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Cadent response to the RIIO-2 tools for cost assessment consultation

Executive Summary

We welcome Ofgem's consultation on RIIO-2 tools for cost assessment, and the opportunity it provides for us and others to comment on the issues raised. Our response provides detailed observations on questions posed by Ofgem as well as proposals for how the detailed modelling can be taken forward. In addition, we would like to make four high level observations:

1. **We think Ofgem should continue to use a "rich picture" approach to determining efficient costs** – at RIIO-1, Ofgem combined insights from a range of different benchmarking techniques to determine efficient costs. In other words, it used a "rich picture" approach. We think it will be essential for Ofgem to continue this approach for RIIO-2. Given the small sample size (eight GDNs and three ownership groups) any single approach to cost assessment is likely to be flawed. This has been acknowledged by CEPA who have noted that using additional historical data does not increase the number of comparators. Within this "rich picture" approach we consider Ofgem should attach the most weight to an overall totex approach – overall totex approaches avoid a known flaw with bottom up approaches which results in unrealistic cost assessments, because they fail to take into account the trade-offs between different activities. For example, in RIIO-1 Ofgem found a relationship between maintenance and LTS pipeline capex, both in terms of solution choices and accounting.

2. **We believe that the total efficiency assumption for gas distribution should be calibrated relative to the external productivity benchmark** – catch-up plus ongoing efficiency should not exceed the external benchmark range unless there is clear justification for the sector achieving higher efficiency gains, and the evidence suggests that ongoing efficiency should be less than that determined at RIIO-1. This is consistent with the aim of the Sector Specific Methodology Decision document to "*aim to set expenditure allowances and output targets in a way that does not anticipate sector wide out-performance, nor underperformance",* and could require benchmarking at the median level of efficiency, glide paths or uplifts as in the IQI.

3. **Given the scale of progress still needed on cost assessment, we believe an additional step should be built into the process** – limited progress seems to have been made in the last year in narrowing down the options for carrying out cost assessment. Indeed, some of the options under

consideration seem to widen the range of potential approaches that might be used, rather than building on the RIIO-1 approach. Given where we are, 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.

4. **We consider that Ofgem should expand on its methodology for identifying which costs are "high confidence" and which are "low confidence"** – the consultation paper does not articulate the distinction between "high confidence" and "low confidence" costs. This distinction forms an important part of the Business Plan Incentive, as detailed in Ofgem's Sector Specific Methodology Decision document. We are unclear how the cost assessment process will contribute to the way that Ofgem assesses the confidence of business plan cost projections. As this assessment will potentially impact on the rewards that companies earn from submitting high quality plans, we think it is important that Ofgem sets out its approach in a transparent way. This will improve confidence in Ofgem's process and in the operation of the Business Plan Incentive.

Consistent with these views, we attach our detailed response to the questions raised in the consultation paper.

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QUESTION RESPONSES

1. General Feedback

1. Do you have any comments about the overall process of this consultation?

We are concerned over the timing of this consultation. It raises many of the issues discussed during the past year at the CAWG meetings. This theoretical paper, as part of the overall price control process, would have been better if run a year earlier. Alternatively, a review of discussion papers from RIIO-1 could have been run.

We are also concerned over the next steps. The consultation will receive responses that may help direct Ofgem's, or their consultants', modelling to understand the many issues faced. The consultation however proposes that the decision is not due till draft Determination in June 2020. It proposes responses will be reviewed and published, but no date. Also, some of the answers to these issues will depend on actual modelling results of options. Therefore, we believe that a third phase should be added, that of sharing cost assessment modelling with GDNs and potentially a wider "Initial Thoughts" consultation in the spring of 2020. Otherwise, the first time that the models and approach will be tested with the outside world will be in the Draft Determination, due in June 2020, which will only allow for one iteration before the Final Determination. This does not seem sufficient and would restrict Ofgem's ability to refine its approach in the light of comments from GDNs and potentially other interested parties.

2. Do you have any comments about its tone and content?

The paper raises the options and questions that need to be understood when running models to determine a view of what is the efficient level of costs for next price control.

It does not however provide sufficient modelling, despite having historic data, to enable many of the questions to be fully understood and merits of different options to be fully understood and answered.

3. Was it easy to read and understand? Or could it have been better written?

Technical, but well structured.

4. Were its conclusions balanced?

The paper has a greater emphasis on raising questions than on reaching conclusions.

5. Did it make reasoned recommendations for improvement?

No, as lacking modelling results. Also it did not set out how the tools fit in with the overall Business Plan Incentive.

6. Any further comments?

No further comments.

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2. Approach to econometric analysis

Key Messages

a) Given the small sample size in gas distribution, any single approach to cost assessment will be flawed. Gas distribution has only eight networks which are owned by three separate corporate entities.
b) Having additional years does not increase reliability of results as acknowledged by CEPA.
c) COLS is the most suitable estimation technique as it is less demanding in terms of sample size and has been widely used in past UK regulation.
d) The third criteria for developing cost pools, called "cost-boundary complexity" should be replaced by "data reliability".
e) We do not support the use of translog models, but believe that linear models should be considered as well as log models with an alpha adjustment, which would provide alternative views.
f) On model selection criteria, we support the view of the CMA that economic and engineering intuition are more important than statistical significance.
g) On model development phases, we believe a third phase should be added to share initial thoughts on modelling results of the options in spring 2020.

Question 1: What model estimation options should be considered for our cost assessment and why?

Given the small sample size in gas distribution, any single approach to cost assessment will be flawed. Therefore, we support a number of approaches to cost assessment. However, it is important that the approaches adopted are both robust and transparent.

In this context we agree with the statement in paragraph 2.51 that COLS is likely to be the most suitable estimation technique. It is transparent and, as noted in paragraph 2.9 "*less demanding in terms of sample size*" than the alternatives. It has also been widely used in UK economic regulation, including by the CMA in the Bristol Water 2015 reference, and we note that Ofgem has investigated the alternatives in previous price controls but rejected them.

In applying COLS, we believe that it is important to consider breaking up the ten year data series contained in the panel data to reflect the fact that the slope of the average cost line is unlikely to remain constant over a long period, as GDNs relative efficiency changes over time.

The alternative to COLS of Stochastic Frontier Analysis (SFA) requires what Ofgem's technical advisor, Dr Andrew Smith, termed as "*essentially arbitrary*" assumptions about how residuals split between noise and efficiency, which would not seem a robust approach or a transparent one. In contrast, COLS does not seek to distinguish between efficiency and noise. Regulatory practice typically assumes that the gap between frontier and upper quartile represents noise, leaving the upper quartile as the efficient level of cost. If, however, there is a poor model fit, an upper quartile benchmarking assumption is very likely to treat noise as efficiency. We also note that the example given in table 2.1 of the consultation

document produces a lower level of efficient costs than produced under the COLS approach with an upper quartile level of efficiency benchmark, which would not seem a credible result.

The alternative of Data Envelope Analysis (DEA) provides no information on the impact of individual cost drivers, and was described by Dr Smith as a "*something of a black box*". It would also appear to need a far larger sample size than provided in gas distribution. Therefore, it would appear neither transparent nor robust.

The alternative of Random Effects (RE) models uses the panel nature of the data to identify the inefficiency element within the error term, but again, it is doubtful that the sample size is large enough to do this robustly, and neither is it as transparent as COLS.

Question 2: Do you agree with our proposed criteria for developing potential cost pools? If not, what additional criteria do you propose and why?

The four criteria proposed by Ofgem are as follows:

- Complementarity – strong technical / economic reasons to consider costs as complementary with a consistent set of cost drivers.
- Cost trade-offs – can GDNs trade-off between activities.
- Cost boundary complexity – how complex is the cost boundary and how well defined the group of costs.
- Risk of inaccurate / biased models – could "noise" in the data lead to inaccurate model results?

We agree with the first and second criteria set out above for developing cost pools, which were the reasons why Ofgem considered maintenance work execution and LTS pipeline capex together at RIIO-1.

However, while we agree that cost pooling should be of complementary costs and where GDNs can trade-off between activities, we are not clear what a "*consistent set of cost drivers*" might be. At RIIO1, with the exception of scale drivers, there were no two activities for which the same driver was used, because all the modelled activities were different and so had different drivers. Even for Emergency and Repair, where Repair jobs are a subset of Emergency jobs, around 80% of Emergency jobs are internal to the building and so do not result in a Repair job.

For the third criteria, we are not clear what this adds, and so consider that it should be replaced. Almost all costs, no matter how well defined, are subject to allocation and organisation structure issues which adversely affect benchmarking. After outsourcing, for example, connections activity to a third party, associated support-type costs will be included in the charge from the third party for connections, whereas prior to outsourcing they would have been reported under Business Support.

We suggest that the third criteria should be replaced by "*reliability of data*". If data for one activity is considered significantly less reliable than for another, we believe it would be

unwise to pool together these activities, the impact of which would be to produce one large weak regression, rather than two smaller regressions, one of which was reasonably robust.

The fourth criterion we do not believe to be a criterion at all, rather it is the result of failings in the other criteria. If costs are not complementary and trade-offs are not possible, or if the data is unreliable, the result will poor models.

We note that the logic of assessing cost pools together leads to totex benchmarking, as being the only approach that ultimately overcomes cost allocation, cost reporting, solution choice and organisation structure issues – as evidenced by better model fits - which is why we believe that it should have greater weight than disaggregated approaches to cost assessment.

Finally, we disagree with the second of the two bullet points in paragraph 2.24 of the consultation paper. The first bullet states that as cost models become more granular, it may be possible to better identify explanatory variables – a statement with which we agree. However, the second bullet states that it may be more difficult at more disaggregated cost levels to reflect all the cost drivers for particular activities. We do not agree with the second bullet, because at higher levels of modelling it is more difficult to understand, attempt to disentangle, and quantify the impact of the different factors that influence costs.

Question 3: Should we continue to use the Cobb-Douglas functional form? If not, why?

To summarise, we do not support the use of translog models, but believe that linear models should be used as well as log models with an alpha adjustment, which would provide alternative views of efficiency.

The consultation paper describes the Cobb-Douglas logarithmic form and also the translog alternative, featuring quadratic terms and interactions between variables which have the effect of allowing varying returns to scale across different company sizes.

The CMA examined the use by Ofwat of translog models at PR14 in the Bristol Water reference. It concluded in paragraph 4.50c that: "*The models involve relatively complex explanatory variables and it is difficult to interpret the relationships they imply between costs and explanatory variables in economic or engineering terms. In the context of the relatively small sample size, the translog structure seemed overly ambitious. In practice, it seems to have compromised the results (e.g. Ofwat's refined base expenditure models implied a form of diseconomies of scale with respect to the size of company's customer base, which we found to be counter-intuitive)*."

The CMA's concerns were set out in terms of the small sample size. However, there were eighteen water companies, which were independently owned. In the case of the gas distribution there are eight GDNs, with three separate owners. Consequently, it is difficult to see how the translog specification could be used in gas distribution.

The Cobb-Douglas form in the consultation paper is stated in log form, on the grounds that this is the standard approach in cost assessment literature as it allows for economies of scale to be captured. However, for Bristol Water the CMA used models with both log and linear form, noting in Appendix 4.2 paragraph 35 that "*the application of cost modelling to the price controls for water companies in England and Wales, and the specific types of explanatory variables used, seemed sufficiently different to cost modelling in other economic literature that we did not consider it safe to rely on general inferences and views on normal practice*".

The CMA described the different logic behind both approaches in terms of totex per property as follows:

- Linear approach: impact of a given change in a cost driver is the same £ across companies and over time
- Log approach: impact of a given change in a cost driver is the same as a % of totex per property across companies and over time.

The CMA undertook a high level assessment of the most suitable functional form, and found in paragraph 40 of the Appendix that the linear approach was the "*least bad*" functional form for more cost drivers than the log form. Furthermore, in paragraph 4.102 of the main report, the CMA noted that under the linear approach there was no need to consider applying an alpha adjustment, to avoid "*log transformation bias*".

We also note that the difference in scale between water companies is far greater than for gas distribution. At PR14, the largest company, Thames Water, was allowed more than 34 times the totex of the smallest, Dee Valley. In contrast, the largest GDN, Southern was allowed around 2.2 the totex of the smallest, West Midlands. Consequently, arguments for the log approach better capturing economies of scale appear less relevant to gas than water.

When Ofgem used the log approach at RIIO1, Ofgem used an alpha adjustment, terming it a "correction factor" at RIIO1, to take account of the fact that the sum of average efficient costs using the log approach was different, typically lower than industry totex. To correct this, we support the use of an alpha adjustment / correction factor under the log approach.

In addition, we observe that the choice of functional form can make a significant difference to both average efficient costs for any GDN and the size of any applied upper quartile adjustment. For example, using the four year totex model from RIIO1, we calculate that the upper quartile adjustment would reduce from 1.3% to 0.9% had the linear approach been used, implying that linear provided a better fit in this instance.

Question 4: Do you agree with the proposed model selection criteria and model development phases?

To summarise, for model selection criteria, we support the view of the CMA that economic and engineering intuition are more important than statistical significance. In respect of model development phases, we believe a third phase should be added to share initial thoughts on modelling results of the options in spring 2020.

Our response is divided into two sections addressing the model selection criteria and model development phases.

Model selection criteria

The three model selection criteria are:

- economic / technical rationale;
- transparency; and
- robustness.

While we agree with the three model selection criteria, we believe that they are not of equal importance, in particular the first criterion, economic / technical rationale is the most important.

The context is that, due to the small sample size, any modelling approach will have weaknesses. As the CMA stated in the 2015 Bristol Water inquiry, paragraph 4.76: "*We recognised that no benchmarking analysis or cost assessment method will be perfect, and there will always be vulnerabilities and limitations in any approach. Any method of estimating a company's future expenditure requirements (if it operates and invests efficiently) over the five year price control period is likely to raise significant risks of inaccuracy or other problems*."

Given the limitations of any approach, we believe that economic and technical rationale is the key criterion. A method may be transparent and apparently reasonably robust, but if it lacks economic / technical rationale it is unlikely to be a safe approach to play a part in setting cost allowances. We note that this view is shared by the CMA, as noted in paragraph 4.177c of the Bristol Water 2015 inquiry: "*We remained comfortable with the approach we had taken, which prioritised the economic and engineering intuition for the models over statistical significance*."

Furthermore, as noted in our answer to question 22, the robustness of the modelling approaches has implications for the level of efficiency that can be assumed in the benchmarking, for example, average cost or upper quartile, and whether a glide path is required.

In addition, the consultation paper describes population density as potentially having a U shaped impact on costs for the emergency service, with both very rural and very urban areas potentially adding cost to the efficient operation of the emergency service. We will provide our evidence on the impact of sparsity in our Business Plan, but note that, as recognised by

Ofgem at RIIO1, it is appropriate to consider sparsity at a sub-network level, rather than at a GDN level. For example, East of England GDN contains very rural areas such as Norfolk, and also very urban parts of London such as Tottenham. The GDN as a whole might have density which appears broadly average, but this masks extremes of urbanity and sparsity and so results in a poor assessment of an efficient level of cost.

Model Development Phases

The consultation paper shows two phases, that of identifying preferred models and then putting these through robustness testing.

We have three proposals on the model development phases as shown in the consultation paper as set out below.

- First, we believe that a third phase should be added, that of sharing cost assessment modelling with GDNs and potentially a wider "Initial Thoughts" consultation in the spring of 2020. Otherwise the first time that the models and approach will be tested with the outside world will be in the Draft Determination, due in June 2020, which will only allow for one iteration before the Final Determination. This does not seem sufficient and would restrict Ofgem's ability to refine its approach in light of the comments from GDNs and potentially other interested parties, reducing the level of confidence in the approach to cost assessment.
- Second, under Phase 1, we support the use of workload drivers as providing the best economic / technical rationale – we do not believe that their use would generate perverse incentives.

  One of the bullets taken from the CEPA report, under Phase 1 – the identification of preferred models asks "*are the results consistent with the rest of the price control* ?" We do not understand how the results of any modelling could be consistent or inconsistent with the rest of the price control. However, from text in paragraph 2.42 of the consultation paper we believe that this should read "*consistency with policy objectives and potential to generate perverse incentives*."

  If the concern is that, by using workload as a driver, GDNs are incentivised to carry out more work than needed once the price control has been set in order to benchmark well in future, this concern would seem unwarranted, as it runs counter to the long standing incentive under RPI-X and RIIO to keep actual costs down as far as possible.

  If the concern is the opposite one, i.e. that GDNs would neglect the condition of the network in order to be able to argue for additional workload in future price controls, this concern is more realistic, especially where cost allowances are set unreasonably low, but is addressed by NARMs under which GDNs are incentivised to maintain or improve asset health, PCDs in RIIO2. We are also subject to health and safety regulatory obligations in respect of asset condition and managing any associated risk.

  We would be surprised if an overall benchmarking approach that did not contain a significant level of workload drivers proved to be robust, given that workload, which varies between GDNs, has such an impact on the level of costs. We would expect

such an approach to fail the first, and in our view, most important criterion, that of economic / technical rationale.

- Third, under Phase 2, we do not believe that “Random Effects” modelling is suitable. The third bullet under Phase 2 is ”Random effects”, which we believe refers to a test for whether RE or COLS modelling produces a better statistical outcome. As stated in our answer to question 1, we doubt whether the sample size is sufficient to apply Random Effects modelling, and believe that, for transparency, the second of Ofgem’s model assessment criteria, it is unlikely to be suitable. In addition, economic / technical rationale should carry greater weight.

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3. Aggregated econometric analysis

Key Messages
a) Because workload has such a key relationship with cost, we propose that it is used as a driver wherever possible – it makes economic and engineering sense.
b) Workload for most engineering related activities is outside the GDNs' control.
c) We agree that there are areas such as Business Support that are suitable to a scale driver.
d) Opex plus modelling, with the multiple trade-offs within gas distribution lead you to a totex model.
e) Under opex plus modelling, it is vital that the costs outside the model are assessed in a similar way. Even so, the results are likely to be less robust than under the totex approach.

Question 5: Should the cost driver of the totex regression model be determined by the cost drivers of the 'bottom-up' models, or should the totex regression model account for different explanatory variables? Why?

Paragraph 2.28 of the consultation paper repeated the principles for developing appropriate cost drivers first set out in the December consultation, that they should:

- Make economic and / or engineering sense.
- Be accurately and consistently measurable.
- Have a relatively stable relationship with costs over time.
- Be beyond the control of the network company as far as is reasonably practicable.

We believe that the drivers for the totex regression should be determined according to these principles, which we consider were also applied when RIIO1 was set. The approach at RIIO1 was to use workload where possible, and scale, as represented by MEAV, where not.

Because workload has such a key relationship with cost, we propose that it is used as a driver wherever possible – it makes economic and engineering sense and should lead to a higher degree of confidence in the approach to cost assessment. For example, GDNs' largest single activity is mains and services replacement. In 2017/18, East of England, which experienced significant extension in the late twentieth century, and so had a high proportion of PE mains, decommissioned 1.1% of its total mains population whereas London, an older and more metallic network, decommissioned 1.8%. Workload is clearly not proportionate to scale and is a key driver of cost. Not to take account of it would present a highly distorted view of efficiency.

We also believe that the workload for most engineering related activities is outside the GDNs' control:

- Repex volumes are driven by the HSE's mains replacement programme;
- c.80% of emergency jobs result from escapes within customers' properties and so are not on assets owned or controlled by GDNs;
- All repair jobs and the remaining c.20% of emergency jobs relate to network age and condition, largely the result of investment decisions taken many decades ago

- Reinforcement volumes are driven by customer demand, and changing patterns of gas flows compared to when that part of the network was built.

For connections, we agree that GDNs have some influence over the level of work. However, to use a scale variable rather than a workload driver would make no economic or engineering sense, and we see no potential detriment to customers in using a workload driver. In contrast, if a scale driver were used for connections activity, all GDNs would be benchmarked down to the lowest activity level of any GDN, and so would be incentivised to leave the connections market completely, which would act against customers' interests.

We agree that there are some areas, such as Business Support, where it does not make economic or engineering sense to use workload drivers. In these cases, we support the use of MEAV as at RIIO1, as it takes significant account of both network length and customer numbers – high level drivers that Ofgem has previously used – as well as other network assets.

Paragraph 4.48 raises a potential issue with combining workload drivers in an aggregated CSV, on the grounds of transparency. We believe that the method adopted by Ofgem at RIIO1 was clear, although, as with any totex model, it was not possible to use those models to split the resulting allowance between activities – which instead was carried-out using the results of the bottom-up modelling. We consider that this concern is unfounded and should be discounted for decision making – it is far more important for the modelling approaches to be robust and for Ofgem to have high confidence in them, than for each model to calculate an allowance by activity.

Question 6: What could be appropriate cost drivers in middle-up models for opex, capex and repex? Why?

As stated in our answer to Question 5, we agree with Ofgem's principles for developing cost drivers i.e. that they should:

- Make economic and / or engineering sense;
- Be accurately and consistently measurable;
- Have a relatively stable relationship with costs over time; and
- Be beyond the control of the Network company as far as is reasonably practicable.

In this context, we consider that the CSVs developed during RIIO1 using workload as a driver where possible - which for engineering activities are largely outside the control of the GDNs - and scale (MEAV) where not, remain appropriate for RIIO2.

Question 7: For which opex activities are there trade-offs that support the rationale for testing 'totex and opex plus' modelling?

From the CEPA report, our understanding of opex plus modelling is that it comprises all of opex plus elements of repex and capex where complementarities and trade-offs exist.

We have identified broadly seven engineering activities where there can be trade-offs between opex and investment:

- Between maintenance and LTS pipeline capex, excluding growth: in RIIO1 Ofgem found a relationship between these activities, both in terms of solution choices and accounting, and consequently made an adjustment to allowances having modelled them together. We believe that this relationship remains and so should be examined for RIIO2.
- Between maintenance and other capex: other capex contains lots of small capital additions, spend on properties, and some valve remediation, so there are probably significant opex trade-offs in this area. With the exception of vehicles and Xoserve capex, which are quite stand-alone, the remainder of other capex could join the cost pool.
- Between repair and repex other services: repair work can often result in or include other service replacement activity - there is significant complementarity between these costs.
- Between repair and mains replacement: repair teams can be used, especially in summer when the volume of repair work is lower, for mains replacement activities and their time and cost is apportioned between the two activities. When repair teams were not used for mains replacement, for example early in the GDSP contracts when almost no repair resource was used for mains replacement, we experienced a rise in repair costs as less cost was charged to repex, but that repex costs fell through using a workforce which was focussed only on mains replacement.
- Between repair and new connections: repair teams can be used for new connections activity, similarly to mains replacement.
- Between repair and reinforcement: repair teams can be used for reinforcement activity, though this would typically be carried out by contractors.
- Between emergency and repex: emergency FCOs can be used to carry out purge and relights after gas has been reconnected following mains or service replacement.

Taking account of all the above trade-offs would result in the "plus" element of "opex plus" being so comprehensive that a totex regression would result. One option to create a manageable "opex plus" regression, would be to exclude reinforcement and mains and services replacement, which could all be assessed separately, on the basis that most of these costs are incurred via contractors, in contrast to repex other services which are wholly carried out by repair teams, and new connections which can be largely carried out by them.

In addition, we believe that there are certain categories of opex, such as holder demolition and land remediation, that should not be included in an opex plus approach because they are variable between GDNs and over time, indeed Cadent have none remaining and are not

high volume iterative activities, which is why they have historically been excluded from regressions.

This option for opex plus leaves most of opex, LTS pipeline capex excluding growth, other capex minus vehicles and Xoserve, repex other services and new connections to be assessed together, using a combination of drivers that make economic and engineering sense, weighted by industry spend.

The methods of assessment of the costs excluded from the opex plus approach are not clear. The consultation paper in paragraph 4.38 mentions "*activity level assessments*". The CEPA report page 50 refers to "*separate technical and qualitative activity level assessments*". We believe that to assess opex plus costs using one approach, and the bulk of repex and mains reinforcement using another, would lead to a significant level of inconsistency and cherry-picking, and deliver results that were not robust and low confidence. Consequently, under the opex plus approach, it would be vital for the remaining costs – the vast majority of repex activity and mains reinforcement – to be assessed in a similar way to the opex plus costs, using a regression with a sensible combination of drivers.

The results of the two regressions could then be combined, after which the chosen level of efficiency could be calculated.

The approach we describe would provide a view of efficiency additional to that given by the totex and disaggregated approaches. However, there are two reasons for believing that the results of the opex plus approach would not be as robust as those of the totex regression:

- First, it misses many of the engineering trade-offs described above, for example between emergency, repair and the bulk of repex. These are all captured in the totex regression.

- Second, it takes little account of significant organisational and capitalisation differences in Asset Management (within Work Management) and also Business Support, where costs can be allocated to repex and capex to varying degrees. Again, these are captured in the totex regression.

It is difficult to be definitive about an approach in advance of seeing it used. However, even assuming that the remaining costs outside of the opex plus regression are assessed in the same way as the opex plus regression, it would seem very likely that the results of the totex regression would be more robust, and is the approach under which Ofgem would have the highest amount of confidence.

Question 8: Are there other particular costs that we should aggregate and test in our analysis?

The main potential opex activities which could be modelled together are Emergency and Repair, given that all Repair jobs come from Emergency jobs and, for such work, the Emergency FCO can only leave the site having handed over to the Repair team. However,

the trade-offs might be limited, in that c.80% of Emergency publicly reported escapes (PREs) are internal to the property and so do not result in Repair jobs.

At a high level there are relationships between many costs. For GD1, Cadent used its GDSP contracts to carry out substantially all mains replacement work, whereas previously some had been carried out by Repair teams in the summer particularly. The change had the impact of reducing repex costs but increasing repair opex. Similarly, as discussed at CAWG, we believe that the proportion of Business Support, Asset Management and Operations Management costs which are capitalised is significantly different between GDNs, affecting the balance between opex, capex and repex. The only apparent way of overcoming the differences in reporting, organisation structures and solution choices is through the totex approach, which is why we believe that it needs to have the largest weight in any combination of approaches, as being the approach in which Ofgem can have most confidence.

In any combination of drivers, we believe that the drivers themselves, and the weights used need to make economic and engineering sense. We support the approach used at RIIO1, that of weighting drivers in a Composite Scale Variable (CSV) according to industry spend.

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4. Disaggregated econometric analysis

Key Messages

a) We believe that Ofgem's totex approach at RIIO1, bringing together all costs and drivers, including workload, has not only been shown to work well, but is also consistent with the spirit of the CMA for Bristol Water.
b) Most engineering activities should be assessed using workload drivers as it makes economic and engineering sense and they are typically beyond the control of the networks.
c) To address the issue of variability of workload, revenue drivers and price control deliverables negate Ofgem's concerns.
d) Repex should be subject to regression as it is a high volume, iterative activity and workload is the only driver to make economic and engineering sense.
e) Reporting issues associated with CISBOT have caused volatility in the repex regression
f) We do not support the use of abandonment as a driver for repex given that there is greater opportunity for economic abandonment in some areas than others.

Question 9: Are there trade-offs between opex and capex activities that support the rationale for considering 'opex plus' modelling?

There have long been recognised trade-offs between opex, capex and repex activities, which is why we support placing greater emphasis on the totex approach in RIIO2 as being the approach in which Ofgem can have most confidence. However, as stated in paragraph 4.37 of the consultation paper, we doubt the value of combining activities in the disaggregated approach because it runs counter to the logic for the approach – to provide granularity to understand cost drivers and regional factors. This was noted by the CMA in the Bristol Water inquiry, paragraph 4.46(a) as follows: "*Disaggregated models or more granular forms of benchmarking analysis may allow a more accurate estimation of the relationship between expenditure and specific cost drivers and allow a greater number of cost drivers to be taken into consideration*."

We also consider CEPA's comment that "*the opex plus approach is arguably the most consistent with the CMA recommendations in Bristol Water*" to be misleading because the circumstances are different in gas to water. In the case of gas distribution, Ofgem has workload drivers to cover the majority of costs, the bulk of which, especially for engineering activities, are outside of the GDNs' control.

In contrast, in water there were no effective workload drivers available to the CMA in its modelling of base costs (i.e. excluding enhancement capex, which was assessed separately). The CMA could not use what it did not have. However, the CMA was critical of Ofwat's approach to investment modelling because it did not take account of investment needs i.e. workload, as stated in Appendix 4(1), paragraph 127 "*Furthermore, Ofwat's econometric models did not include any explanatory variables that measure differences between companies, or over time, in companies' investment needs or the condition or quality of companies' capital stock. Ofwat told us that using variables relating to the condition or quality of the capital stock would create perverse incentives to reward companies with poor*

quality capital stock and that companies had responsibility for serviceability. We agreed that there may be such a risk to incentives (though this depends on other aspects of the price control framework), but this does not detract from the risks of inaccuracy in the results from such models: the estimated expenditure from Ofwat's models may be too high for some companies and too low for others…".

Because of the CMA's concerns, it allowed Bristol Water an additional £9m as a regional factor on account of the age of its mains, based on the CMA's assessment of efficient workload and unit costs.

We believe that Ofgem's totex approach at RIIO1, bringing together all costs and drivers, including workload, has not only been shown to work well, but is also consistent with the spirit of the CMA.

Question 10: Which cost areas should be assessed using workload drivers as opposed to other cost drivers? Why?

In the disaggregated analysis, we consider that the most suitable driver for Emergency is a workload measure, peak PREs in the last five years, because the GDNs are required to meet the 97% attendance target set out in SSC D10 even in a harsh winter, and need to have resources in place accordingly – it has engineering logic. This also meets the other three of Ofgem's criteria for cost drivers – including being outside the GDNs' control, given that c.80% of PREs are not on Cadent's network, and the remaining c.20% largely relate to network age and condition.

For Repair, we consider that the workload driver should reflect network age and condition. However, because we consider that mains reports are more consistently reported than service reports, and the number of services reports should be broadly pro-rata to that of mains, we believe that mains reports is the best workload driver. In addition, the fact that London has a disproportionately high volume of large diameter metal mains, which are more costly to repair than smaller mains, should be taken account of in the workload driver. However, the same effect could be achieved through a pre-regression regional factor.

Ofgem has used a synthetic workload driver for repex for many years. Given the varying quantities of repex that different GDNs need to carry out, and the difference in unit costs associated with the different types of work, we do not see that any other driver could reasonably be used as it would fail the economic / engineering sense criterion. At CAWG, emerging issues of reducing insertion, surface type and project lengths have been raised, and it may be appropriate to build these into the regression. We welcome that the BPDTs contain new data requests on some of these areas.

We consider that connections should have a workload driver, as previously used by Ofgem, with the potential addition of fuel poor connections, as this meets engineering / economic logic. We note that the volume of connections is partly within the GDNs' control, as, although there is a competitive market, a GDN's competitive stance influences its workload.

To overcome this weakness and ensure GDNs do not benefit or lose from variations in workload, a revenue driver could be used in the price control formula.

For reinforcement, we believe that Ofgem's existing synthetic workload driver should continue to be used, with regional factors for exceptional projects such as the recent Thames Tunnel. No other driver that we can envisage would make engineering sense, while the amount of work done is largely driven by changes to localised demand, and so outside of the GDNs' control.

The consultation paper in paragraphs 4.43 and 4.48 suggests four additional problems associated with workload drivers:

- that they encourage GDNs to put forward workload heavy plans
- that the model coefficients when combined in a CSV in the totex models are not easy to interpret, as compared to a single activity, with, typically a single driver
- that it might not be appropriate to reflect some aspects of activity within the cost allowance if they have been accounted for elsewhere
- the HSE's repex policy from the start of GD1, under which 20% of pipes abandoned must come from the highest risk 20% of the mains population, with GDNs free to select from the remaining 80%, has given GDNs more freedom to select which mains to replace, which exacerbates the incentive for Plans to contain larger diameter, and thus more costly mains.

Taking each in turn, for the first problem, the Business Plan Incentive now encourages the use of revenue drivers or price control deliverables where changes in workloads are possible. Consequently, it is difficult to see how a workload heavy plan could benefit a company.

For the second issue, we do not perceive this as a problem. The approach to building the CSV is straightforward, transparent and logical. We agree that it does not produce a separate allowances for each activity, however, as Ofgem did at RIIO1, the allowance can be split according to the results of the disaggregated approach.

For the third problem, we agree that companies should not be rewarded twice for same output. The solution is to ensure that this is not the case.

For the fourth problem, the solution is to ensure that the price control deliverable for Tier 1 repex takes account of the diameter band of work done. At its simplest, and as proposed by Ofgem, it could ensure that the actual mix of diameter bands of the remaining Tier 1 iron mains at the end of the RIIO2 period is little different to that assumed when the price control was set.

Question 11: Should repex (or some categories of repex) be excluded from our regression analysis and assessed using other techniques?

The vast majority of repex should be included in regression analysis. It represents high volume, iterative activity, and so is well suited to regression analysis, using updated synthetic drivers. Regression represents the tried and tested method of taking account of different workloads, which directly impact costs. We cannot envisage any other cost driver that would represent engineering / economic sense and in which Ofgem could have confidence.

The only exceptions to this are repex activities which are not high volume, iterative activities, in particular MOBs related activity, which is concentrated in London, and the London Medium Pressure programme, which is far more costly than most repex and so needs to be assessed separately.

Question 12: Are there other approaches to disaggregated benchmarking that we should consider?

For RIIO1, Ofgem assessed the costs of holder demolition, land remediation, training & apprentice costs, Business Support, MOBs, replacement governors not using regression analysis, but rather unit cost analysis. For Business Support, this enabled comparison with non-regulated sectors, while the other activities were not the high volume, iterative ones suitable to regression.

Our views on how Business Support should be benchmarked in RIIO2 are provided in Questions 13-15 below. For the remaining activities we consider that unit cost analysis remains the most appropriate technique.

This section of the consultation paper contains sections on MEAV, endogeneity issues associated with workload, updates to synthetic drivers, repex drivers and quality, on which we comment separately below.

On MEAV, we welcome that Ofgem accepts that GDNs are not able to materially impact its level in the short run. We continue to support its use as a scale variable, noting that it needs to be updated to include MOBs and embedded entry points, and for replacement costs in general. We do not believe that there are any valid reasons why MEAV should not include MOBs and embedded entry points, given that MEAV is a measure of gross replacement cost of network assets, and both of these represent network assets.

Paragraph 4.53 also sets out Ofgem's concerns that workload drivers present endogeneity issues. We believe that Ofgem's concern is exaggerated. As set out in Question 5, most engineering activities are outside GDNs' control. The exception to this is connections, where each GDN's level of activity is driven in part by its stance in the competitive market. However, the solution to the issue of variability in connections workload should be a revenue driver, rather than benchmarking connections costs using a scale driver, which would be a

poor driver in engineering terms and act to drive down connections activity so as to minimise cost. This would not be in the interests of customers.

Furthermore, we believe that it is better to use a driver that makes economic and engineering sense, rather than one which makes less sense but is entirely outside of the companies' influence. For example in the case of repex, the consequences of different network ages, material types and ground conditions will all be omitted if a scale variable were used as a driver, as opposed to workload. Thus any gaps to an upper quartile calculated using scale will inevitably contain a large amount of noise, not only efficiency. We note the position of the CMA in the Bristol Water inquiry of 2015, paragraph 4.50e "*However, we considered that, given limitations in the available data, it may be better,* in some cases*, to include an explanatory variable that carries risks of endogeneity, than to fail to take any account of potentially important differences between companies*."

In respect of updates to synthetic drivers for repex, connections and reinforcement, we agree that these need to be reviewed in the light of actual costs.

For repex drivers, we agree that there is a degree of volatility in repex regressions year on year, however, we consider that this needs to be better understood as it relates to in year efficiency, rather than considering changing the driver. For example, for Cadent, we are aware that two of our GDNs suffered from sub-contract issues in one particular year, which caused them to have higher costs in relation to workload. Also, at CAWG we have discussed reporting issues associated with CISBOT, which have also caused volatility in the repex regression.

Neither do we consider that changing the driver from mains laid to mains abandoned has engineering logic, nor that Ofgem should use standard abandonment ratios when setting allowances. Lay to abandon ratios vary according to the area in which teams are working. Typically there is more opportunity to rationalise the network, and so reduce the lay to abandon ratio, where there are fewer connections per kilometre, which is typically the case for larger diameter mains and mains in less densely populated areas. We also note that lay to abandon ratios can exceed one, for example where it is more efficient for a team to avoid working in a particularly difficult location, for example a busy box junction, by laying additional main close by.

Finally, we agree that incorporating quality of outputs in regression analysis is difficult. If customers have expressed a desire for additional quality in RIIO2, the efficient additional cost associated with this might best be quantified separate to the modelling, and added in post regression.

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5. Non-econometric analysis

Key Messages
a) We support benchmarking Business Support at a group level and on a gross (pre capitalisation) basis.
b) We support the use of composite cost drivers to enable comparison against other sectors and both composite and MEAV within the gas distribution sector.
c) Ofgem should look at unit cost comparison and regression modelling.
d) IT opex and capex should be benchmarked together and also subject to separate expert review.

Question 13: Should we assess business support costs at a group level in order to address cost allocations across companies within groups?

We support benchmarking Business Support costs at a group level in order to overcome cost allocation differences within groups, and compare costs on a broadly like-for-like basis.

In addition, to overcome differences in accounting policies for capitalisation, we propose that costs be compared on a gross basis (pre-capitalisation) rather than on a net basis.

We note that comparing costs at a group level should be more straightforward for RIIO2 than RIIO1, because Cadent's gas distribution networks are now under independent ownership to the transmission networks.

We would also like to note two further issues associated with Business Support modelling:

- First, in disaggregated modelling, because Business Support costs need to be assessed on a gross basis, logically, those Business Support costs that have previously been allocated to other activities, e.g. capex, repex or possibly elsewhere in opex, need to be stripped out, otherwise this element of cost will be assessed twice, once in gross Business Support and once elsewhere, with distorted results. In reality, these costs will be very difficult to strip out, but the issue represents a further example of the limitations associated with the disaggregated approach, and why we propose that more weight be placed on the totex approach. We note that the opex plus approach to modelling will not overcome this issue unless it includes all costs!

- Second, at the level of aggregated benchmarking, differences between how Business Support costs are allocated in a multi-GDN network such as Cadent, and the drivers in the totex regression could act to distort the result of the regression. Based on the RIIO1 approach, this issue would not affect the disaggregated approach because it is carried out at a group level.

Question 14: Which types of business support costs should be benchmarked, and how should they be benchmarked?

We consider that all Business Support costs should be benchmarked, except for insurance, and that IT opex and capex need to be benchmarked together – see Question 15.

For RIIO1 Ofgem used four different approaches to benchmarking Business Support costs:

Price control	Driver	Benchmark	Approach	Level
GD1 / T1	Composite cost driver	All energy networks	Unit cost	Upper Quartile
GD1 / T1	Composite cost driver	External companies	Unit cost	Upper Quartile
ED1	Composite cost driver	DNOs	Unit cost	Median
ED1	MEAV	DNOs	Unit cost	Median

In respect of the choice of driver for RIIO2, we believe that the composite cost driver (a composite of the drivers of individual categories of Business Support - revenue, total spend, employees and IT end-users - weighted by industry spend across each category) is reasonable and has the advantage of being replicable and broadly comparable across many organisations, not just utilities. We also support the use of MEAV as a driver, but only within each regulated sector, as it will not be available for the external world, and will not be comparable across regulated sectors.

In respect of the choice of which organisations to benchmark against, we consider that there is value in benchmarking against both energy network companies (gas and electricity) and external entities with some similarities, to check efficiency against the non-regulated sector. However, when comparing against the non-regulated sector, it is important to take account of differences between sectors e.g. the additional costs of regulation for the regulated sector, differences in costs structures between asset light and asset heavy industries and even scale of business.

In respect of the approach to benchmarking, we support the continued use of unit cost analysis at a group level, using gross costs. We also believe that the option of regression against the composite cost driver for all distribution networks should be explored as offering an alternative view.

At RIIO1, Ofgem benchmarked Business Support costs at the upper quartile level before summing with the results of other approaches, leading to cherry-picking. Therefore, we support Ofgem's proposal in paragraph 8.22 of the consultation paper to calculate the appropriate level of efficiency having already summed the results of the different modelling approaches.

Question 15: Which types of business support costs should be excluded from benchmarking?

The only Business Support cost we consider should be completely excluded from benchmarking is insurance, which, as noted in paragraph 5.15 of the consultation paper, was assessed separately due to differences in risk appetite and appropriate coverage levels between companies and sectors. Instead we propose that insurance costs should be subject to expert review at RIIO2.

For IT & Telecoms costs, we believe that these should be subject both to benchmarking and expert review, and that these costs need to be considered on a totex basis, to reflect the trade-offs between capex and opex. This is especially important in the light of the "cloud", changing how IT is provided, with less emphasis on the provision of assets (capex) and more on the provision of a service (opex).

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6. Regional factors and company-specific effects

Key Messages

a) Ofgem should continue to make one way and two way adjustments as appropriate, noting that neither raises overall costs to customers.
b) Artificially making one way adjustments into two way, by the imposition of arbitrary changes, will have the effect of undermining confidence in the cost assessment models.
c) The premise that customers overall pay more through allowances for regional factors is incorrect, because Ofgem makes adjustments pre-modelling, which is the most appropriate method. The total cost to customers is unchanged, it is the split between customers that is changed.
d) It is as damaging to customers not to allow a valid factor as it is to allow an invalid one – the impact is equal.
e) In assessing claims, networks should have taken all economic mitigations rather than all feasible mitigations, otherwise valid regional factors will be rejected.
f) In assessing claims, where networks have a number of smaller claims arising from similar causes, these should be capable of being considered together when applying a materiality threshold and considered in context of the benchmarked activity (not totex).

Question 16: How should we estimate and model the impact of regional factors?

We believe that Ofgem should continue to make one way and two way adjustments as appropriate, noting that neither raises overall costs to customers – see also question 17 below.

We believe that regional factors such as pay, should be, as previously, two way adjustments. Whereas other adjustments which are more GDN specific, such as London urbanity costs, should be one-way adjustments.

We support the comment made by SGN quoted in paragraph 6.8 of the consultation paper, that artificially making one way adjustments two way, by the imposition of arbitrary changes, will have the effect of undermining confidence in the cost assessment models, to the overall detriment of customers and GDNs.

We support making regional factor adjustments pre-modelling, consistent with the RIIO1 approach, and without increasing overall costs to customers. We do not believe that there are sufficient data points, with eight GDNs, one of which is far more urban than the others, to attempt to apply the within-model adjustments approach. Also the use of an average network density does not capture the engineering technical and economic rationale that it is the sparse and high urban external factors that impact on a network costs. We thus believe that these regional factors should be judged, pre-modelling, from network evidence.

In respect of the adjustment for regional pay, we believe that the three digit SOC codes used at RIIO1 remain appropriate, being sufficiently detailed to capture the nature of the GDNs'

workforce, both own labour and contractor, while also being sufficiently high level to have large enough sample sizes for the results to be broadly accurate.

Question 17: Do you agree with the proposed criteria for justifying regional cost factors that we have outlined?

The proposed criteria are that:

- The factor should be clearly defined.
- The factor, and subsequent costs it drives, are beyond the control of an efficient company (having taken all the feasible measures to mitigate the costs).
- The company (or a small number of companies) are impacted by a significant amount, and in a materially different way to others.

The premise for the criteria is set out in paragraph 6.10 "*If the process is one-sided, customers may not be adequately protected in cases where the models overestimate the GDNs' expenditure requirements*."

We believe that the premise is based on a misunderstanding of the impact of regional factors. As acknowledged in paragraph 6.4 of the consultation paper, because Ofgem makes regional factor adjustments pre modelling, regional factors make **no difference** to industry average efficient costs and therefore costs paid by customers as a whole. Instead they affect the **split** of averagely efficient costs between GDNs, so one GDN might be allowed say £1m more cost, and the remaining seven £1m less between them.

Consequently, the impact of Ofgem allowing an invalid regional factor claim is that customers in one GDN pay a little too much, and customers in the other seven GDNs not quite enough. Conversely, the impact of Ofgem not allowing a valid regional factor claim is, not only unfair to the GDN, but also that customers in one GDN pay not enough, and in the other seven too much. This means that it is as damaging to customers not to allow a valid regional factor, as it is to allow an invalid one – the impact is equal.

Understood in this light, the proposed criteria appear likely to disallow entirely valid claims and partially valid claims, to the detriment of customers. To make the criteria more balanced we suggest that:

- The second criteria is amended to delete the text in brackets so removing the requirement for all feasible measures to have been taken, and to state that to the extent to which companies have not taken all economic measures to mitigate the cost then the value is reduced accordingly. "*All feasible measures*" is not appropriate because a GDN with a claim for a recurring opex regional factor of £1m, which had a one-off capex alternative of £100m, would fail this criterion because there is a feasible alternative – albeit one which is not in customers' interests and is not economic.

- The third criteria is amended so that a number of smaller claims arising from similar causes can be considered together when applying a materiality threshold – which will be important for London GDN in particular to ensure it is not discriminated against.

We also suggest that "*a significant amount*" needs to be considered in the context of the individual activity subject to cost assessment rather than the impact on costs overall. This is consistent with the reason for the disaggregated approach to cost assessment – to gain a better understanding of cost drivers and regional factors.

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7. Real price effects and ongoing efficiency

Key Messages

a) Our preliminary view is that an expected deviation of 5% of totex is a reasonable threshold for indexation, as this represents around 0.2% of RoRE pre-sharing.
b) Labour (including contractors) and oil are the two factors that merit indexation.
c) UK productivity growth of less than 0.2% pa over the last 12 years, plus weaker incentives at RIIO2 than RIIO1, implies lower ongoing efficiency than determined in RIIO-1.
d) The Ofwat PR19 Draft Determination is subject to significant criticism and much of the rationale is not applicable to gas distribution.
e) The total efficiency assumption for gas distribution (catch-up plus ongoing) should not exceed the external benchmark productivity range unless there is clear justification. This could require benchmarking at the median level of efficiency, glide paths or uplifts as in IQI.
f) Historic frontier shift should not be relevant given Ofgem's decision in SSMD to use external benchmarks for ongoing efficiency.

Question 18: What RPEs should we account for, how should we gauge materiality, and what criteria should we use for index selection?

The start point when considering RPE indexation has to be materiality. A very high level of materiality would lead to no costs being subject to indexation, exposing GDNs and consumers to that risk, whereas a very low level would cause many types of cost to be included, which would be intrusive and burdensome for very small amounts of money.

Our view is that materiality should be measured in terms of what deviation from the forecast level of real cost could reasonably be expected in any year of the GD2 period, as compared to the total level of totex. Our preliminary view is that an expected deviation of 5% of totex is a reasonable threshold, as this represents around 0.2% of RoRE pre-sharing, in the context of Return Adjustment Mechanisms which might operate at a deviation of 3.0% of RoRE. The figure of 5% of totex also sits within the range of triviality and materiality re-openers from RIIO1, which range between 1.5% and 14% of totex (defined as totex, post sharing, of between 0.5% and 5% of base revenue).

At that level of materiality, for gas distribution we are clear that labour costs would be subject to RPE indexation, and our initial view is that PE pipe & fittings, and blacktop surfacing might well pass the materiality hurdle also. We will confirm our view in the December Plan.

Our view of the criteria for index selection is set out below. Building on our own work and that of CEPA, we believe that indices should be:

1. Accurate - representative of efficient GDN costs
2. Independent – not dominated by GDNs
3. Credible – produced by a reputable body
4. Continuous – with no jumps in the series without restatement of prior years
5. Exclusive of efficiency – or there is a double count with continuous improvement

6. Transparent – in the public domain
7. Timely – short time lag so that data is included in the Price Control Financial Model.

Of these, we believe that the first five are fundamental and the others desirable.

We note that the CEPA report contained an additional "desirable" criterion under Transparency, that comparable forecast data should be available from the index supplier. We do not believe that this is desirable because difficulties in forecasting are the root cause of Ofgem's decision to apply RPE indexation, so it seems strange to place weight on the availability of forecasts. For the purposes of forecasting allowed revenue and prices it would be straightforward to assume that the last reported actual index number inflates in line with CPIH for the remainder of the GD2 period.

Given the above and work already completed and presented to CAWG, we believe that, consistent with the RIIO-1 price review that there are two RPEs, that of labour (impacting on direct labour and contractors) and oil prices (impacting on PE materials) and black-top costs within reinstatement.

Question 19: What common input and expenditure categories are appropriate for structuring RPEs?

We agree with Ofgem's view to use average (notional) cost structures in RIIO-2. Having agreed RPE factors the cost categories can then be finalised. Based on the two RPEs of labour and oil prices (as outlined in response to Question 18) we would suggest that the following subjective view would be appropriate:

- Direct labour
- Contract labour
- PE materials
- Reinstatement
- Other

Each of these categories can be provided as a % of opex, capex and repex respectively, which may require changes to the draft BPDT. These are readily available from historic data and so GDNs could provide historic and forecast trends from which Ofgem can then identify average (notional) cost structures. This may be a single figure applicable for all years or may vary by year given GDN forecasts and understanding of the movements. If other RPEs are identified then the subjective view should be appropriately adjusted.

These percentages can then be used along with RPE index forecast and the opex, capex, repex cost allowances. For reinstatement and PE materials it may be appropriate to also request the proportion of the category impacted, i.e. the oil produce element of total PE pipe.

Ofgem could consider requesting the information at the next level down, eg as per Table 2.2 of the RRP. However, on balance we believe that this would require more complexity for little improvement in accuracy, and therefore would not propose such a change.

Question 20: How should we identify an appropriate ongoing efficiency assumption?

Our response to this question is divided into sections covering:

- External comparators
- Application to gas distribution
- Ofwat's approach at PR19
- Our plan approach
- Efficiency sense check
- Consequences of a too high assumption

Each is addressed in turn below.

External comparators

We believe Ofgem should use external comparators when assessing the potential level of productivity growth in gas distribution and should consider UK productivity historic trends and expert forecasts. We agree with the stated focus from paragraph 9.41 of the Sector Specific Methodology Decision (SSMD) that Ofgem should exclude data from those sectors where performance may still be influenced by increases in productivity after privatisation.

We support the use of EU Klems dataset to assess UK productivity trends, with methods employed for RIIO1 being appropriate in looking at comparative industries, such as construction, which is especially relevant for gas distribution. The data shows that since the financial crisis of 2007, now twelve years ago, the UK has seen a step change in productivity growth which has typically been either very low or negative, and has been 0.2% pa or lower in the first five years of RIIO-1.

Consequently, when considering likely productivity growth for the period from 2021 to 2026, unless there are good reasons for believing that the economic conditions similar to those prior to 2007 will return, we believe that experience since 2008 is likely to be a better predictor for GD2. We are aware of no external economic forecasters who expect a return to pre-recession rates of productivity growth, but there are reputable organisations which expect slow productivity growth to continue:

- 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.

Application to gas distribution

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 contracting market.

In addition, gas privatisation will have occurred 35 years ago at the start of RIIO2, 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 RIIO1 because incentives are to be lessened due to:

- the reduction in control length from eight to five years;
- the understandable added restriction of additional price control deliverables in large areas of spend such as repex; and
- 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 and it clearly has benefits on reduced traffic disruption and customer experience, with the low volume of this technology there has been no cost benefit.

Ofwat's approach at PR19

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 behind 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.

Our Plan approach

Given the evidence from external comparators and expert forecasters, and the circumstances of gas distribution in RIIO2, we expect that the potential for ongoing efficiency at RIIO2 will be significantly less than the 0.83% p.a. derived from the EU-Klems data from prior to 2007.

In our July draft business plan, in the context of an assumption of cost allowances being set using an upper quartile level of efficiency, we assumed that, for allowance purposes, ongoing productivity would average 0.5% pa, increasing from 0.3% p.a. in 2021/22 to 0.83% p.a. in 2025/26, reflecting a rise from the level forecast by the Bank of England to the pre 2007 historic level over the course of the RIIO2 period.

Efficiency sense check

When combining the results of assumptions for catch-up efficiency and ongoing efficiency, a sense check that should be used is to compare the resulting total efficiency assumption for the gas distribution sector to the productivity growth assumption taken from the outside world – given that they both represent improvements in average efficiency they should be aligned. We do not believe that the total efficiency assumption for gas distribution should be in excess of a comparable range of external benchmarks, unless there is clear evidence that the gas distribution sector is less efficient than the outside world and/or has more scope for productivity improvements.

The application of this sense check could lead to benchmarking at the average level of efficiency, the use of glide paths, or uplifts (as in the IQI), all of which have been used previously in various price controls.

Consequences of a too high assumption

Ofgem request that Business Plans assume an ambitious level of ongoing efficiency, the rationale stated in paragraph 7.16 being that this will drive the optimisation of processes and

operations and in doing so, enable networks to remain resilient in the face of change and ensure value for money.

While we support ambition, we are concerned that being overly ambitious could lead to the opposite impacts of over-stretching the sector, under-investment and/or other impacts on quality. We learned this lesson from our contracting strategy where stretching cost efficiency targets within the contracts, which included assumptions on benefits of new innovative technology, resulted in the contractors (i.e. the competitive market) placing too much emphasis on cost target delivery at the expense of both customer service and operational delivery. As such, requesting networks to submit ambitious plans is good in requiring networks to strive for improvement, but in setting cost allowances from information that is substantially independent of company forecasts, the view of ongoing efficiency should be realistic rather than ambitious when coupled with a potential upper quartile benchmark level. Otherwise there could be a material risk to overall network performance.

Question 21: How should we determine frontier shift?

We cannot see how using outturn frontier shift can help in comparing RIIO-2 forecasts. As stated, frontier shift is comprised of ongoing efficiency and RPEs. When setting price controls, we believe it is more important to understand the individual elements than the total. If over time the outturns in RIIO are different to the regulatory assumption then:

a. RPE indexation will adjust for the RPE element; and
b. The BPI sharing factor will partially account for the ongoing efficiency element.

Furthermore, as accepted by Ofgem in the SSMD, in the assessment of ongoing efficiency Ofgem will exclude sectors where performance may still be influenced by privatisation gains, which includes gas distribution. Consequently, we are not clear how trying to understand historic movements in costs for the frontier gas distribution company will help.

Finally, we note that during RIIO-1, RPE increases and UK productivity growth have both been below the levels assumed in the RIIO1 determination. Consequently, although networks have benefitted from low RPEs, the impact has been reduced by low productivity growth.

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8. Combining the elements of our cost assessment

Key Messages

a) The level of the efficiency benchmark needs to reflect the degree of confidence in the whole approach to cost assessment.
b) As stated by CEPA, with a small sample size of eight GDNs with three owners, additional years' data does not change this.
c) As in RIIO-1, the uncertainty needs to be recognised, potentially with benchmarking at median and/or glide paths.
d) We support the proposal to sum model results together before the benchmark is set
e) We would not support future cost benchmarking if, as stated in the SSMD, under the BPI it reduces Ofgem's confidence in setting allowances, and lowers incentive rates.
f) The relative weight of the aggregated and disaggregated approaches should be determined by the degree of confidence in the robustness and understanding of each of them.
g) The totex approach is the only approach to balance trade-offs between all the different activity, structural and reporting choices open to GDNs and should carry significantly more weight than the disaggregated approaches.

Question 22: Should we set the efficiency benchmark at the upper quartile level?

We believe that the level of the efficiency benchmark needs to reflect the degree of confidence in the whole approach to cost assessment – not only the level of confidence in the data and the variability in modelling results (paragraph 8.8) but also, for example, to include the suitability of the drivers used and the scale of the assumption for ongoing efficiency. Because at the moment it is too early to know what the approach to cost assessment will be, we cannot give a firm view on whether an upper quartile or lesser benchmark, such as median should be used.

The context is that for gas distribution, there is a small sample size of eight GDNs and three owners. CEPA's report (page 23) notes that despite the availability of additional years since GD1, the number of comparators has not changed and so although there are more observations the overall 'between' variance (i.e. the relative performance between GDNs) has not been enhanced to the same degree. Consequently any single approach to cost assessment will be flawed.

In GD1, Ofgem recognised the uncertainty in cost assessment by:

- Adopting top down and bottom up modelling approaches;
- Calibrating each approach using historic and forecast costs;
- Applying IQI interpolation, so that allowances comprised 75% Ofgem assessment and 25% GDN Plan costs; and
- Reducing the totex incentive rate the bigger the gap between Ofgem's assessed efficient level of costs and GDN Plans.

The variation in models between the highest and lowest for each GDN at the RIIO-GD1 price control averaged 6% with one GDN having a difference of 12%. The IQI uplift resulted in a 1.5%-4.4% increase, in part, compensating for the uncertainty.

Having recognised the uncertainty in cost assessment, Ofgem was sufficiently confident to apply an upper quartile level of benchmarking. Given that the last two features will not be used in GD2, this would be expected to weaken the degree of confidence in the approach to cost assessment. Against that, Ofgem's intention – which we welcome - to sum all the model results together (including Business Support costs) before setting the benchmark should provide greater confidence. This is statistically the correct method, which we note Ofgem used when combining the results of the RIIO-ED1 models.

If there is no more confidence in the entire approach to cost assessment than at RIIO-1, options including benchmarking at median levels, applying uplifts or glide paths to the result will need to be applied.

We believe that in developing the approach to cost assessment Ofgem should consider the alternative options set out in this consultation and responses received consistent with Ofgem's stated objective for cost assessment as explained in paragraph 13.26 of the SSMD: **"*we will aim to set expenditure allowances and output targets in a way that does not anticipate any sector wide outperformance, nor underperformance*."** Consequently Ofgem needs to set allowances in such a way that the average GDN should be able to recover its costs in RIIO-2.

Question 23: Are there types of expenditure that we should model using only historical or forecast data?

This question raises issues in respect of cost assessment modelling and also the interaction with the Business Plan Incentive.

Cost assessment modelling

We believe that the key issue is that GDNs, Ofgem and CEGs are able to understand how and why future costs are expected to be different from past costs, and can quantify changes – which could apply to all GDNs equally, to some more than others, or to some not at all – robustly. As long as potential changes are understood and robust, in principle it should not matter whether only historic costs are benchmarked, with adjustments made to reflect future changes, or forecast costs are benchmarked also.

We do not believe that Ofgem should use **only** forecast data if historical data is available for a certain activity - historical data should be fixed and generally reliable, whereas because the future is fundamentally uncertain, the most diligently prepared forecast could be significantly different to future reality. Ofgem's approach for GD1 reflected this in that historic and short-term forecast data was used – longer term forecast data not proving to be sufficiently robust.

We note that if forecast information is to be benchmarked it will be important to compare GDNs on a like-for-like basis, so that differences in the treatment of uncertainties and output levels are fully taken into account. If not done, GDNs that include more uncertainties or higher output levels in their base costs would be unfairly penalised in cost assessment.

A further issue noted by CEPA was whether the time periods for future cost modelling need to be consistent across activities. We believe that it is essential that they should be consistent. To select benchmarks for different activities from different years would be likely to result in a great deal of cherry-picking, leading to cost allowances that were significantly below the upper quartile, median or whatever level of benchmark is selected. Furthermore, it would be incompatible with the totex approach to benchmarking, which, based on GD1, is likely to be the most robust approach available.

Interaction with Business Plan Incentive

We note that, under the Business Plan Incentive (BPI), Ofgem intends to base allowances predominantly based on historic costs so as to have confidence in the reasonableness of its allowances. Paragraph 11.36 of the SSMD states that "*Our baseline for setting cost allowances should be constructed from information that is substantially independent of company forecasts*." Ofgem's BPI policy suggests a limited role for benchmarking future costs, however, this policy is not reflected in the Cost Assessment consultation paper.

While we consider that future cost benchmarking could reasonably have a role in cost assessment, we would not support this if it led to a reduction in Ofgem's degree of confidence in the ability to set cost allowances, and so to lower incentive rates.

Question 24: If we use a combination of aggregated and disaggregated modelling approaches, how should we determine the weight we apply to each?

We agree that a number of different modelling approaches should be considered, including a combination of aggregated and disaggregated approaches.

We believe that the relative weight of the different approaches to be combined should be determined by the degree of confidence in the robustness and understanding of each of them.

We note that the consultation paper makes reference to "*limitations of the totex model*" in paragraph 3.19. These are not described in the consultation paper, but the accompanying CEPA report on pages 14 and 52 describes them as follows:

1. They can place constraints i.e. fixed weights on the underlying cost drivers.
2. The interpretation of model coefficients is challenging particularly where scale and workload drivers are combined in a CSV.
3. There is a risk that aggregative models do not capture exogenous cost drivers, especially for investment.

4. The efficiency assessment is likely to be sensitive to model choices e.g. explanatory variables and also reflect prior economic / engineering expectations.

Taking each in turn, we agree that the RIIO-1 approach placed fixed weights on drivers. However, we do not see this as a problem. For RIIO1, Ofgem initially allowed the totex model find the weights, but recognising that the resulting weights were not robust and ran counter to engineering and economic logic, opted for fixed weights reflecting relative industry spend. This decision reflected the underlying problem, acknowledged by CEPA, that there is a small sample size, only eight GDNs and three ownership groups and that consequently, letting the model find its own weights was not robust.

Taking the second issue, the interpretation of model coefficients, again we do not see this as a problem under the RIIO1 approach. Workload drivers are used where possible, MEAV where not, with weights determined according to relative industry spend. The approach is straightforward, transparent and logical.

For the third issue, the risk that exogenous cost driver are not captured especially for investment, this appears to be drawn from problems associated with the PR14 approach to totex modelling, which excluded workload drivers. For gas distribution, the fact that robust cost workload drivers exist for most investment spend means that this should not be an issue. To the extent that there are categories of investment spend for which there are no good workload drivers, for example vehicle replacement, a measure of scale e.g. MEAV can be used, and we note that this weakness applies equally to bottom-up as well as top down analysis.

In respect of the fourth issue, all models are sensitive to choices on matters such as explanatory variables. The key point is to select the most suitable and robust drivers for all models. The fact that the RIIO1 model reflected engineering and economic expectations could be considered a strength rather than a weakness – Ofgem considered it a more robust approach than letting the model find its own weights at GD1.

Having addressed the potential disadvantages of the disaggregated approach, we consider the advantages. It overcomes GDN differences associated with:

- cost allocation;
- accounting policies;
- insource / outsource decisions;
- organisational structures; and
- solution choices.

Consequently, although we believe that disaggregated approaches are essential in providing information on cost drivers and regional factors, we consider that the totex approach is the **only** approach to balance trade-offs between all the different activity, structural and reporting choices open to GDNs, and is therefore the approach in which Ofgem should have the highest level of confidence.

As presented in CAWG, in order to provide insights into the development of our business plan, we have taken the RIIO-1 methodology to identify our current performance, i.e. 2017/18 by using data from the RRP data share. In doing this we have maintained the basic structure of the models but updated model coefficients/drivers. The strength of the totex approach is illustrated by the fact that a number of the bottom-up models, even with updated model co-efficients and drivers, have a relatively poor fit using data from the 2017/18 RRP share – an R^2 of under 0.7, compared to over 0.9 using the totex model.

Therefore, we consider that totex approaches are likely to be more robust than disaggregated approaches, and consequently that they should carry more weight.

In advance of Ofgem's modelling being finalised, we cannot specify reasonably how much additional weight should be given to the totex approaches, which will be a matter of judgement, although at present we have assumed a 67% weight for the totex approach in our July Plan.

End