGGD's West Midlands network has shown a large increase in the length of iron mains decommissioned and forecasts to continue to over deliver in relation to the annualised target to compensate for the significant under delivery in the previous two years.

1.7. Table A2.1 shows that four networks did not abandon the length of iron main expected on an annual basis in order to meet the eight year target. These networks are: NGGD's Lon network, NGN, SGN's So network and WWU. On a three-year

[60] http://www.hse.gov.uk/gas/supply/mainsreplacement/enforcement-policy-2013-2021.htm

cumulative basis all NGGD's networks and NGN also removed less iron mains in comparison to a straight line interpolation of the eight-year target. All GDNs forecast to meet their overall delivery level by the end of the price control period.

Table A2.1: Length of iron mains off risk

Company	GDN	Secondary deliverable		2016 actual delivery		3 year cumulative	
		Overall RIIO-GD1 (km)	Annual Average from interpolations of the 8 year deliverable	Length of Iron Mains Abandoned (km)	Variance of 2016 actual against annual average of the 8 year deliverable	length of iron mains abandoned (km)	Length abandoned in RIIO-GD1 compared with annualised secondary deliverable
NGGD	EoE	4,798	600	629	4.9%	1,752	(2.6%)
	Lon	2,888	361	327	(9.4%)	960	(11.3%)
	NW	3,491	436	482	10.3%	1,234	(5.7%)
	WM	2,674	334	381	13.8%	886	(11.7%)
NGN	NGN	3,992	499	464	(7.0%)	1,471	(1.8%)
SGN	Sc	1,993	249	259	3.9%	767	2.6%
	So	5,491	686	649	(5.4%)	2,127	3.3%
WWU	WWU	2,876	359	348	(3.1%)	1,092	1.2%

1.8. Table A2.2 shows the expected and actual delivery of tier 2 and tier 3 mains. Most GDNs have stated that they are planning to use more efficient, innovative[61] ways of removing the risk associated with these larger mains, which are more costly to replace. To allow for these innovative techniques to develop, some GDNs have delayed the decommissioning of these larger mains to the latter years of the price control. This workload is therefore currently significantly lower than the GDNs forecast at the start of RIIO-GD1. The GDNs have stated that they will be carrying out this work within RIIO-GD1 and we will closely monitor progress against targets.

1.9. NGGD has said that it is now forecasting to replace only 29km of London Medium Pressure (LMP) iron mains, compared to the 70km it was allowed and funded for in RIIO-GD1. We are reviewing this as part of the output accountability work we are conducting in parallel to the mid-period review and will seek views from stakeholders in early 2017 on our proposed solution.

[61] For example the new robotic technologies being developed by SGN as a NIC project which can operate inside a live gas main and remotely repair leaking joints.

1.10. **Table A2.2: Tier 2 and 3 workloads**

Company	GDN	Assumed workload in setting RIIO-GD1 final proposals		2016 target after adjusting for Tier 2a workload	2016 actual delivery		Delivery after the first 3 years of RIIO-GD1	
		Total RIIO-GD1 8 year work load (km)	Annual average from interpolation of the 8 year workload (km)		Actual 2016 length of iron mains abandoned (km)	Variance of 2016 actual abandonment against 2016 assumed workload adjusted for Tier 2a	Actual length abandoned in RIIO-GD1	Variance of actual RIIO-GD1 abandonment against assumed workload adjusted for Tier 2a
NGGD	EoE	141	17.6	16.3	13.6	(16.8%)	21.2	(30.6%)
	Lon	274	34.3	30.9	12.9	(58.2%)	18.1	(67.7%)
	NW	195	24.4	20.4	21.9	7.2%	49.5	32.7%
	WM	99	12.4	9.1	7.9	(13.7%)	13.0	(18.5%)
NGN	NGN	285	35.6	30.7	21.4	(30.2%)	91.0	46.7%
SGN	Sc	156	19.5	19.2	4.1	(78.8%)	5.9	(84.4%)
	So	269	33.6	30.3	11.5	(62.1%)	23.7	(58.1%)
WWU	WWU	238	29.8	30.9	15.9	(48.5%)	61.4	(8.5%)

Fractures and failures

1.11. We measure the number of fractures and failures because they can lead to significant gas escapes developing over a relatively short period of time, requiring urgent action. These types of failure mechanisms are the main concern for the safety of iron gas mains and the driver for the iron mains risk reduction policy.

1.12. The relatively mild winter reduced the adverse effects of cold temperatures on network assets in 2015-16. This meant that the occurrence of pipe fractures and failures was lower than would have been expected in a seasonally normal winter. All GDNs were below the annualised target and all showed an improvement in performance from the previous year with the exception on NGGD's Lon network. This network maintained the same performance as in the previous year. Fewer fractures and failures would be expected to lead to lower numbers of iron mains related gas in buildings occurrences and the associated number of incidents. We examine GDN reported figures in the following sections to see how this turned out in practice.

Table A2.3: Number of fractures and failures

Company	GDN	RIIO-GD1 target	Average Annualised target	2013-14 actual	2014-15 Actual	2015-16 actual
NGGD	EoE	13,441	1,680	999	1,213	983
	Lon	3,993	499	278	308	308
	NW	12,362	1,545	755	909	819
	WM	7,421	928	561	703	614
NGN	NGN	21,844	2,730	815	883	685
SGN	Sc	10,386	1,298	455	473	373
	So	13,001	1,625	1,077	1,145	778
WWU	WWU	8,513	1,064	581	616	519
Industry		**90,961**	**11,370**	**5,521**	**6,250**	**5,079**

Gas in building (GIB) events

1.13. GIB events are instances that involve the accumulation of gas within the confines of a building. Gas leaks from mains and services can have the potential of leading to the presence of gas within buildings. The presence of gas in buildings gives rise to the risk of a fire or explosion, which may cause structural damage to buildings, personal injuries and fatalities.

1.14. We expect incidences of such events to trend downwards as the iron mains risk is progressively reduced. Therefore, it is a useful lagging indicator of the achievement of the iron mains primary safety output. The weather has a significant impact on a yearly basis, however, the upward trend in GIBs observed in 2014-15 across all the GDNs has been reversed in 2015-16 with the exception of NGGD Lon and NGN.

1.15. Table A2.4 shows the GIB secondary deliverable target against the actual number of GIB events attributable to iron mains for each of the three years of the price control. We have derived an annual secondary deliverable target using a linear interpolation of the eight-year deliverable. However, this representation of the level to be expected may not be entirely accurate. The later years of the price control might experience a lower number as the mains abandonment work will be further progressed.

1.16. We also acknowledge that effects from outside the model, such as weather conditions, affect annual figures and longer-term trends provide better indications of underlying network characteristics.

Table A2.4: Secondary deliverable level and actual number of gas in buildings occurrences

Company	GDN	RIIO-GD1 target	Average Annualised target	2013-14 actual	2014-15 Actual	2015-16 actual
NGGD	EoE	911	114	74	123	89
	Lon	329	41	24	31	33
	NW	1069	134	54	89	66
	WM	633	79	47	77	53
NGN	NGN	1523	190	18	42	58
SGN	Sc	525	66	33	29	21
	So	605	76	64	94	73
WWU	WWU	550	69	37	45	35

Incidents

1.17. There were no incidents reported relating to iron mains that led to significant property damage, injury or loss of life.

Decommissioning steel service pipes

1.18. Steel service pipes are routinely decommissioned when they require any work, whether this is for customer-led reasons such as moving meter positions, attending to escapes or renewal as part of a mains replacement programme.

1.19. Table A2.5 shows that all of NGGD's GDNs and SGN's Sc network have undertaken more domestic service replacement activities than the annual RIIO-GD1 deliverable. NGN, and WWU have for the third year running undertaken a lower number of domestic service replacements.

Table A2.5: Number of domestic service replacements 2015-16

GDN	Replacement with service alteration	Replacement after escape	Replacement associated with smart metering	Replacement with mains replacement	Other replacement	Total	Annualised RIIO-GD1 target	Variance %
EoE	1,445	3,409	15	26,134	3,912	34,914	30,377	15%
Lon	774	4,164	12	26,218	2,425	33,593	21,481	56%
NW	672	4,251	15	30,002	3,130	38,070	28,383	34%
WM	395	2,378	13	26,069	2,882	31,736	21,125	50%
NGN	1,122	3,838	0	21,134	1,485	27,579	30,932	(11%)
Sc	140	1,127	0	10,604	2,402	14,273	13,224	8%
So	1,356	4,280	0	37,888	4,118	47,642	49,574	(4%)
WWU	628	3,797	0	16,173	1,224	21,822	25,209	(13%)

Appendix 3 – Maintaining operational performance - secondary deliverables

1.1. Maintaining operational performance is measured through five secondary deliverables:

- Number and value of offtake meter errors – annual commitment
- Duration of telemetry faults – annual commitment
- PSSR fault rate – annual commitment
- Gas holder demolition – eight-year commitment
- Health, criticality and risk metrics – eight-year commitment.

1.2. We also consider that maintenance of network records is a useful metric on which to report GDNs' performance of how they are maintaining their network so report this below.

Number and value of offtake meter errors[62]

1.3. All GDNs achieved a level of offtake metering errors significantly within the required limit of 0.1% of throughput. Only NGGD EoE and NW, SGN So and WWU reported errors of between 0.001% and 0.02%, the remaining GDNs having none.

Duration of telemetered faults

1.4. This output provides a commitment to limit the duration of faults detected by telemetry systems. Telemetry provides the GDNs with continuous data on the operational state of the remote, unmanned outstations and will report faults to the distribution control centres.

1.5. As shown in table A3.1, all networks reported durations of telemetered faults below their deliverable limit ie all GDNs have met their target. SGN So achieved a performance significantly below its limit after having failed to achieve the level of performance in the first two years.

[62] The number and value of offtake meter errors is the volume of offtake meter errors in GWh as the percentage of total throughput.

Table A3.1: Duration of telemetered faults

Company	GDN	Hours per AGI					
		2013-14		2014-15		2015-16	
		Deliverable limit	Actual	Deliverable limit	Actual	Deliverable limit	Actual
NGGD	EoE	127	70	123	80	119	34
	Lon	127	132	123	171	119	48
	NW	127	95	123	93	119	25
	WM	127	173	123	175	119	30
NGN	NGN	211	105	196	63	181	135
SGN	Sc	238	140	238	100	238	121
	So	134	297	134	174	134	52
WWU	WWU	181	16	168	5	153	5

PSSR fault rate[63]

1.6. As shown in table A3.2, for the third year running all GDNs reported that they outperformed their PSSR fault secondary deliverables. In 2014, we highlighted that WWU did not meet this secondary output and that this was due to consistency of reporting against how the output was set in final proposals.

Table A3.2: Number of PSSR faults

Company	GDN	Fault Rate					
		2013-14		2014-15		2015-16	
		Deliverable li	Actual	Deliverable li	Actual	Deliverable l	Actual
NGGD	EoE	8.0%	5.0%	8.0%	5.4%	7.0%	6.7%
	Lon	9.0%	4.0%	9.0%	4.4%	8.0%	4.4%
	NW	18.0%	11.0%	16.0%	11.4%	16.0%	11.3%
	WM	6.0%	5.0%	6.0%	5.4%	6.0%	4.7%
NGN	NGN	51.0%	42.6%	51.0%	26.3%	50.0%	30.7%
SGN	Sc	35.6%	22.3%	35.6%	25.7%	35.6%	21.5%
	So	20.9%	19.4%	20.9%	20.9%	20.9%	18.7%
WWU	WWU	7.3%	48.1%	7.2%	5.7%	7.1%	5.0%

Gas holder demolition

1.7. GDNs have a programme for gas holder demolition, made possible by the availability of alternative diurnal storage.[64]

1.8. We are monitoring progress towards the agreed number of gas holders being demolished, alongside reliability outputs for assessment at the end of the period.

[63] The Pressure Systems Safety Regulations require faults to be reported to the relevant enforcing authority. The data in table A3.2 shows the number of faults expressed as a percentage of either the number of inspections or the number of Above Ground Installations. GDN's can choose which method they are using in their report.

[64] Diurnal storage is required to manage within-day fluctuations in gas demand. Storage may be provided using vessels, for example low pressure gas holders, or the pressurisation and depressurisation of pipelines, which is known as linepack.

There are no formal annual output commitments.

1.9. Table A3.3 below compares the actual number of sites demolished in the first three years, together with the target level of sites for demolition and GDNs forecast number by the end of the RIIO-GD1 period.

Table A3.3: Low pressure holder demolition

Company	GDN	2015-16	Cumulative	RIIO-GD1	
		Actual	Actual	Target	Forecast
NGGD	EoE	9	23	29 to 30	29
	Lon	3	14	32 to 33	34
	NW	9	14	35	35
	WM	4	4	4 to 5	4
NGN	NGN	3	6	23 to 24	23
SGN	Sc	2	4	11	14
	So	8	19	44 to 45	53
WWU	WWU	1	10	7 to 8	10
Industry		**39**	**94**	**185 to 191**	**202**

1.10. All GDNs report that they will meet the agreed target by the end of the price control period.

Health, criticality and risk metrics

1.11. Health, criticality and risk metrics are used to monitor the state of network assets in terms of the total of risk around safety, reliability and the environment. GDNs influence the risk level by carrying out interventions that reduce risk, generally by reconditioning or replacing assets or asset sub-components. This will be achieved through the application of the Network Output Measures (NOMs) methodology.

1.12. The GDNs submitted a draft common NOMs methodology to enable the consistent reporting of asset health, criticality and risk in March 2016. This methodology is currently being validated, with a final methodology due to be submitted for approval by the end of March 2017. We are working closely with all the networks to ensure the NOMs methodology is delivered on time and that it will allow a consistent assessment of the health, criticality and risk of the key network assets.

Maintenance of network records

1.13. The effective management of the network is reliant on maintaining good technical records of the live apparatus and that these records are kept up-to-date.

1.14. GDNs are measured on the time taken to digitise new and abandoned pipes on their mapping systems. NGN's performance recovered following a lack of focus in the previous year, though the percentage of records taking more than 60 days to be digitised is more than double that of any other network. NGN forecasts that it will

significantly improve its performance in 2016/17. NGGD's performance in three of its four networks showed a marked deterioration with only the NGGD Lon network showing an increased percentage digitised in less than 30 days. The performance of the GDNs is summarised in table A3.4.

Table A3.4: Number of business days to digitise network records (% digitised by length)

Company	GDN	2013-14			2014-15			2015-16		
		< 30 days	< 60 days	> 60 days	< 30 days	< 60 days	> 60 days	< 30 days	< 60 days	> 60 days
NGGD	EoE	45%	21%	34%	66%	29%	5%	43%	49%	8%
	Lon	63%	19%	18%	72%	24%	4%	73%	24%	4%
	NW	47%	27%	26%	72%	22%	5%	43%	48%	9%
	WM	67%	15%	19%	83%	13%	4%	33%	57%	10%
NGN	NGN	67%	14%	15%	47%	17%	36%	63%	15%	22%
SGN	Sc	98%	2%	1%	94%	5%	1%	97%	2%	1%
	So	97%	1%	2%	98%	1%	1%	97%	2%	1%
WWU	WWU	96%	2%	2%	98%	2%	1%	98%	1%	1%

Appendix 4 – Actions required under the HSE 'three tier' iron mains risk reduction policy

1.1. GDNs must comply with HSE's published policy for iron mains risk reduction.

1.2. Table A4.1 describes the actions required under each diameter band or 'tier'

Table A4.1: Action required by diameter band or tier

Diameter band	Iron pipe nominal diameter range	Summary of required actions
Tier 1 mains	8 inches or less	Must still achieve full decommissioning by 31 March 2032 and replace an agreed length of mains each year as under the old policy but can prioritise replacement based on a wide range of benefits, including reductions in gas losses, operating costs and improvements in safety risk.
Tier 2 mains above the risk action threshold	greater than 8 inches and less than 18 inches	All mains exceeding a defined risk-action threshold must, by 31 March 2021, be abandoned, remediated or assessed for continued safe use (tier 2a)
Tier 2 mains below the risk action threshold	greater than 8 inches and less than 18 inches	Pipes in tier 2 scoring below the risk-action threshold may be decommissioned where this is justified in cost benefit terms (tier 2b)
Tier 3 mains	18 inches or above	GDNs may replace mains if the replacement is justified in cost benefit terms

Appendix 5 – Other emissions and natural resource use

1.1. GDNs also reported on the following environmental aspects:

- Land remediation
- The quantity of virgin aggregate used
- The amount of spoil sent to landfill
- ISO 14001 major non-conformities.

Land remediation

1.2. Land remediation includes the remediation of sites relating to demolished gas holders and non-gas holder sites, as well as routine site monitoring and maintenance. Remediation of gas holder sites is the key activity in this area. Table A5.1 demonstrates performance in this area.

Virgin aggregate use and spoil sent to landfill

1.3. As part of their RIIO commitments, GDNs were asked to submit expected volumes of aggregate extraction and spoil to landfill as part of their business plans. We also require GDNs to report annually their performance levels. Their performance in 2015-16 is set out in table in A5.1 'summary of environmental measures', along with performance data from 2014-15 for comparison. NGN performance has worsened since the previous year and they have reported that they are behind target in this area. NGN state that improvement in this area is a key target moving forward.

ISO 14001 compliance

1.4. All four GDN companies are accredited against the ISO 14001 international standard for environmental management. The standard does not in itself specify performance criteria, but assures conformity with the companies' stated environmental policies. The accrediting body undertakes periodic surveillance audits to check companies' compliance against the requirements of the standard.

1.5. There were no reported major non-conformities against the standard.

Table A5.1: Summary of environmental measures

Other emissions and natural resource use		Description	Units	EoE		Lon		NW		WM		NGN		Sc		So		WWU	
				2015/16	2014/15	2015/16	2014/15	2015/16	2014/15	2015/16	2014/15	2015/16	2014/15	2015/16	2014/15	2015/16	2014/15	2015/16	2014/15
Broad environmental measure	Biomethane	Biomethane enquiries	Number	282	239	6	5	18	20	66	54	45	59	92	95	52	78	66	68
		Biomethane connection studies	Number	10	44	1	1	2	2	10	3	7	6	16	9	12	13	20	17
		Capacity of Biomethane connection studies	m3/h	4,875	33,287	1,500	600	350	1,350	6,700	1,650	3,850	3,960	5,062	7,450	3,875	6,767	14,172	16,200
		Biomethane connections	Number	9	6	-	-	1	2	2	1	8	1	7	2	5	6	7	4
		Capacity of Biomethane connected	m3/h	4,350	4,160	-	-	100	1,423	500	900	7,500	1,200	5,062	3,760	3,875	4,650	7,950	3,250
	Unconventional sources of gas	Other unconventional sources of gas enquiries	Number	-	-	-	-	-	-	-	-	-	-	-	-	1	8	3	-
		Other unconventional sources of gas connection studies	Number	-	-	-	-	-	2	-	-	-	-	1	-	2	2	2	-
		Capacity of other unconventional sources of gas connection studies	m3/h	-	-	-	-	-	20,000	-	-	-	-	-	-	-	2,000	1,200	-
		Other unconventional sources of gas connections	Number	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Capacity of other unconventional sources of gas connected	m3/h	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Narrow environmental measures	Land remediation	Sites routinely monitored & maintained -	Number	50	43	8	7	18	36	16	11	54	40	22	13	20	12	13	25
		Non-gasholder demolition sites - statutory remediation	Number	10	8	2	1	1	3	1	6	2	-	-	-	-	-	8	3
		Gasholder demolition sites - statutory remediation	Number	2	4	3	6	1	18	1	2	1	-	-	-	-	-	-	2
		Total sites (statutory remediation)	Number	62	55	13	14	20	57	18	19	57	40	22	13	20	12	21	30
		Total cost	£m	0.5	1.7	0.2	2.1	0.3	11.2	0.1	0.1	0.5	0.5	0.4	0.6	2.2	1.0	2.6	2.4
	Virgin aggregate	Virgin aggregate (as a percentage of total imported backfill)	%	16.3	29.2	0.2	2.4	11.6	18.9	1.6	12.6	25.4	23.3	10.6	12.0	2.3	10.4	77.0	86.5
		Virgin aggregate	Tonnes	13,725	27,536	95	1,077	13,525	19,258	1,250	5,061	33,520	29,426	9,399	9,593	5,561	26,629	86,760	107,525
	Spoil to landfill	Spoil to landfill (as a percentage of total excavated spoil)	%	5.3	7.3	0.9	0.7	1.6	2.2	0.0	0.3	9.9	10.3	0.3	3.4	0.1	15.0	25.0	22.6
		Spoil to landfill	Tonnes	6,438	10,441	1,018	592	3,090	4,072	2	624	17,311	18,565	220	2,868	196	430	48,142	45,186
	ISO 1400	ISO 14001 major non-conformities	Number	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix 6 – Guaranteed standards of performance by GDN

Table A6.1: Guaranteed standards of performance 2015-16

Guaranteed standard of performance	Target	EoE	Lon	NW	WM	NGN	Sc	So	WWU	Industry
Guaranteed Standard 4 - Regulation 10 - Provision of standard connection quotations =<275kWh per hour	90%	99.95%	99.90%	99.90%	99.94%	99.98%	99.72%	99.55%	99.70%	-
	-	£320	£520	£50	£140	£10	£160	£870	£2,020	£4,090
Guaranteed Standard 5 - Regulation 10 - Provision of non-standard connection quotations =<275kWh per hour	90%	98.15%	97.94%	99.34%	98.88%	99.98%	99.33%	98.22%	98.74%	-
	-	£1,430	£1,850	£30	£90	£40	£1,010	£9,420	£6,460	£20,330
Guaranteed Standard 6 - Regulation 10 - Provision of non-standard connection quotations > 275kWh per hour	90%	99.14%	98.98%	100.00%	100.00%	100.00%	99.78%	98.18%	98.52%	-
	-	£600	£1,540	£0	£0	£0	£220	£3,020	£860	£6,240
Guaranteed Standard 7 - Regulation 10 - Accuracy of quotations (percentage of quotations challenged but found to be accurate)	-	40.00%	25.00%	No accuracy challenges reported						-
	-	£0	£628	£0	£0	£0	£0	£0	£0	£628
Guaranteed Standard 8 - Regulation 10 - Response to land enquiries	90%	98.37%	98.73%	98.52%	98.83%	100.00%	100.00%	100.00%	98.72%	-
	-	£4,970	£3,450	£3,440	£2,100	£0	£0	£760	£1,440	£16,160
Guaranteed Standard 9 - Regulation 10 - Offering a date for commencement and substantial completion of connection works (=<275kWh per hour)	90%	97.73%	93.30%	98.07%	97.86%	99.97%	99.85%	99.90%	99.95%	-
	-	£35,778	£41,600	£14,481	£14,145	£430	£1,500	£1,300	£1,060	£110,294
Guaranteed Standard 10 - Regulation 10 - Offering a date for commencement and substantial completion of connection works (>275kWh per hour)	90%	98.04%	93.42%	90.63%	95.45%	97.59%	99.06%	99.28%	100.00%	
	-	£500	£1,180	£620	£700	£4,640	£500	£200	£0	£8,340
Guaranteed Standard 11 - Regulation 10 - Substantial completion on agreed date	90%	94.41%	93.89%	97.06%	92.99%	98.42%	98.22%	98.58%	94.24%	-
	-	£125,341	£107,009	£17,602	£41,346	£12,899	£6,241	£12,204	£57,371	£380,013
Standard Special Condition D10(2)(f) Responding to telephone calls	90%	92.59%	92.59%	92.59%	92.59%	92.59%	92.59%	92.59%	92.59%	-
	-	-	-	-	-	-	-	-	-	-
Total	**-**	**£168,939**	**£157,777**	**£36,223**	**£58,521**	**£18,019**	**£9,631**	**£27,774**	**£69,211**	**£537,755**

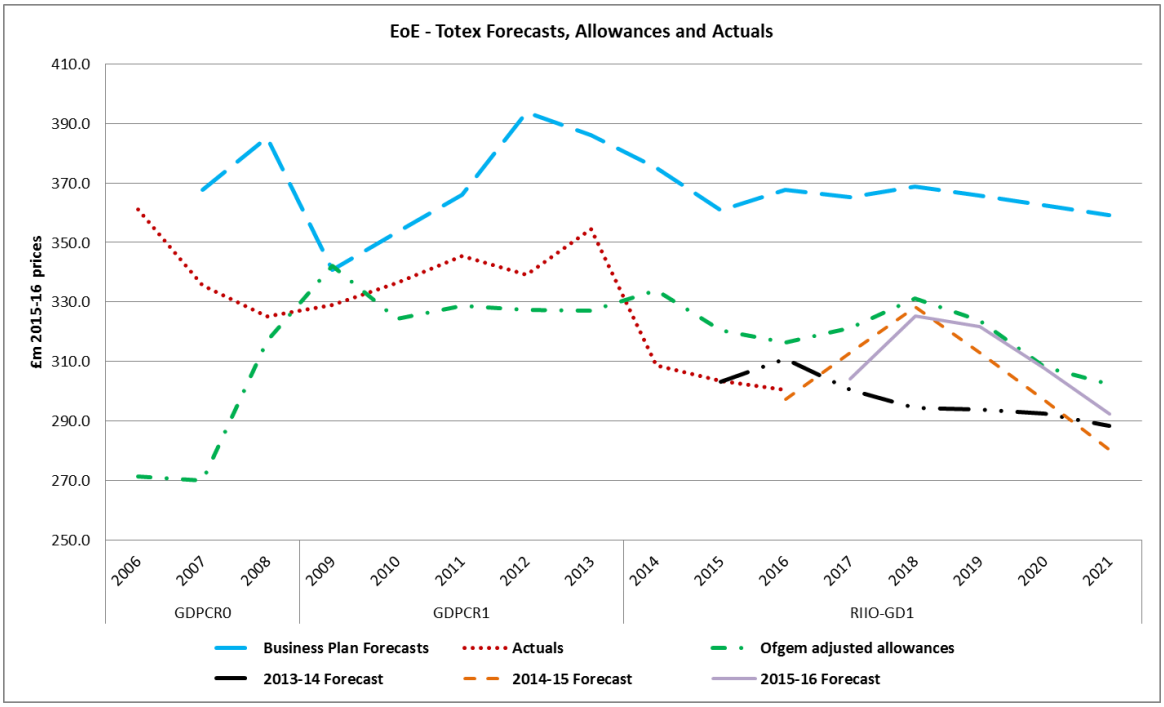
Table A6.2: Guaranteed standards of performance 2015-16

Guaranteed standard of performance		EoE	Lon	NW	WM	NGN	Sc	So	WWU	Industry
Guaranteed Standard 1 - Regulation 7 - Supply Restoration	Number of Payments	5,963	43,294	4,134	2,094	5806	1219	8568	847	
	Total Value of Payments	£180,330	£1,303,690	£128,140	£63,610	£174,180	£36,650	£257,080	£26,050	£2,169,730
Guaranteed Standard 2 - Regulation 8 - Reinstatement of customer's premises	Number of Payments	4,387	1,913	715	1,560	116	183	1031	355	
	Total Value of Payments	£220,050	£96,500	£35,900	£78,200	£6,050	£9,450	£53,000	£17,950	£517,100
Guaranteed Standard 3 - Regulation 9 - Priority domestic customers	Number of Payments	4	10	14	16	0	0	3	18	
	Total Value of Payments	£96	£240	£336	£384	£0	£0	£72	£432	£1,560
Guaranteed Standard 13 - Regulation 10A - Notification of planned supply interruptions	Number of Payments	127	74	101	155	15	1	0	17	
	Total Value of Payments	£2,540	£1,480	£2,050	£3,130	£300	£20	£0	£370	£9,890
Guaranteed Standard 14 - Regulation 10B - Response to complaints	Number of Payments	1773	2873	1609	1429	2	0	5	8	
	Total Value of Payments	£35,460	£57,460	£32,180	£28,580	£40	£0	£100	£160	£153,980
Guaranteed Standard 12 - Regulation 12 - Payments	Number of Payments	4404	2916	687	960	60	63	391	26	
	Total Value of Payments	£88,080	£58,320	£13,740	£19,200	£1,200	£1,260	£7,820	£520	£190,140
Total	-	£526,556	£1,517,690	£212,346	£193,104	£181,770	£47,380	£318,072	£45,482	£3,042,400

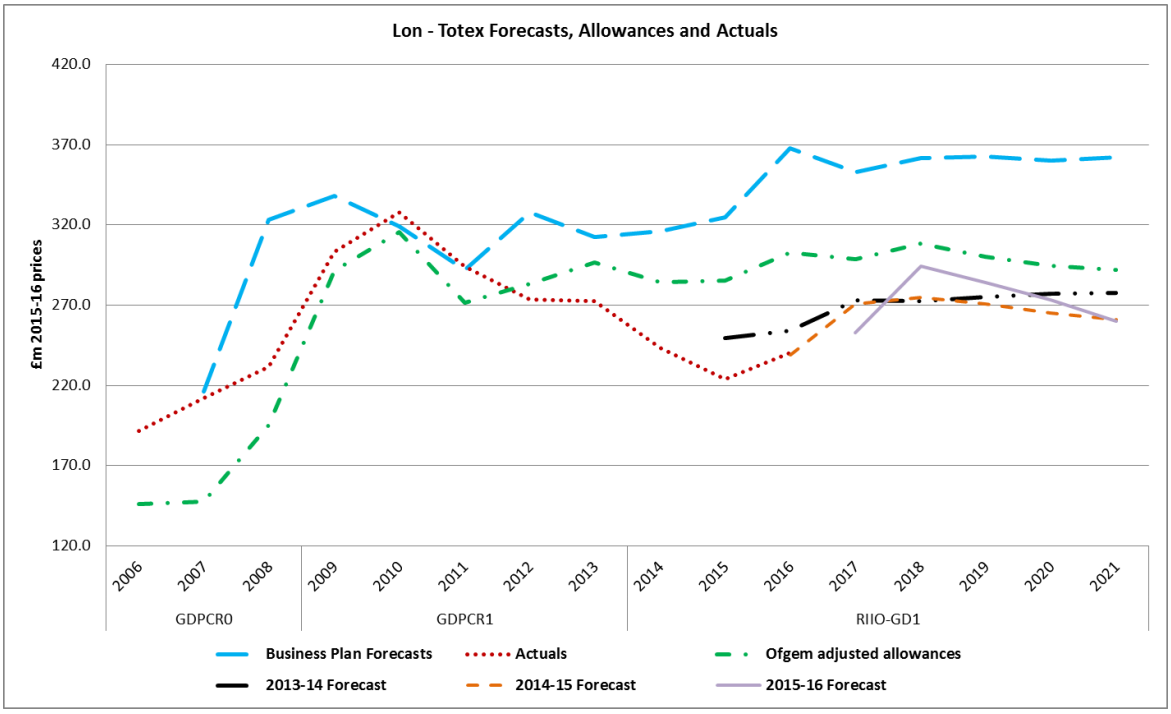
Appendix 7 – RIIO-GD1 controllable totex trends and performance

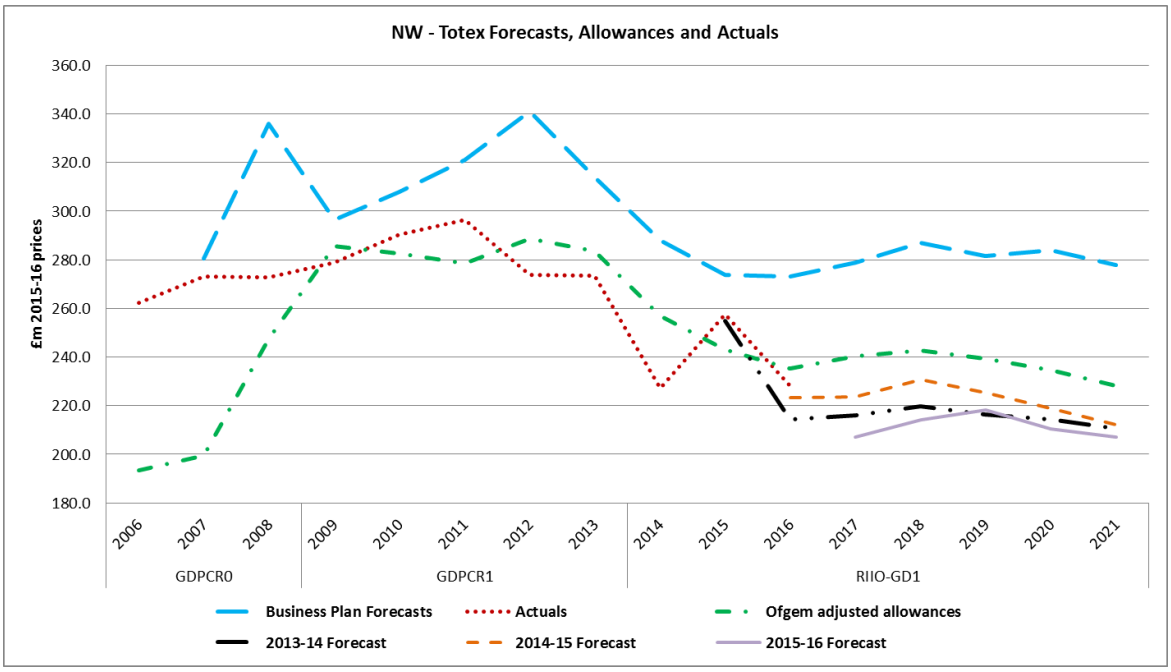
1.1. Requested, allowed and actual expenditure is put into context by comparing this expenditure with historical levels. The graphs below show the investment at GDN level that was allowed and required following network sales in 2005. Since 2011, totex has fallen across all GDNs and is forecast to remain stable throughout the remainder of the RIIO-GD1 period.

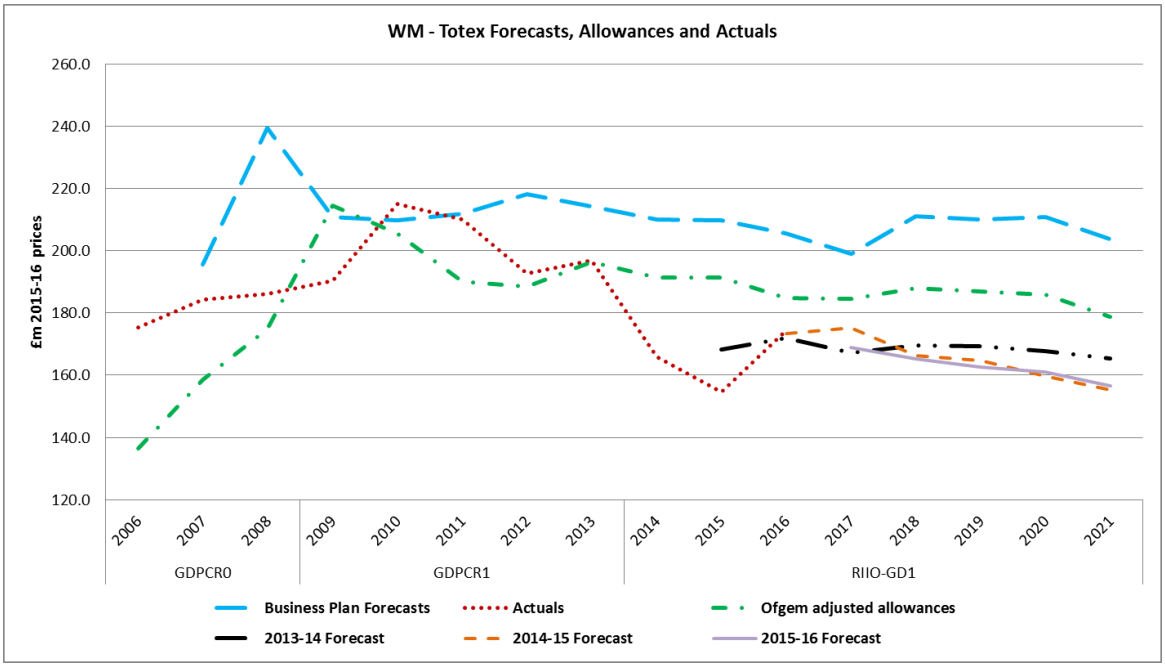
Figure A7.1: Controllable totex forecasts, adjusted allowances[65] and actuals trends by individual GDN

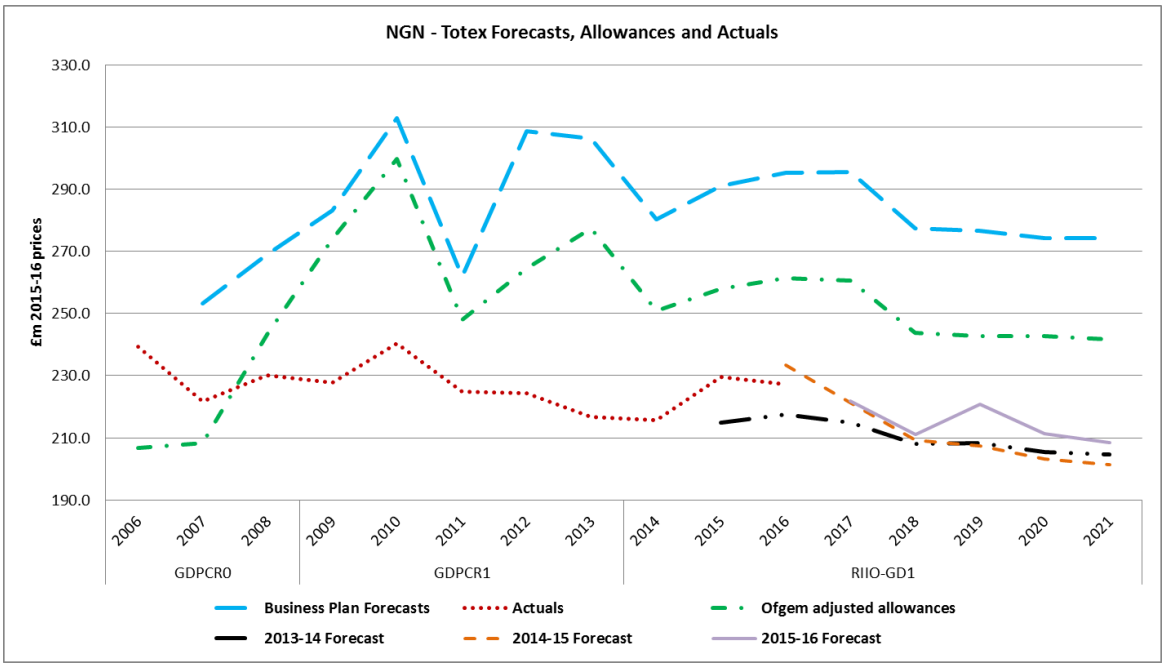


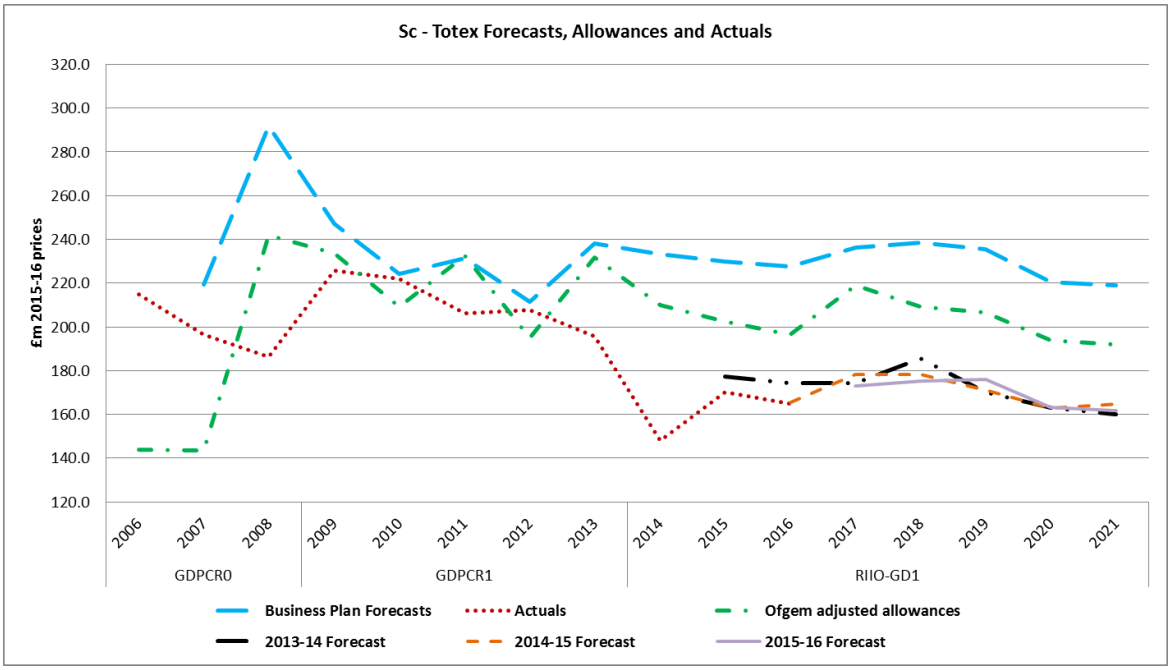
[65] We measure performance against the adjusted allowances of £17.3 billion, which include original allowances and adjustments, described in Chapter 2 of this report.

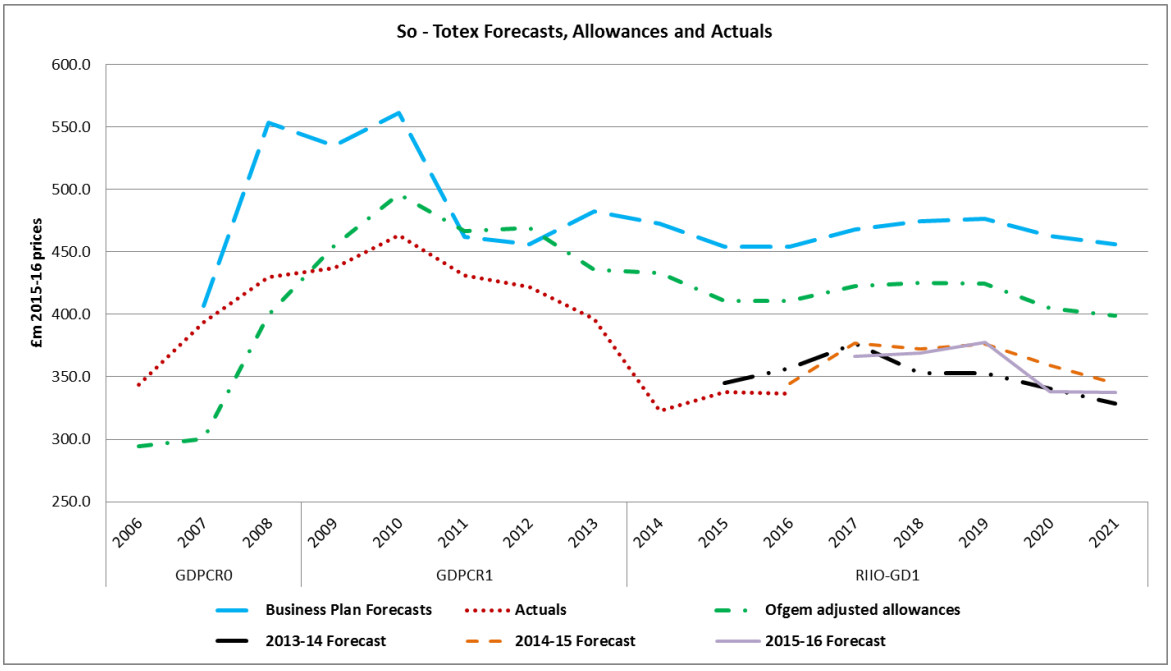

Lon - Totex Forecasts, Allowances and Actuals
£m 2015-16 prices
420.0
370.0
320.0
270.0
220.0
170.0
120.0
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
GDPCR0
GDPCR1
RIIO-GD1
Business Plan Forecasts
Actuals
Ofgem adjusted allowances
2013-14 Forecast
2014-15 Forecast
2015-16 Forecast

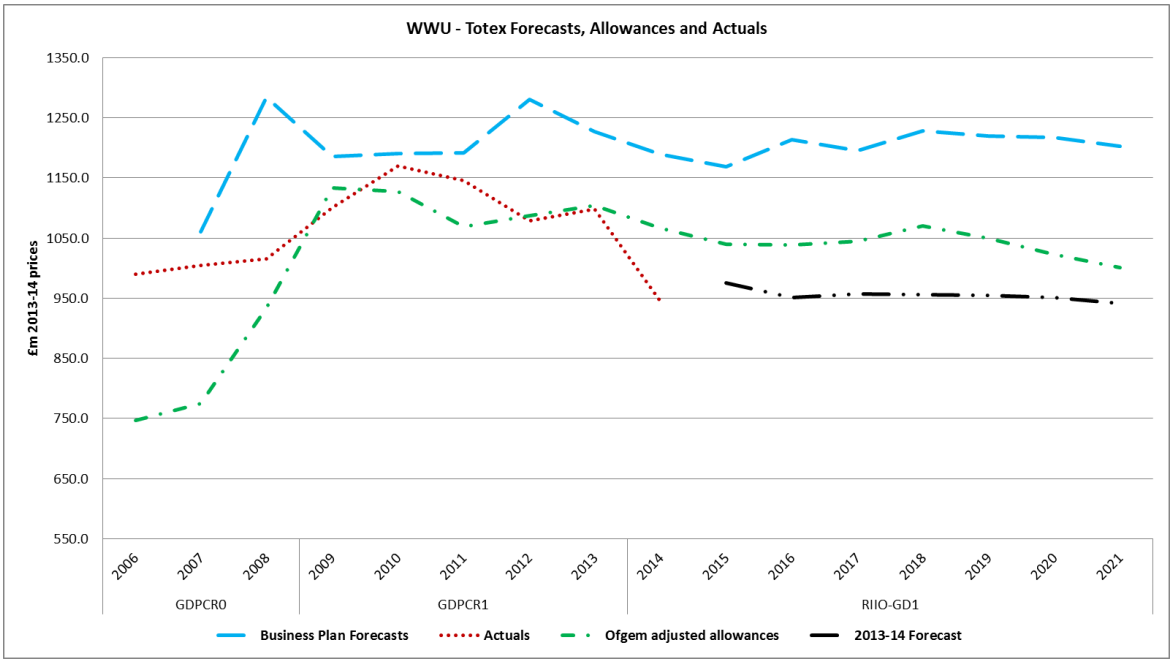

NW - Totex Forecasts, Allowances and Actuals
£m 2015-16 prices
360.0
340.0
320.0
300.0
280.0
260.0
240.0
220.0
200.0
180.0
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
GDPCR0
GDPCR1
RIIO-GD1
Business Plan Forecasts
Actuals
Ofgem adjusted allowances
2013-14 Forecast
2014-15 Forecast
2015-16 Forecast


WM - Totex Forecasts, Allowances and Actuals
£m 2015-16 prices
260.0
240.0
220.0
200.0
180.0
160.0
140.0
120.0
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
GDPCR0
GDPCR1
RIIO-GD1
Business Plan Forecasts
Actuals
Ofgem adjusted allowances
2013-14 Forecast
2014-15 Forecast
2015-16 Forecast


NGN - Totex Forecasts, Allowances and Actuals
£m 2015-16 prices
330.0
310.0
290.0
270.0
250.0
230.0
210.0
190.0
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
GDPCR0
GDPCR1
RIIO-GD1
Business Plan Forecasts
Actuals
Ofgem adjusted allowances
2013-14 Forecast
2014-15 Forecast
2015-16 Forecast


Sc - Totex Forecasts, Allowances and Actuals
£m 2015-16 prices
320.0
300.0
280.0
260.0
240.0
220.0
200.0
180.0
160.0
140.0
120.0
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
GDPCR0
GDPCR1
RIIO-GD1
Business Plan Forecasts
Actuals
Ofgem adjusted allowances
2013-14 Forecast
2014-15 Forecast
2015-16 Forecast


So - Totex Forecasts, Allowances and Actuals
£m 2015-16 prices
600.0
550.0
500.0
450.0
400.0
350.0
300.0
250.0
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
GDPCR0
GDPCR1
RIIO-GD1
Business Plan Forecasts
Actuals
Ofgem adjusted allowances
2013-14 Forecast
2014-15 Forecast
2015-16 Forecast


WWU - Totex Forecasts, Allowances and Actuals
£m 2013-14 prices
1350.0
1250.0
1150.0
1050.0
950.0
850.0
750.0
650.0
550.0
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
GDPCR0
GDPCR1
RIIO-GD1
Business Plan Forecasts
Actuals
Ofgem adjusted allowances
2013-14 Forecast