



Cadent

Your Gas Network

Appendix 09.20

Resolving Our Benchmarked Performance Gap

Contents

1.	Introduction and Summary	3
2.	Benchmarking input into our transformation plans	4
3.	Development of Benchmarking models.....	4
3.1	Evolving the RIIO-1 models	4
3.2	Cadent’s regional factors	5
3.3	Other external benchmarking.....	7
4.	2017/18 and 2018/19 Performance Gaps	8
5.	Ongoing Efficiency	9
5.1.	Experience since 2007 - the productivity puzzle	10
5.2.	Projections for RIIO-2	11
6.	Cadent’s Efficiency Ambition.....	13
7.	Our Efficiencies versus assessed UQ performance.....	15
8.	Cost Confidence in allowance setting	16
9.	Key Messages	18

Summary of changes since October Draft plan

1. No change to efficiency aspirations in RIIO-2, kept at 0.94% over 5 years. However, 200/21 efficiency reduced by £2.5m pa given new IS bought in service contract which is higher than the forecast used in our October plan.
2. 2018/19 performance gap updated for finalisation of our Regional Factor analysis. This made no material change to overall change but identified higher claim for East of England and lower claim for London (see Appendix 09.21 Cadent’s Regional Factors).
3. Additional text in sections 3 and 4 to give more detail on external benchmarking and to outline how the we have targeted our efficiency forecasts across cost activities and our four networks.
4. New section 8 to outline our view of Ofgem’s cost confidence in setting allowances.

1. Introduction and Summary

This appendix sets out the process and results of Cadent's efficiency ambition to resolve the current performance gap so that in RIIO-2 our Totex plans reflect an efficient level of ongoing cost.

- First, we used Ofgem's RIIO-1 benchmarking methodology to assess our cost performance gap following our first year since separation from National Grid. This fed into a comprehensive review of our performance that resulted in our transformation plans to drive through significant operating cost improvements by 2020/21, set to position our cost performance materially on a par with the other networks.
- We have then looked at the RIIO-1 benchmarking models and supported Ofgem's Cost Assessment Working Group process to identify enhancements. Our work has demonstrated that RIIO-1 methodology was a good starting point, that some refinements to the models are desirable, but use of combined size variables (CSVs) using a mix of scale and workload best met Ofgem's criteria.
- In addition, we have re-evidenced the regional factors that impact on our networks. This is predominantly associated with London with respect to regional pay and the harsher operating/engineering environment in London. These factors also impact on our East of England network (as it operates in part of Greater London, including Tottenham) and Southern network.
- We used the updated models in our July plan to identify that the 2017/18 gap to the Upper Quartile (UQ) efficient level was £62m using our weighting of 67% top-down, 33% bottom-up approaches. Using outturn data for 2018/19 we were pleased that our transformation programme's initial year results was on track and has reduced the performance gap by 50% to £31m.
- We projected the efficient level of expenditure benchmark forward by assuming a flat workload and casting forward the UQ level for an ongoing efficiency benchmark. We looked externally to identify external benchmark for ongoing productivity which we have taken as 0.5% pa during RIIO-2. Rationale is that UK productivity has remained significantly below the pre-recession level at less than 0.2% pa, with Bank of England forecast through to 2021/22 at 0.3% pa. Given RIIO-1 determination (based on EU Klems data pre-2007 for total factor productivity) was 0.83% pa, we have assumed that productivity will rise over the period back to 0.83%, despite no external forecaster expecting this return.
- Our July plan included our transformation cost efficiencies that identified improvements in our operating costs of 14% that we believe will close the 2017/18 identified performance gap by the end of RIIO-1. In RIIO-2 it included further efficiencies from the transformation programme resulting from the changes to our contracting strategy, along with further efficiencies from ongoing efficiency assumption that incorporates innovation.
- We have reviewed the benefits and identified further efficiency opportunities which we have now included in our plan and now seek overall ongoing efficiencies of 4.6% (0.94% pa) over the RIIO-2 period. When combined with current RIIO-1 plans this sees an eight year 1.5% pa efficiency being forecast.
- We have then cross checked our planned efficiencies with that of our UQ benchmark, which identifies that our forecast is 2.2% lower than our assessed efficient level.
- In addition to these efficiencies, based on current workload, our plan includes additional efficiencies in assumptions to deliver improved service and work at no extra costs.
- We believe that our evidence supports our view that this is an ambitious plan, one where we are stretching our targets and taking on risk of delivery.

2. Benchmarking input into our transformation plans

During 2017/18, following Cadent's first year of separation from National Grid, a wide-ranging business review was carried out to check our progress towards the efficient delivery of RIIO-1 outputs and improve our customer service performance, which we were aware was generally below the levels attained by the other four networks. This review led to the development of our RIIO-1 transformation program that identified customer service and output delivery improvements and the need for significant organisational and cultural change. This is outlined in more detail in the opening pages of Chapter 9 Costs and Efficiency of the main plan. This review included:

- Consideration of external benchmarks available: we considered international gas distribution benchmarking, primarily the study comparing the efficiency of Phoenix Natural Gas and Firmus Energy in Northern Ireland and the eight GDNs. In 2017 The Utility Regulator used this benchmarking to conclude that the GDNs were significantly more efficient. Additionally, we are aware that Ofgem and GDNs have looked into the possibility of benchmarking outside the United Kingdom but found it very difficult to make valid comparisons due to differences in legislation, age of pipe, iron mains population, exchange rates and level of separation between supply, metering, transmission and distribution.
- We also considered business support benchmarking but did not pursue this at the time in the light of the results of Ofgem's RIIO-1 benchmarking of Business Support costs, which was carried out by Hackett Group, using their database to compare energy utilities to other comparable industries. This revealed that the GDNs compared favourably to external comparators. Since then, GDNs overall have reduced Business Support Opex by 16%, indicating that GDN support costs are efficient when compared with other comparable industries.
- Given the above, for cost benchmarking we reverted to carrying out initial benchmarking against the other GDNs using the regional factors and benchmarking models used by Ofgem in the RIIO-1 price control with 2016/17 Regulatory Reporting Pack (RRP) data. The results confirmed a significant performance gap, but it also identified that some of the model fits were poor, in that some models did not explain the costs of certain activities well.
- The review did however use functional/operational best practice/external insights into other companies to develop our transformation strategy. This covered activities across the business including customer service, safety, governance, environmental, skills and resourcing, back office, information services, change management and contract strategy.

3. Development of Benchmarking models

3.1 Evolving the RIIO-1 models

The results of our initial benchmarking were discussed with Ofgem in summer 2018 in our initial cost assessment bilateral meeting on RIIO-2, along with potential model improvements. Since then we have been fully supportive of Ofgem in their process, via the Cost Assessment Working Group (CAWG), to develop and enhance the RIIO-1 methodology. At the first meeting we presented our initial regression results with a critique for discussion of the drivers for individual models, together with potential options for alternatives to improve model fits in RIIO-2. At subsequent CAWG meetings we have also presented further on benchmarking options and on subjects such as real price effects and regional factors.

Guided by the discussions at CAWG, we have developed our models and our response to the December 2018 consultation paper included suggestions for enhancing models so that their fit is improved, meaning that more suitable drivers, based on engineering logic, better explain network performance. Based on this summer's RIIO-2 tools for cost assessment consultation paper we have tested further our proposed models using actual data for 2018/19, including consideration of using the alternative scale-based drivers contained in that consultation. The results confirmed our consultation response that these are not suitable as the model fit is worse given that it does not capture the known inherent differences in workload (for example level of iron mains), with three networks being significantly worse (outliers), including one that moved from the frontier to rank sixth. A key cause of the changed rankings is the different scale of the replacement programme between GDNs, which is addressed in our totex models, similar to those of Ofgem at RIIO-1, by

the use of mixed scale and workload driver.

Our main recommendations for improved drivers were provided in our response to the RIIO-2 tools for cost assessment methodology and are summarised below:

Table 1 - Modelling Developments used in draft plan assessment

Updating Drivers	MEAV driver	Ofgem developed this scale variable at RIIO-1 to assess costs with no clear workload driver, such as Work Management. MEAV uses a standard replacement cost for all network assets. We have developed the driver to include MOBs and Embedded entry points
	Repex synthetic costs	These stylised unit costs, used to account for differences in costs across the diameter bands, have been updated to reflect all GDNs' RIIO-1 experience
Changing drivers	Emergency	RIIO-1 used customer numbers in the CSV as a proxy for the number of internal escapes. However, there are significant network differences in the number of emergencies on customers' own pipes/appliances per customer. Therefore, we propose to replace the RIIO-1 driver with the maximum number of escapes over the previous last 5 years, a driver which reflects the need for networks to resource for cold weather conditions
	Repair	We propose to develop the existing number of reports driver, to reflect mains reports weighted by diameter band. This will reflect the additional work associated with repairing larger mains and the different proportions of remaining iron mains by size across GDNs.
	Connections	We propose to include the cost of fuel poor connections within the modelling, and for the driver to include the number of fuel poor connections also, to overcome cost allocation issues between the different types of Connection.
	Business Support / IS capex	We propose to combine IS capex and IS opex, to remove the distortions caused by the opex / capex trade-off and use an MEAV scale driver because there is no suitable workload driver available.

We will continue to support Ofgem's development of the RIIO-1 models, but as in our response to the tools consultation, we believe it would be helpful to build a further formal step into the process, to carry out an Initial Thoughts consultation in the spring of 2020, to share Ofgem's developing thinking and modelling results prior to the Draft Determination, which would allow for two iterations of the approach before the Final Determination, rather than only one. This is due to the limited progress that has been made in the last year in narrowing down the options for carrying out cost assessment, indeed some of the options under consideration in the recent consultation paper seemingly widen the range of potential approaches that might be used, rather than building on the RIIO-1 approach. Ofgem have decided to address this concern via a less formal approach of extending their Cost Assessment Working Group through into 2020.

3.2 Cadent's regional factors

In addition to looking at the model drivers, we have also looked at regional factors. Evidence for and quantification of these is provided in the associated Appendix 09.21 Cadent's regional factors. In summary the main factors identified are set out below:

Table 2 – Regional Factors identified

All local activities	Regional pay levels are well above the national average in London region in particular, and to a lesser degree in South East region. We have used the 2018 ONS ASHE data to update the Ofgem assumptions from RIIO-1.
Emergency	London is impacted by longer job times driven by more difficult working conditions, such as highly urban areas where gas travels some distance underground before being detected. In addition, London's 24 hour society and where FCOs can afford to live requires more night shifts rather than Standby arrangements.
Repair	London repair teams are impacted by increased costs from Highway Authorities for Temporary Traffic Regulation Orders and for providing manned traffic lights. In addition, the higher density of concrete roads and manpower costs leads to higher reinstatement costs.
Maintenance	East of England, with its arable agricultural land requires remedial work to protect pipelines where agricultural activity has lowered top soil and so created security of supply risk. Also, Cathodic Protection workload driven by the HSE has and will continue to add cost, especially in East of England.
Other Opex	London has higher property rental costs for its depots, plus the efficient level of additional GSOS payments that are unavoidable given the requirement for long interruptions associated with Emergency related work on London's MOB's, consistent with our MOB's Improvement Plan
Reinforcement	In 2016/17, 2017/18 and 2018/19 London work included costs associated with Battersea tunnel under the Thames, which is many times the unit cost of other reinforcement.
Repex	We have retained Ofgem's assumption from RIIO-1 of a 15% productivity differential for work within the M25, as this is supported by data from tRIIO (our delivery contractor) for RIIO-1. This may need to be raised in RIIO-2 to take account of more working in central London. Following our review of GDSP costs we have re-categorised around 25% of repex reported as labour in the RRP to Plant Hire, Reinstatement and Other. Based on a mixture of tRIIO tender costs and actual data, Plant Hire per metre costs 20% more in London than East - mainly associated with lower productivity, while reinstatement costs per metre are also higher by a similar amount. London GDN also unavoidably incurs significant parking bay suspension costs, which are not levied under NRSWA but under TMA and so not included under Streetworks in the RRP.
Sparsity	We have finalised our sparsity analysis that was ongoing at the time of our October Plan. We have removed any sparsity adjustment from Repair work execution as the evidence for any adjustment was very weak. For Emergency work execution, the evidence was mixed but on balance we decided an adjustment was merited, though our quantification significantly reduced the scale of the adjustment from the level of RIIO-1.

Cadent's review of regional factors has currently identified London factors worth £43.8m in 2018/19, using Ofgem's RIIO-1 methodology for regional pay and repex productivity, along with £18.5m for other specific factors that are evidenced as impacting on London but not our other three networks. This analysis has also identified £5m in EoE, partly associated with the Tottenham area that sits within EoE boundary, but mainly maintenance workload driven, by the HSE on Cathodic Protection and also reduced depth of cover as soil has eroded. The table below summaries the regional factors by GDN, between pay, repex productivity and other evidenced factors.

Table 3 - Annual Regional Factors used in current modelling

£m p.a. 2018/19 prices	EoE	Lon	NW	WM	Cadent
Regional Pay	3.6	-17.0	3.7	2.7	-7.0
Repex Productivity	-0.6	-8.3	-	-	-8.9
Other RFs evidenced	-5.3	-18.5	-2.7	-0.9	-27.4
Total	-2.3	-43.8	1.0	1.8	-43.3

The analysis of regional factors rejected over nineteen other items that operational managers considered may be differentially impacting on their cost performance. For the majority of these we were unable to identify robust analytical evidence, but certain items were identified as cost performance differences not driven by the external environment, such as JCB hire in London. These factors are built into our transformation plans.

Given the scale of London’s Regional Factors through higher costs or environment related productivity impacts we have taken part in a project run by NERA and Arcadis, together with Thames Water, UK Power Networks, and SGN, in order to try and identify common London factors across our Networks. The report, “Understanding the Baseline Level of Efficiency in London” is provided in Appendix 09.40, which corroborates our findings, with overall a higher factor identified.

As requested we have taken a prudent view of Regional Factors impacting on operating a gas network in the capital, which is reinforced by the fact that our benchmarking, after applying our view of Regional Factors, still shows London GDN as having our highest performance gap in 2018/19 (see section 4), despite it being run using the same processes and procedures.

3.3 Other external benchmarking

As part of our RIIO-2 planning we have also tried to assess our current performance against industries other than UK gas distribution. We initiated external benchmarking on Business Support (including IS) against a wide variety of comparators through The and on connections/replacement activities against the UK water sector through . We also sought to initiate international benchmarking against companies undertaking gas distribution overseas. However, bids received in response to our tender were poor in quality and two companies declined to bid as they believed that any comparisons were not like for like due to regulatory, structural (i.e. integrated companies vs gas distribution only), asset condition (no iron mains) and exchange rate issues. As a result we did not pursue international benchmarking.

The Business Support (including IS) benchmarking was carried out on our actual costs for 2018/19 and our forecasts for 2020/21, post the roll-out of our transformation programme. The benchmarking identified that both our actual and forecast costs forecasts were at or below the upper quartile performance of various peer groups, including that used by Ofgem at RIIO-1. However, we find it difficult to understand how our actual costs benchmark so well, given that historically we have benchmarked relatively poorly in this area. On new connections and replacement the results identified that our cost of service replacement was significantly below that of the water companies, despite our connecting from the main to customers’ houses, whereas in water the connection is only made to the property boundary. The cost of mains associated with connections were broadly in-line, but our replacement mains, especially for larger diameters, were significantly higher cost. The report identified a number of reasons why gas costs would be higher, including higher material costs, more demanding gas civil works, more complex commissioning and therefore the requirement for a higher skilled workforce, plus the ability of water companies to use steel pipes which are a cheaper option for large diameter mains. However, the report was unable to quantify the cost impact of these.

Our transformation plans, as outlined in section 9.1 of our main plan, were developed using our GDN benchmarking to target overall cost efficiency, with extensive external insights from other GDNs, other utility companies and organisations with large field force operations and/or a high degree of workforce planning requirements. Our IS strategy included working with Gartner, an international research and advisory firm, and as such we have tested our RIIO-2 IS plans with Gartner, details are provided in Appendix 09.30 Technology: IT and Telecoms, section 10.1.

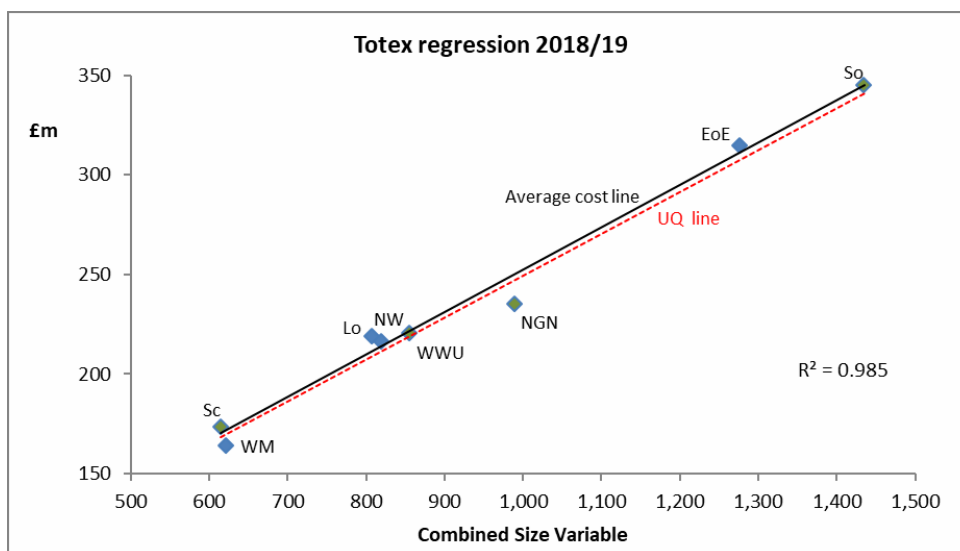
In conclusion, we have found it difficult to find robust external (to GDNs) benchmarking that is of sufficiently high confidence for use in cost assessment. As such, we expect Ofgem to focus their work on GDN benchmarking, along with expert review in areas such as IS.

4. 2017/18 and 2018/19 Performance Gaps

Our updated Totex model together with our updated regional factors enabled us to identify an efficient level of cost for each network, by taking the linear regression ‘best fit’ line to identify the average performance level and, from there the Upper Quartile (UQ) level, being broadly the average of the 2nd and 3rd best networks. We could thus identify our performance gap in 2017/18 by comparing our actual costs to the UQ level. The Totex identified performance gap in 2017/18 was £50m pa (5%) relative to our peers. Running the models on 2018/19 actual data, we are pleased to see that our performance gap had closed the Totex modelling result to £26m pa (2.6%) following our first year of transformation – demonstrating good progress on resolving our performance gap.

The figure below illustrates the network positions and the UQ line from our 2018/19 totex modelling, which has a good fit with an r-squared of 0.985. This fit is an improvement from 0.97 in 2017/18 due to the improvement in Cadent’s performance from the first year of our transformation efficiencies.

Figure 1 - 2018/19 Totex Regression



As well as the Totex model, we have applied a Bottom Up approach, using a mixture of regression and non-regression analysis for different activities. Summing the results of this analysis, the identified Totex performance gap in 2018/19 is £44m pa. However, the regression models for some of these activities have a poor level of fit (r-squared levels below 0.7), and other activities are outside of regression. Through discussions at CAWG we are aware of inherent inconsistencies between GDNs in detailed reporting. This is due to a number of factors including; differences in organisational structure, cost allocation, capitalisation policy, and solution choices. Reporting inconsistencies and poor model fits, combined with the use of different benchmarking techniques for different activities under the bottom up approach, result in the bottom-up approach providing an inappropriately low UQ position. With only 8 GDNs, and 3 ownership groups, these distortions have a material impact and lead to an inappropriately low overall UQ target.

Ofgem has noted these potential inconsistencies and may be able to resolve some of the issues raised and so improve individual models. However, we are aware of sensitivity of the results of our modelling, with the Bottom-Up view of the efficiency gap being 80% higher than the Top-Down result. This is inherent with the small sample size (of 8, well below the general view of needing larger sample sizes) while the use of multiple years does not remove this limitation / sensitivity, as noted by CEPA in their report supporting

the RIIO-2 tools for cost assessment methodology consultation paper. We have found that the results of some of the individual cost category models are extremely sensitive and so are concerned that results may change, on either the absolute level for Cadent and/or the performance gaps by network. Ofgem’s June consultation on costing methodology did not progress this issue or provide any useable results to help us quantify our performance gap. With the scale driver alternative models proving to not be robust we have tested our business plan forecasts against our modelling assessment.

Given the inherent limitations and sensitivity discussed above on the bottom-up approach to cost assessment, our view is that the 2018/19 totex performance gap is:

- A minimum gap, based on Totex models, is around £24m pa (2.3% of totex).
- A maximum gap, based on Bottom-Up models, is around £44m pa (4.3% of totex).
- **A central ‘fair’ gap of £31m pa (3.0% of totex).** This assumes, given the poor model fits on some Bottom-Up models and the known inherent differences across networks, that the Top-Down Totex results should be given double the weighting to that of the Bottom-Up approach, i.e. 67% Top-Down to 33% Bottom-Up.

Table 4 - 2018/19 Efficiency Gaps to Upper Quartile

£m 18/19 prices per annum	EoE	Lo	NW	WM	Cadent	% Gap
Totex (top down) gap	8.7	12.0	7.0	-3.6	24.1	2.3%
Bottom Up gap	20.2	13.6	7.5	2.8	44.1	4.3%
Weighted average gap *	12.5	12.6	7.2	-1.5	30.8	3.0%
Total Totex	340	301	223	169	1033	
Gap as % of Totex	3.7%	4.2%	3.2%	-0.9%	3.0%	

The table above provides the performance gaps identified by our four networks, which indicates that West Midlands is our best performer, at around the Upper Quartile level, being ranked second using the top-down model. Our other three networks are around 4% from the Upper Quartile. We also observe that the Bottom-Up models give a slightly different picture with our largest (EoE) and smallest (WM) having increased performance gaps.

In summary, our assessment is that in our first year of our transformation programme, we have closed the central ‘fair’ performance gap from 6% in 2017/18 to 3.0% in 2018/19. We are on track to materially remove the identified performance gap by the end of RIIO-1.

5. Ongoing Efficiency

In order to review our RIIO-2 efficiency plans, as well as identifying the current performance gap challenge we have looked externally for a view about the pace of future productivity improvements. This section has been summarised from a report prepared by First Economics for the ENA, see Appendix 09.39 Frontier Productivity Growth.

To place the issue in context, at RIIO-1 Ofgem found an efficient level of costs, using the Upper Quartile level of efficiency, then rolled that forward applying assumptions for both Real Price Effects (RPEs – the extent to which cost are predicted to change due to variations in input prices relative to general inflation), workload and Continuous Improvement (Ongoing Efficiency).

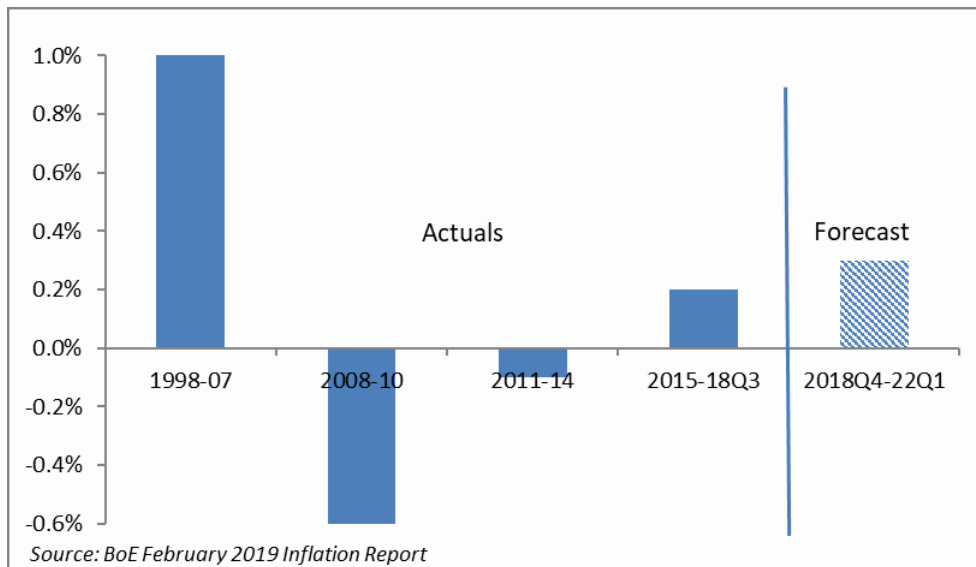
In the RIIO-1 final determination Ofgem applied an assumption of 1.0% p.a. for operating costs and 0.7 % p.a. for investment, which, if weighted by industry allowances, was equivalent to a totex Continuous Improvement assumption of 0.83% p.a. These numbers were similar to a number of other regulatory precedents from that time. Ofgem derived its numbers using various extracts of productivity growth data for different comparator industries from the EU Klems dataset, covering the period from 1970-2007. It was assumed that productivity trends would revert back to pre-global financial crisis of 2007.

5.1. Experience since 2007 - the productivity puzzle

In order to construct our RIIO-2 plan and be able to review our efficiency targets, we sought external view of the pace of future productivity and commissioned a report from First Economics through the ENA which is included separately, see Appendix 09.39 Frontier Productivity Growth. This section summarises that report.

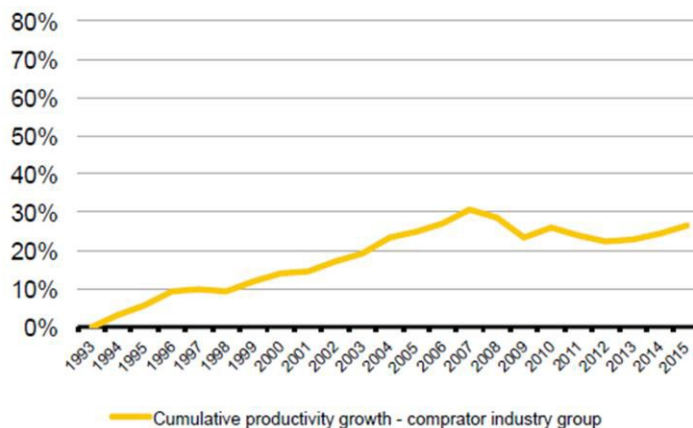
The assumptions made for RIIO-1 appear no longer applicable, because, since the global financial crisis of 2007, productivity growth in the UK and globally has been far lower than previously. The chart below shows UK average annual growth in Total Factor Productivity (TFP) before and since the financial crisis, using data from the Bank of England’s Inflation Report of February 2019.

Figure 2 – UK Total Factor Productivity growth



The slowing in productivity growth has not just occurred in sectors of the UK economy which are far removed from gas distribution. Figure 3 shows annual growth in Total Factor Productivity from comparator industries from 1993 to 2015:

Figure 3 – Total Factor Productivity growth in comparator sectors (cumulative)



Source: Frontier Economics.

Comparators comprise: Construction, manufacture of chemicals & chemical products, manufacture of electrical and optical equipment, manufacture of transport equipment, transport & storage, electricity, gas & water supply, maintenance & repair of motor vehicles & the retail supply of fuel, renting of machinery, equipment & other business activities, finance, insurance, real estate & business services, financial intermediation, post & telecoms

A variety of explanations have been put forward to explain the UK “productivity puzzle”, as summarised below:

- Sector specific effects: certain sectors, especially Finance, have contributed disproportionately to the flat or low UK productivity growth: the contraction in Finance may be responsible for up to 40% of the reduction in UK productivity.
- Lower capital investment: sectors other than Finance, such as manufacturing and ICT, have also contributed disproportionately to the slowdown in productivity growth. Lower levels of R&D and capital investment, perhaps due to risk aversion following the financial crisis, could be a driver of this.
- Market concentration and competition between firms: empirical work suggests a growing disparity between efficient companies operating at the frontier, and a long tail of less efficient companies failing to keep pace. This could be due to increasingly large barriers to competition e.g. arising from patents and intellectual property, or market concentration, with larger companies facing much less of a competitive threat from smaller firms.
- Loose monetary policy: low interest rates may have mainly benefited low-productivity companies that might otherwise have failed, reducing productivity not only in their own sector but also preventing the reallocation of labour and capital to more productive sectors.
- Slower technological progress: low productivity growth across much of the developed world could be due to a slowdown in innate technological progress, perhaps because of diminishing returns on R&D, perhaps because the IT revolution of the 1990s is now quite mature.

There is no consensus on the relative importance of the above factors, some of which are likely to be more long-lasting than others. However, there is a consensus that, over the next few years at least, productivity growth is likely to be lower than that experienced before the Financial crisis.

- In November 2017, the OBR stated that “As the remarkable period of post-crisis weakness extends – and as various explanations pointing to a temporary slowdown become less compelling – it seems sensible to place more weight on recent trends as a guide to the next few years.”
- Subsequently, in 2018 the Deputy Governor of the Bank of England stated that “...after such a long period of weak productivity growth it is reasonable to argue that we are in a new paradigm of lower productivity growth, and that is reinforced by the global nature of the weakness.”
- Furthermore, in February 2019, the Bank of England forecast annual growth in Total Factor Productivity of 0.3% from 2018 Quarter 4 to 2022 Quarter 1, as shown in the first chart above.

5.2. Projections for RIIO-2

The analysis above shows that productivity growth has been far weaker in the twelve years since 2007, than beforehand. Although no-one knows how the speed and extent to which productivity growth will improve, authoritative opinion from the OBR and Bank of England, would suggest that the most likely outcome is only a small further recovery until 2022 at the earliest.

We are aware that Ofwat have assumed ongoing efficiency improvements of 1.5% p.a. in the PR19 Draft Determinations. The basis of this flows from the combined assessment of historic EU-Klems based assessment of Total Factor Productivity and the opportunity that PR19 might give due to the relatively new Totex and Outcomes based regimes. We believe that many water companies and other observers have significant concerns over the methodology and assumptions used to calculate the 1.5%, and consequently it is not clear whether the Final Determinations and any subsequent CMA references will adhere to this view. However, even if it is ultimately used in the water sector, we believe that there are reasons why there is significantly less potential for productivity improvements in the gas sector, in particular that:

- the gas sector was fully unbundled, with separate ownership of production, transportation, and retail by the end of the twentieth century. Because water has remained vertically integrated, it offers more scope for productivity growth from structural change arising from current and future liberalisation.
- Capex is far higher relative to opex in water than gas, and the big opportunities for saving money from the totex regime arise from trade-offs between capex and opex.

- A totex regime has been in place for two years longer in gas distribution than in water, so the potential for efficiencies from the new regime is reduced.

Turning to the potential for ongoing efficiency in gas distribution, it is important to note that we are far from immune from the wider UK environment, with the majority of Totex being procured from the contractor market. In addition, gas privatisation will have occurred 35 years ago at the start of RIIO-2, with additional benefits of competition realised fourteen years ago following independent ownership of four GDNs, through reducing costs in period and resetting allowances at the upper quartile level of efficiency. The benefits of privatisation and competition are therefore likely to have already been fully realised.

In addition, we expect the RIIO-2 regime to weaken the potential for productivity growth in gas distribution compared to RIIO-1 because incentives are to be lessened due to:

- the reduction in control length from eight to five years;
- the restriction of additional price control deliverables in large areas of spend such as repex;
- a reduction in incentive rate from 63% to somewhere in the range of 15%-50%; and
- the introduction of RPE indexation on the majority of totex.

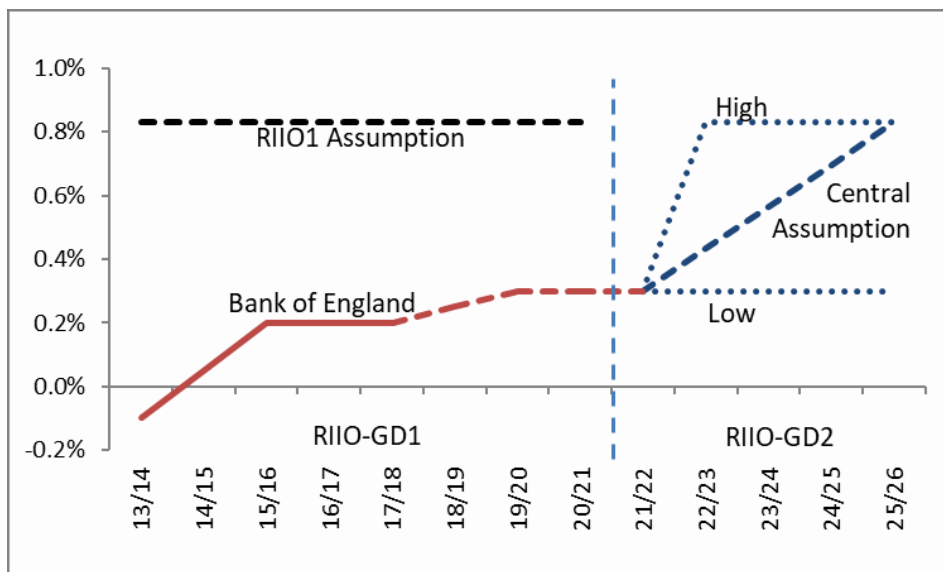
Furthermore, we are not aware of any new breakthrough technology which is likely to drive a step change in cost efficiencies during RIIO-2. During RIIO-1 we have used the innovation incentive to research new robotic techniques, such as CISBOT. Although the technical development has been successful, it clearly has benefits on reduced traffic disruption and customer experience, but with the low volume of this technology there has been no cost benefit.

Given the above and the uncertainty whether rates of productivity growth will ever revert back to pre-2007 levels, based on the First Economics report, we have prepared a range of potential assumptions for Continuous Improvement, with low, high and central cases. All three cases apply the Bank of England forecast of 0.3% p.a. until 31 March 2022.

- The low case assumes that the causes of the productivity puzzle are entrenched and consequently that productivity growth remains at 0.3% for the whole period to Quarter 1 2026.
- In contrast, the high case assumes that the causes of the productivity puzzle are temporary and are entirely resolved in 2022/23, with productivity growth returning immediately to the RIIO-1 assumption at that point.
- The central case assumes that productivity growth steadily returns to its pre-crisis level in the last year of the price control period, 2025/26, increasing in a straight line after 2021/22.

The three cases are shown, along with the RIIO-1 assumption and the Bank of England's actual/forecast, in the chart below.

Figure 4 – Totex Productivity growth case









In addition, we note that pre-recession the UK economy achieved TFP at just over 1% (see Figure 2), slightly higher than the 0.83% pa pre-recession assessment from comparable industries by EU-Klems used by Ofgem for RIIO-1. This suggests that ongoing efficiency for comparable industries to gas distribution is similar to or slightly below what might be expected for the UK economy as a whole. This demonstrates the reasonableness of our using the Bank of England’s 0.3% pa forecast for the UK economy as a whole for the gas distribution industry for RIIO-2.

6. Cadent’s Efficiency Ambition

Our transformation plan, initiated in 2017/18, discussed in Chapter 9 Cost and Efficiency, is seeking a step change in our operating costs, a 14% opex efficiency improvement, which combined with flat investment efficiency drives an overall c.£70m (7%) totex cost efficiency reduction in three years. Based on our assessment of central UQ performance gap in 2018/19 (see section 4) this will we believe position us at around efficient level for gas distribution networks by the close of RIIO-1.

Development of potential cost efficiencies in the five years of RIIO-2 flowing on from the full roll out of our transformation plans into RIIO-2 was carried out as part of our winter planning process and was included in the July draft plan. During the summer, as part of our review process and the challenge from initial stakeholder feedback regarding our planned RIIO-2 overall Totex cost increases, the new business organisation reviewed the opportunities and were challenged to seek additional benefits. With the development of our thinking behind the contract changes it was identified that we could stretch the contract savings in repex by an additional £5m pa by 2025/26. The exercise did not find any new opportunities on opex or capex costs.

Table 5 - Efficiency Opportunities in 5 years to 2025/26

		Cost Movement in 5 years to 25/26
Transformation - Operations	The end of current GDSP contracts will enable the new operating model to drive further efficiencies from greater field force and supervisors given greater flexibility between different work types	 £6m pa
Transformation - Investment	Benefits from new contract strategy from: reduced contract fees, lower back office from new cell structure and network integration, reduced man-marking and less site revisits and re-mobilisation	 £24m pa
Repair risk restriction removal	In RIIO-1 network companies have different repair risk measures, Cadent’s metric & target is more onerous, with this output being removed this enables cost savings	 £5m pa
RIIO-1 repex protection removed	GDSP contracts are in pain, actual prices being above contract prices. With a 50:50 sharing factor RIIO-1 repex has an element of price protection	 £10m pa
Innovation	Benefits from RIIO-1 NIA projects being fully rolled out during RIIO-2 including any benefits that may flow from other networks or best practice from other industries	 £7m pa
Additional efficiencies	Other cost movements, including as yet unidentified improvements - set below our central external CI assumption given above identified specific improvements	 £11m pa
Targeted Efficiencies £43m pa (4.6% in 5 years, 0.94% pa)		

The above initiatives were developed at a Cadent level and identified a split across repex, capex and opex of 5%, 2.9% and 4.7% respectively. In order to apportion efficiencies across our four networks and the individual cost activities the middle and bottom-up regression results were taken into account.

- For repex, with the tightness of fit of the repex middle-up regression and the strong incentive borne by our 2 GDSP contracts we considered the differences to due to not taking adequately into account all explanatory factors, rather than specific differences in efficiency. As such we applied the efficiencies pro-rata to across our four network and the individual cost activities.
- For capex, we targeted the efficiency to the asset health element, i.e. not other capex, such as IS, given that transformational changes will drive benefits in those areas. We did however apply a greater level of efficiency into East of England network in respect of Connections, where the bottom-up regression identified that this network was expensive compared to all other networks.
- On opex, we targeted our transformation efficiencies across our direct costs, with a lower proportion given to West Midlands where the middle-up regression identified it was our most efficient network. In addition, repair risk efficiencies were targeted to the repair activity. For indirect costs, we attributed efficiencies pro-rata to spend across our networks but given comparison with other networks identified that IS was above other networks, despite knowing of acknowledged inconsistencies in reporting, we attributed a higher proportion to IS than the other cost categories.

It should be noted, that if future Ofgem modelling provides different results as to the relative benchmarking position of a cost category the apportionment methodology used above may be at odds with their results in the detail, which would require caution/adjustment if any of our GDNs drive the UQ level in future year regressions.

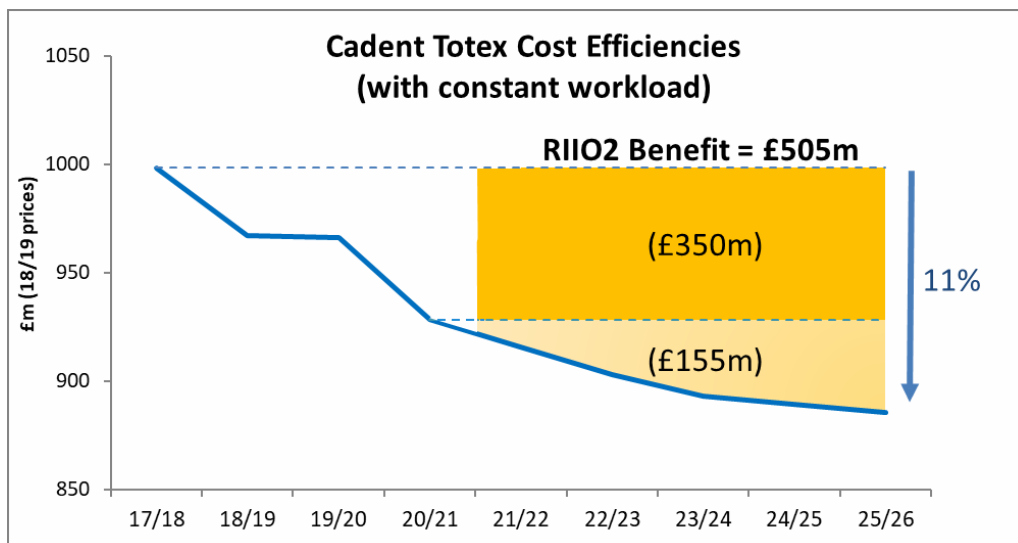
Overall, our plan is targeting a 11.3% cost efficiency improvement over the eight years from 2017/18 (the start of our transformation programme) to 2025/26 (the end of RIIO-2). This is equivalent to an annual improvement of 1.5% pa for eight years, significantly above the external benchmarks, but driven by need to address the performance gap in RIIO-1. Consequently, over RIIO-2 the efficiency targets are lower, but at 0.94% pa, this remains above the external benchmark of 0.3% pa rising to 0.83% pa.

Table 6 – Totex Efficiency ambition to 2025/26

17/18 to 25/26		RIIO-2 Period	
8 Year	p.a.	5 Year	p.a.
11.3%	1.5%	4.6%	0.94%

The 11.3% efficiency target from 2017/18 to 2025/26 will reduce our cost base, excluding changes in workload/outputs, by £505m over the RIIO-2 period, with 70% of the savings targeted for delivery before the start of RIIO-2 by closing the performance gap, as seen in the figure below.

Figure 6 – Cadent Totex cost efficiencies (with constant workload)



There are risks associated with delivery of these cost efficiency plans, including the current operating cost transformation plans through to 2020/21 and being cognisant of one of our RIIO-1 lessons learned, that associated with setting stretching GDSP contracts with overly ambitious cost plans resulting in consequential negative impacts on customer service and delivery. We believe this forecast is an

appropriate level balancing this risk with the request of Ofgem to develop ambitious plans.

As such we believe our efficiency forecasts are ambitious, a P40 plan, i.e. 40% chance of delivery, stretching beyond a pure central case given:

- The front loading to close the performance gap before the start of RIIO-2 (both the risk of the size and speed of benefit realisation).
- RIIO-2 efficiencies that include an element of currently unidentified efficiencies and is greater than even the independently sourced high case assumption for Totex productivity growth.

In addition to these efficiencies based on current workload, our plan also includes two additional efficiency challenges associated with changes in workload/outputs:

- On fault repairs to MOBs, RIIO-2 workloads are forecast to be at around 100 times the current level, meaning it will be impossible to deliver with our present Direct Labour resource. Therefore, we expect to utilise alternative resources and achieve a 15% improvement in the unit cost of this activity from economies of scale and dedicating the activity to bespoke local contracts. This is equivalent to a £2m pa efficiency. Further details are provided in Appendix 9.04 Transforming The Experience for Multiple Occupancy Building Customers - Risers.
- There are a number of areas where we will improve the experiences of our customers and stakeholders by investing in our people, processes and systems. Following internal review after the submission of our July draft plan we have made the decision to absorb some of these investments as we believe they will form the foundation of building a business that sets standards that customers love and others aspire to. These amount to an inbuilt extra efficiency of c.£4m p.a. Further details provided in Chapter 7, Our Commitments.

These two efficiencies increase the RIIO-2 efficiency to around 5.1% over RIIO-2 period, that is 1.0% pa over the 5 years, further evidencing the ambition in our plans.

7. Our Efficiencies versus assessed UQ performance

The figure below illustrates the position of our Totex cost efficiency plan against the potential range for the assessment of efficient UQ performance for our networks, using the plausible range of performance gaps for 2018/19 together with the three alternative continuous improvement cases. From the figure and table below, it can be seen that our targeted P40 plan delivers efficiencies that are 2% below our identified efficient level (based on weighted 2018/19 performance gap, plus central case ongoing efficiencies) and just ahead of the lower bound of the range.

Figure 7 – Totex Cost Efficiencies vs UQ range

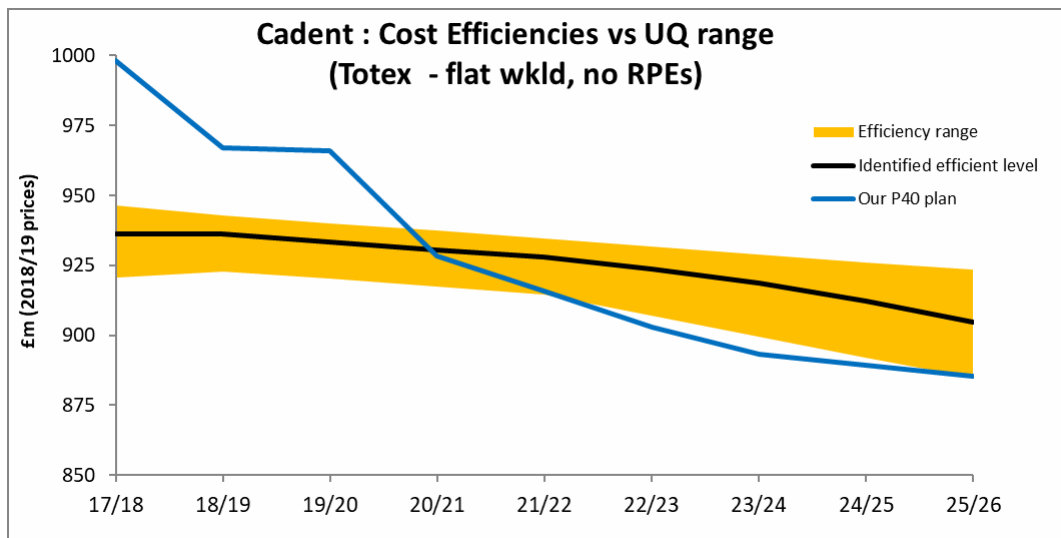


Table 7 – Targeted P40 case position against the efficient performance level range

Efficient performance scenario	2018/19 UQ Performance Gap	Ongoing efficiency benchmark	Our plan's RIIO-2 performance vs Efficient level
Upper range	Totex (£24m, 2.3%)	Low (0.3% pa)	3.4% below
Central 'fair'	Weighted (£31m, 3.2%)	Central (0.5% pa)	2.2% below
Lower range	Bottom-Up (£44m, 4.3%)	High (0.8% pa)	0.3% below

In the context of our ambition to be a leading gas distribution company which delivers value to customers, we believe that this evidence demonstrates that this is an ambitious plan which drives an efficient level of future cost performance.

8. Cost Confidence in allowance setting

Ofgem has stated that the incentive rate applied to totex overspend and underspend in RIIO-2 will be calculated according to the degree of confidence it has in its ability to set cost allowances accurately.

Ofgem will apply a single incentive rate to each GDN's totex, calculated as a weighted average of high confidence costs – attracting a 50% incentive rate, and low confidence – attracting a 15% incentive rate.

Cadent has reviewed each of the cost categories used by Ofgem at GD1 for cost assessment, and come to a view as to whether Ofgem's level of confidence for each area should be high or low, coming to a total view for costs as a whole. We have specifically taken account of:

- The innate level of risk associated with workload volume and costs during RIIO2, taking account of
 - The likely method of assessment, regression or technical assessment, and if regression how high the R2 or measure of fit was for 2018/19, according to Cadent's models (and using Cadent's assessment of Regional Factors).
 - Are the cost elements included in the Totex regression.
 - Are there historic trends and GDN comparators to aide forecasting and assessment.
 - Is activity subject to competitive tenders to find the efficient price.
 - Areas where our level of cost confidence in investment planning is low as category has not progressed past the conceptual design phase, ie cost confidence of forecast is +/- 20% or more. This is outlined in Appendix 09.00 Overview: How We Have Developed Our Investment Plan, Section 5.1 Articulating Cost Certainty.

Note: indexation of RPEs has also increased cost confidence overall as it removes this risk from all areas.

- Secondly, we looked at the information Ofgem will have to aide their assessment, for instance ability to overcome identified differences between GDN cost categorisation and the inclusion of mitigation factors to reduce external uncertainties, such as proposed PCD / revenue drivers.
- From these a determination of High or Low confidence in Ofgem's ability to set allowances is made

The table below summarises the review which has identified that 95% of Totex will have high confidence of allowance determination. This assessment gives an overall Totex blended sharing factor of 48%.

We consider that this note provides a prudent view of Ofgem's level of confidence in cost assessment as this analysis is based on Ofgem's bottom-up approach to cost assessment at RIIO1. We believe (and have argued elsewhere) that the Totex approach to cost assessment is significantly more robust than the bottom up approach and should therefore carry far more weight. Consequently, combined with developments such as NARMs and the common CBA framework providing improved supporting evidence together with ongoing price control processes to clarify positions we believe our analysis in this paper probably understates the potential level of confidence in cost assessment.

Table 8 – Cadent’s view of Ofgem’s confidence in setting cost allowances

Our view of Ofgem's ability to set allowances accurately with confidence																
	RIIO-2	Avg Spend	Assessment method	Inclusion in Totex	History trends / GDN Comparison	Competitive Nature	Inv. Lifecycle Not past Conceptual	Future Workload Uncertainty		Rational and Mitigations	Final Cost Confidence Assessment					
	£m	Regression (18/19 R ²)	Technical	Regression												
Opex	Emergency	43	Y 0.87		Y	Y			Y	Good regression, historic trends, but uncertainty around external smart meter roll-out related work Mitigation: smart related workload volume driver	H					
	Repair	59	Y 0.65		Y	Y				Regression currently poor, due to identified distortion of repair risk differences (removed in Cadent's RIIO-2 plan). Workload trends are predictable	H					
	Maintenance	100	Y 0.82		Y	Y		c.10%	Y	Reasonable regression, merging with LTS spend removes some inconsistencies between GDNs. NARM/CBA give justification for workload re non-routine / capex workloads variability.	H					
	Other Direct	10		Y	Y	Y				No regression, but historic costs and plans and subsequent technical review will identify network differences and comparison between networks to enable cost confidence	H					
	Work Management	76	Y 0.72		Y	Y				Moderate regression, Cadent transformation plan will improve fit as gap closed. Also accepted areas of structural & reporting differences between GDNs identified with Ofgem.	H					
	Business Support & IT capex	117	Y 0.63	Y	Y	Y			Y	Regression poor, due Cadent off pace, Cadent transformation plans will improve regression of future years. Also accepted areas of structural & reporting differences between GDNs identified with Ofgem. Mitigation: cyber re-opener re uncertainty	H					
	Training & Apprentices	17		Y	Y	Y				Technical assessment should be robust given age profile / staff turnover assumptions and GDN comparators re cost of training available	H					
RepeX	Mains & Services Replacement	431	Y 0.94		Y	Y	Y		Y	Good regression, known drivers Mitigations: a) HSE Policy re-opener: b) PCDs: c) Tier 2 A volume driver: d) non-chargeable diversions volume driver: e) Ofgem policy re work mix	H					
	Risers	24		Y		Y		Y		Good supporting evidence from focus in recent years with plans identified improvement plans. Poor Other GDN historic data quality. Mitigation: Re-Opener for legislative changes	H					
	London Medium Pressure	16					Y	100%	Y	Still at feasibility stage of investment design, extensive stakeholder engagement ongoing re options, so significant uncertainty on unit costs. Also deliverability risks Mitigation: PCD for volume	L					
Capex	Connections	22	Y 0.93		Y	Y	Y		Y	Good regression Mitigations: a) workload volume driver: b) unauthorised connections re-opener	H					
	Reinforcement	10	Y 0.89		Y	Y	Y		Y	Good regression, Mitigation: volume driver	H					
	LTS, Storage & entry	35		Y	Y	Y	Y	c.30%	Y	Technical reviews, NARMS and CBA evidence for workload, history and comparitors for unit costs Mitigations: a) Entry charging review: re-opener to trigger volume driver: b) LTS, re-opener for Lowestoft	H					
	Governor replacement	3		Y	Y	Y	Y			Technical reviews, NARMS and CBA evidence for workload, history and comparitors for unit costs	H					
	Vehicles	13		Y	Y	Y	Y			Good GDN comparison available (unit cost analysis and vehicle age)	H					
	Other	43		Y	Y	Y	Y		c.28%	Y	Made up from discrete activities for which trends and GDN comparators combined with NARMS and CBA evidence, but some underlying uncertainties Mitigations: a) HSE driven asset traffic collision protection b) High pressure valves (also impacts other opex): c) Re-opener for Physical Security requirements	H				
New Outputs / Pension admin	36		Y	Y/N	Y/N					Detailed supporting evidence, including stakeholder acceptance. Common elements could be included in regression, other elements subject to technical review (as in UM submissions)	H					
Totex 1,056 of which: <table style="display: inline-table; vertical-align: top;"> <tr> <td>High Confidence 1,008</td> <td>95%</td> <td>Sharing factor 50%</td> </tr> <tr> <td>Low Confidence 48</td> <td>5%</td> <td>15%</td> </tr> </table> <p style="text-align: center;">48% Blended rate</p>											High Confidence 1,008	95%	Sharing factor 50%	Low Confidence 48	5%	15%
High Confidence 1,008	95%	Sharing factor 50%														
Low Confidence 48	5%	15%														

9. Key Messages

Cadent Key messages:

- Cadent, recognising our cost efficiency position relative to other networks, have taken early steps to resolve our cost performance by initiating an organisational transformation towards a depot centric model that will see our cost efficiency improve.
- Cadent will continue to support Ofgem's Cost Assessment Working Group in developing the approach to benchmarking. We believe it would be helpful to build a further formal step into the process, to carry out an Initial Thoughts consultation in the spring of 2020, to share Ofgem's developing thinking and modelling results prior to the Draft Determination, which would allow for two iterations of the approach before the Final Determination, rather than only one. Ofgem have decided to address this concern via a less formal approach of extending their Cost Assessment Working Group through into 2020.
- We have developed the RIIO-1 models to improve driver selection and updated our evidence for regional factors, primarily around evidence for differences impacting on London. This modelling identified a performance gap of 6% in 2017/18 to the Upper Quartile efficient level.
- Ongoing efficiency in the UK has not returned and is not expected to return to pre-recession levels in the near future. There are no known new technologies that can deliver a step change in productivity in the industry thus ongoing efficiency targets must be below the level assumed for the RIIO-1 determination – which was based on pre-recession data. We have assumed a level of 0.5% pa, which is set between the Bank of England's forecast of 0.3% p.a. and the RIIO-1 assumption of 0.83% p.a.
- We have identified improvements in our operating costs of 14% that we believe will close the 2017/18 identified performance gap by the end of RIIO-1. The 2018/19 outturns confirmed we were on track to close the gap, with the performance gap reduced to 3.0%.
- Looking into RIIO-2, we will change our contracting strategy to complete the change in our operating structure, and implement further efficiencies including from innovation
- Overall, in eight years we are seeking a 11% reduction in our Totex costbase, excluding changes in workload/outputs, which will deliver £505m lower expenditure over RIIO-2 than that incurred in our 2017/18 performance level.
- This is an ambitious plan that seeks RIIO-2 efficiencies of 0.94% pa and sets our cost performance 2.2% below the efficient level in all years, overall 2.2% below than the central forecast of an efficient network over the five years of RIIO-2.
- With the processes in place, our assessment is that Ofgem can have around 95% of the totex activities to have a high confidence in ability to set allowances. This would lead to a blended sharing factor of 48%.