

FURTHER ANALYSIS OF OFGEM'S PROPOSAL TO ADJUST BASELINE ALLOWED RETURNS

A report prepared for the ENA

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EXECUTIVE SUMMARY

In its Draft Determination Ofgem proposes to make a downward adjustment of 25 bps to the allowed cost of equity for GD2/T2 to reflect its expectations that companies will outperform the targets that it sets at these price control reviews. Further, contrary to well-understood and longstanding practice, Ofgem's proposals do not "aim up" within the range it has identified for the allowed return on equity.

Frontier Economics was commissioned by the ENA to comment on Ofgem's proposed approach on this topic when it introduced the concept in its Sector Specific Methodology Consultation¹. The first Frontier report was submitted to Ofgem last year. In its Sector Specific Methodology Decision, published in May 2019, Ofgem summarised what it considered the key points made in Frontier's report and responded to those points. Ofgem's Draft Determination, published in July 2020, also references the first Frontier report on this topic.

This report seeks to respond to all of the points raised by Ofgem in response to our first report, both in the Sector Specific Methodology Decision and also in the Draft Determination. It also responds to additional evidence and new points that Ofgem makes in its Draft Determination. We summarise our key arguments below.

Aiming up

In our first report assessing Ofgem's proposal for the ENA, we argued that Ofgem should aim up when setting an allowed return within the identified reasonable range for the cost of capital. We based this conclusion on a review of the relevant academic literature (in particular the model presented in Dobbs (2011)) and regulatory precedent.

The in principle arguments for aiming up are very strong

We remain of the view that the public policy case for aiming up is clear and unambiguous. It is a prudent and precautionary response to the asymmetric risks that arise as a result of the need to set a point estimate for the cost of capital in the face of material uncertainty over what the true required rate actually is. The downsides of getting this number too high are relatively modest. But the downsides of getting this number too low are anything but, as it may cause network companies to under invest, and such underinvestment can create material consumer detriments. In this report we go further than in our previous analyses to show that even a small diminution of service in respect of just one of these potential detriments (quality of service) can easily more than offset the benefit of not aiming up.

Ofgem is yet to identify a line of argument that clearly supports an alternative policy of not aiming up. In response Ofgem has offered little defence of its position, but has chosen instead to bring forward specious examples that purport to demonstrate how aiming up will not work, or will not be effective.² Ofgem's example

¹ Ofgem (2018), RIIO-2 Sector Specific Methodology Consultation Annex: Finance, section 3

² Ofgem (2020), RIIO-2 Draft Determinations Finance Annex, para 3.146

involves comparing the choice a company has about whether to invest more or invest less, based solely on trading off the benefits to it that would arise from:

- rewards from the totex incentive mechanism should it not invest and hence underspend;
- against the benefit that Ofgem considers the company would receive through aiming up if it did invest.

Under Ofgem's example, a decision to aim up simply creates an unnecessary extra wedge of return, that the company would trade off against other sources of additional profit. Ofgem's conclusion is that it would take many years for the benefit from aiming up to pay off, and therefore doubts the effectiveness of the aiming up policy in bringing forward any extra investment.³

This absurdity of the example can be seen if we actually take Ofgem's illustration to its logical conclusion. Under Ofgem's logic companies have no incentive to invest at all. On the contrary, companies will always be better off not investing and saving money. However, this would clearly be an absurd and an entirely infeasible strategy for a company to adopt, and Ofgem's example serves no practical purpose.

Ofgem's argument is concerning as it serves to illustrate that it continues to misunderstand the principle of aiming up. The intention is not to offer a wedge over and above the true underlying cost of equity to shift incentives to invest more. It is to avoid inadvertently setting the cost of capital too low, given the asymmetric risks associated with failure to invest. The logic is simple then – set the number (by accident) too low and investment will most likely not be viable and will not proceed.

CMA's position on aiming up in the recent NERL redetermination

In its final report for the NERL redetermination, the CMA has considered the question of aiming up. It looked into three factors that it considered as possible reasons to depart from the midpoint of the range. These are:

- potential bias in the cost of capital range;
- potential asymmetries in the broader price control settlement; and
- potential asymmetries in the balance of risk between getting the cost of capital too high or too low.

For the first factor, the CMA concluded that its cost of capital range did not suffer from bias. For the second factor, the CMA acknowledged some asymmetries in some of the incentives in the price control and proposed a number of mitigations to the risks that NERL identified regarding capex incentives.

For the last factor, the CMA recognised Frontier's submission on behalf of the ENA on the topic of aiming up due to the asymmetry of getting the cost of capital too high and too low, and it accepted that there might be an argument that, in the long run, customers' interests were served by a small premium to the cost of capital. In particular the CMA stated:⁴

³ Ofgem (2020), RIIO-2 Draft Determinations Finance Annex, para 3.146

⁴ CMA, 2020, NATS (En Route) Plc /CAA Regulatory Appeal Final report, Page 246

“If there were positive externalities and longer-term benefits to consumers from identifying and investing in new capital projects, then we agreed that there could be a case for a long-term premium on the cost of capital.”

Even though the CMA has ultimately decided for NERL not to aim up, it has not taken a view on whether or not our view expressed in the report for the ENA would be justified in the energy sector.

Unlike the regulatory settlement for NERL, Ofgem's RIIO-2 settlement has the potential to leave a material amount of investment with positive externalities (such as environmental benefits) unexplored due to the possibility of setting the allowed return too low. We believe that the framework set out by the CMA in the NERL case would lead a rational regulator to aim up in the context of the energy sector.

The practical effect of failure to aim up

Despite the simplicity and power of the case for aiming up, it would appear that we are now on the brink of shifting to a new paradigm, in which regulators do not always aim up, as signalled by Ofgem, and as signalled by the CMA in its decision for NERL. Where the CMA has historically aimed up toward the top of its range of allowed returns, it has now aimed for the middle in the NERL case. The CMA has however left open the door to aim up in some other sectors.

As a simple matter of fact, a move away from aiming up must increase the risk that the returns on offer to invest are no longer as attractive as they were. Maybe the level of return on offer will still prove to be sufficiently attractive to bring forward all required investment. But the risk that it is not sufficient must have increased by some quantum, and given the difference between the top and middle of most COE ranges, it seems reasonable to assume that this increase in risk will not be trivial.

The practical effect of this is that, going forward, we are now more likely to find companies facing more borderline investment decisions. Companies may become increasingly indifferent between delivering an investment under this more onerous set of commercial arrangements, or simply choosing not to bother, thereby eliminating delivery risk, but depriving consumers of all the benefits that would have arisen above the cost of delivery. It is this heightened risk that investment is no longer attractive that the CMA has chosen to take on behalf consumers in respect of its NATS determination. We will watch with interest to see how the sector evolves following this change as it may make an interesting case study in the future.

The practical effect of aiming down

But Ofgem intends to go further. It does not intend to aim for the middle, but owing to the outperformance wedge it intends to deduct from its central estimate, it intends to aim towards the bottom of its range. Where the CMA has decided to accept a heightened risk that its determination may fail to attract investment, Ofgem has chosen a policy that will greatly magnify this risk. Now it must be much more likely companies will look at individual investment decisions and wonder why they are bothering.

This is not to say that essential investment, for example to ensure the safety of assets, will not proceed. Networks are subject to a raft of licence obligations that must be met and the penalties that would arise for failure to meet those are potentially severe. But for any more discretionary investment, where the commercial case for an investment is weak, where the nexus of allowances and tight project specifications create risks of future penalty or disallowance, it seems increasingly plausible – perhaps even likely – that companies will choose to not take on such projects.

The combined effect of UMs/PCDs and ex post regulatory risk with aiming down

Now that we have been able to see all aspects of Ofgem's proposed design for RIIO-2 we consider that a failure to aim up will be particularly harmful in the present circumstances.

Ofgem intends to pass a substantial proportion of expenditure at RIIO-2 through uncertainty mechanisms instead of providing ex-ante funding allowances. While the use of reopeners can be justified in certain scenarios, the increased use at RIIO-2 creates additional uncertainty around the amount of investment that will ultimately be funded. It will require companies to carry out further work to justify the needs case of investments during the price control period, which will be burdensome and costly. Ofgem may choose to disallow some proportion of planned costs, creating a highly challenging target. And even in the world where a project is ultimately allowed and fully funded, there will be a delay while companies need to wait while the decision is made. This shift in approach clearly reduces the attractiveness of investment in the sector.

Now couple this regulatory risk from the operation of UMs with an aimed down cost of capital, and furthermore note that under many UMs the trigger for a potential reopener is a business case being brought forward by the company.

Why would a company bother to bring forward a business case in a world where their primary incentive to invest – the allowed rate of return – has been set too low, and where by doing so it exposes itself to a potential funding crunch, delivery risk and material regulatory risk from ex post review?

It is our view that should this set of circumstances come to pass, there is a material risk that Ofgem will simply see proposals from the companies for additional funding drying up, unless the spend is absolutely necessary to meet a clearly specified licence obligation.

Against this backdrop, it is particularly risky for Ofgem to adopt its new approach of choosing not to aim-up. It increases the risk that, if the cost of equity is set too low, there will be significant underinvestment in the sector with a range of detriments to consumers arising as a result.

Overall effect on investment

The combined effect of not aiming-up and other RIIO-2 mechanisms that have reduced the attractiveness of investments in the sector should not be underestimated. Under these circumstances, why would companies do anything

else than simply carry out the core aspects of their business? Companies may well see opportunities for projects that could unlock significant customer or wider environmental benefits, but are now likely to lack any real incentive to come forward with those plans. The hope would be that this suite of potential projects are at least kept on the stocks, such that they might be brought forward at a future price control review should the commercial framework become more attractive, but that is by no means certain. Even within the stylised Dobbs model, there is a cohort of “now or never” investments, and if those are not pursued then the potential benefits of that new service are lost forever.

The commercial case for networks to play a leadership role, proactively seeking out opportunities to deploy capital in order to pursue service improvements, future efficiencies, new services, or progress towards environmental targets – including Net Zero – will have been fatally undermined. The overall effect of this is that companies will focus entirely on core projects, and then run down the merit order list of projects to determine what can and cannot be carried out. Any discretionary projects will be at severe risk of not being completed.

Given the impact the energy industry already has, and the potential benefits that it could bestow on the general public and the environment, this is a particularly troubling set of scenarios. As is well-known to Ofgem, companies need to invest to maintain their excellent safety records to reduce the risk of their inherently dangerous networks leading to accidents for employees and the general public. Companies need to invest to maintain the reliability of the networks that we are all becoming increasingly reliant on. Companies need to invest to reduce the environment impacts that running the networks can have. Companies also now have the opportunity to invest to support the economic recovery from the global pandemic and also to play a crucial role in meeting the net zero targets, both of which have the potential to deliver material benefits for the wider population.

Despite these risks, Ofgem is yet to carry out a formal impact assessment of its proposal to aim down. Now that we can see the full RIIO-2 package, we urge it to do so.

Use of an outperformance wedge

Ofgem decided in its Sector Specific Methodology Decision that it would adjust the baseline return downward by a wedge to account for the expected outperformance in RIIO2.⁵ Ofgem seems to have based its proposal on the recommendation from the UKRN paper where a subset of the authors (Mason, Pickford and Wright) concluded that regulators should set the allowed return taking into account any anticipated outperformance such that the expected rate of return is equal to the WACC.⁶

In our original report, we examined Ofgem’s motivation and assumptions behind making an adjustment to baseline returns to take account of anticipated outperformance. We disagree strongly with MPW’s recommendation because their model (and consequently Ofgem’s proposal based on their model) is flawed, they

⁵ Ofgem (2019), RIIO-2 Sector Specific Methodology Decision Annex: Finance, para 3.300

⁶ Wrights, Burns, Mason, Pickford, 2018, Estimating the cost of capital for implementation of price controls by UK Regulators, UKRN

provide no guide on how to implement their proposal, and their assessment of wider impacts is non-existent.

In its Draft Determination, Ofgem set out a range of new analysis to support a revised calibration of the outperformance wedge, down from 50 bps to 25 bps.

This report sets out the reasons why we continue to believe that Ofgem's outperformance wedge is a misguided and flawed regulatory instrument. It also examines the new evidence that Ofgem has brought forward to inform on quantum, and considers various other aspects of Ofgem's developing policy, including the proposal to include an ex post true up.

Unintended incentive and other effects of outperformance wedge

We continue to believe that as a matter of principle, the proposal to adopt an outperformance wedge is flawed owing to the raft of negative effects that it will have on the wider regulatory framework and the harmful consequences for incentives. Ofgem, or any other advocate of the policy of aiming off, is yet to provide a compelling argument for why these detriments either will not arise or why they are on balance worth living with.

In our original report, we explored thoroughly the unintended consequences that would arise from Ofgem's proposed approach. We outlined in detail how Ofgem's proposal would:

- erode investor confidence and increase investor risk;
- weaken incentives for efficiency and innovation;
- distort managerial incentives to invest; and
- weaken the clarity over how the price control is calibrated.

Each of these has the capacity to be materially harmful in its own right, reducing confidence in the stability and transparency of the existing regulatory and commercial arrangements, and likely having the effect of stimulating weaker ongoing performance improvements and increasing the cost of capital.

Where Ofgem has previously expressed doubts of our arguments (e.g. in its Methodology Decision document), we have attempted to address them again more thoroughly in this report. In its draft determination, Ofgem has said next to nothing about the negative incentive effects and other effects of its proposals, focusing all of its attention on calibrating the wedge.

In this report we go further than in previous work to estimate the potential harm that arises as a result of the weakening of incentives that would inevitably arise when an outperformance wedge calibrated on the basis of past performance is added as a new regulatory instrument.

Our results from this analysis show that the effect of a loss in even a small proportion of the expected efficiency gains going forward would cause large consumer detriments. In a reasonably conservative scenario where 10% of the net productivity gains in the energy sector are removed by the adjustment for anticipated outperformance, the annual loss in cost savings due to compromised productivity gains would outweigh the gain (from the 25 bps deduction) by 2027/28.

We have also calculated at what point the loss in productivity would outweigh the consumer gains brought about by the lower equity returns. To do this we discounted the above cash flows over the next 50 years and analysed the net present value (NPV) of those cash flows. We found that if the annual net productivity gains are eroded by anything more than around 3%⁷, due to changes in the strength of the incentives regime brought about by the 25 bps outperformance-based reduction on equity returns, the present value of the productivity losses to the sector would outweigh the present value of the gains for the customers.

We consider that it would be prudent for Ofgem to make its own assessment on the potential damage that can be caused by the proposed outperformance adjustment to baseline returns, before it presses ahead as the only regulator to implement this mechanism. We have not yet seen satisfactory assessment from Ofgem to date to suggest that the pros and cons of this mechanism have been appropriately considered.

Quantification of the wedge

Our main objections to Ofgem's approach are in relation to the unintended negative effects of applying an outperformance wedge. Therefore, whether the wedge is 50 bps, or 25 or 101 is, to a large extent, irrelevant as those criticisms would remain regardless. Nonetheless we have reviewed Ofgem's analysis in relation to the quantification of the wedge.

In its Draft Determination, Ofgem introduced three new pieces of analysis to support its revised outperformance wedge of 25 bps. These are:

- A review of historical cost outperformance across many price controls and sectors (contained in the "AR-ER database.xlsx" file);
- An attempt to show what performance in RIIO-1 would have been under the RIIO-2 framework (contained in the "Residual outperformance.xlsx" file); and
- Ofgem's assessment of what can be properly inferred from prevailing MARs and past transaction premia (contained in the "Simple MAR application model.xlsx" file).

All of the historical analysis Ofgem presents is subject to a critical weakness: RIIO-2 is set to be a significantly different price control to RIIO-1 (and even more so to predecessor price controls) in a large number of ways. This means that any assessment of what companies have previously achieved does not provide useful information on future potential outperformance. In particular, the RIIO-2 framework includes the following changes:

- the indexation of RPEs;
- widespread use of PCDs;
- changes to the NARMs framework;

⁷ Our calculations are based on Ofgem's own productivity assumptions of 1.2% for capex and 1.4% for opex. We have approximated this by using an assumption of 1.3% for all costs. This means that if the 1.3% annual productivity is eroded by 3% (or more), such that the annual productivity improvement is only 1.26% (or less), then the impact of this productivity loss would outweigh the gains from the lower cost of equity.

- a tougher approach to benchmarking (e.g. using the 85th percentile as the benchmark rather than the upper quartile);
- a tougher productivity assumption, despite most of the evidence pointing to the number now being, if anything, lower than in the past;
- the removal of “interpolation” as part of the IQI process;
- the widespread use of penalties under the new BPI and the removal of the opportunity to receive fast-track rewards; and
- a significant toughening of the calibration of the suite of ODIs to which companies are exposed.

Any representation of historical data would need to adjust for the above in order to provide a sound basis from which to draw valid conclusions of potential future outperformance.

While Ofgem attempted to account for these differences in the second strand of its analysis, our review of that work shows that Ofgem failed to take account of all of these differences. Ofgem’s conclusion that the new analyses support its revised outperformance wedge of 25 bps is therefore unfounded.

Below we provide a summary of our response to each of Ofgem’s three strands of analysis, and we also provide a summary of our updated work for NGN on the potential scale of RIIO-2 performance.

Ofgem’s totex outperformance database (AR-ER database.xlsx)

Ofgem has collated a substantial body of raw data on cost performance across multiple sectors and over time, drawn from underlying data on allowed and outturn costs across a range of sectors. Based on analysis of this database Ofgem concludes that historical totex outperformance across the sectors examined has averaged 7% over time.⁸ From this Ofgem argue that the proposed 25 bps wedge is small compared to the outperformance that must be expected given historical outperformance.⁹

We have substantial concerns with Ofgem’s approach, as outlined below.

- Ofgem’s overall approach hinges on the assumption that it is robust to make inferences on future outperformance by reviewing achieved past outperformance. On its own, this is a risky assumption to make, as such an approach would fail to take account of any changes or differences between the past and the future.
- Ofgem’s database includes early network price controls (e.g. DPCR1, 2 and 3, PCR2002) which have methodologies that are far removed from that which has been set for RIIO-2. This ancient history therefore tells us nothing meaningful about likely levels of performance during RIIO-2. If we exclude these price controls from Ofgem’s analysis, the average outperformance falls to 3.7%.

⁸ Ofgem (2020), RIIO-2 Draft Determinations Finance Annex, para 3.123

⁹ Ofgem (2020), RIIO-2 Draft Determinations Finance Annex, para 3.127

- Even relatively more recent history from RIIO-1 is not a reliable guide of RIIO-2 performance, since Ofgem makes no adjustments to take account of the important differences between the RIIO-1 and RIIO-2 frameworks.
- In addition to data from the energy sector, Ofgem includes data from a range of other sectors (airports, air traffic control and the water sector). There are material differences between these price control approaches, and Ofgem makes no attempt to reflect these differences in the way it reviews the data. Consequently, we cannot draw any informed conclusions from this on the likely levels of performance in RIIO-2.
- Ofgem claims it has a large sample size and this strengthens the results from its analysis. Ofgem fails to recognise that performance across companies within the same price control is not statistically independent. This means that in counting the number of companies included in its database, Ofgem is grossly overstating its sample size.

Overall, the data that Ofgem has compiled gives us no meaningful view of likely performance at RIIO-2. It is also instructive to consider how other UK regulators have apparently viewed this data. While Ofgem appears to give significant weight to this evidence, which includes data from water and aviation price controls, the other UK regulators (including Ofwat, the CAA and the CMA) must have had access to the same data – in particular data for their own sector – and drawn a different conclusion to Ofgem. None of the other UK regulators have viewed this evidence and concluded that it is necessary to include an outperformance wedge. Ofgem's conclusion and approach is therefore at odds with all other UK regulators.

Ofgem's analysis of RIIO-1 performance restated to a RIIO-2 basis (Residual outperformance.xlsx)

An alternative approach used by Ofgem to estimate the likely levels of outperformance at RIIO-2 is restating RIIO-1 historical returns in a RIIO-2 context. To do this, Ofgem has gathered data on RIIO-1 outperformance across all energy network operators and has made various adjustments to the underlying data. The adjustments are intended to reflect the differences between the regulatory instruments at RIIO-1 and RIIO-2, and show what the RIIO-1 outperformance would have been if the RIIO-2 framework applied instead.

However, having reviewed Ofgem's approach and workings, we have identified serious methodological issues and a calculation error in the analysis. As a result of these failings, Ofgem's approach materially underestimates the scale of changes it has made for RIIO-2 and the conclusions it draws from its analysis are incorrect and misleading.

In restating RIIO-1 performance on to RIIO-2 basis, Ofgem has:

- Excluded items not relevant for RIIO-2: equity return on RAV & Information Quality Incentive (IQI);
- Excluded debt and tax performance;
- Adjusted for the effect of indexing Real Price Effects (RPEs);
- Replaced RIIO-1 incentive strengths with RIIO-2 incentive strengths;
- Replaced RIIO-1 notational gearing(s) with a RIIO-2 benchmark level of 60%;

- Replaced RIIO-1 Totex: RAV ratios with RIIO-2 levels ; and
- Excluded non-totex incentives from RIIO-1 levels.

We agree that all of these adjustments are broadly sensible, but, as noted above, many further changes are needed.

However, there are very many further adjustments that are needed to complete this restatement exercise. In particular Ofgem has failed to adjust for:

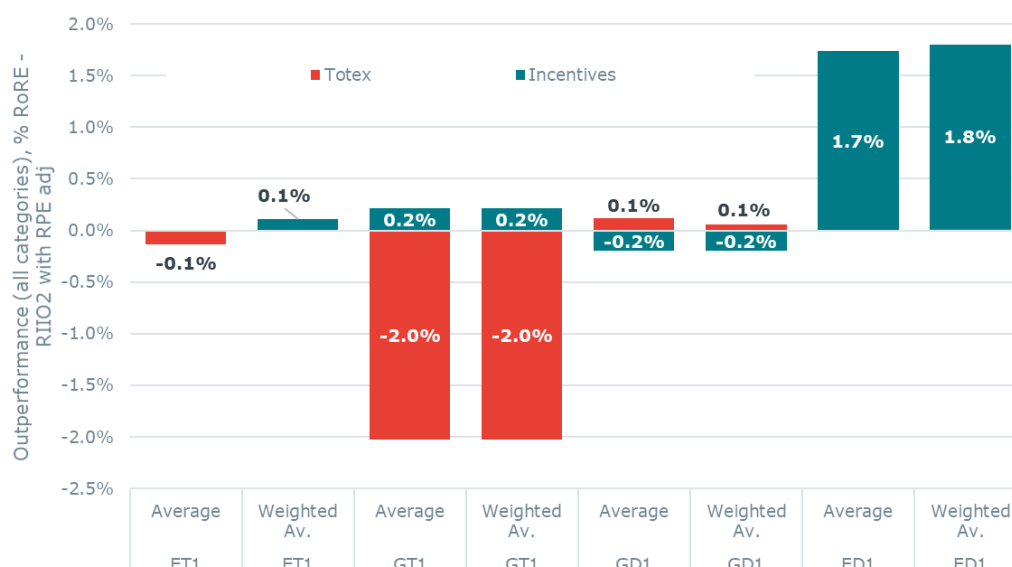
- the tougher approach that Ofgem has adopted to benchmarking (e.g. setting the frontier at the 85th percentile for GDNs rather than the upper quartile);
- the wider application of a catch up efficiency challenge to wider set of costs in respect of the GD sector;
- the material toughening of benchmarking approach in respect of the transmission sector, which has led to an unprecedented level of disallowance;
- the higher assumed productivity, despite most of the evidence pointing to the number now being, if anything, lower than in the past;
- the application of this efficiency challenge to a broader set of costs;
- the use of “interpolation” as part of the IQI process historically, which is no longer used;
- the widespread use of penalties under the new BPI and the removal of the opportunity to receive fast-track rewards;
- the widespread use of PCDs and UMs which will greatly mitigate the scope for future outperformance across the segment of the cost base over which they operate;
- the changes to the NARMs regulations, which again remove any scope for material outperformance;
- the marked toughening in approach to calibration of a range of output incentives; and
- the switching off of some incentives between RIIO-1 and RIIO-2.

Ofgem also makes a spreadsheet error in its adjustment of RPEs that materially overstates the levels of outperformance for RIIO-GT1.

We have attempted to update Ofgem's analysis to take account of a number of these factors, although it has not been possible to account for all of them in the time available. Overall our analysis shows (see Figure 1) that there is very little prospect of any outperformance at RIIO-2 (putting to one side the ED sector for which it is far too early to comment on what Ofgem intends).

In particular, our results show that there is almost no opportunity to deliver totex outperformance, and this is despite the fact that there are additional changes between RIIO-1 to RIIO-2 which have not been reflected in our analysis (such as the introduction of NARMs and PCDs).

Figure 1 Results from our analysis of outperformance restatement



Source: Frontier Economics

Note: This should be compared with Figure 18 in the DD Finance Annex.

Ofgem's inferences from MARs and transaction premia (Simple MAR application mode.xlsx)

Ofgem's third strand of evidence to support its proposed outperformance wedge is evidence gathered for it by CEPA on the MARs of the five listed GB utility firms (SVT, UU, PNN, NG, SSE) and transaction premium drawn from analysis of recent private infrastructure transactions in the UK.¹⁰ Ofgem uses this analysis to simultaneously inform its calibration of the cost of equity allowance and the outperformance wedge.

However, we consider that Ofgem's reliance on the MAR to calibrate allowed returns (either the overall level or an outperformance wedge) is misguided. This is because:

- using volatile market information to fine tune allowed returns has the potential to introduce volatility into regulatory determinations, something that is inconsistent with the long-run nature of these businesses and their very long-term planning horizons;
- most market observers would accept that equity prices can move in ways that are not perfectly correlated with the fundamentals of valuation, hence MAR evidence is difficult to interpret and must be treated with considerable caution;
- Ofgem relies extensively on evidence from the three listed water companies, which we do not consider to be a reliable basis on which to draw inferences for energy networks;
- the transaction premia cited by Ofgem are out of date;
- if Ofgem were capable of measuring energy network MARs and used these to fine tune allowed returns, then this is likely to lead Ofgem to over-correct at RII0-2 (and at future price controls) for past outperformance;

¹⁰ Ofgem RII0-2 Draft Determination – Finance Annex, paras 3.133 to 3.138, and Figure 19

- introducing a MAR cross check has the potential to further weaken the incentives for companies to outperform, for the same reasons as does applying an outperformance wedge; and
- the process of fine tuning of allowed returns introduces another source of arbitrary regulatory judgement with the potential for the resulting regulatory risk to be asymmetric, as regulators may be happy to adjust allowed returns down but far less happy about adjusting them up.

Our estimation of the size of RIIO-2 performance

We have separately been asked by National Grid and NGN to undertake an analysis of the outperformance wedge at RIIO-2, using the same framework from our previous analysis for NGN. We apply this framework to NGGT, NGET, and a notional GDN.

In summary, we have not identified a reasonable basis on which either transmission company or a notional GDN can be deemed to have expected outperformance of 25bps in RoRE terms during RIIO-2. Our findings cast serious doubt over the validity of Ofgem's assumption that 25bps of outperformance is a valid central assumption.

Our core model suggests that companies should expect to underperform at RIIO-2. In RoRE terms, we expect this underperformance to be:

- -0.20% for NGET;
- -0.26% for NGGT; and
- -0.20% for a notional GDN.

This result arises despite the fact that we have introduced several assumptions that would tend to bias these results upwards relative to a more balanced approach.

The overall results are robust to changing the modelling assumptions around totex performance and different correlations.

Another key conclusion to draw from this analysis is that the firms are not only expected to underperform, but also there is a low probability of exceeding the 25bps, the point at which Ofgem has set the outperformance wedge. The likelihood of outperforming by 25bps or more is, in our (conservative) base scenarios, around:

- 1.7% for NGET;
- 12.6% for NGGT; and
- 25% for a notional GDN.

This suggests that the outperformance wedge cannot be applied ex-ante, because in the majority of cases, the outturn performance is likely to be lower than the point at which the wedge is set.

Finally, we note that one interpretation of our finding of expected underperformance may be that rather than applying a deduction to the headline cost of equity, Ofgem should apply an uplift. We would encourage the reader not

to reach this view. We disagree in principle with Ofgem's proposition that the allowed return on equity should be adjusted to account for expected outperformance (or indeed under-performance).

Appraisal of ex-post adjustment

In its Draft Determination, Ofgem considers introducing an additional mechanism whereby companies' returns will be topped up at the end of RIIO-2, if realised outperformance is not as high as expected. In particular, if average outperformance is below 0.25 bps, the mechanism will apply, up to a maximum top-up of 0.25 bps.¹¹ In addition, this ex-post assessment will be based on the average performance across a group of companies (for two groups - gas companies and ET companies), at the end of the RIIO-2 price control period rather than annually.

The ex post mechanism may prima facie appear to helpfully mitigate some of the potentially harmful effects of the existence of the wedge in the first place. However our analysis highlights that it has the potential to weaken incentives for outperformance even more despite its yardstick based design, adding to the problems created by the use of the outperformance wedge in the first place. This is an important detriment.

Moreover the desire to use a yardstick is brings with it further practical design problems.

- **Need for a level playing field in the yardstick group:** The validity and credibility of any yardstick system applied in this way rests heavily on having a sufficiently reliable cost assessment methodology across participants to ensure that the appraisal of average performance is fair and even handed. For the ex-post true-up to be considered valid, the group of entities put together into each yardstick group would need to consider that they all start from a similar position and any differences in outturn performance arise from managerial competence, not from mis-calibration by Ofgem.
- **Difficulty in creating a level playing field in practice:** Marked differences between the companies within a group being considered in a yardstick regime could lead to arbitrary and therefore unfair outcomes (e.g. differences in totex incentive rates, ODI frameworks and regional differences for gas companies; bespoke business plans and output regimes for electricity transmission companies). These differences may be amplified by different totex:RAV ratios across the companies in a group.
- **Potential for tacit collusion:** This is at least a theoretical concern. If all companies are performing in a lacklustre manner as the control goes on, then there would be a great "easy life" benefit if all took their foot off the gas.
- **Weakened incentive to collaborate:** The type of ex-post incentive envisaged would materially harm any scope for co-operation across the sector on output delivery. Any licensee which identifies a great new innovation or pushes the boundaries of best practice is unlikely to want to share that information with

¹¹ Ofgem RIIO-2 Draft Determination – Finance Annex, para 3.153

others, since better performance by others in the sector would now reduce the prospects of a true-up being applied.

- **Impact on long-term productivity:** We have noted the behavioural changes and consequent negative effects on long-term productivity that would be triggered by a deterioration of incentives to network companies. The ex-post true-up being considered here by Ofgem would not in any circumstances offset the negative impact on productivity, and in many cases, makes the impact much worse.
- **Impact on financeability:** Ofgem has included this ex-post true-up mechanism in its financeability assessment. We believe this is not appropriate. There can be no certainty that the true up would kick in for any particular company as it operates at the sector level. Moreover, any appraisal of whether to trigger the ex post adjustment to the performance wedge would be subject to regulatory risk as part of the close out process. In any event, given the timing with which the true up would be triggered, it cannot generate additional cashflow during the RIIO-2 period and hence cannot support financeability over that time window.

Alternatives to outperformance wedge

In its Draft Determination, Ofgem briefly considers the following four policy alternatives to the outperformance wedge:

- a) Set neutral cost and performance targets;
- b) Lower incentive strengths;
- c) Asymmetric incentives or incentive strengths; and
- d) Competed, fixed or zero pot for incentives.¹²

Ofgem considers that, due to information asymmetry and based on its assessment of historical performance, option A would be improbable.¹³ We strongly disagree with Ofgem on this point. It is perfectly possible to set ex-ante symmetrical targets: this has been achieved by Ofgem and other regulators in the past. As an example, Ofwat set the Final Determinations for the water companies in England and Wales in December 2019. It has arguably set tremendously challenging packages for the water companies and an unprecedented four companies are appealing this decision at the CMA. Even by Ofwat's own estimation, PR19 shows a profile of risks for most water companies with a slight tilting towards the downside.¹⁴

Further, our review of the evidence suggests that even before the outperformance wedge has been applied, Ofgem has almost entirely removed the potential for outperformance at RIIO-2 due to other various changes it has made to the regulatory framework.

Overall therefore, we find that it is possible to set neutral cost and performance targets. And indeed, the empirics arguably show that Ofgem has managed to achieve option A for RIIO-2 and it seems entirely likely that it has in fact gone too

¹² Ofgem RIIO-2 Draft Determination – Finance Annex, para 3.140

¹³ Ofgem RIIO-2 Draft Determination – Finance Annex, para 3.141

¹⁴ Ofwat (2019), PR19 Final Determinations, Aligning risk and return technical appendix, Figure 3.11

far. It is therefore entirely unnecessary to introduce the outperformance wedge. We strongly urge Ofgem to reassess its evidence base, and review its conclusion that it is not possible to set neutral cost and performance targets.

Concluding remarks

The combined effect of Ofgem's minded to decision to not aim up, and to deduct an outperformance wedge, will weaken the primary incentive for companies to invest and lead to a marked weakening in incentives to drive performance improvements. We consider that both of these effects will lead to material consumer detriments, and that as a result Ofgem's proposed policy cannot be in the best interests of consumers.

Ofgem's proposals are flawed on an in principle basis for the reasons we have set out. But even putting those reasons to one side, there is no evidence at all to support a view that any systematic outperformance is likely at RIIO-2. None of the evidence that Ofgem has brought forward is robust, relevant and complete and none of it supports a wedge of 25 bps.

1 INTRODUCTION

In its Draft Determination, Ofgem has proposed to deduct an outperformance wedge from its best estimate of the appropriate allowed cost of equity. This adjustment has been inspired by arguments made by Mason, Pickford and Wright (MPW), a subset of the authors of the 2018 UKRN report on the cost of capital¹⁵; and on its own analysis of historical outperformance. The outperformance wedge will be applied to a central estimate of the allowed cost of equity, as Ofgem has also decided that, contrary to prevailing regulatory practice, it will not “aim up” when setting allowed returns.

Ofgem initially proposed to make a downward adjustment of 50 bps to the allowed cost of equity for GD2/T2 to reflect its expectations that companies will outperform the targets that it sets at these price control reviews.

Following the publication of Ofgem's methodology consultation, Frontier Economics was commissioned by the ENA to comment on Ofgem's approach on this topic.¹⁶ This report was submitted to Ofgem last year, and subsequently to the CMA as part of the NATS/NERL CMA process.

In its decision document published in May 2019, Ofgem summarised what it considered were the key points made in Frontier's report and set out its response. These points are reproduced here in Annex C. Ofgem also stated that it intended to retain its proposal to deduct an outperformance wedge from the headline allowed cost of equity, but to consider the size of that wedge further.

In its recently published Draft Determination, Ofgem has:

- retained its view that aiming up is not necessary;
- lowered its proposed outperformance wedge from 50 bps to 25 bps supported primarily by:
 - fresh analysis of historical outperformance; and
 - a review of the areas in which the RIIO-2 price control may (or may not) differ from RIIO-1; and
- proposed an ex-post true up mechanism that it could apply.

Ofgem has also reiterated and reframed certain points it raised previously around Frontier's work on this topic, including both our original work for the ENA and a related report prepared for NGN (submitted to Ofgem in support of NGN's business plan).

This report further explores and addresses comprehensively the key points raised by Ofgem in respect of aiming up and the proposed outperformance wedge, and all our work on this topic. In particular,

- In section 2, we discuss Ofgem's reaction to our argument to aim-up in its allowance of the rate of return;

¹⁵ Wrights, Burns, Mason, Pickford, 2018, Estimating the cost of capital for implementation of price controls by UK Regulators, UKRN

¹⁶ Frontier (March 2019), “Adjusting Baseline Returns for Anticipated Outperformance”

- In section 3, we assess the potential negative effect of the proposed adjustment, including in terms of the impact on consumers due to a loss of efficiency improvements that would have resulted from strong incentive systems;
- In section 4 we assess and critique Ofgem's justification of the scale of the proposed outperformance wedge;
- In section 5 we appraise the introduction of the ex-post true-up mechanism; and
- In section 6, we assess Ofgem's views on the alternative to the outperformance wedge.

Annexes provide further details of our empirical work.

2 AIMING UP

In this section we focus on the concept of “aiming up” when setting the point estimate for the cost of equity. A highly related topic is the issue of how the range for the cost of equity is set, but we note that this is outside the scope of this report. We simply note that, while Ofgem appears to suggest that it has aimed up in setting the range for the cost of equity estimation¹⁷, we do not agree with Ofgem in this regard and have seen no evidence from Ofgem to suggest otherwise. For the purposes of this section we presume that Ofgem will set a broadly symmetric range centred around its best estimate of the required rate of return, and then assess the arguments for where to locate a point estimate within that range.

In the remainder of this section we cover:

- arguments in our original report on this topic for the ENA;
- Ofgem’s reaction to our first report; and
- our response.

2.1 Arguments in Frontier’s original report

In our first report assessing Ofgem’s proposal for the ENA, we argued that Ofgem should aim up when setting an allowed return within the identified reasonable range for the cost of capital. This was in response to Ofgem’s sector-specific methodology consultation, where Ofgem had remained silent on the topic of aiming up, and had not explicitly explained the reasons for not aiming up at either an aggregate level or on any specific parameters of the WACC.

Our recommendation that Ofgem should support aiming up was based on a review of the relevant academic literature (in particular the model presented in Dobbs (2011)) and regulatory precedent. Our key arguments were:

- Aiming up is an optimal regulatory response to the uncertainty inherent in estimating the cost of equity and the asymmetry of the consequences arising from setting the allowed return too high or too low, owing to the fact that it maximises societal welfare.¹⁸
- Aiming up is common practice in UK regulatory regimes.¹⁹
- The CMA in particular has, until very recently, consistently and transparently aimed up in its decisions.²⁰
- The relevant academic literature is supportive of aiming up.²¹
- MPW’s model supports aiming up for new investments, whilst its conclusion that there should be a lower rate of return for sunk investments rests upon an

¹⁷ Ofgem RII0-2 Draft Determination – Finance Annex, para 3.171

¹⁸ Frontier report for the ENA in response to Ofgem’s RII0-2 sector specific methodology consultation, Adjusting Baseline Returns for Anticipated Outperformance, Section 2.1

¹⁹ As above, Section 2.2

²⁰ As above, section 2.2.1

²¹ As above, section 2.3

unrealistic level of myopia by investors to generate its conclusion and therefore should be disregarded.²²

2.2 Ofgem's reaction to our report

In its response to our report in its methodology decision, Ofgem argued that for aiming up on the WACC to be appropriate the following assumptions needed to be satisfied:

- "First, the range itself must be relatively accurate at both the high and low ends."; and
- "Second, the cost of underinvestment and over-remuneration need to each be estimated accurately."²³

Ofgem also raised a number of other arguments against aiming up which were that:

- "arguments to over-remunerate may be more applicable in sectors that are experiencing capacity shortages, such as those in aviation or other growth sectors."
- "our proposal to cross-check CAPM against four other investor return benchmarks, may in fact better capture investors true expectations. To aim-up after considering these cross-checks may lead to a double-count.'
- "It would be remiss to ignore the risks of consistent and deliberate over-remuneration. Such risks, including political risk and increased legitimacy risk, could in fact out-weigh the benefit of aiming up, to which Frontier, and Dobbs, refer."²⁴

In its Draft Determination Ofgem provided two further arguments to supports its view that it should not aim up.

- Ofgem found that the CMA in its Provisional Findings for NERL did not comment on other sectors, but that if aiming up was to be used, it might only need to be small.²⁵
- Ofgem does not agree that aiming up will lead to more investment.²⁶

Lastly, Ofgem sets out its view that, contrary to the evidence, it considers that it has in fact aimed up in determining certain CAPM parameters, hence in its view further weakening the need for any aiming up.²⁷

²² As above, section 2.3.3

²³ Ofgem (2019), RIIO-2 Sector Specific Methodology Decision Annex: Finance, p 138

²⁴ Ofgem (2019), RIIO-2 Sector Specific Methodology Decision Annex: Finance, p. 138

²⁵ Ofgem (2020), RIIO-2 Draft Determinations Finance Annex, para 3.145

²⁶ Ofgem (2020), RIIO-2 Draft Determinations Finance Annex, para 3.146

²⁷ Ofgem (2020), RIIO-2 Draft Determinations Finance Annex, para 3.171

2.3 Our response

We respond to Ofgem's points above, and provide further evidence on the potential harm to consumers and society as a whole that can be caused by underinvestment triggered by a lack of adequate funding from regulatory allowances.

2.3.1 Arguments Ofgem made in its methodology decision

Symmetric range for the WACC

We agree with Ofgem that within Dobbs' theoretical framework, the WACC parameters are assumed to be estimated symmetrically at both the low end and the high end. The asymmetric risk of the midpoint of this range being too high or too low then requires the point estimate to be set at a point higher than the midpoint, with the exact location depending on the nature of the asymmetric risks. We agree therefore that the case for aiming up would be somewhat less clear if the regulator has already implicitly aimed up when constructing the range. However, Ofgem's proposed methodology for RIIO T2/GD2 does not suggest any erring on the side of caution aiming up in constructing the ranges of any parameters. Indeed, there is evidence to suggest that, if anything, Ofgem may have aimed down on certain parameters, for example in its estimate of TMR²⁸ and in respect of beta. While exploration of this is beyond the scope of this report, we anticipate that Ofgem will be in receipt of numerous submissions that expound this point. We therefore consider that, in keeping with the clear logic of the Dobbs model, a more explicit aiming up in the final stage of determining a point estimate is then required.

Cost of over- and under-remuneration

Firstly we should caution against Ofgem's seemingly casual use of the term "over-remuneration", which Ofgem seems to use interchangeably with the term aiming up.²⁹ It is important to be clear that the principle of aiming up is *not* to deliberately over-remunerate. In the absence of certainty around the **required** rate of return, the **allowed** return needs to match (or exceed) the required return for investment to be viable. However, due to the high level of uncertainty around, in particular, the cost of equity, there is no guarantee that the midpoint of a best endeavours and reasonably judged range would turn out to be at or above the right level to satisfy this constraint. In this environment, given the asymmetric consequences of failure to invest, aiming up is an optimal regulatory response to the uncertainty inherent in estimating the cost of equity and the asymmetry of the consequences arising from setting the allowed return too high or too low. The purpose of aiming up, as is made explicitly clear in the Dobbs model, is to maximise societal welfare (an objective that we do not consider controversial), not to systematically over-remunerate the company.

²⁸ For example, in work commissioned by water companies appealing PR19, Professor Alan Gregory sets out an evidenced based approach to assessing TMR that suggests a higher number should be used than that adopted by either Ofgem or Ofwat; "Setting the Cost of Equity in UK Price Controls", by Professor Alan Gregory, January 2020.

²⁹ Ofgem (2019), RIIO-2 Sector Specific Methodology Decision Annex: Finance, p. 138

Having addressed choice of language, we agree with Ofgem that the cost of underinvestment and over-remuneration need to each be estimated accurately. We consider that the harm arising from underinvestment would arise through a number of channels that may directly harm customers.

- Under investment may lead to a worsening in the operational performance of assets, leading to lower levels of reliability and more interruptions, to the direct detriment of customers.
- Under investment may also stifle innovation, as the investment needed to support the development and deployment of new processes and technologies may not be viable and hence may not be delivered. This might lead to a failure to enhance existing service levels, to provide new services, to fully adopt the benefits of digitalisation and to deliver efficiency savings at the same pace and so forth. If there is no business case to support innovation any and all of these outcomes would directly harm consumers.
- Lack of investment may also harm the adoption and roll out of low carbon technologies at scale. For example, renewable generation may not be connected at pace, or may end up being connected to networks that lack the capacity to make use of the output generated efficiently, leading to green energy being unnecessarily constrained off and reliance on more expensive back-up sources of power. Similar arguments arise in respect of gas and the ability of networks to accommodate inputs of unconventional gas, including hydrogen or gas/hydrogen blends. A lack of investment and innovation may also hamper the decarbonisation of space and water heating.

To be clear, it is not possible to say with certainty in advance how the policy adopted by Ofgem of not aiming up will impact investment levels in the future. This is due to the inherent uncertainty in where the required cost of equity lies, which is not known in advance when allowances are set, and therefore it is not possible to know in advance whether the allowed cost of equity is sufficient or not. Aiming up recognises this uncertainty, and allows for a prudent approach to setting the point estimate of the cost of equity. This precautionary approach reduces the risk that the allowed cost of equity is set below the required cost of equity, and therefore reduces the risk of the above customer detriment from occurring. In direct contrast to this, Ofgem's approach risks setting the cost of equity too low, and increases the risk of under-investment that leads to consumer harm. However, we will not know for some time whether Ofgem's risk has actually led to this potential harm or not.

In order to move forward the debate, we have carried out a relatively simple analysis of only the first of these potential detriments, where we compare the benefit of under-remuneration and the associated societal cost. This analysis is presented in full in Annex A, but we provide a brief summary of our findings here:

- For the electricity sector, using data on consumer value of lost load³⁰, we find that the consumer detriment arising from a worsening in reliability owing to

³⁰ The value to lost load (VoLL) captures the value that a customer is willing to pay to avoid being deprived of a unit of electricity, and therefore helps quantify the magnitude of any deterioration in network reliability. We note that Ofgem has routinely relied on this concept in calibrating various reliability incentives across its network regulation.

underinvestment may be large, even with a relatively small deterioration in network reliability and quality.

- We find that if underinvestment led to just a 2.1 minute increase in minutes lost per customer this would remove entirely the savings that would arise from Ofgem's proposed 25 bps reduction in the headline rate of return.
- Therefore the consumer benefit of under-remuneration in the form of a lower allowed return may easily be more than offset by the cost of only slightly worse quality of service.
- And again we stress that this analysis has considered only one of the potential sources of detriment to consumers and society.

In the light of this finding Ofgem must satisfy itself that its decision on where to locate its point estimate for the allowed cost of equity (which combines a failure to aim up with a 25 bps cut on the allowed return) will not lead to even a modest deterioration in network quality due to underinvestment. Otherwise its proposal to set a low headline rate of allowed returns would be likely to lead to net consumer detriment.

Aiming-up and capacity shortage

We disagree with Ofgem's argument that because aiming-up would only be applicable for sectors with capacity constraints or significant growth it would not be necessary in the energy sector.³¹ This argument is suspect on two accounts.

- First, we disagree with Ofgem's logic that aiming-up is only relevant for sectors with capacity constraints or significant growth. As long as there is significant need for investment in the sector, even if this for routine asset maintenance and incremental enhancement, the argument for aiming up applies. In fact, Dobbs' framework includes a separate treatment of both renewal investment and new investments to expand capacity/deliver new services and finds that aiming up is relevant across all types of investment (even if aiming up becomes most relevant in the context of new services/capacity).
- Second, even if we were to discount the first objection, we consider that in fact there is likely to be significant growth in network capacity/capability needed in the GB energy sector over the years ahead, and hence the circumstances that Ofgem considers to be necessary will be met anyway. With the energy sector facing unprecedented demand to invest to meet current policy ambitions (in particular Net Zero by 2050), there is likely to be an ongoing increase in investment in new capacity by the electricity networks, while gas networks may need to invest to meet new demands placed on the network and to potentially cater for alternative inputs of unconventional gas (including hydrogen).

Ofgem seems to have misunderstood the principles under which Dobbs' framework suggests aiming-up is needed and mischaracterised the need for large investment within the energy network sector going forward. These two factors could have contributed to Ofgem's reluctance to consider the need for aiming-up and its willingness to aim off.

³¹ Ofgem (2019), RIIO-2 Sector Specific Methodology Decision Annex: Finance, p. 138

Cross checks and double count

We also disagree with Ofgem's assertion that aiming up may lead to a double count owing to its use of cross checks on CAPM.³² This is mainly because there is significant uncertainty in the quality of the cross checks used by Ofgem.

The topic of the cross checks have been debated extensively in other studies, and we do not elaborate or repeat those arguments in this paper. But briefly, these cross checks are either the result of a bid process, such as in the case of MAR or OFTOs, or short-term evidence such as recent infrastructure fund returns or investment manager discount rates. The former includes too many unknown variables that go into the bid WACC (in the case of OFTOs³³) or bid price (in case of the MAR), and the latter is in direct conflict with the principle of long-term historic views of assessing the cost of equity to which Ofgem claims to subscribe. In our view, simply passing some arbitrary cross checks constructed to support the low end of the WACC range does not imply that aiming up creates a risk of double counting. On the contrary the use of arbitrary cross checks may make the range identified by primary analysis of CAPM parameters look artificially high and may lead to intentional or unintentional aiming down.

We return to the topic of Ofgem's cross checks, in particular its MAR cross check, in Section 4.3.

Political and legitimacy risk

Finally, we note the risk that Ofgem flags, that consistent over-remuneration may jeopardise the legitimacy of the regime, to the detriment of the customers as well as the companies.³⁴ However, we consider that this would only be the case where there are entirely unjustified returns being earned, whereas the Dobbs model makes clear that aiming up is in fact entirely rational and justified.

Furthermore, we also note that questions of legitimacy have, in our view, largely arisen as a result of Ofgem's failure to benchmark and target set well. As our original report has shown, the returns in excess of the WACC that were achieved by the sector in the recent past were due to various factors that are either no longer relevant or are being directly addressed by one of Ofgem's mechanisms for RIIO-2. We continue to believe that the legitimacy of the sector rests firmly on the ability of the regulator to calibrate well its price controls, striking a balance between ensuring the essential investment needed in the sector and the ongoing incentives for companies to drive efficiency gains and deliver value and quality service for customers. We do not believe unjustified blanket deductions from the cost of equity is the most effective way to ensure legitimacy.

³² Ofgem (2019), RIIO-2 Sector Specific Methodology Decision Annex: Finance, p. 138

³³ It is also clear that OFTOs have a markedly different risk profile to the other regulated network infrastructure for a wide range of reasons, not least the certainty provided by the long term contract that determines recoverable revenues.

³⁴ Ofgem (2019), RIIO-2 Sector Specific Methodology Decision Annex: Finance, p. 140

2.3.2 Arguments made in Ofgem's draft determination

In its Draft Determination, Ofgem notes that at the time of its Sector Specific Methodology Decision it considered stakeholder arguments in relation to aiming up, but was not persuaded by them. Ofgem further notes that in its provisional findings for NERL, the CMA found that any aiming up would only need to be small to be effective.³⁵

The relationship between aiming up and the quantum of investment

Ofgem restates in its Draft Determination that it is not convinced that aiming up will lead to more investment, and it has developed what we consider to an unrealistic and illogical example to attempt to illustrate its point.³⁶ Ofgem's example involves comparing the choice a company has about whether to invest more or invest less, based solely on trading off the benefits to it that would arise from:

- rewards from the totex incentive mechanism should it not invest and hence underspend;
- against the benefit that Ofgem considers the company would receive through aiming up if it did invest.

Under Ofgem's account, a decision to aim up simply creates an unnecessary extra wedge of return, that the company would trade off against other sources of additional profit. Ofgem's conclusion is that it would take many years for the benefit from aiming up to pay off, and therefore doubts the effectiveness of the aiming up policy in bringing forward any extra investment.³⁷

This absurdity of the example can be seen if we actually take Ofgem's illustration to its logical conclusion. Under Ofgem's logic companies have no incentive to invest at all. On the contrary, companies will always be better off not investing and saving money. However, this would clearly be an absurd and an entirely infeasible strategy for a company to adopt, and Ofgem's example serves no practical purpose.

Ofgem's argument is concerning as it serves to illustrate that it continues to misunderstand the principle of aiming up. The intention is not to offer a wedge over and above the true underlying cost of equity to shift incentives to invest more. It is to avoid inadvertently setting the cost of capital too low, given the asymmetric risks associated with failure to invest. The logic is simple then – set the number (by accident) too low and investment will most likely not be viable and will not proceed.

Ofgem's more general point that returns are in expectation a combination of baseline returns and expected incentives has already been noted and treated by Frontier in past work. It is clearly the case that rewards from other incentives *could* make up the shortfall in headline allowed returns. But there is no guarantee that all needed projects can be delivered at allowances, meaning that some degree of underinvestment must be expected if aiming up is not carried out. Designing something that intentionally sets allowed returns too low would require a high

³⁵ Ofgem (2020), RIIO-2 Draft Determinations Finance Annex, para 3.145

³⁶ Ofgem (2020), RIIO-2 Draft Determinations Finance Annex, para 3.146

³⁷ Ofgem (2020), RIIO-2 Draft Determinations Finance Annex, para 3.146

degree of care in the design of those wider incentives, to ensure that they provide just the right “top up” to returns. And in particular for a PCD style allowance, companies will not deliver any project where the outperformance is insufficient to make up the headline rate shortfall, meaning the benefit of all of those outputs would be lost.

Overall, it appears that Ofgem still does not understand the logic that underpins aiming up. It's example does not provide a reason not to aim up. Since the role of aiming up in bringing forward investment is such a critical topic however, we return to it again below, offering a discussion of how the overall set of arrangements Ofgem has proposed for RIIO-2 may particularly exacerbate the dangers of underinvestment.

CMA's position on aiming up in the recent NERL redetermination

In its final report for the NERL redetermination, the CMA has considered the question of aiming up. It looked into three factors that it considered as possible reasons to depart from the midpoint of the range. These are:

- potential bias in the cost of capital range;
- potential asymmetries in the broader price control settlement; and
- potential asymmetries in the balance of risk between getting the cost of capital too high or too low.

For the first factor, the CMA concluded that its cost of capital range did not suffer from bias. For the second factor, the CMA acknowledged some asymmetries in some of the incentives in the price control and proposed a number of mitigations to the risks that NERL identified regarding capex incentives.

For the last factor, the CMA recognised Frontier's submission on behalf of the ENA on the topic of aiming up due to the asymmetry of getting the cost of capital too high and too low, and it accepted that there might be an argument that, in the long run, customers' interests were served by a small premium to the cost of capital. In particular the CMA stated:³⁸

“If there were positive externalities and longer-term benefits to consumers from identifying and investing in new capital projects, then we agreed that there could be a case for a long-term premium on the cost of capital.”

Even though the CMA has ultimately decided for NERL not to aim up, it has not taken a view on whether or not our view expressed in the report for the ENA would be justified in the energy sector.

Unlike the regulatory settlement for NERL, as shown in this report, Ofgem's RIIO-2 settlement has the potential to leave a material amount of investment with positive externalities (such as environmental benefits) unexplored due to the possibility of setting the allowed return too low. We believe that the framework set out by the CMA in the NERL case would lead a rational regulator to aim up in the context of the energy sector.

³⁸ CMA, 2020, NATS (En Route) Plc /CAA Regulatory Appeal Final report, Page 246

2.3.3 Likely effect of Ofgem's Draft Determination

Historical precedent of aiming up

There is substantial evidence from historical regulatory precedent that aiming up has, until now, been the preferred approach for all UK regulators. We reviewed this regulatory precedent in-depth in our first report on the ENA's behalf, and so for brevity do not restate the details here.³⁹

But what have consumers actually got for this aiming up? Is it possible for us to concretely evidence the effect of this historical adherence to aiming up on the part of all UK regulatory offices? Clearly this is difficult as it is always challenging to create a counterfactual case, i.e. the level of investment that would have been brought forward had regulators not aimed up and the detriments that would have been faced by network users. But certain pieces of empirical work contained within this report do serve to illustrate the potential scale of the harm from even modest failure to invest. We do not need a complete switching off of investment funds. Companies simply "dragging their heels" would likely be enough to cause material consumer harm that would easily outweigh the benefit of not aiming up.

It is clear that, hitherto, there has not been heal dragging. Network owners have invested huge sums in their assets. When Ofgem has called for service enhancements, or more innovation, or for more capacity, or for companies to take on new roles, the companies have responded with vigour to meet those needs. In our view aiming up has led to an environment in which companies have simply not sought to ration the volume of capital deployed. As needs have emerged, they have been met, and in fact the companies have proactively sought investments that have secured real benefits precisely because there has been a desire to invest under the regulatory arrangements that existed hitherto.

Risks of not aiming up

In choosing not to aim up when setting the point estimate for the allowed cost of equity, Ofgem has gone against all this regulatory precedent. So we are now on the brink of shifting to a new paradigm in which regulators choose not to aim up, as signalled by Ofgem, and as signalled by the CMA in its decision for NERL. Where the CMA has historically aimed up toward the top of its range of allowed returns, it will now aim for the middle it seems (notwithstanding the fact that the CMA leaves the door open to aim up in some other sectors).

As a simple matter of fact, this must increase the risk that the returns on offer to investment are no longer as attractive as they were. Maybe the level of return on offer will still prove to be sufficiently attractive to bring forward all required investment. But the risk that it is not sufficient must have increased by some quantum, and given the difference between the top and middle of most COE ranges, it seems reasonable to assume that this increase in risk will not be trivial.

The practical effect of this is that going forward, we are now more likely to find companies facing more borderline investment decisions. Companies may become

³⁹ Frontier report for the ENA in response to Ofgem's RIIO-2 sector specific methodology consultation, Adjusting Baseline Returns for Anticipated Outperformance, Section 2.2

increasingly indifferent between delivering an investment under this more onerous set of commercial arrangements, or simply choosing not to bother, thereby eliminating delivery risk, but depriving consumers of all the benefits that would arise above the cost of delivery. It is this heightened risk that investment is no longer attractive that the CMA has chosen to take on behalf of consumers in respect of its NATS determination. We will watch with interest to see how the sector evolves following this change as it may make an interesting case study in the future.

But Ofgem intends to go further. It does not intend to aim for the middle, but owing to the outperformance wedge it intends to deduct from its central estimate, it intends to aim towards the bottom of its range. Where the CMA has decided to accept a heightened risk that its determination may fail to attract investment, Ofgem has chosen a policy that will greatly magnify this risk. Now it must be much more likely companies will look at individual investment decisions and wonder why they are bothering.

This is not to say that essential investment, for example to ensure the safety of assets, will not proceed. Networks are subject to a raft of licence obligations that must be met and the penalties that would arise for failure to meet those are potentially severe. But for any more discretionary investment, where the commercial case for an investment is weak, where the nexus of allowances and tight project specifications create risks of future penalty or disallowance, it seems increasingly plausible – perhaps even likely – that companies will choose to not take on such projects.

Aiming up and its interaction with other RIIO2 mechanisms

The question that then arises is what quantum of spend might be regarded as more discretionary, where the company clearly has an option not to do something if it doesn't see the commercial imperative.

It is here that we see the potential effect of Ofgem's decision to aim down being compounded by other aspects of the RIIO-2 approach that reduce the attractiveness of investment in the sector in their own right, but more critically provide ample opportunity for companies to drag their heels in a very material way.

- **PCDs.** Ofgem has introduced the PCD mechanism, which links some elements of ex-ante funding to required output deliverables. Ofgem will review ex-post whether or not the PCDs have been delivered. This creates a risk that companies could lose a proportion of the cost that was tied to the PCD, if Ofgem judges that the PCD has not been sufficiently well delivered. It is unclear what the scope of this ex post review will be, and companies may well perceive a risk that any efficiency improvements are clawed back, as there is a risk that Ofgem may judge that these savings are not valid. For example, suppose the company identifies a markedly different way of delivering the same outcome that is much cheaper. Will Ofgem accept this as a valid saving from which the company may benefit as well as customers? Or will Ofgem simply use the ex post review to rewrite the deliverable? We consider that on balance this new mechanism leads to a material downside risk, with limited scope for upside for

companies, versus a more traditional price control arrangement where ex post review does not play a role.

- But, crucially, given the nature of the PCD arrangement, companies are likely to have a choice over whether to proceed with the delivery of a PCD at all, or whether to simply fail to deliver and have the sum clawed back.
- It is our view that in a world where Ofgem aims down, and loads additional regulatory risk onto a project through ex post review, we are much more likely to see companies abandon PCDs rather than take on delivery risk and regulatory risk when there is potentially little to gain.
- **Uncertainty mechanisms.** Ofgem has intends to pass a substantial proportion of expenditure at RIIO-2 through uncertainty mechanisms instead of providing ex-ante funding allowances. While the use of reopeners can be justified in certain scenarios, the increased use at RIIO-2 creates additional uncertainty around the amount of investment that will ultimately be funded. It will require companies to carry out further work to justify the needs case of investments during the price control period, which will be burdensome and costly. Ofgem may choose to disallow some proportion of planned costs, creating a highly challenging target. And even in the world where a project is ultimately allowed and fully funded, there will be a delay while companies need to wait for the decision is made. This shift in approach clearly reduces the attractiveness of investment in the sector.
 - Now couple this regulatory risk from the operation of UMs with an aimed down cost of capital. And, furthermore, note that under many UMs the trigger for a potential reopener is a business case being brought forward by the company.
 - Why would a company bother to bring forward a business case in a world where their primary incentive to invest – the allowed rate of return – has been set too low, and where by doing so it exposes itself to a potential funding crunch, delivery risk and material regulatory risk from ex post review.
 - It is our view that should this set of circumstances come to pass, there is a material risk that Ofgem will simply see proposals from the companies for additional funding drying up, unless the spend is absolutely necessary to meet a clearly specified licence obligation.

Against this backdrop, it is particularly risky for Ofgem to adopt its new approach of choosing not to aim-up. It increases the risk that, if the cost of equity is set too low, there will be significant underinvestment in the sector with a range of detriments to consumers arising as a result.

Overall effect on investment

The combined effect of not aiming-up and other RIIO-2 mechanisms that have reduced the attractiveness of investments in the sector should not be underestimated. Under these circumstances, why would companies do anything else than simply carry out the core aspects of their business? Companies may well see opportunities for projects that could unlock significant customer or wider

environmental benefits, but are now likely to lack any real incentive to come forward with those plans. The hope would be that this suite of potential projects are at least kept on the stocks, such that they might be brought forward at a future price control review should the commercial framework become more attractive, but that is by no means certain. Even within the stylised Dobbs model, there is a cohort of “now or never” investments, and if those are not pursued then the potential benefits of that new service are lost forever.

The commercial case for networks to play a leadership role, proactively seeking out opportunities to deploy capital in order to pursue service improvements, future efficiencies, new services, or progress towards environmental targets – including Net Zero – will have been fatally undermined. The overall effect of this is that companies will focus entirely on core projects, and then run down the merit order list of projects to determine what can and cannot be carried out. Any discretionary projects will be at severe risk of not being completed.

Given the impact the energy industry already has, and the potential benefits that it could bestow on the general public and the environment, this is a particularly troubling set of scenarios. As is well-known to Ofgem, companies need to invest to maintain their excellent safety records to reduce the risk of their inherently dangerous networks leading to accidents for employees and the general public. Companies need to invest to maintain the reliability of the networks that we are all becoming increasingly reliant on. Companies need to invest to reduce the environmental impacts that running the networks can have. Companies also now have the opportunity to invest to support the economic recovery from the global pandemic and also to play a crucial role in meeting the net zero targets, both of which have the potential to deliver material benefits for the wider population.

Despite these risks, Ofgem is yet to carry out a formal impact assessment of its proposal to aim down. Now that we can see the full RIIO-2 package, we urge it to do so.

3 UNINTENDED NEGATIVE EFFECTS OF APPLYING AN OUTPERFORMANCE WEDGE

As explained above, in its sector specific consultation document, Ofgem proposed to adjust the baseline allowed return for an anticipated outperformance wedge, based on MPW's recommendation in the UKRN paper. We note that, in proposing to adopt such a novel and, in our view, radical approach, Ofgem had not carried out an assessment of any unintended consequences this could lead to, particularly the negative effects on efficiency incentives of the companies. This has been an important gap in Ofgem's reasoning.

Ofgem's proposal came in the context of setting the allowed return, and was treated in the consultation as a pure regulatory finance issue. However, in our view, it goes well beyond regulatory finance and right to the heart of incentive regulation more generally and the incentive based philosophy that has underpinned UK utility regulation since privatisation. We disagree strongly with MPW's recommendation to impose an outperformance wedge because their model is flawed, they provide no guidance on how to implement their proposal, and their assessment of wider impacts is non-existent. Ofgem's proposal, which is inspired by the recommendation put forward by MPW, suffers from similar flaws.

In our original report, we explored thoroughly the unintended consequences that would arise from Ofgem's proposed approach. We outlined in detail how Ofgem's proposal would:

- erode investor confidence and increase investor risk;
- weaken incentives for efficiency and innovation;
- distort managerial incentives to invest; and
- weaken the clarity over how the price control is calibrated.

We consider that our original criticism of Ofgem's proposal stands. Each of these detriments is important in its own right, and the likely combined effect of these detriments is a fatal flaw in Ofgem's proposal to which it has yet to provide a satisfactory answer.

3.1 Ofgem's reaction to our report

In its methodology decision, Ofgem reacted to our concerns with the following comments:

- "However, we fear that Frontier's depiction of incentives (and thus productive efficiency) does not distinguish between justified and unjustified returns. By extension, Frontier appear to assume that reductions in excess returns must be associated with reductions in incentives. However, investors can be just as incentivised with the correct level of remuneration. Frontier do not address this

distinction and therefore fail to demonstrate a sufficiently strong link between returns and incentives to call Ofgem's analysis into question."⁴⁰

- "We also agree that there may be an impact on investor confidence, in terms of earning excessive returns. However, an accurate reading of the Ofgem proposals is that investors can be confident of earning returns commensurate with risks, in line with the cost of capital. This return will, in expectation, be a combination of baseline allowances coupled with incentives."⁴¹
- "In our view, for incentive regulation to be an enduring concept, both investors and customers must have confidence that there is not a systematic bias."⁴²
- "Frontier's argument that there is a loss of clarity is not well founded or explained in detail - although we welcome further explanation in this regard."⁴³

While stating that it still believes in incentive regulation, Ofgem casts doubt on its overall benefit by stating that the measured TFP productivity growth for the energy networks has been slow.

In its draft determination, Ofgem has said next to nothing about the negative incentive and other effects of its proposals, focusing all of its attention on calibrating the wedge. The only discussion of incentives is found in paragraph 3.148 of the finance annex:

- "For the avoidance of doubt, Step 3 is not designed to entirely or perfectly capture future outperformance. Therefore, investors can still expect to earn returns above the cost of capital, if companies perform well. We have sought to ensure that incentive properties will remain for individual companies and sectors. For these reasons, we do not consider that there is a binary choice between the benefit of incentives and accounting for expected outperformance or information asymmetry".⁴⁴

3.1.1 Loss of clarity

First of all, we provide further explanations on our point on the loss of clarity.

The lack of clarity stems from the fact that, if Ofgem's proposed 25 bps deduction is adopted, there will now be a number within the price control that represents Ofgem's subjective judgement of the extent to which it has failed to set other aspects of the price control (including financing, cost allowances, ODIs, etc.) appropriately. The validation of this number would be almost impossible, leading to confusion over not only the basis of the 25 bps deduction, but moreover which aspects of the price control Ofgem considers it has got wrong.

The outperformance wedge provides no clarity as to what Ofgem believes the true underlying calibration of any other part of the regime should actually be. This:

⁴⁰ Ofgem (2019), RIIO-2 Sector Specific Methodology Decision Annex: Finance, p. 139

⁴¹ Ofgem (2019), RIIO-2 Sector Specific Methodology Decision Annex: Finance, p. 140

⁴² Ofgem (2019), RIIO-2 Sector Specific Methodology Decision Annex: Finance, p. 140

⁴³ Ofgem (2019), RIIO-2 Sector Specific Methodology Decision Annex: Finance, p. 140

⁴⁴ Ofgem (2020), RIIO-2 Draft Determinations Finance Annex, para 3.148

- provides no proper basis to assess ex post whether outturn evidence of any individual part of the price control suggests that Ofgem's allowance/target was right, or too high, or too low;
- therefore clouds the judgement of the future calibration of such price control parts;
- will frustrate the proper use of focused appeal rights; and
- will also hinder proper scrutiny and interpretation of targets by all stakeholders.

It is the equivalent of a catch all bucket of the price control that can "right" all perceived "wrongs". Except the "wrongs" are never explicitly stated, allowing no scope for debate as to whether they should indeed be properly understood to be wrong. And moreover, the "righting" of these "wrongs" for future price controls derives from the assessment of "wrongs" from previous price controls.

Obfuscation and lack of clarity will inevitably follow should Ofgem persist with this approach.

3.1.2 Justified versus unjustified returns and enduring incentive system

Next, we discuss the notion Ofgem introduces on "justified" and "unjustified" returns. It is not clear to us what constitutes justified or unjustified returns in Ofgem's view. Companies are given a set of price control targets to meet or beat, and in so doing realise a level of return different from the cost of equity that was estimated by the regulator. In fact, this has been the driving force for the efficiency improvement in the sector. Outperforming companies earn a return higher than the cost of equity, while companies unable to meet targets earn a lower return. If by unjustified return Ofgem means any realised return in excess of the estimated cost of equity, this would amount to retrospective regulation inconsistent with the principles of incentive regulation to which Ofgem claims to subscribe.

We agree with Ofgem that the incentive system must not have a systematic bias if it is to be enduring. We would also agree with Ofgem that systematic over-remuneration is not necessary to maintain an adequate level of investment and could indeed lead to challenges to the legitimacy of the system. However, as we explained in our original report, and now also supported with the latest UK regulatory precedent, the solution to any suspected systematic over-remuneration is to fix the root cause of it. In the case of RIIO-1, the root cause of most outperformance was Ofgem's failure to set appropriate targets in certain key areas. This had little to do with the assessment of the cost of equity or allowed returns and Ofgem should not conflate its analysis of what is now the reasonable level of returns with these past failures to set reasonable targets. The allowed return is simply not the appropriate place to address the issue.

3.1.3 Clarifying again the harm to incentives

Ofgem's reaction to our argument regarding the potential loss of incentives in its methodology decision focuses on the incentives for the investors to continue to invest, by stating that as long as the allowed return coupled with the incentives

payment would meet the cost of capital in expectation, investors would continue to invest. However, this does not address our core concern. By loss of incentives, we mean the incentives to innovate and improve cost efficiency and wider service performance, which comes from the fact companies are allowed to create extra financial gains as a result of superior operational performance.

Ofgem returns – albeit only very briefly – to the question of how the outperformance wedge may harm incentives in its draft determination, noting that it does not face a ‘binary choice’ between applying a wedge and incentives.⁴⁵ However, at no point does it present any kind of appraisal of:

- whether its policy will harm incentives;
- if so, by how much; and
- what the potential effect on company behaviour, outcomes and overall consumer welfare may be.

For the reasons we set out below, this has been throughout and remains a critical gap in Ofgem’s reasoning.

Ofgem’s proposal unambiguously forms a link between outperformance in one period and a negative downward adjustment to allowed returns in future reviews. The creation of this link could now not be clearer, following the publication of the draft determination, in which Ofgem relies on (amongst other things) an analysis of outperformance in RIIO-1 to validate the quantum of the proposed wedge it will apply at RIIO-2.

The creation of this link between past performance and the future outperformance wedge, as a matter of simple logic, must dampen incentives to make future efficiency gains. Gains in this period will directly harm allowed returns next time around, and since such gains would then be “in the database” that may inform calibration over many periods ahead, over the longer term too. This is at the heart of our objection to Ofgem’s policy. Companies can now see that should they, as a group, not outperform at all during RIIO-2, they will be rewarded by receiving a lower outperformance wedge and hence a higher cost of equity.

This may have profound consequences for company behaviour. As Hicks so wisely warned us, ‘the best of all monopoly profits is a quiet life’. Ofgem has created a device that provides companies with direct encouragement to stop driving their business forward, and simply deliver against their plan, i.e. it is adding mechanism after mechanism, each of which is encouraging the companies to slow down their rate of improvement, to keep ideas on the shelf and simply stick to the plan. It would appear that the intention of the RIIO-2 design is to more or less eliminate the scope for outperformance to result in additional profits. It will not take companies long to see that the way forward prescribed by Hicks leads to almost exactly the same reward as stretching every sinew, but moreover it avoids future regulatory scrutiny and markedly reduces regulatory risk.

The productive efficiency gains stimulated by incentive regulation have delivered huge value to consumers, and should continue to drive customer value in future. However, Ofgem’s proposed (in our view misplaced) mechanism risks jeopardising

⁴⁵ Ofgem (2019), RIIO-2 Sector Specific Methodology Decision Annex: Finance, p. 138

this incentive regime. We are yet to see any advocate of this policy – MPW, the National Infrastructure Commission, or Ofgem – address this point head on, and explain why it considers that despite this risk, the adoption of an outperformance wedge is in customers' long run interests.

In addition to this, we are concerned about the impact that the outperformance wedge may have on the discount rate that Ofgem adopts to calculate the present value of any true-up mechanisms. It is standard regulatory practice for some incentive mechanisms to be calculated and/or trued-up at the end of price control periods, and the relevant discount rate is used to ensure the payments across price controls are net present value neutral. We are assuming that, Ofgem intends to use the allowed cost of equity with the outperformance wedge applied as the discount rate (i.e. the 25 bps reduction will also be applied to the discount rate). While this will ensure that the cost of equity and the discount rate are consistent, it will further weaken any incentives that are trued-up at the end of price controls. For any incentive payment that a company is due to receive in the next price control period for performance in the current price control, the received payment will be lower than it would have been if the correct discount rate had been used (i.e. the point estimate of the cost of equity). Similarly, if a company is due to return money back to customers in the next price control, the present value calculation will be lower than it would be without the application of the outperformance wedge. This has the overall effect of reducing the strength of incentives, as the effective value of any rewards or penalties is lower.

3.1.4 Ofgem underestimates the importance of productivity gains in the energy sector

We have outlined above our profound concern in relation to the negative incentive effects that could arise from Ofgem's proposal, and the behavioural change that this could trigger. The end result of this could be a marked deterioration in the vigour with which companies now pursue operational and service improvement. This can only slow the productivity delivered by the sector.

While Ofgem's position is, we understand, that there is little to lose by harming these incentives, our view is that there is much to lose to the direct detriment of customers. Below we illustrate this by demonstrating the effect of losing these productivity gains in future.

Size of the productivity gain at risk

To measure the scale of the productivity gains at risk, we use Ofgem's ongoing efficiency estimate from its Draft Determination. Ofgem has set the ongoing efficiency challenge at 1.2% per year for capex and 1.4% per year for opex.⁴⁶ We understand that many companies dispute the validity of Ofgem's assumptions, but below we use Ofgem's own number to illustrate the potential costs of harming incentives.

In our analysis we use an assumption of 1.3% per year across the total cost base. We use this to put into context the potential losses that could result from under-

⁴⁶ Ofgem (2020), RIIO-2 Draft Determinations -Core Document p. 44

remuneration going forward. This is particularly important as the UK energy sector gears up to achieve the UK's 2050 carbon neutral target. Sacrificing even a fraction of long-term productivity gains for short-term savings could result in large cost increases across the sector, making any erosion of the incentive regime (such as the 25 bps adjustment) likely to do more harm than good in the long run.

To compare the cost and benefit of the 25 bps adjustment directly, we look into various illustrative scenarios to assess the impact on productivity gains in more detail in Annex B. Our key findings are:

- In a reasonably conservative scenario where 10% of the expected productivity gains in the energy sector are removed by the adjustment for anticipated outperformance, the annual loss in cost savings due to compromised productivity gains would outweigh the benefit (from the 25 bps deduction) by 2026/27. Under other scenarios with further productivity losses, the catch up point would be much sooner with the annual loss in cost savings outweighing the gains (from the 25 bps deduction) by 2021/22 if 25% of the net productivity gains are removed and by 2020/21 if 50% of gains are removed.
- Finally, if we discount the above cash flows over the next 50 years and consider the net present value (NPV), we find that if the expected annual net productivity gains were eroded by anything more than around 3% due to changes in the strength of the incentives regime brought about by the 25 bps outperformance-based reduction on equity returns, the present value of the productivity losses to the sector would outweigh the present value of the gains for the customers.

The results from this analysis show that, although there is uncertainty regarding the scale of the impact on efficiency gains, the effect of a loss in even a small proportion of the expected efficiency gains going forward would cause enormous consumer detriments. As we have said repeatedly in meetings with Ofgem, the role of the regulator is to create a framework that encourages the companies to keep driving out those 1% improvements every year. Over time, given the scale of the GB energy networks, these marginal gains lead to huge societal savings.

We consider that it would be prudent for Ofgem to make its own assessment on the potential damage that could be caused by the proposed outperformance adjustment to baseline returns, before it presses ahead as the only regulator to implement this mechanism. We have not yet seen satisfactory assessment from Ofgem to suggest that the pros and cons of this mechanism have been appropriately considered.

4 JUSTIFICATION FOR THE QUANTUM OF THE PROPOSED OUTPERFORMANCE WEDGE

While Ofgem originally proposed an outperformance wedge of 50 bps, it has now proposed a reduced wedge of 25 bps. The mere fact that Ofgem previously considered that the evidence pointed to a wedge of at least 50 bps, whereas it now considers the evidence points to a wedge of 25 bps, may tell us something about the difficulty of calibrating a wedge of this kind, notwithstanding the raft of in principle concerns as to why this is a poorly thought through regulatory proposal.

In supporting its wedge, Ofgem relies on a range of new evidence, presented for the first time in its draft determination.⁴⁷ These are:

- a review of historical cost outperformance across many price controls and sectors (contained in the “AR-ER database.xlsx” file);
- an analysis of what performance in RIIO-1 would have been under the RIIO-2 framework (contained in the “Residual outperformance.xlsx” file); and
- Ofgem’s assessment of what can be properly inferred from prevailing MARs and past transaction premia (contained in the “Simple MAR application model.xlsx” file).

Ofgem also explains why it considers work by Frontier for NGN on the likely size of the outperformance wedge to be a helpful contribution to the debate, but one to which it needs attach no weight at all.⁴⁸

We set out here our view of the analysis that Ofgem has now provided to justify a wedge of 25 bps. But before doing so, it is important to be as clear as possible about two things.

- Our main objections to the policy are described in section 3 and revolve around the wider harm to effective incentive regulation that results from this proposal. Whether the wedge is 50 bps, or 25 bps or 101 bps is, to a large extent, irrelevant as those criticisms would remain regardless.
- All of the historical analysis Ofgem presents is subject to an important weakness.⁴⁹ It is now clear that RIIO-2 will be a very different price control to RIIO-1 (and even more so to predecessor price controls) in a large number of ways. As a result, an assessment of what companies have previously achieved against price control arrangements that no longer exist in the same form tells us almost nothing useful about future outperformance against a new regulatory regime. In this regard, as we explain below, Ofgem’s attempt to capture these changes in its analysis are inadequate.

Notwithstanding these overarching observations, below we set out our thoughts on Ofgem’s analysis in support of a wedge of 25 bps. Our key findings are:

⁴⁷ Ofgem (2020), RIIO-2 Draft Determinations Finance Annex, Section 3, Step 3

⁴⁸ Ofgem (2020), RIIO-2 Draft Determinations Finance Annex, paras 3.115 and 3.119

⁴⁹ Ofgem (2020), RIIO-2 Draft Determinations Finance Annex, paras 3.120 to 3.128

- Ofgem's historical database is based on irrelevant ancient history, non-comparable data from other sectors, and RIIO-1 price control data which has not been adjusted to take account of many important differences between RIIO1 and RIIO2. Overall, the findings from the database are completely unreliable and cannot be considered to provide any meaningful insight into likely performance at RIIO-2.
- Ofgem's restatement of RIIO-1 performance in RIIO-2 terms fails to take account of a number of important differences between the two price controls. In doing so, Ofgem has overstated the potential for outperformance at RIIO-2. Our analysis shows that when more of the differences are reflected, there is limited (almost no) opportunity for outperformance at RIIO-2.
- Ofgem's reliance on the MAR to calibrate allowed returns (either the overall level of an outperformance wedge) is misguided.
- In our updated work on estimating the likely levels of performance at RIIO-2, on behalf of National Grid and NGN, we have found that both transmission companies and a notional GDN are all expected to deliver underperformance at RIIO-2.

4.1 Ofgem's totex outperformance database (AR-ER database.xlsx)

Ofgem has collated a substantial body of raw data on cost performance across multiple sectors and over time, drawn from underlying data on allowed and outturn costs across a range of sectors.⁵⁰ Based on analysis of this database Ofgem concludes that:

- historical outperformance across the sectors examined has averaged 7% over time⁵¹;
- this finding is robust to many permutations of the data, e.g. dropping sectors or price controls⁵²; and
- given this historical outperformance, Ofgem considers it safe to assume that *'despite the measures included in our proposed RIIO-2 price controls, companies (on average) have the scope to outperform, and investors can have a reasonable expectation of outperformance⁵³ since 'On this analysis, expected outperformance, at the 60% notional gearing level, should be greater than 0.25% for RIIO-2.'*⁵⁴

In this subsection we provide a critique of this first strand of Ofgem's analysis in support of its 25 bps deduction.

⁵⁰ Ofgem (2020), RIIO-2 Draft Determinations Finance Annex, paras 3.120 to 3.128

⁵¹ Ofgem (2020), RIIO-2 Draft Determinations Finance Annex, paras 3.123

⁵² Ofgem (2020), RIIO-2 Draft Determinations Finance Annex, paras 3.124

⁵³ Ofgem (2020), RIIO-2 Draft Determinations Finance Annex, paras 3.127

⁵⁴ Ofgem (2020), RIIO-2 Draft Determinations Finance Annex, paras 3.128

4.1.1 What has Ofgem done?

Ofgem has gathered and analysed historical cost allowances and cost outturns.⁵⁵ Ofgem includes in its analysis a number of sectors:

- the four energy network sectors;
- the water and sewerage companies;
- airports; and
- air traffic control.

In each case each licence holder is captured separately.

The time period covered by Ofgem's database is extensive, with evidence gathered all the way back, for example, to DPCR1, the first electricity distribution price control review after privatisation which was in force during the early 1990s.

Ofgem processes raw data obtained from various sources through multiple steps in order create two large "flat tables" of data:

- one of which contains data by company for whole price controls at a time (the sheet Flat_Data_PriceControls); and
- a second which presents evidence on an year-by-year basis, so for a five year price control each company subject to that price control would have five entries in the database (Flat_Data_Nominal).

Ofgem notes that this provides a database containing 943 observations (on an annual basis) and 210 observations (on a whole price control basis).⁵⁶

The database contains information on opex and capex separately where Ofgem has been able to obtain this information, but it focuses its analysis primarily on totex. The database therefore contains the percentage underspend on opex, capex and totex over time per company and price control/year (albeit with numerous gaps for missing information).

Using these flat tables, Ofgem provides a range of summary information, including:

- histograms showing the distribution of historical underspend; and
- summary measures of average price control outperformance and by sector.

Switches are provided to enable one to include/exclude, for example, specific sectors from the analysis. The outputs within the spreadsheet then (in most cases) update automatically.

4.1.2 Practical problems with the spreadsheet

We note that while considerable effort has clearly gone into creating the database, it is far from easy to work with and navigate. There is a large volume of raw data obtained that is processed through multiple stages of adjustment, for example:

- from one price base to another, sometimes multiple times;

⁵⁵ Ofgem (2020), Spreadsheet entitled "AR ER database"

⁵⁶ Ofgem (2020), RIIO-2 Draft Determinations Finance Annex, paras 3.120 to 3.122

- some raw data is used to impute other parts of the database (for example totex is calculated from underlying opex and capex);
- in some cases whole price control data is converted into annualised data, calling into question the reasonableness of drawing inferences from the annualised data (or at the very least whether it is likely to tell anything reliable beyond that which can be inferred from the analysis conducted at the granularity of the whole price control); and
- there was clearly some thought given to making various corrections to the data, e.g. in respect of Ofgem's IQI or Ofwat's CIS, but having followed through the relevant cells these adjustments do not actually feed into any outputs. It would therefore appear that in certain regards a slightly more ambitious analysis was contemplated but abandoned.

There is very little signposting contained in the book to explain what is being done at each stage and why, so it left to the reviewer to put the pieces together. In particular from this wealth of data it is hard to see what Ofgem has actually relied on in putting its data together, for example: there are two highly contradictory sets of water sector data contained within the file.

- One set of data seems to be used in the "price control" version of the data table (rather than the annual, per year analysis) that generates the histogram contained in the Finance Annex document as Figure 16⁵⁷.
- The second set is used to produce other exhibits within the spreadsheet (see for example the PCOutput1 sheet, table headed "Average PC outperformance by price control").

By inspection it would appear that this second data set produces highly doubtful results, at least results at the sector level that seem to bear no relation to the evidence recently submitted by Ofwat to the CMA.

Have both of these sets of data played a role in shaping Ofgem's thinking? This is unclear. If we take the view that it is the "price control" histogram that mostly shapes Ofgem's view, then there are seemingly arbitrary price control selections made:

- TPCR1, 2, and 4 (including the 1 year rollover) are included.;
- TPCR3 appears to have been excluded.

While this does not markedly change conclusions, it speaks to weak quality control in presenting this work and adds an extra layer of confusion to any attempt to follow Ofgem's work.

It is possible that Ofgem in fact relies on the first two sheets at the front of the work book (ignoring the cover page, so "Wedge prob assumptions & chart" and "Wedge prob calculations"). These sheets contain numerous hard coded cells. It is therefore unclear exactly which cuts of the database are included in these sheets, making them extremely difficult to audit and comment on. It is unclear whether Ofgem considers these sheets the most relevant and important or not.

⁵⁷ Slightly unhelpfully the Excel database file does not actually contain the histogram used in the Ofgem consultation paper, but from inspection it appears that the "all price control" version of the frequency of outperformance analysis matches the Figure.

Given its size and the number of steps involved we have not completed a full audit of Ofgem's work. To do so would require a disproportionate amount of effort. We consider that the construction of the spreadsheet falls short of best practice. Regardless, for the reasons we set out below, we consider the contents of the historical database largely irrelevant anyway.

4.1.3 In principle problems with Ofgem's approach

The most obvious problem with Ofgem's approach here is the presumption that it is safe to infer something sensible about **future** outperformance from **past** outperformance. We do not believe that such an inference is reasonable or logical.

Recent history is no reliable guide

Given the scale of change that is proposed for RIIO-2 versus RIIO-1, it is unsafe to draw inferences on the potential performance at RIIO-2 from recent historical evidence without making a large number of adjustments. Even a quick comparison of the proposed RIIO-2 framework with RIIO-1 will reveal a host of profound changes that go far beyond simple things like changes in incentive rates. Ofgem has itself acknowledged this fact in its second strand of analysis (where it attempts to restate RIIO-1 performance on a RIIO-2 basis), but takes no account of this in this first strand of analysis. Because of all of these changes from RIIO-1 to RIIO-2 which are not accounted for, the data that is provided in Figure 17 of Ofgem's report is entirely irrelevant.⁵⁸

On the specifics of the changes that should be captured when considering the relevance of RIIO-1 for RIIO-2, we detail the most important of these in section 4.2.2 when we consider the analysis that Ofgem has done to restate RIIO-1 outperformance on a RIIO-2 basis. But to provide an indication of what is to come, in order to make this historical database valid, adjustment would need to be made to take account of:

- the indexation of RPEs;
- the widespread use of PCDs;
- changes to the NARMs framework;
- the tougher approach that Ofgem has adopted to benchmarking (e.g. setting the frontier at the 85th percentile for GDNs rather than the upper quartile);
- the higher assumed productivity, despite most of the evidence pointing to the number now being, if anything, lower than in the past;
- the use of "interpolation" as part of the IQI process historically, which is no longer used; and
- the widespread use of penalties under the new BPI and the removal of the opportunity to receive fast-track rewards.

Any and all of these new steps will have the effect of reducing the scope for outperformance, and had they been applied (or in the case of IQI interpolation not

⁵⁸ Ofgem RIIO-2 Draft Determination – Finance Annex, Figure 17

applied) in the past then far lower levels of outperformance would have emerged from past price controls.

It is clear that so many important things have changed that it is entirely unsafe to presume that performance at RIIO-1 – in particular absent any adjustment at all – will tell us anything about what we should expect in RIIO-2. We provide a full review of these differences in section 4.2.

Ancient history is totally irrelevant

The problems of comparability become even more profound when we go back further, in particular to the early energy network price controls (e.g. DPCR1, 2 and 3, PCR2002). The philosophy and methodologies that underpinned those price controls are far removed from those that have been adopted more recently, in particular those that are being used now to set RIIO-2. Price controls were smaller in scale and ambition with far fewer instruments. Benchmarking was comparatively limited and there was no heavy focus on ensuring that costs and revenues would track one another closely during a price control. The focus was entirely on setting a broadly reasonable “fixed target” alongside very strong incentives (particularly on opex) that would provide strong inducement for the only relatively recently privatised firms to pursue and reveal efficiencies as aggressively as possible. This they did, in spades, often easily outperforming price control targets.

It is simply not credible however to suggest that the very high levels of outperformance achieved during those early price controls would provide a sound basis for drawing inferences about expected performance during RIIO-2. To illustrate the extent of this historical outperformance, and how illogical it is to assume this may tell us something about RIIO-2:

- according to Ofgem's database, outperformance in DPCR2 was, on average 18% across all totex, with one company outperforming by 38%. In respect of capex, sector average outperformance was 30%.
- similarly, the GDNs outperformed PCR2002 by a huge margin according to Ofgem's database, with average outperformance of 35%, while the best performing company outperformed its price control by almost 49%.

The notion that an investor today appraising the future prospects of an energy network would somehow include outperformance of this magnitude within its reasonable distribution of possible outcomes (as is suggested by Ofgem in paragraph 3.127) is fanciful. We note in passing that simply removing DPCR1 to 3 and PCR2002 reduces the mean observed outperformance to 3.7% (based on 160 observations). Although we stress again that we do not consider this value at all relevant for RIIO-2, as this figure is still derived from past price controls that were set on a markedly different basis to RIIO-2.

The relevance of data from other sectors

The inclusion of airports, air traffic control and the water sector in an analysis that is intended to support inferences about what the energy networks may be able to achieve in future is clearly distinctly debateable. While there are some high level similarities in the overall price control frameworks, there are also important

differences in the way regulation is done and the underlying costs and cost structures of these different businesses operating in different sectors. To illustrate, Heathrow has an average revenue form of price control so there is a need to control for volumes. It seems that this has not been done, and hence it is not clear that the data for airports is reliable, even if we were to believe that it is otherwise comparable.

If we were answering a different question (for example, what has outperformance in price controls for UK regulated infrastructure been in the past?) then clearly one needs to cover all sectors. But that is not the relevant question here. We do not consider then that there is much to say about the relevance of the analysis.

However, as we have already noted elsewhere, there may be one high level lesson to learn from Ofwat's track record of setting price controls. In a recent submission to the CMA⁵⁹ Ofwat provides its own analysis of outperformance against past price controls. Average outperformance has been 1.8% over approximately 20 years of price controls, and over the most recent price controls even lower than that (-0.2%, 1.1%, 1.4% in 2005-10, 2010-15 and 2015-19 respectively). This set of evidence highlights three things.

- Despite Ofgem's protestations, there is no a priori reason to consider that it is impossible to set a broadly symmetric price control. Ofwat has previously done so, in a sector that Ofgem clearly considers to be sufficiently similar to rely on when drawing inferences. And it has done so not just once, but repeatedly.
- Given this track record, it is far from obvious that a marked toughening of price controls by Ofwat was necessary. The CMA will obviously need to decide on the merits of ongoing appeals, but this may explain why Ofwat now faces an unprecedented four appeals.
- All the years of theory and practice in regulation tells us that strong incentives are absolutely critical to driving company performance and that it is this that drives low cost and strong service for customers. Given the small skew in favour of the companies that we see in Ofwat's history of price setting, our view is that the harm that would be done to incentives and other aspects of the price control, and hence the harm that would result to customer outcomes from imposing an outperformance wedge, is manifestly not worth it.

Ofgem also fails to recognise that it has set a one size fits all approach

In addition to failing to recognise the very significant differences between RIIO-1 and RIIO-2 in this first strand of its analysis, Ofgem has also failed to recognise when estimating RIIO-2 expected outperformance that it has set a one size fits all approach. Ofgem shows in table 26 that the RIIO-2 expected outperformance can differ depending on the incentive strength and totex:RAV ratio, but then later concludes that on balance an expectation of 25 bps is cautious across all of these scenarios.⁶⁰ Ofgem unfortunately misses the point here. The central reason for raising the fact that there are differences in incentive strengths and totex:RAV

⁵⁹ https://assets.publishing.service.gov.uk/media/5eb16056e90e0723aef8056c/008_-_Reference_to_the_PR19_final_determinations_Risk_and_return_response_to_common_issues_002.pdf#page=33. See Table 2.1

⁶⁰ Ofgem RIIO-2 Draft Determination – Finance Annex, Table 26 para 3.127

ratios is not to estimate the size of the outperformance wedge for each of these cases, but rather to illustrate the point that the Ofgem approach is a one size fits all adjustment. The 25 bps outperformance wedge has been set the same for all companies, which in practice will translate arbitrarily into different, company specific targets. It is unclear why Ofgem thinks that this is an acceptable policy.

Ofgem's sample size is effectively much smaller than it claims

Ofgem states that its database has “a total of 943 observations” and since it presents the results on a price control basis rather than annually, this reduces to 210.⁶¹ Ofgem appears to be suggesting that its analysis is based on a large dataset and that this strengthens the results that it then finds. However, this heavily rests on the assumption that each individual licensee should be accounted for individually in this analysis. In actual fact, a very significant proportion of the apparent outperformance from the RIIO-1 price controls was due to forecasting errors and Ofgem's decisions on various price control elements as we will explain in section 4.2. Therefore the outperformance across companies within the same price control is closely related, not at all statistically independent, meaning that data on each individual company cannot really be considered to bring much additional information to the sample. As a result, to suggest that Ofgem has 210 let alone 943 observations is misleading and overstates the informational quality of the sample.

Added to this, as we have explained above, we have material concerns with the inclusion of ancient price controls in this analysis, as they are completely irrelevant in terms of assessing the likely levels of performance at RIIO-2. The removal of these price controls from the dataset would further reduce the sample size.

And even then, as we also highlight above, it is highly debatable how informative RIIO-1 is in assessing the levels of likely performance at RIIO-2, due to the vast number of changes Ofgem has introduced to reduce the opportunity for companies to outperform. And in addition the uselessness and relevance of other sectors is limited.

Overall, the number of observations that Ofgem claims to have is significantly misleading as it counts each company individually, and includes price controls that are not relevant. As a result, there is no validity to the argument that this database has a large sample and is somehow statistically robust.

4.1.4 Summary views on Ofgem's historical totex database

The database is clearly intended to provide broad narrative support for the points that Ofgem, as far as we understand it, relies on in concluding that an outperformance wedge is necessary. In our own words, these arguments are:

- that regulation is a “one way bet” in which companies materially outperform in expectation;

⁶¹ Ofgem RIIO-2 Draft Determination – Finance Annex, para 3.122

- that the proposed 25 bps wedge is, however one considers it, small compared to the outperformance that must be expected given historical outperformance; and
- that a broadly symmetric calibration is impossible to achieve, or at least sufficiently improbable, and hence an outperformance wedge is the only viable alternative to protect customers.

In fact the database properly considered does not support any of these assertions.

- The overall conclusion on measured outperformance is very materially influenced by ancient history that is wholly irrelevant. Correcting for this alone already reduces average observed outperformance from 7% to 3.7%.
- That 3.7% is then based on more recent price controls, but even this is a wholly irrelevant number given the raft of changes that Ofgem now proposes to introduce at RIIO-2, compared to earlier price controls. No attempt has been made to control for these changes, so this tells us nothing relevant about future outperformance at RIIO-2.
- Far from confirming that setting a symmetric price control is impossible, this analysis provides numerous examples of broadly symmetric price controls being put in place, with relatively small levels of overall sector outperformance. Ofgem has set broadly symmetric price controls before, although perhaps not as often as it should. Ofwat has done so repeatedly.

Our primary objection to the outperformance wedge arises from the in principle harm that would result, as explained fully in section 3. Notwithstanding those objections, we consider that Ofgem's historical totex database tells us nothing useful about the future quantum of outperformance and certainly does not support a view that (putting those objections to one side) a wedge calibrated at 25 bps is somehow reasonable.

4.2 Ofgem's analysis of RIIO-1 performance restated to a RIIO-2 basis (Residual outperformance.xlsx)

Ofgem states that it has identified an alternative approach for estimating the likely levels of outperformance at RIIO-2 by restating the RIIO-1 historical performance on a RIIO-2 basis.⁶² To do this, Ofgem has gathered data on RIIO-1 outperformance across all energy network operators and has made various adjustments to the underlying data. The adjustments are intended to reflect the differences between the regulatory instruments at RIIO-1 and RIIO-2, hence showing what the RIIO-1 outperformance would have been if the RIIO-2 framework applied instead. Ofgem concludes that the adjusted results "are more informative for RIIO-2, given the greater consistency with the RIIO-2 framework" and that "this analysis generally supports expected outperformance levels above 0.25% for RIIO-2".⁶³

Having reviewed Ofgem's approach and workings, we have identified important methodological issues, errors and omissions with the analysis. As a result of these

⁶² Ofgem RIIO-2 Draft Determination – Finance Annex, para 3.129

⁶³ Ofgem RIIO-2 Draft Determination – Finance Annex, paras 3.131 and 3.132

failings, Ofgem's approach materially underestimates the scale of changes it has made for RIIO-2 and hence materially overstates what might be expected at RIIO-2 given what has been seen during RIIO-1.

Overall our analysis shows that, when a more complete set of the changes in incentives and totex mechanisms between RIIO-1 and RIIO-2 are reflected in the restatement, there is limited opportunity for outperformance (if any at all) under RIIO-2.

In this section we:

- set out the approach that Ofgem has taken;
- explain the methodological issues and errors with Ofgem's approach; and
- show how these failings led Ofgem to materially overstate the level of likely RIIO-2 outperformance.

4.2.1 What has Ofgem done?

The aim of Ofgem's analysis is to understand what RIIO-1 outperformance would have been if RIIO-2 instruments were in place. The results of this are then used to infer the likely levels of outperformance in RIIO-2.

Ofgem calculations

We understand that the Ofgem analysis is based on company data, as provided by company submitted Regulatory Financial Performance Report (RFPRs)⁶⁴, although much of the input data is hard coded. We have not verified the source data in most cases, beyond performing some spot checks. Ofgem's collected data is first used to calculate RIIO-1 outperformance. Ofgem define outperformance as the sum of outperformance in totex, incentives, tax and debt. This outperformance is shown as a percentage return on the regulatory equity. The presentation of this outperformance in Ofgem's Draft Determination is focused on totex and incentive outperformance, with outperformance on debt and tax put to one side.⁶⁵ Ofgem calculate totex and incentive outperformance as follows:

- totex outperformance is calculated by comparing totex actuals with totex allowances; and
- incentive outperformance is the sum of all outperformance across various incentive mechanisms, in line with the set of incentives in place for each energy network sector.

To illustrate Ofgem's findings, Figure 2 shows each of the wider incentives (i.e. non-totex) included in the analysis, and its contribution to incentive outperformance in RIIO-1 for each sector.

⁶⁴ Ofgem (2020), RIIO-2 Draft Determinations Finance Annex, paras 3.131

⁶⁵ Ofgem RIIO-2 Draft Determination – Figure 18

Figure 2 RIIO-1 incentive outperformance (excl. totex)

Variable	Label	% Incentive Outperformance			
		ET1	GT1	ED1	GD1
IQI	Post tax	0.40%	-0.02%	0.15%	0.23%
BMCS	Broad measure of customer service			0.74%	0.28%
IIS	Interruptions-related quality of service			2.10%	
ICE	Incentive on connections engagement				
TTC	Time to Connect Incentive			0.19%	
Losses	Losses discretionary reward scheme			0.01%	
NRI	Network Reliability Incentive	0.09%			
SSO	Stakeholder Satisfaction Output	0.15%	0.05%		
SF6	SF6 Emissions	0.02%	0.05%		
EDR	Environmental Discretionary Reward	0.03%			
TCI	Performance re offers of timely connection	0.00%			
SARA	Shrinkage Allowance Revenue Adjustment				0.05%
EEI	Environment Emissions Incentive				0.25%
DRS	Discretionary Reward Scheme				0.01%
NTSEC	NTS Exit Capacity				0.29%
TOTAL	Total incentive outperformance	0.70%	0.27%	2.14%	1.14%

Source: Frontier Economics based on Ofgem Residual Outperformance spreadsheet

Note: Outperformance is shown as return on regulatory equity

In order to re-present RIIO-1 outperformance in a RIIO-2 context, Ofgem consider changes between RIIO-1 and RIIO-2 and then adjust the analysis to account for these changes. Ofgem states that it makes the following adjustments to RIIO-1 outperformance:⁶⁶

- Excluding items not relevant for RIIO-2: equity return on RAV & Information Quality Incentive (IQI);
- Excluding debt and tax performance;
- Excluding Real Price Effects (RPEs);
- Replacing RIIO-1 incentive strengths with RIIO-2 incentive strengths;
- Replacing RIIO-1 notational gearing(s) with a RIIO-2 benchmark level of 60%;
- Replacing RIIO-1 Totex: RAV ratios with RIIO-2 levels ; and
- Excluding non-totex incentives from RIIO-1 levels.

However, as noted above, many further changes are needed.

We note that Ofgem's underlying analysis has an option for selecting to use either "baseline values for RAV" ratio or to include UMs in the analysis. Both of these values are hard coded and we have therefore not been able to verify the difference between these two values but we note that Ofgem has used the baseline values. Switching to the UM values has no material impact on our conclusions.

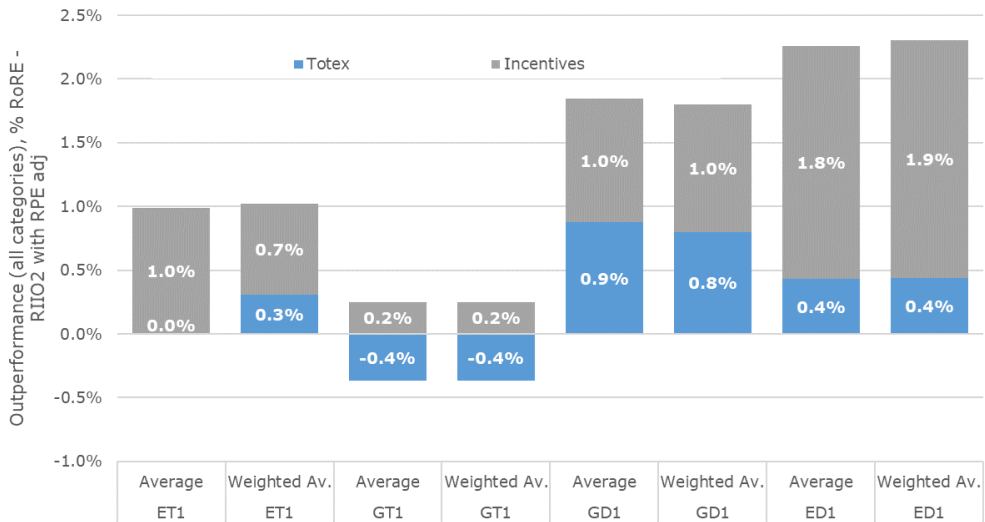
The calculations also include all eight years of data for RIIO-1 (implying therefore that the analysis is conducted on the latest forecasts for the whole period submitted by the companies), and the figures by Ofgem present the average per annum outperformance. Again it is possible to switch to using historical-only values, and this has no material impact on the conclusions.

⁶⁶ Ofgem RIIO-2 Draft Determination – Finance Annex, paras 3.131 and 3.132

Ofgem results

The result of Ofgem’s restatement of outperformance are presented in Figure 3. Ofgem concludes that “this analysis generally supports expected outperformance levels of above 0.25% for RIIO-2”.⁶⁷

Figure 3 Ofgem restatement of RIIO-1 outperformance to RIIO-2 results



Source: Ofgem RIIO-2 Draft Determination – Finance Annex, Figure 18

4.2.2 Methodological issues and errors with Ofgem’s approach

We have reviewed Ofgem’s approach and have identified significant methodological issues and errors. In this section we summarise our findings.

Ofgem adjusts for but downplays the significant impact that RPEs has on performance

One of the changes that Ofgem has accounted for between RIIO-1 and RIIO-2 is the change in approach in relation to RPEs. At RIIO-1 RPE allowances were set ex-ante based on forecasts of the chosen indices. However at RIIO-2 Ofgem will use a set of price indices to update RPE allowances during the price control, based on actual changes in these indices. As noted above, while Ofgem has accounted for this methodological change in its restatement of RIIO-1 onto a RIIO-2 basis it has not made any such adjustment in its database of historical totex outperformance.

We have reviewed Ofgem’s underlying analysis which shows the extent of the difference between the ex-ante RPE allowances that were set at RIIO-1 and the RPE allowances that would have been set, had they been indexed each year throughout the period to track actual price changes. We are unable to comment on precisely how Ofgem has done this at this stage, as the RPE adjustments it has made have been hard coded. At this stage therefore, we have assumed that

⁶⁷ Ofgem (2020), RIIO-2 Draft Determinations Finance Annex, paras 3.132

Ofgem has correctly reflected the effect of its RIIO-2 policy on RPEs in its analysis and limit our review to discussing the effect of this change.

As is now well known, for some but not all energy network sectors Ofgem has concluded that there turned out to be a substantial difference between fixed allowances and outturn price pressures. Ofgem's analysis shows that the totex allowances for the GDNs would have been 5% lower if RPE allowances had been indexed each year rather than being set ex-ante based on forecast price changes. Given that average totex outperformance in this sector was 11.8% (before applying any sharing factors), this implies that RPEs alone account for almost half of observed totex outperformance.

In contrast, Ofgem's analysis suggests forecast RPEs for electricity distribution are very close to the actual RPEs (if anything slightly higher than the actual RPEs).

We conclude that it seems likely that Ofgem has made an adequate adjustment for RPEs. This adjustment substantially reduces observed RIIO-1 outperformance when restated on a RIIO-2 basis.

Ofgem's RPEs calculation error overstates outperformance for RIIO-GT1

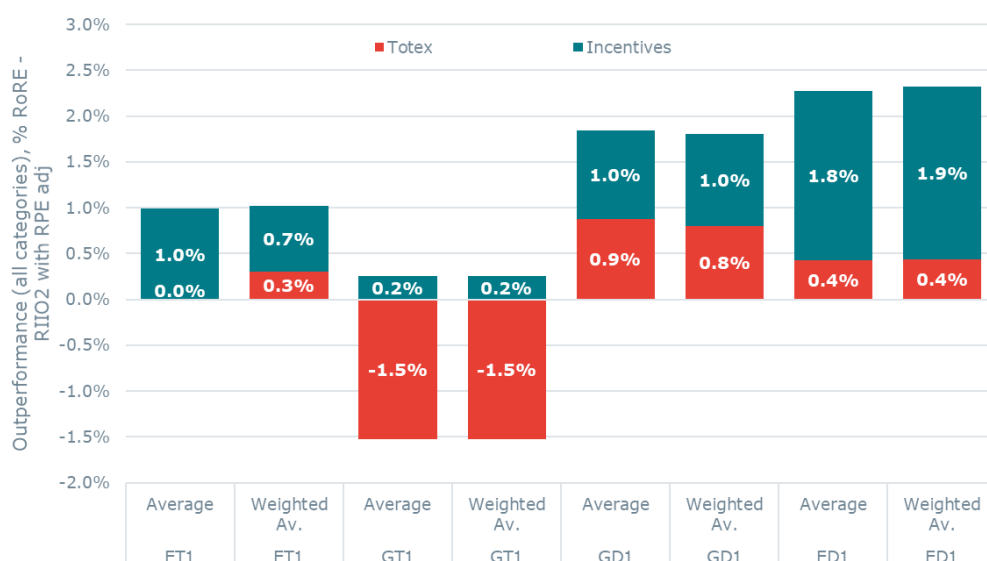
We have identified an error in the calculation of GT1 totex outperformance that results in the outperformance after RPE adjustment being overestimated. Ofgem's calculation suggests that the RPE adjustment increases the GT1 totex performance from -1.0% to -0.4% of RoRE. This is contrary to our expectation: by removing the element of apparent outperformance that was caused by the forecast errors in the RPEs indices, we would have expected the totex performance to reduce (or in this case make the negative performance even more negative).

We reviewed Ofgem's analysis and found that there is an apparent spreadsheet error in the calculation of totex outperformance for GT1, which causes this counterintuitive result. This inconsistency means that the comparison of totex outperformance with and without RPEs adjustment does not isolate the impact of the RPEs adjustment, as it also includes a difference in the totex numbers that are used. In particular, "totex (uncertainty) actual" is included in the calculation of totex outperformance in the without RPEs assessment, but it is not used when the calculation of totex outperformance is carried out with the RPEs adjustment.⁶⁸

Once this error is corrected, GT1 totex performance decreases from -0.4% to -1.5%(in RoRE terms) . Figure 4 shows Ofgem's analysis adjusted for this error.

⁶⁸ In the sheet "Cal_RIIO-1_ex_RPEs" there is an error in cells T62 and U62, as neither cell include "Totex (uncertainty) actual", i.e. they omit cells T54 and U54 respectively. To correct for this error, we have amended the formula in cells T62 and U62 to include this variable (i.e. cells T54 and U54) in the summation formula.

Figure 4 Adjusting calculation error in restatement of RIIO-1 outperformance



Source: Frontier Economics

Note: This analysis is based on Ofgem's Residual outperformance calculations. Figure 18 in the DD Finance Annex presents the Ofgem's version of this figure.

Ofgem fails to take account of all of the relevant differences between RIIO-1 and RIIO-2

In addition to the calculation error that we explain above, Ofgem's analysis fails to take account of all the differences between RIIO-1 and RIIO-2. In doing so, Ofgem's analysis is incomplete and consequently misleading.

There are a number of changes that Ofgem has adopted for RIIO-2, all of which act to reduce the opportunity for outperformance, which we summarise here.

- PCDs.** PCDs are specific carefully prescribed deliverables against which specific funding has been allocated. The intention is to put in place a mechanism whereby revenues are clawed back if the specified output is not delivered (either entirely or partially). The funding for these projects are not transferrable to a different output. The nature of individual PCDs are bespoke, and so the way they are assessed will need to vary from PCD to PCD. As described by Ofgem, PCDs are subject to project-specific incentives. Some PCDs will have allowances recovered through a formulaic method, while others will be subject to an ex-post review from Ofgem. However, we understand that Ofgem's broad intention behind introducing PCDs is to restrict any totex outperformance in the event of non-delivery or late-delivery of specific projects, or changes in scope/spec of works compared to what was anticipated when the price control was set.⁶⁹ Given this, we consider that this means a (potentially significant) source of totex outperformance in RIIO-1 has now been removed for RIIO-2. Given the proposed nature of the clawback mechanisms and the use of ex post appraisal, we consider it is sensible to assume that expected outperformance is zero on PCD-totex. PCDs will be applied to around 25%-

⁶⁹ RIIO-2 DD core document, paragraph 4.8-4.10

45% of each company's total expenditure.⁷⁰ Ofgem has made no adjustment to take account of the widespread use of PCDs (and other related UMs that can be expected to operate in a similar way).

- **NARMs:** For RIIO-2, Ofgem has proposed to introduce a new incentive framework for the Network Asset Risk Metric (NARM). Our understanding is that the NARM methodology is very similar to that for the previously employed Network Output Methodology (NOM), in the sense that it starts from a target for the monetised value of risk removed over the course of a price control. However, the RIIO-2 NARM methodology differs from the RIIO-1 approach in a number of key respects.

- First, Ofgem's proposal for RIIO-2 is now to allocate a specific portion of the DD totex allowances to be targeted specifically at the investments and interventions to deliver the NARM risk removed output. Our understanding is that more costs will be more specifically linked to NARM outputs than was the case for NOM in RIIO-1. The information we have seen suggests that NARMs is likely to apply to around 10%-20% of totex⁷¹, albeit we acknowledge that Ofgem has not yet finalised exactly how much totex will be allocated to the NARM model.⁷²
- Associated with this, Ofgem has introduced a new framework for financial incentivisation, which is called the 'NARM Funding Adjustment and Penalty Mechanism' (NARM FAPM). Under the NARM FAPM, companies will be set a target for the ratio of baseline NARM-allocated totex over NARM risk removed. This target is referred to as the Unit Cost of Risk Benefit (UCR).
- Any outturn deviations from the UCR target will be closely scrutinised by Ofgem through an ex post review. Clearly, deviations from the UCR target could be driven by:
 - a change in expenditure vs. what was allowed for in the UCR numerator; and/or
 - a change in risk benefit delivered vs. what was targeted in the UCR denominator.
- Ofgem says it will reward **cost reductions** with the full TIM sharing factor if the companies provide evidence in an ex-post close out Performance Report that:
 - the cost reductions represent "genuine efficiencies" and
 - the cost reductions "have not been offset by higher costs elsewhere".

Any cost reductions which do not pass those two tests will be treated as outperformance but, instead of receiving the normal TIM sharing factor, the outperformance reward will be reduced according to a Delivery Adjustment Factor (DAF) which Ofgem has currently set at 95%. For NGET, for example, any cost reductions which are not found to be "genuine efficiencies" will receive an effective sharing factor of 1.96%, as opposed to the normal TIM of 39.2%.⁷³ While Ofgem is consulting on what level to set

⁷⁰ This is based on data we have received from the companies and also through the Ofgem license models.

⁷¹ This is based on data we have received from the companies and also through the Ofgem license models.

⁷² Ofgem, Draft Determination – NARMs Annex, para 3.18

⁷³ i.e. $1.96\% = 39.2\% * (1 - 95\%)$.

the DAF, it is clear that Ofgem intends a very material reduction in the effective sharing factor, for any underspends which do not meet the two tests above.

- In contrast, for any **cost overspends**, the full TIM sharing factor will be applied. This means there is no equivalent test for “genuine” overspend that would offer equivalent downside protection for the companies. This means the new DAF mechanism creates inherently asymmetric risk on NARM-related totex, skewed materially to the downside for the companies.
- For over-delivery or under-delivery against the **NARM risk benefit target**, Ofgem will assess whether this is “justified” or “unjustified” and accordingly impose different treatments, notably:
 - Any justified over-delivery or under-delivery is effectively allowed in full, so long as the unit cost of this delivery is in line with the ex ante allowance. However, there is no reward associated with any “justified” change in output delivery – in essence the companies cost allowances are simply trued up to make the company whole for justified over or under delivery. This means there is absolutely no incentive for the companies to attempt to deliver anything other than the NARM target (even if such a change would be justified).
 - Any unjustified under-delivery receives a penalty of 2.5% of the resulting change in allowances.
 - Any unjustified over-delivery will have associated increase in costs disallowed, effectively receiving a penalty based on the full TIM sharing factor.
- A number of new restrictions have also been placed on exactly how networks can deliver their risk output. In particular, companies will have new restrictions around the extent to which they can ‘trade’ risk reduction outputs across assets in different categories, meaning companies will no longer be able to beat totex allowances by changing the work mix (while delivering the target risk benefit).

Effect on incentives

The clear intention of Ofgem in developing this framework has been to try to remove the possibility of any windfall gains arising from the NARM incentive. Ofgem appears to have concerns that, without some constraints, companies might be able to materially outperform totex allowances while still delivering at (or above) the target NARM benefit – primarily by shifting some expenditure towards interventions which are lower cost and equivalent/higher impact in terms of risk removed. Ofgem evidently would consider that such a shift was not a “genuine” efficiency saving – rather, it would represent companies exploiting the underlying weaknesses of the NARM methodology.⁷⁴

The issue, however, is that in attempting to impose these constraints, Ofgem has proposed a model that relies almost entirely on judgements made by the regulator ex post. Specifically, companies will now be significantly exposed to the decision that Ofgem makes ex post on whether costs savings were

⁷⁴ In a similar vein, Ofgem has also sought to remove the potential for any equivalent windfall gains/losses to arise due to “non-intervention” changes in the delivered risk output – for example due to NARM methodology changes; consequence of failure changes; or data cleansing.

“genuine”; and on whether any departures from the risk target were “justified” or “un-justified”. Importantly, Ofgem’s underlying principle seems to be that companies must bear the burden of proof in these ex-post assessments – in other words, Ofgem’s default position will be that deviations are unjustified, and it is up to the companies to convince Ofgem otherwise.

At the same time, the NARM framework imposes a significantly skewed balance of risk towards the downside, conditional on the exercise of Ofgem’s ex post discretion.

- First, in relation to **totex over-/under-spends**, if Ofgem deems cost reductions are not genuine, there is virtually no upside (given the application of the DAF). Companies will know that even if they pursue and deliver what they consider to be genuine efficiencies, there will still be a chance that Ofgem might not consider those efficiencies to be genuine after the fact. Ofgem has provided no guidance about what tests it will apply to determine whether or not costs are efficient – and by Ofgem’s own admission, this exercise will not be straightforward.

In light of the overall approach that Ofgem appears to be adopting towards incentive regulation and the general clamp-down on outperformance in RIIO-2, our view is that companies would quite reasonably expect that little (if any) cost reductions will be deemed “genuine efficiencies” by Ofgem. This will almost entirely undermine any incentive for the companies to reduce these costs.

On the flip side, as noted above, there is no symmetric protection applied to overspend – for this, the TIM sharing factor is applied. Overall this represent a sharp skew towards downside risk on totex.

- Second, in relation to **NARM output delivery**, Ofgem has imposed (potentially material) downside penalties for any “unjustified” under-delivery or over-delivery, but quite literally no upside for “justified” under-delivery or over-delivery. Again, little if any guidance has been given by Ofgem about what tests it will apply or how in reaching these judgements.

Faced with this set of arrangements and the threat of penalties being applied ex post at the discretion of the regulator, in our view there is only one optimal strategy for the companies – they will stick as closely as possible to the specific allowed costs; and deliver as close as possible the NARM risk target.

The overall effect of these changes to the NARM framework are therefore potentially profound. As a result, we consider that this is a further quantum of the cost base over which there is no prospect of outperformance. Even this would be a conservative assumption – the limitations in trading will, prima facie, eliminate the opportunity to benefit from making certain types of savings versus allowance during RIIO-2 compared to RIIO-1; and the DAF and other elements introduce significant downside asymmetry. There must be some risk that companies aim to deliver but are deemed by Ofgem ex post to have failed in some regards, and are then exposed to penalties despite their best efforts.

Again, in its restatement of RIIO-1 on a RIIO-2 basis, Ofgem has failed to take account of any of these effects of its new NARMs methodology.

- **Productivity:** At RIIO-1, Ofgem set the annual productivity challenge at 1% for opex and 0.7% for repex and capex. For RIIO-2 Ofgem has set the tougher annual challenges of 1.4% for opex and 1.2% for repex and capex, despite the fact that the evidence for such rapid productivity improvement seems in many regards weaker now than it did at RIIO-1. As a result of its assumptions with respect to productivity, Ofgem will set tougher cost allowances for RIIO-2 than it did at RIIO-1. This will reduce the likelihood that companies outperform. This toughening of calibration should be reflected in Ofgem's restatement analysis, but it has not been.
- **Benchmarking approach:** Ofgem has made a number of changes to its benchmarking approach that have acted to toughen the cost allowances that it has set.
 - At RIIO-1 Ofgem used the upper quartile as its benchmark in the cost assessment for the GDNs (as it did at ED1) but at RIIO-2 Ofgem has set the tougher benchmark of the 85th percentile. This will set tougher cost allowances and reduce the companies' chance to outperform. As a result, this change needs to be reflected in the analysis.
 - It is our understanding that there has also been a marked toughening in the approach to benchmarking within the transmission sector, and that this has led to a level of disallowance that is unprecedented. It is not straightforward to capture quantitatively the effect of this toughening versus the practice that prevailed at RIIO-1, but the effect is clearly highly material and again this change in approach has not been accounted for by Ofgem. This is a further reason to suppose that RIIO-1 levels of outperformance will not be repeated at RIIO-2.
 - In addition to this, Ofgem is also proposing a further clawback adjustment for NGET, which amounts to a clawback of £556m of RIIO-1 outperformance (unspent non-load allowances for T1/T2 crossover work).⁷⁵ We have not adjusted for this change, but we note that it will further act to materially worsen NGET's ability to outperform.
 - The scope of application of the benchmarking analysis has been expanded in RIIO-GD2. In both RIIO-GD1 and RIIO-GD2 (and in benchmarking more generally), Ofgem removes certain costs pre-benchmarking on the basis that they should be normalised out. One example of this is regional wage differentials. Companies operating in London and South East have to pay higher wages for certain types of labour - this is normalised out prior to benchmarking, so that it does not distort the assessment of "inefficiency" in a relative benchmarking exercise. In RIIO-GD1, the value of the costs that were normalised pre-benchmarking was allowed back to the relevant companies in full – so for example, if the additional cost of operating in London and the South East was deemed to be £1m, this £1m would be added in to the companies' final allowances. In RIIO-2, Ofgem applies the benchmark efficiency score (now based on the 85th percentile) to these normalised out costs. So, given the efficiency benchmark is 95% in the RIIO-GD2 DD, the £1m that would have been allowed under the RIIO-1 approach will now be reduced to £950k in allowances in RIIO-GD2. Our

⁷⁵ Ofgem, Draft Determination, NGET Annex, footnote 38, p. 39

understanding is that this 5% additional catch-up efficiency target is applied to all costs that are normalised out pre-benchmarking, whereas in RIIO-GD1 it was applied to none of these normalised costs.

- The same issue also applies to what are termed “non-regressed costs”. In RIIO-GD2, these include costs associated with Multi-Occupancy Buildings (MOBs), Diversions, Growth Governors, Streetworks, Smart metering, Land remediation, and Scottish Independent Undertakings (SIU). The RIIO-GD1 model did not apply the benchmark target upper quartile efficiency score to these cost categories, whereas in RIIO-GD2 they are now given the 85th percentile “catch up” target. However, the direction of travel of this change is less clear, as it depends on how stretching or not Ofgem has been in its separate assessment of each individual non-regressed cost area vs. RIIO-GD1, a topic which we do not explore further here.
- Finally, a further differentiator is the scope of costs to which the headline productivity challenge is applied. In RIIO-GD2, a productivity target is applied to all costs, including pre-regression normalisations (like regional wages); non-regressed costs; and the separate ‘technically assessed costs’; as well as to allowances for bespoke outputs and uncertainty mechanisms. In RIIO-GD1, our understanding is that the productivity target was not applied to any such costs. Specifically, Ofgem stated in its RIIO-GD1 FD that “we have not applied productivity assumptions in our assessment of non-regressed costs.”⁷⁶
- It is self-evident that all of these changes would markedly reduce the scope for outperformance at RIIO-2, yet Ofgem has made no attempt to capture any of these changes.
- **IQI and the BPI:** the IQI has been removed for RIIO-2 and replaced by the BPI. Ofgem states that it considers the impact of these two schemes on returns “may be similar”.⁷⁷ For this reason, Ofgem does not quantify the change of removing the IQI and introducing the BPI. In our view this is a flawed assumption for the following reasons.
 - The IQI had three components: it affected the size of the sharing factor; it included an upfront additional reward / penalty; and also relied on interpolation to set final allowances, as a weighted average of 75% modelled costs and 25% submitted costs.
Firstly, Ofgem appears to be comparing the impact of only the additional reward/penalty aspect of the IQI with the BPI and concluding that these may be similar, and therefore it does not need to quantify this change.
 - However, this is simply not the case. Some companies have received very substantial penalties under the BPI and as a result, this change needs to be accounted for much more completely.
 - Secondly, Ofgem does not appear to recognise the need to account for the removal of the IQI interpolation at RIIO-2. IQI interpolation had a material impact on final allowances at RIIO-1, and nothing at RIIO-2 could be considered to be equivalent to this.

⁷⁶ Ofgem RIIO-GD1 Final Determinations, Real price effects and ongoing efficiency appendix, para 3.27

⁷⁷ Ofgem RIIO-2 Draft Determination – Finance Annex, Table 27

- **Fast tracking:** At RIIO-1, the IQI did not apply to companies that were fast-tracked. But fast-tracked companies received cost allowances equal to their submitted costs, and an upfront reward equal to 2.5% of totex allowances. The opportunity to be fast-tracked has been removed, and with it the chance to earn this reward. The fast-track reward should therefore be removed from Ofgem's analysis, but it has not been.
- **Changes to output incentives:** Ofgem has changed some of the detailed aspects of various output incentives, and also removed some output incentives entirely. For example, the NTS Exit Capacity incentive has been removed from the GD price control. While Ofgem has also added in a new incentive to the GD control, the unplanned interruptions incentive, this is a penalty only incentive.⁷⁸ Overall therefore the potential for outperformance on output incentives in the GD sector has been reduced. More generally, it is clear that Ofgem has significantly toughened its approach to ODI calibration in very many areas across all price controls, and the effect on potential outperformance is clear. Due to the timing of RIIO-ED2, we of course do not know exactly what changes will be made to this sector. However, the sector specific methodology consultation shows that there is a clear direction of travel to reduce the potential for output outperformance in the ED sector too. For example, Ofgem is consulting on introducing dynamic targets for customer service (rather than maintaining static targets throughout the price control)⁷⁹ and Ofgem's approach will lead to more challenging targets on the IIS⁸⁰, leading to less opportunity to outperform on both of these two mechanisms. Ofgem is therefore wrong to take no account of these changes in its analysis.

4.2.3 Ofgem has failed to sufficiently take account of all the differences between RIIO-1 and RIIO-2

While Ofgem suggest that the aspects that it has ignored in its analysis are irrelevant or immaterial⁸¹, this is clearly wrong. Ofgem's set of adjustments in restating RIIO-1 on a RIIO-2 basis is clearly incomplete. The conclusions it draws from its analysis are therefore incorrect and misleading.

Ofgem's failure to adjust for all relevant differences between RIIO-1 and RIIO-2 lead it to overstate markedly the level of likely RIIO-2 performance. To quantify how much Ofgem's analysis fails to overstate RIIO-2 outperformance, we have expanded Ofgem's analysis (and corrected for the calculation error as explained in section 4.2.2).

In this section, we set out:

- our approach;
- the findings from our quantitative analysis; and

⁷⁸ Ofgem RIIO-2 Draft Determinations – Gas Distribution Annex, p. 33

⁷⁹ Ofgem (2020), RIIO-ED1 Sector Methodology Consultation: Annex 1 – Delivering value for money services for consumers, para 4.9

⁸⁰ Ofgem (2020), RIIO-ED1 Sector Methodology Consultation: Annex 1 – Delivering value for money services for consumers, para 7.21

⁸¹ Ofgem RIIO-2 Draft Determination – Finance Annex, Table 27

- the qualitative findings we have in relation to the further changes between RIIO-1 and RIIO-2 which act to reduce potential outperformance, but which we have not been able to quantify.

Our approach

In addressing the concerns raised in section 4.2.2 we have undertaken a revision of Ofgem's restatement to more completely and robustly re-present the historical returns under the RIIO-2 framework. In this section we set out the approach we have used to amend Ofgem's analysis, where we have been able to quantify the impact of the additional changes between RIIO-1 and RIIO-2. The results show that accounting for these additional differences in incentive regimes and changes in totex calculations leaves very limited opportunity for outperformance (if any at all) under RIIO-2.

- **Correct Ofgem's spreadsheet error:** Our first step in re-presenting the historical returns was to correct for the spreadsheet calculation error which overstates the outperformance in RIIO-GT1 (Figure 4 illustrates this amendment). We then assessed how to quantify the additional differences that Ofgem failed to account for, which we outlined in section 4.2.2.
- **Adjust for IQI and fast-track upfront rewards/BPI penalties:** the BPI cannot be considered to be equivalent to the IQI upfront reward/penalty. As a result, in order to account for this difference, the RIIO-1 figures need to be adjusted to remove the impact of any IQI additional reward/penalty, and the impact of the BPI needs to be added. We have also removed the impact of the upfront fast-track reward. In relation to this, we note that we are of course unable to add in the impact of the BPI for the electricity DNOs, as the RIIO-ED2 price control review has not begun.⁸²
- **Removal of the NTS Exit Capacity:** the NTS Exit Capacity incentive has not been included in RIIO-2. As a result, we have removed the incentive from the restatement. This affects the GD sector only.
- **Remove IQI interpolation.** Ofgem has failed to take account of the IQI interpolation element. In order to fully account for the move away from IQI we also need to remove the effect of the IQI interpolation on final allowances. The IQI interpolation weighted final totex allowances as 75% of modelled costs (Ofgem's underlying view of costs) and 25% of submitted costs (as per the company business plan). Whereas at RIIO-2, the final allowances will be set as 100% of modelled costs. To unwind this impact, we replace the totex allowances set at RIIO-1 (post interpolation) with the underlying modelled costs from RIIO-1.⁸³ We note that fast-tracked companies at RIIO-1 received their submitted costs as their total allowances. We have not been able to unwind this change, as we cannot say what the modelled costs would have been for these

⁸² We note that the BPI impact is published at the group level rather than the licensee level. Where a company has multiple licensees, we have equally split the BPI impact across the licensees.

⁸³ We note that due to data availability, we have replaced the allowances with the modelled costs including the RIIO-1 RPE ex-ante allowances. The impact of this actually interacts with the change in the RPE methodology, and if we had been able to use the RIIO-1 modelled costs restated to take account of the RIIO-2 RPE methodology, the modelled costs would have been lower. This means that our approach if anything understates the scale of the impact of removing the IQI interpolation.

companies, had they not been fast-tracked. We summarise below how we have carried out this adjustment.

- For ED1, we had access to the underlying benchmarking models, a copy of which we had from prior client work. We have used the summary spreadsheet from these models to quantify the change of moving from using the final totex allowances to using the modelled costs instead.
- For GD1, we have reviewed the RIIO-GD1 Final Proposals and have quantified the difference between the final allowances and the modelled costs.⁸⁴
- For NGET and NGGT, we have reviewed the RIIO-T1 Final Proposals and have quantified the difference between the final allowances and the modelled costs.⁸⁵
- **Productivity.** As explained in section 4.2.2, Ofgem has made the annual productivity assumptions for RIIO-2 tougher than they were at RIIO-1, and this also needs to be accounted for in the restatement of RIIO-1 outperformance. We have quantified the impact of this change, where possible, although we are limited in terms of data availability in some cases. However, we have been able to estimate the impact of this change, as follows.⁸⁶
 - For GD1, we have access to the underlying benchmarking models from previous client work. We have updated the totex benchmarking models to assess how the change in the productivity assumptions affects the modelled costs.⁸⁷
 - For ED1, it is not straightforward to apply a tougher productivity target as ED2 has not yet been struck. As an approximation however of the likely effect, we apply the same differential impact as we have derived for the GDNs, as a percentage of totex allowances. It is noted that this can only be regarded as an approximation.
 - The same approximation is applied for transmission.
- **85th percentile.** As explained in section 4.2.2, Ofgem has made a number of changes to toughen the cost allowances it has set for RIIO-2. One of these changes is to set a tougher benchmark in its cost assessment, moving from an upper-quartile (or 75th percentile) benchmark to a 85th percentile benchmark. As for the change in the productivity assumption, this effect will reduce the opportunity to outperform on totex, and therefore needs to be accounted for in Ofgem's restatement. But Ofgem has failed to do this. We have been able to quantify the impact of the change in the benchmark as follows (although we

⁸⁴ Ofgem, RIIO-GD1, Final Proposals – Supporting document – cost efficiency, Table 10.4

⁸⁵ Ofgem, RIIO-T1, Final Proposals for National Grid Electricity Transmission and National Grid Gas, Tables 2.1 and 2.2

⁸⁶ We note that this step also interacts with the change in the RPEs approach. There were therefore two steps to this aspect. We took the productivity impacts from the underlying GD1 and ED1 models, and then scaled these impacts down by the ratio of totex allowances without RPE adjustment to the totex allowances with RPE adjustment.

⁸⁷ We note that we have estimated this impact by assessing how the tougher productivity assumptions affect the totex models. We have not assessed how this change affects the disaggregated RIIO-GD1 models.

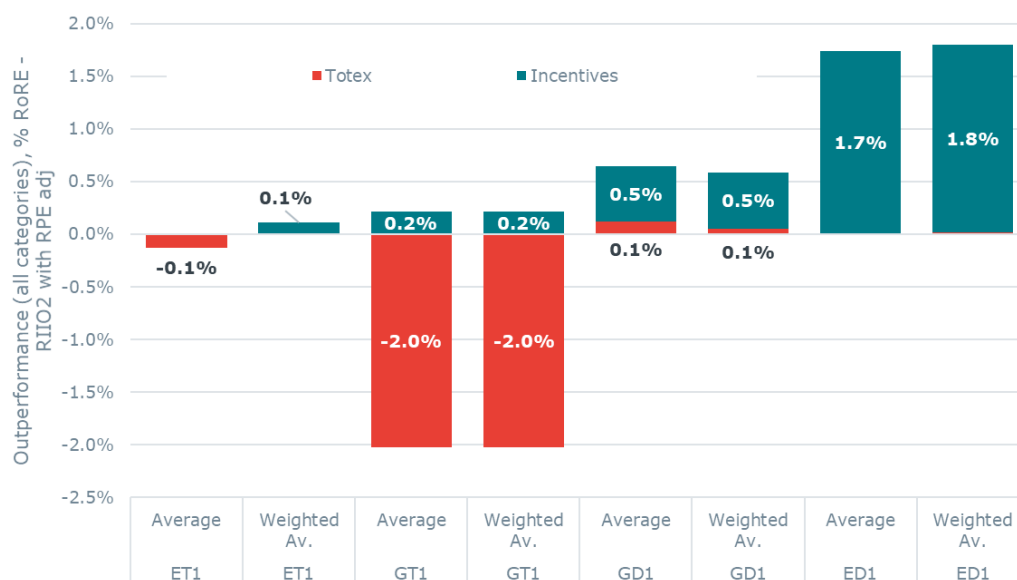
have not been able to quantify the impact of the other changes in the benchmarking approach for RIIO-2).⁸⁸

- For GD1, we have access to the underlying benchmarking models through our work with gas distribution network companies. We have updated the totex benchmarking models to assess how the change in the benchmark affects the modelled costs.⁸⁹
- For ED1, we have access to the underlying benchmarking models through prior client work. We have updated the calculation of modelled costs to account for this change from the 75th percentile that was used at RIIO-ED1 to the 85th percentile used at RIIO-2.
- For transmission, we have not quantified the impact, as the cost assessment approach is different to the distribution sectors. However, it is clear that a much tougher benchmarking exercise has been conducted for the transmission sector and since our analysis has not captured this, it should be regarded as particularly conservative in the case of transmission.

Our findings – quantified impact

Overall our analysis shows that, when more of the changes in incentives and totex mechanisms between RIIO-1 and RIIO-2 are reflected in the restatement, there is limited opportunity for outperformance (if any at all) under RIIO-2. The results from our analysis are shown in Figure 5.

Figure 5 Interim results from our analysis of outperformance restatement



Source: Frontier Economics

Note: Note these are interim results and do not include the final adjustment for GD incentives. The adjustments included in this piece of analysis are those in the subsection above titled 'Our approach'

⁸⁸ We note that this step also interacts with the change in the RPEs approach. There were therefore two steps to this aspect. We took the benchmarking impacts from the underlying GD1 and ED1 models, and then scaled these impacts down by the ratio of totex allowances without RPE adjustment to the totex allowances with RPE adjustment.

⁸⁹ We note that we have estimated this impact by assessing how the tougher productivity assumptions affect the totex models. We have not assessed how this change affects the disaggregated RIIO-GD1 models.

Our analysis shows that there is almost no opportunity to deliver totex outperformance. This finding emerges even though we have not accounted for a raft of important additional changes between RIIO-1 to RIIO-2. In particular the results we set out above do not take account of the likely effect of PCDs/UMs or the NARMs framework, nor the toughening of benchmarks in transmission. We have assessed these further differences qualitatively in the next sub-section.

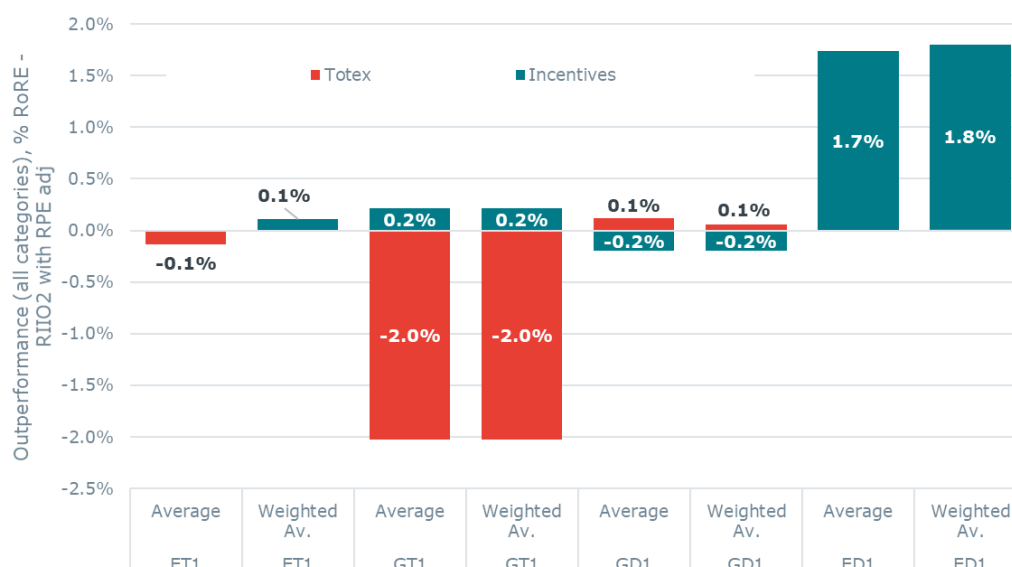
In respect of incentive performance, we note that, again, we have not reflected all changes to output incentives, despite the fact that there has clearly been a marked toughening in approach by Ofgem. And we have not been able to reflect any of the changes to output incentives for the ED sector. The reader should not therefore take the view that there is the same opportunity to outperform on incentives generally under RIIO-2 as at RIIO-1. This will not be the case. It is however, hard to quantify empirically the effect of this, and in the time available a detailed analysis of all incentive calibration has not been attempted. We have only included the ED sector in this figure to be consistent with Ofgem's analysis, but the restatement for this sector is inevitably incomplete, as little progress has been made on the ED2 control.

Fortunately though, through a separate piece of client work (for a GDN) we have estimated the likely levels of outperformance, including on incentives at RIIO-GD2. This other piece of work is not strictly speaking the same exercise, as it is a forward-looking piece to estimate RIIO-2 performance, rather than a backward-looking piece that restates RIIO-1 performance. However, the underlying principles are the same, and the results from our other piece of work therefore provide a useful approximation that we can draw on. Our other piece of work has estimated that incentives performance is likely to be around -0.2% for the GDNs, which contrasts to the 0.5% shown in Figure 6. This difference is primarily due to changes in License Obligations for GDs, such as Guaranteed Standards of Performance and Emergency Response Times. A similar piece of work for a transmission company has consistent results to the levels of incentive performance shown in Figure 5 for ET and GT.

We have therefore used the levels of incentive outperformance estimated in our other piece of work for the GDNs to amend the final conclusion of our work. The final results from our analysis are shown in Figure 6.

Finally we note that, even if there remains some scope to outperform on incentives, we expect this to be far outweighed by the likely underperformance on totex. Overall this leads to there being very limited opportunity for net outperformance across both totex and incentives, certainly nowhere near enough to justify any outperformance wedge.

Figure 6 Results from our analysis of outperformance restatement



Source: Frontier Economics

Note: This should be compared with Figure 18 in the DD Finance Annex. We note that the analysis presented in this chart ignores many material further changes from RIIO-1 to RIIO-2, each of which would have the effect of further reducing the scope for outperformance, namely PCDs, NARMS, the tougher approach to benchmarking in the transmission sector and various detailed changes to benchmarking of the GDNs each of which result in a tougher benchmark and the tougher approach to calibration of incentives across all RIIO-2 price controls (particularly for ED). We therefore consider the scope for outperformance shown in this figure highly optimistic.

We show in the table below how our restatement of the RIIO-1 performance in RIIO-2 compares with Ofgem's analysis, separately for totex and output performance.

Figure 7 Comparison of our results with Ofgem's results

Sector	Ofgem's restatement of performance			Results from our restatement of performance		
	Totex	Incentive	Net*	Totex	Incentive	Net*
ET (average)	0.0%	1.0%	1.0%	-0.1%	0.0%	-0.1%
ET (weighted average)	0.3%	0.7%	1.0%	0.0%	0.1%	0.1%
GT (average)	-0.4%	0.2%	-0.2%	-2.0%	0.2%	-1.8%
GT (weighted average)	-0.4%	0.2%	-0.2%	-2.0%	0.2%	-1.8%
GD (average)	0.9%	1.0%	1.8%	0.1%	-0.2%	-0.1%
GD (weighted average)	0.8%	1.0%	1.8%	0.1%	-0.2%	-0.1%
ED (average)	0.4%	1.8%	2.3%	0.0%	1.7%	1.7%
ED (weighted average)	0.4%	1.9%	2.3%	0.0%	1.8%	1.8%

Source: Ofgem spreadsheet (Residual outperformance.xlsx) and Frontier analysis

Note: Net here is the sum of outperformance for all outperformance categories: totex and incentives

We set out below further detail on how our analysis compares to Ofgem's.

Totex outperformance

Our analysis shows that RIIO-1 totex outperformance restated in RIIO-2 terms amounts to between 0.0% and 0.1% return on equity for the ET, GD and ED sectors. This change is a result of the IQI interpolation adjustment, productivity and the 85th percentile adjustments. IQI interpolation is the most significant of these adjustments, accounting for around half of the total adjustments to totex allowances.

For GT, our analysis shows material totex underperformance of 2.0% (as a return on equity). The reason why this sector has seen the most change, relative to Ofgem's analysis, is due to the correction of the spreadsheet error which was having a material impact on Ofgem's analysis.

Incentive outperformance

Figure 6 shows that incentive outperformance is close to 0.0% for ET and GT. Removing the impact of the upfront rewards/penalties under the IQI and replacing these with the impact of the BPI has reduced incentive outperformance for all sectors. However, the BPI adjustment has a particularly significant effect on the ET sector due to the large BPI penalties that the companies in this sector received.

The removal of the NTS Exit Capacity incentive has further reduced incentive outperformance for the GD sector.

As stated above, there are changes to output incentives between RIIO-1 and RIIO-2 that have not been included in the restated outperformance, in particular the general toughening in approach to calibration (albeit that this partially factored in to the forward-looking analysis of incentives we undertook in the separate work in relation to GDNs). In particular, we have of course not been able to add in the BPI adjustments or make amendments for any output incentives in the ED sector.

Other changes will also act to reduce outperformance

We have not been able to quantify the impact of all of the changes that we set out in section 4.2. In this section, we set out our qualitative assessment of how these changes between the RIIO-1 and RIIO-2 regulatory frameworks will impact the opportunity for companies to outperform. We summarise this qualitative assessment below.

- **PCDs.** As explained in section 4.2, PCDs remove a (potentially significant) source of totex outperformance. In particular, we consider it is sensible to assume that expected outperformance is zero on PCD-totex. PCDs have been applied over a material proportion of each company's expenditure and this has therefore further removed an opportunity for companies to outperform on totex.
- **NARMs:** As explained in section 4.2.2, NARMs will significantly reduce companies' incentives to outperform on any totex that NARMs relate to. For the reasons set out above, the only rational response for companies faced with this set of arrangements is to stick as closely as possible to the specific allowed costs; and deliver as close as possible the NARM risk target. This will clearly reduce outperformance vs. RIIO-1, while other elements of the model mean the balance of risk is also now heavily skewed to the downside.

- **Further benchmarking changes:** Our analysis includes an adjustment for moving to a tougher benchmark in Ofgem's RIIO-2 cost assessment. That is, changing from an upper-quartile (or 75th percentile) benchmark in RIIO-1 to a 85th percentile benchmark in RIIO-2. As explained in section 4.2, there are additional changes that have further toughened Ofgem's RIIO-2 cost assessment, which we have not been able to include in our analysis but these will act to further reduce the opportunity to outperform on totex. These include:
 - The marked toughening in the approach to benchmarking across the transmission sector.
 - The scope of the benchmarking analysis has been expanded in RIIO-2, resulting in efficiency targets being applied to a wider set of costs. This includes costs such as regional wage differentials that were normalised out pre-benchmarking in RIIO-1.
 - At RIIO-2, the headline productivity challenge is applied to a wider set of costs than at RIIO-1.
- **Fast tracking:** While we have removed the effect of the upfront fast-track award, we have not been able to model the impact of the change to totex allowances for companies that were fast-tracked at RIIO-1 (i.e. their totex allowances would have been based on their submitted costs rather than modelled costs due to being fast-tracked).
- **Changes to output incentives:** Our analysis only reflects the cases where output incentives have been removed for RIIO-2. In particular, we have removed the effect of the NTS Exit Capacity on incentive outperformance. However, there are further changes to output incentives that have not been included in the analysis and would further act to reduce outperformance, as explained in section 4.2.

4.2.4 Summary views on Ofgem's restatement of RIIO-1

Ofgem's analysis aimed to restate RIIO-1 performance as if the RIIO-2 framework was in place, in order to draw inferences on the likely levels of outperformance in RIIO-2. Ofgem concluded that "this analysis generally supports expected outperformance levels of above 0.25% for RIIO-2".⁹⁰

However, Ofgem's approach includes a calculation error and misses critical differences between RIIO-1 and RIIO-2, which materially affect totex and incentive performance. Due to this, Ofgem's analysis fails to robustly estimate what the RIIO-1 outperformance would have been in a RIIO-2 environment. The result is that Ofgem has overstated levels of likely outperformance.

Our results show that, when properly accounting for the differences between RIIO-1 and RIIO-2, there is almost no opportunity to deliver outperformance. In particular, there is very limited opportunity to deliver totex outperformance. This is despite the fact that we have not been able to quantify the impact of PCDs and NARMS, or a raft of ways in which totex benchmarks have been toughened at RIIO-2. Given that both of these mechanisms and Ofgem's benchmarking changes will further act to reduce totex outperformance, the overall conclusion is that there is

⁹⁰ Ofgem (2020), RIIO-2 Draft Determinations Finance Annex, paras 3.132

very limited (almost no) opportunity to outperform in RIIO-2. Our analysis also shows reduced opportunities to outperform on other incentives, even though we have not accounted for all changes to output incentives.

Finally we note that, even if there remains some scope to outperform on incentives, we expect this to be outweighed by the likely underperformance on totex. This leads to there being very limited opportunity for net outperformance across both totex and incentives.

4.3 Ofgem's inferences from MARs and transaction premia (Simple MAR application mode.xlsx)

Ofgem's third strand of evidence to support its proposed outperformance wedge is evidence gathered for it by CEPA on the MARs of the five listed GB utility firms (SVT, UU, PNN, NG, SSE) and transaction premia drawn from analysis of recent private infrastructure transactions in the UK.⁹¹ Ofgem uses this analysis to simultaneously inform its calibration of the cost of equity allowance and the outperformance wedge.

CEPA's analysis is built on the notion that:

- if the price control is calibrated "correctly", i.e.:
 - all allowances match exactly all costs;
 - all output targets exactly match expected outcomes; and
 - the allowed rate of return exactly matches the allowed cost of capital; then
- there would be no reason for the market price of shares of publicly traded utilities to deviate from its underlying regulatory value.

Hence one would observe a MAR of exactly 1 and one could be confident that the price control was well calibrated. However if one observes a MAR above 1, then it must be the case that something has been set "too high", either a cost allowance, or the reward from a performance incentive, or some aspect of the allowed rate of return.

CEPA performs a range of analysis on public data to estimate MARs. It finds MARs substantially above 1 "at the time of writing" in all cases, although it does find periods in the past when according to its calculations firms traded at a discount.⁹²

CEPA's spreadsheets also present a stylised analysis of how MARs above 1 can be fixed by imputing the level of outperformance on either incentives or allowed returns that investors must be assuming in order for some given level of MAR to arise.⁹³

We have no material comments on the mechanics of CEPA's spreadsheet. However, we argue that Ofgem's reliance on the MAR to calibrate allowed returns (either the overall level of an outperformance wedge) is misguided. This is because:

⁹¹ Ofgem RIIO-2 Draft Determination – Finance Annex, paras 3.133 to 3.138, and Figure 19

⁹² Ofgem RIIO-2 Draft Determination – Finance Annex, Figure 10

⁹³ Ofgem RIIO-2 Draft Determination – Finance Annex, Table 22

- using volatile market information to fine tune allowed returns has the potential to introduce volatility into regulatory determinations, something that is inconsistent with the long-run nature of these businesses and their very long-term planning horizons;
- most market observers would accept that equity prices can move in ways that are not perfectly correlated with the fundamentals of valuation, hence MAR evidence is difficult to interpret and must be treated with considerable caution;
- Ofgem relies extensively on evidence from the three listed water companies, which we do not consider to be a reliable basis to draw inferences for energy networks;
- the transaction premia cited by Ofgem are out of date;
- if Ofgem were capable of measuring energy network MARs and used these to fine tune allowed returns, then this is likely to lead Ofgem to over-correct at RIIO-2 (and at future price controls) for past outperformance;
- introducing a MAR cross check has the potential to further weaken the incentives for companies to outperform, for the same reasons as does applying an outperformance wedge; and
- the process of fine tuning allowed returns introduces another source of arbitrary regulatory judgement with the potential for the resulting regulatory risk to be asymmetric, as regulators may be happy to adjust allowed returns down but far less happy about adjusting them up.

We also note that Ofgem is cherry picking the information that it relies on in a way that is internally inconsistent and likely to lead to biased (downwards) outcomes. It is happy to rely on MAR evidence here that is evidently volatile over time and derived from a decomposition of the business activities of the various listed entities analysed by CEPA that requires a multitude of assumptions. This evidence Ofgem decides is sufficient to support a downward adjustment in allowed returns. Yet within the same consultation Ofgem, supported by CEPA, concludes that no weight at all should be placed on beta decomposition analysis, as it is volatile and depends on too many assumptions.⁹⁴ Hence Ofgem decides that a lower range for allowed betas is justified. We do not consider that there is a reasonable justification for this arbitrary difference in approach across different aspects of its decision.

4.3.1 Volatility and inability to draw strong conclusions

Stock markets and individual stock prices are volatile, sometimes highly volatile. Over the last month (at the time of writing) the share price of SVT has ranged between 2,361 and 2,505. Over that time, SVT's news feed shows one trading update, noting that the first quarter was in line with its expectations and predicated annual performance in line with guidance.

It is of course entirely unknown – and unknowable – precisely what caused this change in share price, but the “fundamentalist” approach to interpreting market data proposed by Ofgem would require us to interpret this change in valuation as evidence of a change in the underlying prospects of the business, despite there

⁹⁴ Ofgem RIIO-2 Draft Determination – Finance Annex, paras 3.58 and 3.59

being no changes to SVT's price control and no operational update that would provide new information on those fundamentals.

Stock analysts all over the world devote the majority of their professional life trying to understand the complex factors that contribute to the fundamental valuation of stocks in order to help them provide reliable buying and selling guidance for their clients. However, despite the abundance of information and research, stock prices are well known for diverging from consensus fundamental valuations, even in the long run. It is a well-known fact that even though there are countless models and information that can help investors understand the stock valuation and stock price movements in general, no individual or modelling analysis can consistently and reliably predict share prices. There has never been and probably will never be. This can be due a host of reasons, a few examples include the following:

- Market momentum (the concept of bull and bear markets) – there is an entire literature of behaviour finance that is dedicated to explaining why markets behave in ways which lead to stock prices diverging from fundamental values;
- Portfolio balancing and availability of liquidity – due to large movement in liquidity such as financial crisis or central bank quantitative easing, investors often find themselves revaluing asset prices due to the need of portfolio management rather than changes in underlying valuation;
- Subjectivity of fundamental valuation – a stock is worth however much a buyer considers it is worth and if there are other buyers who agree with the same subjective valuation the price would remain regardless of what objective valuation suggests (Keynesian's beauty contest).

Moreover, this approach has the potential to introduce significant noise into the process of setting the allowed cost of capital. The timing with which a regulator looks at the data on MARs may matter a lot. The assumptions used to derive MARs may strongly influence a regulator's decision. How confident is CEPA in its analysis? Would it be willing to sanction market trades off the back of it? This question is highly pertinent, as Ofgem is about to rely (at least in part) on CEPA's analysis to justify setting the cost of equity at an unprecedentedly low level for a large proportion of the UK's national infrastructure.

If such cross checks were to become common practice they have the potential to cause the setting of allowed returns to become more volatile and subject to more measurement error and substantial regulatory discretion. This will erode investor confidence in the process of regulation and has the potential to increase the perception and reality of risk.

4.3.2 Reliance on MARs for three water companies

Ofgem continues to rely on evidence from the water sector to support its headline cost of equity and its outperformance wedge.⁹⁵ Using water company MARs to adjust the allowed return for energy network companies could introduce arbitrary noise into the methodology.

⁹⁵ Ofgem RIIO-2 Draft Determination – Finance Annex, Figure 9

The MARs of water companies ultimately depend on the calibration of Ofwat's regulatory regime and companies' own operational risks. Using water company MARs to adjust returns for energy networks would create the risk of adjusting returns for energy networks to take account of factors that may be entirely irrelevant to that sector.

Furthermore, the three listed water companies may not even be particularly representative of the performance of the wider water sector, adding a further complication:

- the three listed companies happen to be the only three companies to receive enhanced status from Ofwat. These companies may well face price controls with more upside opportunity than exists for the sector more widely.
- these three companies may also face other advantageous circumstances, e.g. according to Ofwat's most recent performance reports all three appear to have average costs of debt comfortably below Ofwat allowances and below industry peers.⁹⁶

We therefore find no merit in Ofgem's use of water company evidence to calibrate energy network MARs.

4.3.3 Reliance on out of date transaction premia

Ofgem also relies on the premia observed on energy (and other) network transactions.⁹⁷

We do not consider this to be a reliable cross check. The premia observed on private equity transactions are likely to contain additional premia (such as control premium, option value for the potential use of securitised structures, etc.) and may be affected by a Winner's Curse.

Moreover, all of the transaction premia pointed to are very out of date. The latest transaction premia included in the chart are from 2018 (Cadent and South Staffs). Both of these will predate all material design work on RIIO-2, and the conclusion of work on PR19 (indeed, PR19 is arguably still open while the CMA continues its work). Given the raft of changes from RIIO-1 to RIIO-2 that we have described above, we do not consider that these historical transaction premia now tell us anything useful about investor expectations for RIIO-2.

4.3.4 Correcting the same perceived error twice

As noted above, Ofgem has made a raft of changes elsewhere to address excess returns. A MAR adjustment, where those MARs are primarily derived from other sectors and out of date transaction premia will not embody those many important changes in regulatory design. Hence there is a clear danger that Ofgem ends up correcting aspects of the RIIO-1 price controls that led to outperformance directly at source, and also introducing an additional wedge on the cost of equity to correct for those same errors. This would be a clear double count error.

⁹⁶ Monitoring Financial Resilience, Ofwat, January 2020. See slide 15.

⁹⁷ Ofgem RIIO-2 Draft Determination – Finance Annex, Figure 20

4.3.5 A further erosion of the incentive for companies to beat targets

Ofgem's proposal to use a MAR cross check to fix the cost of equity/outperformance wedge has the potential to weaken incentives to seek outperformance in the first instance. Notwithstanding our observations about the challenges in measuring MARs and identifying their origins, Ofgem is essentially seeking to establish a calibration rule whereby any anticipated future outperformance that is crystallised in EV above RAV is automatically eliminated through an offsetting adjustment to WACC. What is not clear is why, in the existence of such a rule, a network company would strive to achieve some marginal improvement in performance, given that it will simply be confiscated. Over time, applying such a mechanism has the potential to very materially weaken incentives for performance improvement, and is therefore unlikely to be in the interests of any stakeholders, in particular those of consumers. This would achieve exactly the opposite of Ofgem's long-term regulatory objectives of driving efficiency and service quality for the benefit of customers.

We also note that this adjustment has the potential to result in an artificially low cost of capital allowance. Since the cost of capital allowance acts as the primary incentive for networks to invest, Ofgem's adjustment may have profound effects on the day-to-day business case for investment appraisals undertaken by all network operators. Investment that should rightly proceed may no longer pass a cost benefit analysis.

There are clear parallels here with all of the incentive arguments outlined above in section 3 in relation to the outperformance wedge. The use of MARs has the potential to reinforce these concerns.

4.3.6 A new asymmetric regulatory risk

Ofgem is keen to apply a MAR cross check as it considers that there is still clear evidence that MARs are above 1 and hence price controls are still too generous. But would Ofgem be able to justify an adjustment the opposite way when required?

The risk is that Ofgem would be keen to "punish" a sector that performs well by applying a downward adjustment to lower MAR back 1. However, if evidence on MARs turned the other way, Ofgem may be highly reluctant to apply the adjustment the other way, and may instead presume that underperformance versus the price control was simply a result of poor management. Hence investors may perceive a risk that MAR is only ever applied one way and therefore creates an asymmetric downside regulatory risk.

4.4 Ofgem's criticism of our work for NGN

In its review of the original Frontier/NGN paper, Ofgem acknowledged that:

*Frontier's work is a helpful contribution, which we recognise as a plausible framework for further work.*⁹⁸

However, Ofgem ultimately placed no weight on the analysis in exercising its judgement around the level of the outperformance wedge. Ofgem's principle concern was that it could not reconcile the input assumptions we had used with "actual data, including observed returns."⁹⁹ Specifically, Ofgem identified two issues.

- First, our assumption of neutral totex performance as the mean/expected position for totex incentives was, in Ofgem's view, unjustified. This is based on Ofgem's assessment of a database on totex performance in regulated sectors spanning from 1993 to 2020, from which Ofgem concludes that average observed totex underspends in the past have been 7%.¹⁰⁰
 - In section 4.1 we have explored the relevance of Ofgem's assessment of past underspends for the likely performance in RIIO-2, given the package Ofgem has set out. Our overall conclusion was that there are significant issues with Ofgem's historical database, and that we cannot draw any helpful conclusions on likely performance at RIIO-2. This criticism therefore does not stand.
 - Our work in section 4.2 on the restatement of RIIO-1 performance in RIIO-2 terms, when properly accounting for the differences between the price controls, shows very limited opportunity for totex outperformance at RIIO-2, if any.
 - We also note that while it is correct that the *average* assumed totex outperformance was zero, the key benefit of Monte Carlo analysis is that it allows us to assess the likely *range of possible outcomes* around that average. Ofgem did not appear to engage with this at all in its DD review of our paper.
- Second, Ofgem identifies that some of the results for certain ODIs (specifically GSOP and emergency response times) appeared to give more downside than historical data suggested was plausible.¹⁰¹ We explore this issue in more detail in our updated NGN report, in terms of the specific incentives identified (which are only relevant for the GDNs). More generally, however, we agree with Ofgem's view that it is important to sense check the results of the analysis against the available evidence, and to ensure closer alignment to verifiable data and to the emerging incentive framework that is now proposed for RIIO-2. This is a helpful steer from Ofgem and, in our updated work for NGN, we have therefore sought to explain fully how our assumptions are derived from the combination of both historical data and the now-crystallised proposals that are set out in the DD. We note, in particular, that there were substantial uncertainties surrounding the specifics of the RIIO-2 incentive framework when our original work for NGN was undertaken, the majority of which have now been resolved by the DD.

⁹⁸ Ofgem RIIO-2 Draft Determination – Finance Annex, para 3.115

⁹⁹ Ofgem RIIO-2 Draft Determination – Finance Annex, para 3.116

¹⁰⁰ Ofgem RIIO-2 Draft Determination – Finance Annex, para 3.116

¹⁰¹ Ofgem RIIO-2 Draft Determination – Finance Annex, para 3.117

In short, we believe our updated work fully reflects the guidance Ofgem has provided in these comments.

4.5 Further work appraising the outperformance wedge

We have separately been asked by National Grid and NGN to undertake an analysis of the outperformance wedge at RIIO-2, using the same framework from our previous analysis for NGN. We apply this framework to NGGT, NGET, and a notional GDN.

In summary, we have not identified a reasonable basis on which either transmission company or a notional GDN can be deemed to have expected outperformance of 25bps in RoRE terms during RIIO-2. Our findings cast serious doubt over the validity of Ofgem's assumption that 25bps of outperformance is a valid central assumption.

Our core model suggests that companies should expect to underperform at RIIO-2. In RoRE terms, we expect this underperformance to be:

- -0.20% for NGET;
- -0.26% for NGGT; and
- -0.20% for a notional GDN.

This result arises *despite* the fact that we have introduced several assumptions that would tend to bias these results upwards relative to a more balanced approach.

The overall results are robust to changing the modelling assumptions around totex performance and different correlations.

Another key conclusion to draw from this analysis is that the firms are not only expected to underperform, but also there is a low probability of exceeding the 25bps, the point at which Ofgem has set the outperformance wedge. The likelihood of outperforming by 25bps or more is, in our (conservative) base scenarios, around:

- 1.7% for NGET;
- 12.6% for NGGT; and
- 25% for a notional GDN.

This suggests that the outperformance wedge cannot be applied ex-ante, because in the majority of cases, the outturn performance is likely to be lower than the point at which the wedge is set.

Finally, we note that one interpretation of our finding of expected underperformance may be that rather than applying a deduction to the headline cost of equity, Ofgem should apply an uplift. We would encourage the reader not to reach this view. We disagree in principle with Ofgem's proposition that the allowed return on equity should be adjusted to account for expected outperformance (or indeed under-performance).

5 APPRAISAL OF THE PROPOSED EX POST TRUE UP OF THE OUTPERFORMANCE WEDGE

In its Draft Determination, Ofgem introduced an additional mechanism whereby companies' returns will be topped up at the end of RIIO-2, if realised outperformance is not as high as expected. In particular, if average outperformance is below 0.25%, the mechanism will apply, up to a maximum top-up of 0.25%.¹⁰²

Ofgem has specified that the mechanism will operate as follows.¹⁰³

- The ex-post assessment of performance will be based on average performance across a group of companies. Two groups have been formed: one including gas transmission and distribution companies (NGGT, Cadent, SGN, NGN and WWU); and a second group composed of the electricity transmission licence holders (NGET, SHET and SPT).
- For each of the two groups, Ofgem will calculate the simple average of performance across all companies within the group. The ex-post top-up will apply for all companies within a group if the average performance of that group is below 0.25%. In the event of a top-up, all licensees within the group would receive the same top up allowance, in equity percentage terms.
- Ofgem will calculate this mechanism at the close-out of RIIO-2 rather than each year. The calculation will reflect Ofgem's final view on uncertainty mechanisms, PCDs, licence obligations, and after applying the RAM. But the BPI, debt performance and tax performance will not be included within the calculation.

Ofgem stated that the mechanism should "reinforce confidence in the regulatory regime" and that it ensures that "investors are protected...if outperformance does not materialise".¹⁰⁴

While at first glance this mechanism may appear helpful, in fact the introduction of this mechanism exacerbates the concerns we set out in section 3.1.3, as it will further weaken the incentives on companies to outperform in future. Moreover, it would introduce a range of further practical concerns, that mirror previous criticisms of certain proposals that Ofgem has previously considered and rejected, i.e. for "competed pots" and so forth.

In the remainder of this section we:

- explain how the introduction of this mechanism will weaken incentives on companies to outperform; and
- set out the additional practical challenges associated with this mechanism.

¹⁰² Ofgem RIIO-2 Draft Determination – Finance Annex, para 3.153

¹⁰³ Ofgem RIIO-2 Draft Determination – Finance Annex, para 3.154 and para 3.159

¹⁰⁴ Ofgem RIIO-2 Draft Determination – Finance Annex, para 3.155

5.1 Impact on incentives

In its Draft Determination, Ofgem does not address the impact that its ex-post true-up could have on company incentives to outperform. In this section we assess how Ofgem's additional mechanism affects incentives.

5.1.1 Effect on incentives without yardstick

We note that Ofgem's mechanism is based on average performance within a group, as opposed to assessing a company's performance on an individual basis. However, it is insightful to first explore how this mechanism would affect incentives, were it to be based on each company's individual outperformance. This simple illustration displays how the mechanism can create perverse incentives for companies in terms of their performance levels.

There are the following three possible scenarios to consider.

- **Outperformance by more than 25 bps:** in this scenario, the firm outperforms by more than Ofgem's expectations, and no top-up is applied. The firm would have known during the period that it was likely to have outperformed above 25 bps, and that any top-up through this ex-post assessment was unlikely. As a result, the firm is likely to have behaved as it would have done absent the ex-post true-up. The negative incentive effects of the outperformance wedge, as explained in section 3.1.3, would still have applied in this case, but there would not have been any additional perverse effects coming through the ex-post true-up.
- **Underperformance:** in this scenario, the firm underperforms over the course of the price control, and the full potential top-up of 25 bps would be applicable. However, the top-up would not exceed 25 bps. At some point during the price control, the firm would realise that it was underperforming, and while it would have known that it would be entitled to the 25 bps top-up (assuming it continued to underperform), the top-up amount would not vary at the margin given the presumed level of underperformance. The ex-post mechanism would not therefore alter the firm's incentives, and it would behave as it would have done absent the mechanism. However, the negative incentive effects associated with the outperformance wedge, as explained in section 3.1.3, would apply to this scenario as well.
- **Outperformance by no more than 25 bps:** in this scenario, the firm outperforms but by no more than 25 bps. The top-up applies in this case, and the amount depends on the level of outperformance achieved. The mechanism is therefore likely to affect the firm's behaviour under this scenario.

Suppose that in the penultimate year of the price control the firm could see that its outperformance would fall in the range 0 bps to 25 bps by the end of the price control. The introduction of the ex-post mechanism would create a perverse incentive to spend aggressively in the final year in order to target a performance level of 0 bps across the entire price control, reversing all of the gains made earlier in the period. Under the ex-post true up, the company would

receive the full top-up of 25 bps, if it reached zero outperformance across the whole period.

Spending aggressively in the final year of the price control would have resulted in the firm earning the same returns as if it had continued to outperform as it had done earlier in the control. However, having spent more in the final part of the period, the company is more likely to have met outcome targets and be better positioned for outperforming in future (or submitting a lean looking plan next time having front loaded some expenditure). It is therefore clear that the firm would have an incentive to target zero outperformance under this scenario.

This simple illustration clearly shows that the introduction of the mechanism, if calculated on the basis of a single firm, would introduce a further perverse incentive to reduce outperformance in cases where outperformance is likely but would be below 25 bps.

5.1.2 Effects on incentives with yardstick groups

We now consider the situation that Ofgem has introduced, an ex-post assessment of performance that is carried out for a yardstick group, as opposed to being applied individually for each firm. In terms of assessing how this new mechanism affects company incentives to outperform, we consider the same three scenarios from the previous section: outperformance by more than 25 bps; underperformance; and outperformance below 25 bps. As before, for the first two of these three scenarios, the mechanism will not affect companies' incentives to outperform, albeit that the outperformance wedge will still have a detrimental impact on incentives. But, incentives are affected in the final scenario. In the remainder of this section, we focus on this case where average outperformance is less than 25 bps.

A worked example can help to illustrate how one company's performance affects the group average and the top-up mechanism under this scenario.

- Suppose there are three firms within a yardstick group.
- For simplicity, assume all three firms are due to outperform, one by 10 bps, one by 15 bps and another by 20 bps.
- Ofgem's ex-post assessment would calculate the average outperformance for the group at 15 bps, and all firms would receive a top-up return of 10 bps.
- Now we can consider how one company's behaviour can affect the group average performance and top-up amount.
- If instead the second of these three firms did not outperform, such that it had zero outperformance instead of 15 bps of outperformance, the group average outperformance would fall to 10 bps.
- Hence the company deciding whether, at the margin, to make some improvement or not would see a reduction of 5 bps in the top up rather than a 15 bps reduction. Overall, this second firm would now receive a return on 15 bps (entirely through the top-up), as opposed to a return of 25 bps (made up of 15 bps of its own return plus a 10 bps top-up).

- In the case of a three firm yardstick group, the share retained by the company in question is therefore 1 divided 3.
- This would increase Ofgem's top-up to 15 bps for all three companies.

This contrasts neatly with the case above, where we assumed a yardstick group of one firm only, in which case there was a 100% effect on the top up of the actions of that firm. With a group of one, incentives to outperform where performance is likely to lie within the band where the ex post true up operates would be removed entirely. With a group of three, the impact of any single company's actions on the yardstick are reduced by two thirds, compared to the single firm case.

This example can be extended easily to see the effect of the size of the yardstick group in effective incentives, as we illustrate in the table below.

Figure 8 Reduction in incentives as a result of ex-post mechanism

Yardstick group size	Reduction in incentives
n = 1	100%
n = 2	50%
n = 3	33%
n = 4	25%
n = 5	20%

Source: *Frontier Economics*

5.1.3 Summary view of the effect on overall incentives

Our assessment has shown that the ex-post true-up mechanism does have the potential to reduce company's incentives to outperform, over and above the perverse incentives that have already been introduced by the outperformance wedge. The scale of the impact depends on performance levels during RIIO-2, but the ex-post mechanism has the potential to reduce the strength of incentives by up to 33% in the electricity group and up to 20% in the gas group. Given that this perverse incentive would be layered on top of weakened incentives to outperform, this is a material and concerning impact. This effect would apply across all operational incentives (cost and ODI, but not debt and tax), since it operates at that level.

5.2 Additional practical implementation challenges

In addition to these concerning impacts on incentives to outperform, we have also identified significant practical challenges that Ofgem will face in the way that it implements this mechanism. We outline these concerns in turn in this section.

5.2.1 Need for a level playing field in the yardstick group

The validity and credibility of any yardstick system applied in this way rests heavily on having a sufficiently reliable cost assessment methodology across participants to ensure that the appraisal of average performance is fair and even handed. Where parties are highly similar in terms of the way that allowances have been set

and their ability to meet them, then any outperformance can be compared fairly across companies and is likely to be the result of managerial strength. However, if a less credible cost assessment approach has been applied, differences in performance across companies within the group may instead be due to issues with the cost assessment as opposed to genuine outperformance. Creating a yardstick group under such circumstances then risks creating arbitrary winners and losers, in receipt of undeserved gains and losses.

For the ex-post true-up to be considered valid then, the group of entities put together into each yardstick group would need to consider that they all start from a similar position and any differences in outturn performance arise from managerial competence, not from mis-calibration by Ofgem. To illustrate this point, if one company in a group has erroneously been given far too generous an allowance and subsequently outperforms strongly, this may be sufficient to ensure that the entire group slightly outperforms overall, even if performance by others is poor. Other companies with weaker performance in the group may then (loosely speaking) “deserve” a true-up, but would not receive one due to regulatory error elsewhere. It is straightforward to construct examples that run the other way, e.g. with one company underperforming a mis-specified price control but receiving no true-up due to the outperformance of others.

5.2.2 Difficulty in creating a level playing field in practice

In addition to the prospect of regulatory miscalibration creating arbitrary and unfair outcomes, there needs to be a wider consideration given the diverse nature of the entities that Ofgem intends to group together. Yardstick regimes work best when the companies in question are highly similar. Where there are marked differences, outcomes from the yardstick can end up being arbitrary and unfair as a result.

For the gas companies:

- The group contains a transmission network and distribution networks that face markedly different regimes and circumstances, for example;
 - totex incentive rates are very different as between distribution and transmission (see Figure 9 below); and
 - the companies face entirely different ODI frameworks.
- There may be important regional differences between gas distributors that may not have been captured perfectly.

For the electricity companies:

- each licensee operates a very different network serving a different region;
- their business plans are far more bespoke and tailored as a result, limiting their direct comparability (for example the application of PCDs are highly individual); and
- while output regimes are broadly similar, each has been calibrated on a bespoke basis.

Figure 9 Proposed TIM incentive rates by company

Licensee	Proposed TIM incentive rate
ET – NGET	39.2%
ET – SPT	39.1%
ET – SHETL	30.9%
GD – Cadent	49.7%
GD – NGN	50.0%
GD – SGN	49.4%
GD – WWU	49.6%
GT – NGGT	36.6%

Source: Ofgem, RIIO-2 Draft Determination – Core Document, Table 14

Further differences will arise as a result of there being different totex:RAV ratios across all the companies in the group, meaning that what might be small (large) differences in performance for some company may trigger much larger (smaller) movements in overall performance for other companies depending on the size of totex:RAV ratio.

As a result, there seems little prospect of creating a benchmark that one could have confidence will operate fairly, reasonable and predictably for all.

5.2.3 Potential for tacit collusion

This is at least a theoretical concern. If all companies are performing in a lacklustre manner as the control goes on, then there would be a great “easy life” benefit if all took their foot off the gas.

5.2.4 Weakened incentive to collaborate

The type of ex-post incentive envisaged would materially harm any scope for co-operation across the sector on output delivery. Companies now have the potential to benefit from weak performance delivered by sector peers. Hence any licensee which identifies a great new innovation or pushes the boundaries of best practice is unlikely to want to share that information with others. Better performance by others in the sector would now reduce the prospects of a true-up being applied. Given the potential importance of cooperation across the sector in driving performance and delivering whole sector solutions, this deterrent to collaboration could prove harmful to sector performance and hence customer interests.

5.2.5 Impact on long-term productivity

We have noted in section 3.1 above the behavioural changes and consequent negative effects on long-term productivity that would be triggered by a deterioration of incentives to network companies. The ex-post true-up being considered here by Ofgem would not in any circumstances offset the negative impact on productivity, and in many cases, makes the impact much worse. Therefore, our arguments outlined above on the long-term consequences on productivity of the gas and electricity sectors would still be applicable.

5.2.6 Impact on financeability

Ofgem's ex-post adjustment also impacts on the financeability assessment. Ofgem considers that it is appropriate to reflect the ex-post adjustment in the financeability assessment. However, there are three concerns with this approach.

- Any one company is not certain to receive this adjustment. Even if a company fails to deliver at least 25 bps of outperformance, it is by no means certain that it will receive additional returns through this ex-post adjustment. This is because the adjustment requires average performance (from the relevant comparator group) to be below 25 bps. As such, any one company's chance of receiving the adjustment depends on the toughness of other companies' allowances and those companies' chances of outperforming.
- There is also an element of regulatory risk around how Ofgem will choose to apply this mechanism. The ex post true would only be calculated during the close out period, alongside a vast array of other ex post assessments, appraisals and true ups. Companies may perceive some outcome as being likely going into that process, but can have no certainty over how Ofgem will actually administer the true up in the end. Indeed the existence of the true up may have consequences for the way in which Ofgem approaches its close process., There is clearly a material regulatory risk around this element of the return and it cannot be regarded as guaranteed.
- In addition to this, any potential adjustment will be calculated at the end of the RIIO-2 price control period. This means that any income generated through the adjustment will only increase cashflow in the next regulatory period and cannot help to secure financeability in the forthcoming period.

For all these reasons, we do not consider that the ex post true up contributes to improving sector financeability as Ofgem suggests.

6 ALTERNATIVES TO AN OUTPERFORMANCE WEDGE

In its Draft Determination, Ofgem states that business plan submissions continue to reject the introduction of an outperformance wedge, and given that, Ofgem states that it did consider alternative policy options. The options that Ofgem considered were as follows:

- a) Set neutral cost and performance targets;
- b) Lower incentive strengths;
- c) Asymmetric incentives or incentive strengths; and
- d) Competed, fixed or zero pot for incentives.¹⁰⁵

In respect of these options, the first is clearly preferable as any and all of the others have important concerns around their incentive and other effects. In this section we explain:

- why we consider a more symmetric calibration entirely feasible;
- the benefits that this policy alternative would have brought relative to the outperformance wedge that Ofgem has instead chosen to adopt; and
- finally we outline the incentive issues with the final three options that Ofgem identified.

6.1 Feasibility of a more symmetric calibration

As we have already elaborated on in our original report, we consider Ofgem's characterisation of regulation being a one-way bet as unnecessarily defeatist. We have shown in our report that the fact that RIIO-1 may have led to higher than expected returns for some companies does not mean that price controls in general cannot be calibrated fairly and symmetrically. There are a number of factors in RIIO-1 which led to the out-performance – along with actual efficiency gains by network companies (which are, we should remind ourselves, of direct benefit to customers and by far the most important objective of incentive regulation). These included a number of factors outside the control of network companies, particularly:

- lower than expected RPEs (which is likely to be due to the unforeseen weakness in real wage growth post the global financial crisis)¹⁰⁶
- in respect of gas distribution the Repex programme;
- alongside the fact that the price control lasted for eight years inevitably leading to greater forecast error.

There is no reason to suppose that the factors beyond network control will continue to be observed in RIIO-2 because they are either not relevant for RIIO-2 or have been mitigated directly by relevant proposed indexation mechanisms and Ofgem's

¹⁰⁵ Ofgem RIIO-2 Draft Determination – Finance Annex, para 3.140

¹⁰⁶ Applicable to companies that were awarded RPEs.

measures to limit outperformance (as detailed in section 4). This already provides a clear reason why the calibration of RIIO-2 will, ex-ante, be far more symmetric .

Overall therefore, we find that it is possible to set neutral cost and performance targets. And indeed, the empirics arguably show that Ofgem has managed to achieve option A for RIIO-2 and it seems entirely likely that it has in fact gone too far. It is therefore entirely unnecessary to introduce the outperformance wedge. We strongly urge Ofgem to reassess its evidence base, and review its conclusion that it is not possible to set neutral cost and performance targets.

Furthermore, we also note that Ofgem seems to be the only regulator with such a striking lack of confidence in its own ability to set a symmetric price control, to such an extent that mechanisms that serve to curb incentives (such as the adjustment on baseline returns and RAMs) are proposed purely for the purpose to avoid excessive returns in the next price control. We observe that other UK regulators such as Ofwat and the CMA (which has recently finished redetermining the price control for NERL) do not seem to believe that there is a need to put in such mechanisms at the cost of curbing incentives.

6.1.1 Historical evidence on outperformance

Ofgem seeks to claim that it would be impossible to address its concerns through direct recalibration of the areas where it considers outperformance will inevitably arise.¹⁰⁷

However, we show in section 4.2, there is no empirical basis for Ofgem's view that such efforts would be futile. In particular, we show that once the differences between RIIO-1 and RIIO-2 are properly accounted for, Ofgem has already almost entirely eliminated the potential for outperformance. While we reject the need for an outperformance wedge in principle and also based on actual levels of outperformance, our analysis suggests that Ofgem appears to have managed to achieve its alternative policy of more symmetrically setting cost allowances and targets. Indeed, we consider that some licence holders may well start with an expectation of negative returns based on the DD calibration. This obviates the need for an outperformance wedge.

In addition to the evidence we show in section 4.2, there is further evidence from other price controls that it is perfectly feasible to set fair price controls, as we explain below.

- Evidence from previous price controls outlined in section 3.2 of our original report does not support Ofgem's view that regulation is a one way bet, and that material outperformance is inevitable for all companies.
- Recent experience in the water sector set out in section 3.4 of our original report demonstrates that Ofwat has managed to set a price control for PR14, where the distribution of returns has been shown to be far less skewed in favour of the investor and by and large looks like a fair bet. We presume that this observation from history will have fuelled Ofwat's confidence in its ability to set

¹⁰⁷ Ofgem (2018), RIIO-2 Sector Specific Methodology Consultation Annex: Finance, para 3.164.

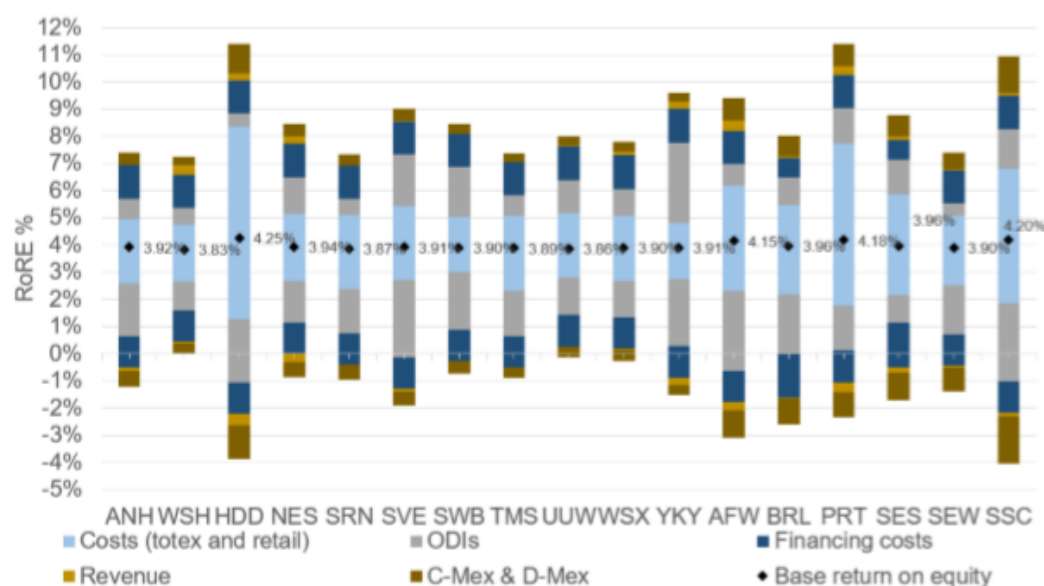
a fair price control for investors and consumers without the need for arbitrary deductions from the cost of equity, as we set out below. Albeit that Ofwat now arguably has set tremendously challenging price controls, as we set out further in section 6.1.2 below.

6.1.2 Ofwat PR19

Since we concluded work on our original report Ofwat has now concluded PR19. We note that in its PR19 determinations, Ofwat has not resorted to adjusting the baseline allowed return on equity in anticipation of future outperformance. In fact, Ofwat has arguably set tremendously challenging packages for the water companies, and even by its own estimation, shows a profile of risks for most water companies with a slight tilting towards the downside.

Figure 10 PR19 proposed RoRE ranges¹⁰⁸

Figure 3.11: PR19 final determination risk ranges calculated as a percentage of regulatory equity



Source: Ofwat

We note that many water companies consider Ofwat's characterisation of risk unrealistic, and that it is over-estimating the upside and under-estimating the downside. Indeed, an unprecedented four water companies have referred the Final Determination to the CMA.

While there will be intense debate over Ofwat's approach to calibration of many aspects of its price control, the above example shows that Ofwat has been able to calibrate a tough price control (potentially too tough) without resorting to blanket adjustments to headline returns.

¹⁰⁸ Ofwat (2019), PR19 Final Determinations, Aligning risk and return technical appendix, Figure 3.11

6.1.3 CMA NERL price control redetermination

In its latest determination for the air traffic controller NERL, the CMA has calibrated a price control settlement where it did not deem it necessary to adjust the baseline return on equity. The CMA has allowed NERL to have a level of return on equity at the midpoint of the CMA's estimated range for the cost of equity for NERL.¹⁰⁹ In particular the CMA stated:

Taking these points together, we concluded that there was no evidence that the net effect of the price control was asymmetric either in favour of NERL or against NERL. Subject to the provisional recommendations in our report, we considered that the package of incentives and adjustment mechanisms formed an appropriate balance, and there was no need to adjust the cost of capital due to asymmetry.

In fact, Ofgem is the only regulator that we know of that has proposed a mechanism to adjust the baseline return on equity in anticipation of outperformance. This proposal seems to have been based on the advice of a subset of the authors in the UKRN paper, which the remaining author, Burns, has strongly opposed. In our view, this advice is based on a fundamental lack of understanding of regulatory economics theory and practice, and Ofgem must be careful not to fall foul of.

Even if Ofgem disagrees with some of our characterisations of the issue, it is important for it to acknowledge that the best way to address the issue of the so-called excess return is by somehow addressing the root cause of it, rather than the final output. The fact that none of Ofwat, the CAA nor the CMA has adopted a blanket adjustment to allowed returns is a timely reminder that Ofgem may be veering towards a wrong path alone and would be facing unsatisfactory results and unintended consequences in years to come.

6.2 Benefits of seeking more symmetric targets

Ofgem's alternative approach of seeking to set more symmetric cost allowances and output targets is a much more beneficial strategy. This will avoid all of the negative incentive effects that we outline in detail in section 3. Removing the outperformance wedge and aiming to set targets symmetrically will instead act to ensure that companies face the full strength of incentives to outperform cost allowances and meet or beat other output based incentives. Adopting this strategy will allow incentive regulation to work as it was designed to do, incentivising companies in the right places and ultimately to deliver better value for consumers.

It appears that Ofgem has lost sight of the principle and benefits of incentive regulation. In this section we set out just how the right symmetric incentives will deliver best value for consumers and why incentive based regulation is beneficial.

Without any form of economic regulation, natural monopolies will seek to earn excessive returns. One way to introduce economic regulation is to set allowed prices or revenues, but allow no opportunity whatsoever for outperformance. While this approach would fix allowed returns, it has the weakness of not creating any

¹⁰⁹ CMA, 2020, NATS (En Route) Plc /CAA Regulatory Appeal Final report, Page 246

incentives at all, and therefore the risk that companies do not deliver productive or dynamic efficiency. In introducing the outperformance wedge and not aiming up, Ofgem appears to move more toward this view of the world, where incentives and outperformance are seen as bad (or at least likely to deliver additional returns to companies that are viewed as problematic). But in this world, we face underinvestment, inefficiency and worse levels of service.

Conversely, through incentive based regulation, allowed prices or revenues are set in advance, but opportunities to out or underperform are also introduced. Introducing the opportunity to outperform creates the incentive for companies to innovate and look for ways to deliver their services for less, and to deliver better services for customers. In order for natural monopolies to innovate and reveal new information on what is possible, and due to asymmetry of information, it is well understood that a clear incentive framework is needed.

Regulators need to weigh up the benefits of greater efficiency and better service to consumers and society, against the cost of “paying” for that information through incentives. For many decades regulators have struck the balance of using these incentives but time limiting the period that companies can receive rewards for any outperformance by updating price controls every few years. On balance this strikes the best deal for customers.

Overall, incentive based regulation delivers the best deal for customers. In giving up on setting symmetric targets and cost allowances, and introducing the outperformance wedge, Ofgem has undermined the strength of incentives that it has set elsewhere. This is clearly not a sensible policy goal and Ofgem needs to stop pursuing it as the loss of incentive power simply cannot be in customers' best interests.

6.3 Incentive problems with Ofgem's alternative proposals

Ofgem has also considered three alternative proposals, all of which would in some way harm the incentives companies have to deliver productive efficiency, dynamic efficiency and innovate to deliver further service improvements. As we explained in section 6.1 it is perfectly possible to set symmetric cost allowances and targets. And given that this option is feasible, and that incentive regulation leads to the best possible outcome for customers, this is clearly the optimal policy to adopt. Any alternative that does not bring forth the same incentive effects will likely deliver worse outcomes for customers. We briefly summarise why this is the case for each of Ofgem's three alternative options.

- **Lower incentive strengths:** lowering the strength of incentives, will reduce the amount of time and energy that companies put into innovating to find cost savings and ways of delivering more for less. This will lead to lower productivity and lower service levels for consumers. Ultimately customers will get a worse deal in the short run and the effect will likely grow to become material in the long run.
- **Asymmetric incentives or incentive strengths:** making the incentives for underperformance larger than those for outperformance would skew

incentives, and assuming targets were set symmetrically, this would lead to ex-ante expectations of underperformance. This may lead investors to expect returns below the required rate, which could weaken incentives to invest, and lead to worse customer outcomes over time. This will also reduce the chance that companies carry out innovation, as this is naturally more risky, and companies will be particularly averse to options that lead to more risk in terms of possible performance levels.

- **Competed, fixed or zero pot incentives:** setting incentives that depend not only on what you do but also what other companies do will necessarily reduce the chance that a given company receives a reward. This will have a similar impact to the lowering of unit incentive rates. Incentives to outperform will be reduced, and this will lead to lower productivity and worse customer outcomes.

Overall, Ofgem should not consider any of these alternatives, when it has a clear optimal strategy of setting symmetric targets in the first place.

ANNEX A SOCIETAL COST OF UNDER-INVESTMENT

As our original report explained, the societal costs that arise from setting the allowed return too high or too low are not symmetric. Setting the allowed return too low creates a material risk of underinvestment. Particularly in the energy sector, under-investment would have socio-economic implications - lower investment in low-carbon technology, delayed transition to carbon neutral goals, curtailment cost, higher failure rates through older assets resulting in lost load and electricity not supplied. In this annex we try to provide an indicative quantification of the scale of one of these costs, namely the consequence of reduced network reliability arising from underinvestment.

A simple way of quantifying the societal costs that may arise if there was to be a reduction in network reliability is to consider the concept of the value of lost load (VoLL). The VoLL is a common metric used to understand what a customer is willing to pay to avoid being deprived of a unit of electricity. We note that a similar concept could be applied to gas, but limit the analysis here to electricity for simplicity.

Up to date estimates of VoLL have recently been prepared by Electricity North West (ENWL) as part of an innovation project. These are summarised in Figure 11 for different types of customers, with a combined weighted average VoLL estimate of £25,301/MWh. To provide a further point of reference, we also consider an alternative estimate of VoLL (£16,000/MWh), the value relied upon by Ofgem to support various RIIO-1 calculations, as estimated for Ofgem and DECC in 2013 by London Economics.¹¹⁰ The overall increase in VoLL since 2013 demonstrates how reliability is increasing in value to customers.

Figure 11 Overall Value of Lost Load (VoLL)

Assumptions	VoLL (£/MWh)	% of total electricity consumption in 2018
Domestic Customers	£17,500	36%
SME Customers	£47,500	64%

Source: VoLL estimates from ENWL's 2018 Value of Lost Load to Customers study - <https://www.enwl.co.uk/globalassets/innovation/enwl010-voll/voll-general-docs/voll-phase-3-report.pdf>
Data on consumption – <https://www.gov.uk/government/statistics/energy-consumption-in-the-uk>

Note: SME customer consumption includes all non-domestic consumption

Attributing a monetary value to lost load can help us put the savings from Ofgem's 25 bps adjustment into context. We analyse below the additional lost load (in the form of customer interruptions and customer minutes lost) that would negate any savings on the allowed return as a result of Ofgem's proposed reductions.

As outlined further below, it would require only 2.1 minutes of additional customer minutes lost for the losses from interruptions to outweigh any savings due to lower allowed returns. We compute this as follows:

¹¹⁰ <https://www.ofgem.gov.uk/ofgem-publications/82293/london-economics-value-lost-load-electricity-gbpdf>

- **Value of lost load:** By multiplying the above values of an hour of electricity lost by the total hourly consumption of electricity in the UK¹¹¹, one can estimate the total value of one hour of electricity across the UK to be £1.2 billion in 2018. This is a conservative estimate as ENWL's VoLL figures show that as customers rely on and use more Low Carbon Technologies (including Electric Vehicles), VoLL goes up. The underlying figures for this calculation, split by domestic and non-domestic consumers, are outlined in Figure 12.

Figure 12 Total value of an hour of lost load

	VoLL (£/MWh)	Annual consumption (TWh)	Hourly consumption (GWh)	Total value of 1 hour of lost load (VoLL * hourly consumption)
Domestic consumers	£ 17,500	105	12	£ 210 m
Non- domestic consumers	£ 47,500	190	22	£ 1,029 m
Total		295	34	£ 1,239 m

Source: VoLL estimates from ENWL's 2018 Value of Lost Load to Customers study –

<https://www.enwl.co.uk/globalassets/innovation/enwl010-voll/voll-general-docs/voll-phase-3-report.pdf>

Data on electricity consumption – <https://www.gov.uk/government/statistics/energy-consumption-in-the-uk>

Note: VoLL for SME consumers applied to all non-domestic consumption.

- **Cost savings on allowed return:** On the other hand, a 25 bps reduction in the allowed cost of equity would lead to an annual decrease in revenue, that is, a reduction in bills for electricity distribution (ED) customers of £25 million.¹¹² If we also include electricity transmission (ET), the cost saving on the RAV would increase to £43 million.

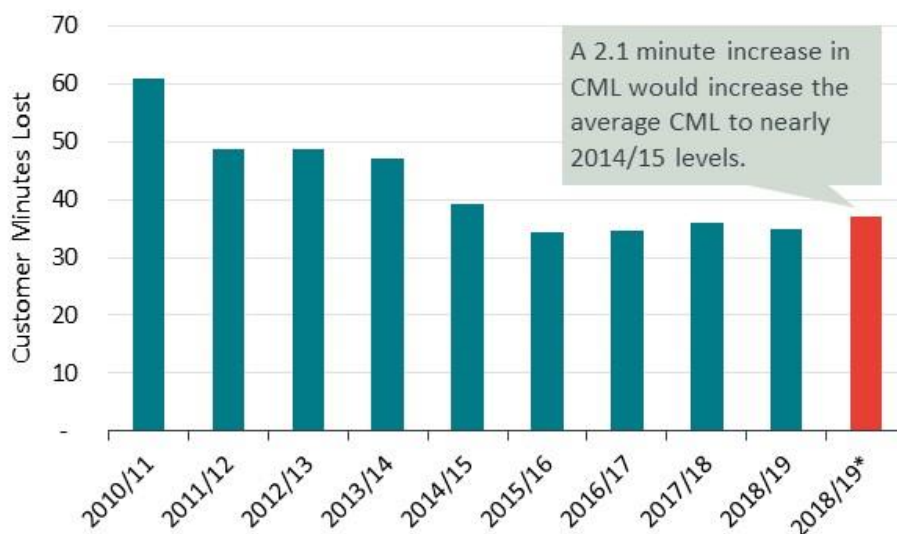
The above two figures (i.e. the total value of an hour of lost load versus the annual savings on the electricity sector's allowed return) indicate that it would require only 2.1 minutes of additional lost load per customer (i.e. customer minutes lost) for the monetary impact of interruptions to outweigh any savings on the revenue due to a lower allowed returns.

The historical evolution of customer minutes lost (CML per customer) in the UK is shown in Figure 13. This indicates that an increase of 2.1 minutes should be understood to be a relatively modest increase, which could arise from a relatively modest diminution in renewal investment. This loss of 2.1 minutes would be only a 6% increase in the current average CML per customer, returning minutes lost per customer to nearly 2014-15 levels.

¹¹¹ Hourly consumption = Annual consumption/8760, computed using 2018 data on consumption by sector - <https://www.gov.uk/government/statistics/energy-consumption-in-the-uk>

¹¹² Cost saving on the RAV = RAV * Percentage of equity * 25 bps

Figure 13 Average minutes lost per customer



Source: Ofgem

Note: * This bar indicates the total 2018/19 CML after factoring in the additional CML required for the monetary impact of interruptions to outweigh any savings on the RAV due to a lower allowed returns

While the above analysis considers the regulatory savings in both the ED and ET sectors, we only look at the service interruptions at the distribution level. This is a conservative approach, as in reality, there would be additional detriment to customer service incurred on the transmission networks.

This analysis shows that the consumer detriment arising from a worsening in reliability owing to underinvestment may be quite large, even with a relatively small deterioration in network reliability and quality. In addition, ENWL's work shows that the VoLL for customers in fuel poverty, priority service customers and vulnerable customers is higher than the general population indicating that these groups could suffer most from the potential adverse consequences of service deteriorations caused by lack of appropriate returns for investment in networks.

Our analysis then demonstrates that only a relatively modest backward step in one aspect of service delivery would more than offset the benefit to consumers of ceasing to aim up.

ANNEX B IMPORTANCE OF ENERGY SECTOR PRODUCTIVITY GAIN

Ofgem has set the annual ongoing efficiency, or required productivity gains, in its Draft Determination at 1.2% for capex and 1.4% for opex.¹¹³ We have used these figures, approximated as an overall productivity gain of 1.3% for totex, to put into context the potential losses that could result from under-remuneration. We understand that many companies dispute the validity of Ofgem's number, but below we use Ofgem's own number to illustrate the potential costs of harming incentives.

The potential loss of productivity in future is particularly important as the UK energy sector gears up to achieve the UK's 2050 carbon neutral target. Sacrificing even a fraction of long-term productivity gains for short-term savings could result in large losses to the sector, making any tinkering of the incentive regime (such as the 25 bps adjustment) extremely vulnerable to unintended consequences.

Figure 14 and Figure 15 compare the potential losses to the sector due to reduced productivity gains to the benefits from annual cost savings as a result of Ofgem's proposed 25 bps reduction in the allowed return. Specifically, we illustrate the below two cost flows:

- **Additional costs in the absence of productivity gains:** Starting in 2019/20 and looking up to 2050, there would be an average loss of £1.7 billion per year from lost potential totex cost savings across the whole energy sector if there were no productivity gains. Even under a situation where there was a loss of only 10% of the total potential productivity gains, there would be an average loss of £166 million per year from lost potential totex cost savings across the whole energy sector.
- **Additional savings due to 25 bps reduction in allowed return:** These results can be further put into context by comparing them to the annual customer bill savings of £68 million, that is, the savings on the revenue from the entire energy sector thanks to a 25 bps reduction in the allowed return for energy companies.¹¹⁴

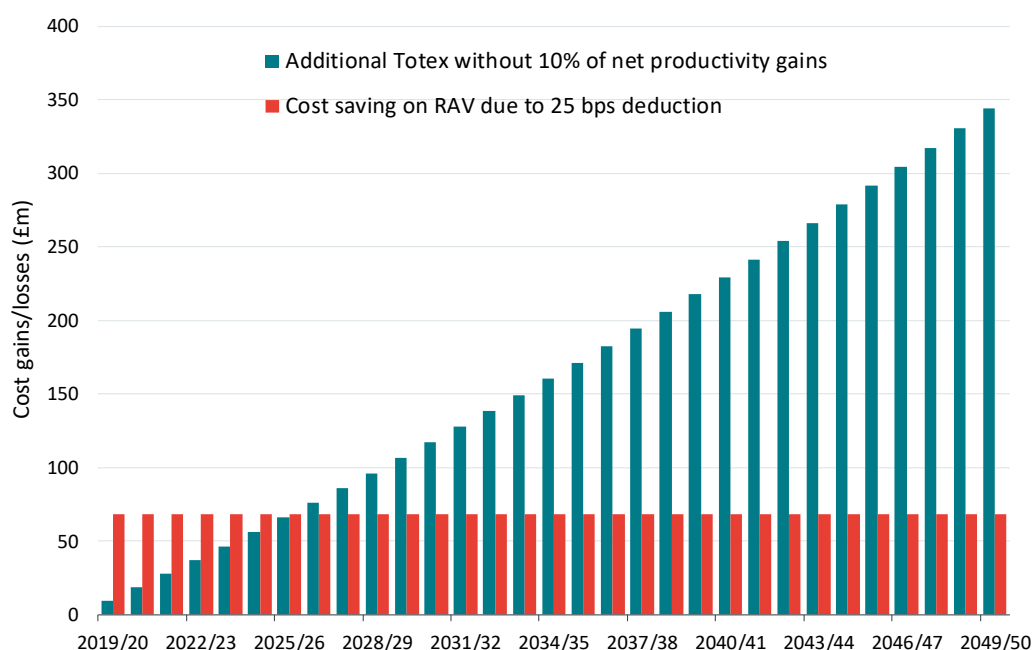
To compare the cost and benefit of the 25 bps adjustment directly, we look into various illustrative scenarios of the impact on productivity gains. For example, a reasonably conservative scenario could be one in which 10% of the net productivity gains in the energy sector are removed by the adjustment for anticipated outperformance.

Figure 14 illustrates that the annual loss in cost savings due to compromised productivity gains would outweigh the gain (from the 25 bps deduction) by 2026/27 in the reasonably conservative scenario of 10% compromise in productivity gain.

¹¹³ Ofgem RIIO-2 Draft Determination – Core Document, p.44

¹¹⁴ Cost saving on the RAV = RAV * Percentage of equity * 25 bps (computed using 2018/19 RAV for the ED, ET, GD and GT sectors)

Figure 14 Comparison of potential losses (due to losing productivity gains) with the gain from annual cost savings (25bps reduction on cost of equity)



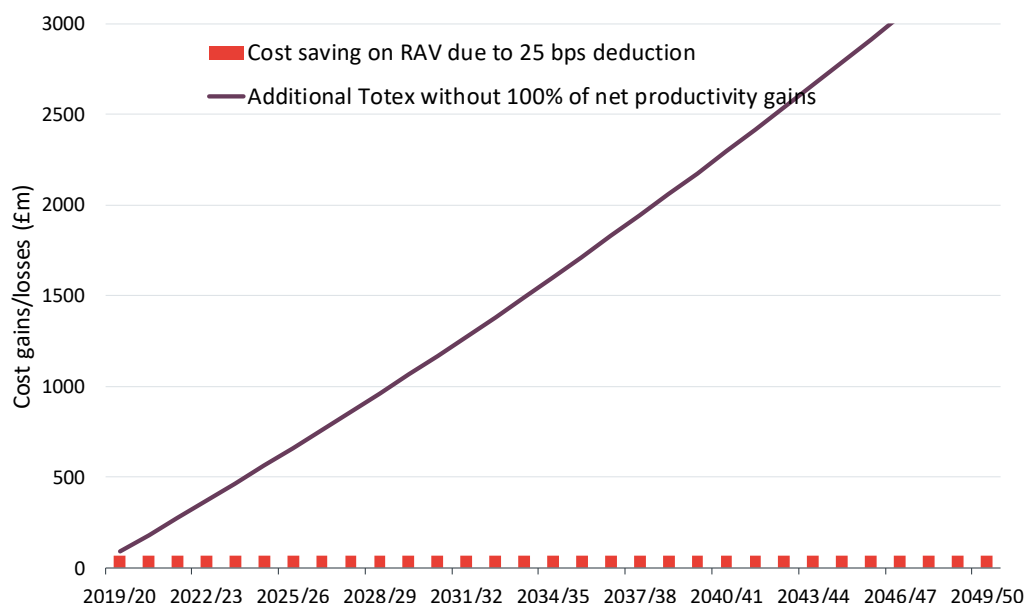
Source: Frontier Economics

Note: The above illustrative calculations are in real terms, and also assume that there is no growth in RAV (for regulatory cost savings) or 2018/19 totex (for productivity losses).

Under other scenarios with further productivity losses, the catch up point would be much sooner with the annual loss in cost savings outweighing the gains (from the 25 bps deduction) by 2021/22 if 25% of the net productivity gains are removed and by 2020/21 if 50% of gains are removed.

In addition, in Figure 15 we consider the full effect scenario where 100% of the potential productivity gains are removed.

Figure 15 Illustrative comparison of 100% productivity losses versus gains from a 25 bps reduction in allowed return



Source: Frontier Economics

Note: The above illustrative calculations are in real terms, and also assume that there is no growth in RAV (for regulatory cost savings) or 2018/19 totex (for productivity losses).

In this scenario, the catch up point where cost losses start to outweigh gains (from the 25bps deduction) would happen immediately, i.e. even before the start of the next regulatory period.

Finally, if we discount the above cash flows over the next 50 years and consider the net present value (NPV), we find that the energy sector only has to compromise around 3% of its annual productivity improvement for the net gain for the customers to be negative in the long run.¹¹⁵ In other words, if the assumed annual net productivity gains are eroded by anything more than around 3% due to changes in the strength of the incentives regime brought about by the 25 bps outperformance-based reduction on equity returns, the present value of the productivity losses to the sector would outweigh the present value of the gains for the customers.

¹¹⁵ We consider two discount rates in the analysis - (i) Ofgem's proposed WACC of 2.88%, and (ii) a social discount rate of 3.5% according to the Government Green Book. These result in a range of 3.1% and 3.3%, respectively, in terms of proportion of the productivity lost needed for the net effect to be negative over 50 years.

ANNEX C OFGEM'S REACTION TO FRONTIER ORIGINAL REPORT

Figure 16 Key arguments by Ofgem

Arguments as summarised by Ofgem	Ofgem's comment
Frontier argue that Ofgem should, when setting an allowed return within the cost of capital range, consider the Dobbs (2011) model and regulatory precedent, and therefore aim up.	<p>The argument to aim up within the cost of capital range rests upon a number of subjective assumptions.</p> <p>First, the range itself must be relatively accurate at both the high and low ends. Second, the cost of underinvestment and over-remuneration need to each be estimated accurately. Arguments to over-remunerate may be more applicable in sectors that are experiencing capacity shortages, such as those in aviation or other growth sectors. This may have been a factor in the Competition Commission deliberations regarding the airport decision in 2007, to which Frontier refer. Third, our proposal to cross-check CAPM against four other investor return benchmarks, may in fact better capture investors true expectations. To aim-up after considering these cross-checks may lead to a double-count. Finally, it would be remiss to ignore the risks of consistent and deliberate over-remuneration. Such risks, including political risk and increased legitimacy risk, could in fact out-weigh the benefit of aiming up, to which Frontier, and Dobbs, refer.</p>

Arguments as summarised by Ofgem	Ofgem's comment
<p>Frontier argue that the theoretical foundations of setting the allowed return in expectation of outperformance is deeply flawed. Frontier argue that the proposals arise from an impossible premise that the outcomes of a general equilibrium framework that assumes perfect competition and efficient capital markets can and should be found where the assumptions of perfect competition do not hold.</p> <p>Frontier argue that the approach is an attempt to improve allocative efficiency, setting prices in line with costs, at the cost of dynamic and productive efficiency.</p> <p>In Frontier's view, it is impossible to simultaneously satisfy allocative, productive and dynamic efficiency and forcing allocative efficiency at the expense of productive and dynamic efficiency is unambiguously detrimental to customers' interests.</p>	<p>A 'perfectly competitive market' is difficult to define and would in any case be an unduly high bar against which to assess regulatory mechanisms.</p> <p>In our view, Frontier appear to see a binary choice between allocative and productive efficiency. This is unduly simplistic and we note that price controls, and economic regulation generally, typically combine these two desirable features – where costs are in line with allowances and where incentive properties (regarding productivity) still remain. Our recent work on network charging demonstrates examples of such trade-offs.</p> <p>It may in fact be beneficial to sacrifice some productive efficiency in light of the benefits of allocative efficiency.</p> <p>However, we fear that Frontier's depiction of incentives (and thus productive efficiency) does not distinguish between justified and unjustified returns. By extension, Frontier appear to assume that reductions in excess returns must be associated with reductions in incentives. However, investors can be just as incentivised with the correct level of remuneration. In fact, excess returns can lead to suboptimal properties – where even poor performers have high returns (and are therefore not incentivised to improve efficiency). Frontier do not address this distinction and therefore fail to demonstrate a sufficiently strong link between returns and incentives to call Ofgem's analysis into question.</p>
<p>Frontier argue that price controls can be calibrated more symmetrically (than RII0-1) and that outperformance varies significantly across sectors and over time and is not therefore a one-way bet.</p>	<p>We agree with Frontier that price controls can be calibrated symmetrically. However, Frontier's argument focuses on what is possible rather than what is probable.</p> <p>Investors are likely to base their expectations for RII0-2 on probabilities, and it is reasonable to assume that these probabilities are, at least in part, informed by previous scenarios.</p>

FURTHER ANALYSIS OF OFGEM'S PROPOSAL TO ADJUST BASELINE ALLOWED RETURNS

Arguments as summarised by Ofgem	Ofgem's comment
Frontier argue that Ofgem makes no allowance for the fact that the scope for outperformance is likely to be quite different in the RIIO-2 period than the RIIO-1 period.	<p>Frontier's analysis shows RIIO-1 outperformance is forecast to be greater than 2% for the majority of (16 of 18) observations (some observations by company and some network area), with outperformance for SPEN and NGGT to be closer to 1%.</p> <p>The working assumption in the consultation assumed 0.5% for RIIO-2, which seemed suitably conservative in light of the available evidence.</p> <p>Given that price controls are a repeat exercise, it is not clear whether the differences between RIIO-1 and RIIO-2 are materially different between pre-RIIO and RIIO-1.</p>
Frontier argue that Ofgem has not properly evaluated the wider consequences of this adjustment – which all, in Frontier's view, point in the direction of harming customers. Frontier argue that these detriments include: erosion of investor confidence; weakened incentives; distortion of incentives; and loss of clarity.	<p>Frontier assume that the proposals, necessarily and exclusively, have negative effects. It is not clear from Frontier's arguments that this is the case.</p> <p>We agree with Frontier, however, that any potential for negative effects should be considered.</p> <p>We also agree that there may be an impact on investor confidence, in terms of earning excessive returns. However, an accurate reading of the Ofgem proposals is that investors can be confident of earning returns commensurate with risks, in line with the cost of capital. This return will, in expectation, be a combination of baseline allowances coupled with incentives.</p> <p>In our view, for incentive regulation to be an enduring concept, both investors and customers must have confidence that there is not a systematic bias.</p> <p>Frontier's argument that there is a loss of clarity is not well founded or explained in detail - although we welcome further explanation in this regard.</p>

FURTHER ANALYSIS OF OFGEM'S PROPOSAL TO ADJUST BASELINE ALLOWED RETURNS

Arguments as summarised by Ofgem	Ofgem's comment
Frontier state that information asymmetry and information problems in general are, and have always been, a feature of UK regulation to date. Frontier refer to research by Pollitt that provides, in Frontier's view, evidence that customers have significantly benefitted from incentive based regulation.	<p>We agree with Frontier that information asymmetry and information problems were a factor in previous price controls, and in our view, this is likely to also be the case for future price controls including RII0-2.</p> <p>Although we still believe in the benefits of incentive regulation, in our view, the research by Pollitt is not as conclusive as Frontier claim. For example, Pollitt's study states¹⁰⁸:</p>
In Frontier's view, Ofgem's argument that information asymmetries will lead to positive expectations of company performance during RII02 is an extremely weak justification for adjusting baseline returns.	<p>"A major learning has been just how slow the measured TFP productivity growth for energy networks has been over the entire period (in general), but this is still better than the UK economy as a whole. A suspected reason for low measured productivity is that energy networks have needed to invest heavily to respond to government objectives for the addition of renewables and the promotion of energy efficiency without seeing increased measured outputs."</p>

Source: Ofgem, RII02 sector-specific methodology decision – finance, Appendix 2

