Review of Cost of Capital 2022/2023: response to submissions

New Zealand Commerce Commission

15 May 2023

FINAL REPORT

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1. EXECUTIVE SUMMARY

The New Zealand Commerce Commission is undertaking its 2023 review of the input methodologies (IMs) for services that are regulated under Part 4 of the Commerce Act 1986. As part of this review, the Commission commissioned CEPA to prepare a report on aspects of the cost of capital including the WACC percentile uplift.[1]

The Commission is unique when compared to other regulators in the way it sets an uplift to the allowed return on capital. This includes estimating the uncertainty around each parameter of WACC and creating an uncertainty band around the overall estimate of the WACC. This allows an estimation of WACC at various percentiles away from the mid-point. The Commission previously commissioned Oxera to provide a methodology for determining the appropriate WACC percentile to apply. This methodology compares an estimated expected cost to customers of lost load as a result of possible underinvestment resulting from an allowed return below the WACC to the cost of the addition to the allowed return. Referencing this methodology, in 2016 the Commission set the allowed return for electricity and gas businesses at the 67th percentile.

In our November 2022 report we reviewed the approach of other regulators to this issue and also updated the evidence for Oxera's methodology. We did not set out to evaluate the methodology itself. The evidence we reviewed pointed in different directions. On the one hand, we found that other regulators have reduced their support for choosing an allowed return above the mid-point. On the other hand, we found evidence that the importance of network reliability has increased in New Zealand.

The Commission has now asked CEPA to comment on submissions and expert reports on our November paper as they relate to the WACC percentile uplift. In this summary we highlight the main issues raised by submitters and our response to them. The remainder of this report sets out more detailed comments on issues raised by the submissions.

Regulatory precedent on WACC has changed and is now to "aim straight"

Submitters agreed with our assessment that the evidence from recent precedent is that regulators (in particular those in the UK and Australia) now "aim straight" and no longer set allowed returns above their WACC estimate.

However, while Oxera and Frontier argue that this international evidence is not relevant they do not present compelling evidence that the regulatory frameworks in the UK and Australia are sufficiently different to reject evidence from there on the regulatory stance on aiming up. In those jurisdictions we observe quality incentives which influence capital expenditure decisions, as we do in New Zealand. For example, the Commission has implemented incentives to improve reliability on EDBs, initially in 2014 IMs[2], and more recently in 2019[3], which includes reliability incentives with revenue exposure of + / - 2% of revenue. In addition to the incentives in price-quality paths, the Commission may make seek financial and compensation remedies from Court processes, and take action against directors and shareholders. These incentives in combination are likely to ensure that the impact of a failure to invest in quality will be a loss of profit that is larger than the allowed return applied to the capital expenditure saved.

While there are some international regulators and appeal bodies that continue to aim up, the balance of evidence is that regulators now aim straight. This is a change from Oxera's 2014[4] report for the Commission, in which it found that the balance of evidence from other regulators favoured aiming up. In considering the precedent, we suggest then as now it is appropriate to place weight on the full range of evidence.

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[1] CEPA (2022) Review of Cost of Capital 2022/23, New Zealand Commerce Commission, 29 November 2022.

[2] NZCC (2014) Input methodology amendments for electricity distribution services. Default price-quality paths. Chapter 5.

[3] NZCC (2019) Default price-quality paths for electricity distribution businesses from 1 April 2020 – Final decision. Reasons paper. Chapter 7.

[4] Oxera (2014) Review of the '75th percentile' approach, New Zealand Commerce Commission, 23 June 2014

Evidence of cost of underinvestment is weak and likely an overestimate

Submitters have commented that the updated Oxera methodology gives a higher WACC percentile than the same approach used in 2014. (e.g., Frontier, CEG). This is a correct interpretation of the evidence that we analysed and presented. However, an assessment of the evidence in support of this analysis indicates that the conclusion should be treated with caution.

Oxera has updated its evidence from academic studies on the cost of network failures, and consider that the new studies provide evidence of underestimation of the cost of underinvestment. However, the papers they cite report research that does not directly assess the incremental impact of network investment on network failures, but largely on the total cost of outages. We therefore continue to consider that reported costs are likely to overestimate the cost of network failures.

CEG has estimated the marginal benefit of increasing the allowed rate of return as a percentage of the RAB. However, RAB represents the resource cost of inputs to the energy value chain, rather than the value placed by consumers on the outputs, which is what the measure of value used here is intended to represent.

WACC percentile is a blunt tool to incentivise other objectives

Stakeholder submissions represented that the determination of the WACC percentile should take account of the impact of underinvestment on objectives other than the reduction of supply interruptions. For example, CEG[5] suggests that EDBs need to invest to ensure that they increasingly can take on "distribution system operator" (DSO) roles, and that delays in investment would delay this and the associated benefits. Oxera[6] comments on the requirement on EDBs to connect low carbon generation and batteries, and large associated investment requirements.

Any investment planned by energy networks should have a positive value for its stakeholders. If an investment doesn't take place because the allowed return is lower than the WACC, provided that the net present value remains positive, other regulatory mechanisms (e.g., future rise in the allowed return, direct incentive arrangements) can ensure that the investment is undertaken later, so the benefits are deferred rather than lost. No evidence has been presented that suggests a link between underinvestment and achievement of objectives other than reliability. The WACC percentile is a blunt tool to address incentivisation of such goals, if that is required, rather than direct incentives.

Furthermore, use of a WACC percentile above the 50th may incentivise energy networks to invest in assets above the level that is necessary. That has been acknowledged by Oxera; even if this has not been a problem to date, it is an important consideration. This is particularly the case with DSO roles for EDBs, where one of the main purposes to the introduction of such institutional arrangements is to facilitate a more efficient use of distribution networks, and therefore that less investment may be needed than would otherwise be the case.

Higher growth and increased uncertainty reflected in application of Oxera approach

CEG states that investment needs after 2025 are higher than they were in 2014, and there is higher uncertainty around the projection for demand growth. It argues that this implies that the WACC percentile needs to increase.

Under the Oxera approach, there is an assumption that under investment will occur and lead to network failure if the "true" WACC is higher than the allowed return by more than a defined threshold, and that the probability of network failure is the probability that the "true" WACC is higher than the allowed return by at least that threshold. Under CEG's approach, the value of the impact of underinvestment is increased by arbitrary amounts to reflect the increased uncertainty.

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[5] CEG (2023) para 66.

[6] Oxera (2023a) p39.

In our November report, we reflected the effect of increasing demand growth in our updated estimation of the Oxera model through a 58% real increase in the value of lost load. In the framework of the Oxera model, if the increase in uncertainty matters for this, we would observe an increase in asset beta, its standard error, and a resulting increase in standard error of the WACC which would lead to a change in the WACC percentile.

The effects that CEG highlights are reflected in our application of the Oxera approach.

The gas industry

MGUG noted that CEPA's updated Oxera analysis focused entirely on the electricity sector, and that with a declining reliance in the economy on gas, the value of interruptions is likely to be lower. They argue that the evidence for the application of a WACC percentile above the 50th has not been made.

An analysis of the gas industry was outside the scope of our work for the Commission. However, we consider that an application of the Oxera methodology to the gas industry is likely to result in a lower WACC percentile, but we note that the Commission has previously used the same WACC percentile for gas as electricity despite the evidence only being for electricity.

Conclusion

Our update of Oxera's quantitative 2014 analysis indicates that a higher WACC percentile could be used. However, a careful assessment of the evidence indicates that there is a risk that this is overstated.

International precedent is now that regulators tend to "aim straight' with their cost of capital determinations. Convincing evidence was not presented that suggests that a consideration of the full range of decisions is not appropriate for New Zealand. We consider that the balance of regulatory evidence is now against a WACC percentile above the 50th.

Reports reviewed

In this paper we comment on the following reports and submissions in turn:

- Oxera's report *Review of the percentile of the WACC distribution that should be targeted by the NZCC* for Aurora, Orion, Powerco, Unison, Vector, and Wellington Electricity
- Oxera's report *Asset beta and WACC percentile for New Zealand gas distribution businesses* for Vector, Firstgas and Powerco.
- CEG's report for the New Zealand Electricity Networks Association *Updating the 2014 WACC percentile*
- A submission by the Major Electricity Users Group
- A submission by the Major Gas Users Group
- Frontier's report *Response to CEPA WACC report* for Transpower.

We have not commented on every issue raised, but only those that we consider most salient to the issue. We have not repeated work in our November 2022 report.

2. OXERA'S REPORTS

Two papers by Oxera which include commentary on the WACC percentile have been submitted, one on behalf of electricity networks[7], and one on behalf of gas companies[8]. There is overlap in the issues that they cover and their treatment of them, and so it is efficient to comment on the papers together, and we note where an issue is only covered in one paper.

It was a paper by Oxera[9] that is the source of the quantitative methodology on which the Commission's 2016 IM decision was based, and which we replicated in CEPA (2022).

The key issues addressed in Oxera's two reports are:

- Regulatory precedent and its relevance to the New Zealand market (both papers).
- Academic evidence on the WACC percentile (both papers).
- A suggestion that the standard error of additional variables, particularly leverage, should be incorporated in the estimate for the standard error of the WACC (report for electricity companies).
- The risk of under-investment in low carbon technologies (report for electricity companies)
- Whether CEPA's estimate of the cost of underinvestment is underestimated (both reports)
- Whether aiming up is the right regulatory tool (both reports).
- Whether characteristics of gas transport support aiming up (report for gas companies)
- Whether EV/RAB ratios can be used to assess whether the allowed return is different from the WACC (report for electricity companies).

2.1. ISSUE: THE APPLICATION OF REGULATORY PRECEDENT TO NEW ZEALAND

2.1.1. Oxera's comments on international regulatory decisions

Oxera states that "*While recent regulatory decisions include fewer aiming-up decisions than previously, many regulators still consider aiming up to be reasonable*".[10] It cites three specific examples of this:

- The redetermination for UK water by the appeal body, the CMA.
- The French energy regulator CRE's determinations for electricity and gas
- The Irish airport regulator CAR's determination for Dublin airport.

2.1.2. Commentary / our response

We agree that there is still some evidence of regulators setting a WACC above the midpoint. However, our review of a broad range of international evidence finds that the weight has shifted since 2014 towards regulators aiming straight. This contrasts with the selective evidence that Oxera now presents.

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[7] Oxera (2023a) Review of the percentile of the WACC distribution that should be targeted by the NZCC, 31 January 2023

[8] Oxera (2023b) Asset beta and WACC percentile for New Zealand gas distribution businesses, 1 February 2023

[9] Oxera (2014)

[10] Oxera (2023b) p34.

It is also worth noting that the CMA in its 2019 determination relied on the Commission's decisions (including in the 2016 IMs) to set an allowed return above the midpoint of its estimate of the WACC. There is a circularity in relying on that CMA decision.

2.1.3. Oxera's comments on the AER decision

Oxera reports on the decision by the Australian Energy Regulator, the AER, which has set out its reasoning to "aim straight" because[11]: regulators are as likely to over or underestimate WACC; that it is not possible to identify the appropriate adjustment; and making the adjustment would be costly. Oxera agrees with the AER that the WACC estimates are unbiased. However, it disagrees that an appropriate adjustment cannot be determined, because the Commission has identified a methodology (developed by Oxera) to do so. It also disagrees that adjusting the WACC adds further costs, arguing that there is an asymmetric distribution of costs and benefits of setting the allowed return above the "true WACC".

2.1.4. Commentary / our response

On the issue of whether they should have a conscious bias toward over investment or under investment the AER stated "*The evidence does not clearly support the application of a bias in one direction or the other. Reasonable points are made in support of both directions*".[12] The AER considered a broader range of evidence of the effects of over and under investment in Chapter 12 of their *Reasons* document, including submissions from stakeholders. Oxera rebuts the AER based on just two papers by academics.

For the second issue related to the AER's aiming straight decision, Oxera contend that the use of their 2014 methodology leads to a decision that is not arbitrary. Oxera states that *"while the use of this framework requires assumption to be made about the costs of network reliability and a degree of judgement, this is also true of other parameters in the regulatory WACC determination"*.[13] We agree that the approach to estimating WACC requires judgement, and that this is also the case with the estimation of the Oxera model. However, we have not been asked specifically to assess the appropriateness of the Oxera model for this task.

It is worth noting that in the AER's 2022 rate of return decision, the final version of which was published after the submissions we are reviewing, the issue of setting the allowed return above the mid-point WACC estimate was considered only briefly, and the AER stated:

> *"We consider that policy options exist outside of the Rate of Return Instrument to address potential concerns about investment in transmission…Considering this, and the long-term interest of consumers, we consider we are justified in maintaining an unbiased approach (neither upwards nor downwards) when setting the rate of return.* [14]

2.2. Issue: Academic evidence

2.2.1. Oxera's commentary on academic evidence

Oxera cites a new paper by Romeijnders & Mulder[15] that they say "*explains why the costs of aiming up on the WACC are less than the costs of aiming straight*". Much commentary and analysis in the papers rely on this paper.

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[11] AER (2018).

[12] AER (2018) p405.

[13] Oxera (2023a) p39-40.

[14] AER (2023) p 300.

[15] Romeijnders & Mulder (2022). Optimal WACC in tariff regulation under uncertainty. Journal of Regulatory Economics 61 89-107.

2.2.2. Commentary / our response

The paper cited sets out a model that relates interruption costs to the choice of WACC, and uses Monte-Carlo simulation techniques. It concludes that "*by trading off consumer surplus and expected disruption costs in the electricity grid, we conclude that from a social-welfare perspective in most cases the optimal WACC in tariff regulation is above the historical mean of the cost of capital*."[16]

A full critique of this paper is beyond the scope of this report. But as with any economic model, the issue is whether the assumptions are a good representation of underlying behaviours. There are a range of assumptions related to the determination of the appropriate WACC For example, a core assumption in the paper is that "*the operator only invests in period t when the regulator's WACC w^r is equal to or exceeds the actual costs of equity and debt on the capital market w_t^c.*"[17]

That is one behavioural assumption, but it is not necessarily the way that companies behave:

- If the regulator determines an allowed return based on an estimate of WACC that is unbiased, then over the life of an energy network assets (decades), the investor can anticipate receiving an expected return that is close to its cost of capital. Therefore, even if the current allowed return is below the WACC, it is rational for an investor to continue to invest in the network.
- If a regulatory framework incentivises network reliability with financial rewards and penalties, then failing to invest in network quality will lead to a change in returns that is not simply allowed return x change in RAB. This may make the *marginal* impact on changes in investments that affect network quality higher than the allowed return.

If this assumption does not hold than it is likely that a different conclusion would be reached.

2.3. Issue: Standard error of the WACC / gearing

2.3.1. Oxera's commentary on standard error of the WACC

Oxera[18] highlights that the NZCC calculates the standard error of the WACC by using the standard error of three parameters in its formula: the Tax-adjusted Market Risk Premium; the debt premium; and the asset beta. Oxera argues that the other components of the WACC formula (the risk free-rate, debt issuance costs, leverage and tax rates) should also be taken account of in the estimate of the standard error of the WACC.

Of the four additional parameters, Oxera states that only the tax rate can be known with certainty. It also considers that while there may be variation of the risk-free rate and debt premium, the standard error of these two parameters is likely to be immaterial.

Oxera does consider that the NZCC "could be wrong about the optimal level of leverage", that "this might be more likely in New Zealand …because the approach that the NZCC takes to estimating leverage uses a considerably larger number of comparators", and that Dr Lally considers that there could be "significant uncertainty around the leverage of regulated networks".

[16] Romeijinders & Mulder (2022) p1.

[17] Romeijinders & Mulder (2022) p95.

[18] Oxera (2023a) p41 - 42

2.3.2. Commentary / our response

The notional leverage is used in two ways in the NZCC WACC formula: to gear up asset betas to estimate equity betas, and to weight the cost of equity and cost of debt. The notional leverage used is the average leverage of the asset beta comparator samples.[19]

NZCC also states in its 2016 IMs that "it is generally understood that leverage does not affect a firm's WACC in a tax neutral environment because the cost of capital reflects the riskiness of cash-flows rather than how these are divided between equity and debt." There are some nuances with respect to tax, but "we did not consider that variations in … actual leverage (within prudent levels), in practice, alter its actual cost of capital or regulatory cost of capital".[20]

Given that under the NZCC's approach to WACC estimation, changes in leverage have little impact on the WACC when all the effects are traced through the formula, it follows that any error in the estimation should make little difference to the standard error of the WACC. In these circumstances an assumption that the standard error of the leverage estimate is zero is an appropriate way to reflect that.

As Oxera considers that the standard error of all the other parameters is likely to be immaterial we do not comment further on these.

2.4. Issue: Harm from risk of under-investment in low carbon technologies

2.4.1. Oxera's commentary on investment in low carbon technology

Oxera claims[21] that NZCC should target a higher WACC percentile because of an asymmetric loss from under-investment related to decarbonisation. They argue that this is because fast connection of low carbon technology generation assets is required, which requires investment by electricity networks. It also argues that as the New Zealand economy electrifies, the impact of outages increases.

2.4.2. Commentary / our response

Any proposed investment by an energy network company should, from the public's perspective, have a positive net present value, evaluated using the appropriate discount rate. That is, the public should experience benefits from the investment the net present value of which that exceed the resource cost of that investment. While the regulatory framework in New Zealand does not require an explicit cost benefit analysis for capex proposals (other than for transmission[22]), the overall framework of the IMs is intended to ensure that, in line with the Commerce Act section 52 duties. For electricity distribution businesses, the information disclosure approach provides protection to customers for business as usual capex for companies operating under a default price path, but with greater capex scrutiny if companies make a submission.

If a company does not make a planned investment, the public will not benefit from that investment, i.e. they lose the NPV that they would have enjoyed. However, the counterfactual to assess the situation against is not that the investment never takes place. If the investment remains positive from the public's perspective, then it should remain in the capex plans of the company. The company is unlikely to stop capex altogether, but rather to prioritise those projects that offer the highest benefits. If it is crucial project, feedback from stakeholders will ensure that it remains under active consideration. If the reason for the delay is because the cost of capital is too low, it is likely that a revision to IMs would increase returns in future, and the company may invest in anticipation of that or after it

[19] NZCC IMs (2016) paras 546 – 547.

[20] NZCC IMs (2016) para 559. While the comment refers specifically to Transpower, the argumentation would apply to any company.

[21] Oxera (2023a) section 5.2.

[22] Capex IMs 7.5.1. (1) (b)

has occurred. The upshot of this is that any cancellation of capex for NPV positive projects is unlikely to be permanent, but a delay. Customers will get the NPV of the investment, but later, and so the NPV of the benefit will be reduced, but only modestly.

2.5. ISSUE: THE COST OF UNDERINVESTMENT

2.5.1. Oxera's commentary on underinvestment impacts

Oxera reviewed CEPA's update of evidence for the Oxera (2014) framework. While they agreed that "*The approach taken by CEPA to updating the evidence on the impact of network failures is appropriate*" they did not *agree with CEPA's view that the estimates may overstate the impact of network outages. In fact, we note that there are number of reasons why they may understate them"*.[23] In particular, they disagree with CEPA's concerns that:

- Oxera initially used the costs of one-off events to estimate the impact of underinvestment on the New Zealand economy.
- Oxera assumed that the probability of network failures in a world of perfect investment is zero.

Oxera recognise that these are legitimate concerns[24], responding:

- They consider that the ASCE study allows for network failures to be observed even if the investment gap is closed, and therefore consider that it does represent incremental impacts of underinvestment[25]
- They removed a one off event study of Canada that was of particular concern.
- In response to CEPA's concerns, Oxera updated their table of academic studies into the cost of network failure, removing the one-off event study of Canada that was of particular concern.

They maintain that the costs of underinvestment are potentially larger than our estimates, stating: "*We have updated our summary of the impacts of network failure and present the results of this in Table 4.4 below. While none of the studies in Table 4.4 provides a perfect comparator for New Zealand and the full range of impacts is very wide— between NZ$0.5bn and NZ$21bn—it does suggest that the potential impacts of underinvestment could be even larger than was suggested by CEPA.[26]"*

2.5.2. Commentary / our response

Oxera has correctly interpreted our update of their 2014 framework, which supports choosing a WACC percentile above the 67th percentile. However, analysis of the academic studies indicates that the evidence on annualised cost on network failure due to underinvestment is weak, and we remain concerned that the expected annualised cost of network outages may be overestimated. We agree with Oxera that if the expected annualised cost of network outages are inflated, this would support choosing a lower WACC percentile.

We have reviewed the academic studies included in Table 4.4 of their submission and make the following observations:

- The ASCE (2011) study that carried significant weight in Oxera's 2014 framework is a hypothetical analysis of the economic costs arising if growth in electricity demand outpaces growth in investment and an investment gap forms. The investment gap is calculated by simply projecting forward the average investment in electricity infrastructure from 2000-2010 and forecasting electricity demand over the same

[23] Oxera (2023a) p32.

[24] Oxera (2023a) p42.

[25] Oxera (2023a) p42.

[26] Oxera (2023a) p43.

period. It is not clear that this investment gap can form under the various regulatory frameworks within the US. Furthermore, half of projected investment required is in generation assets as opposed to transmission and distribution so apportioning the full cost of network outages to underinvestment in transmission and distribution networks seems inappropriate.

- The LaCommare et al (2004) study compares the hypothetical costs of network outages that may arise from persistent underinvestment in generation and transmission/distribution assets to a scenario where consumers invest in storage or back-up generation technology.
- The Nexant (2003) and Zacharaiadias and Poullikas (2012) studies both seem irrelevant to the New Zealand context. Nexant (2003) looks at the cost of poor quality of power supply in Nepal, which has been caused by both underinvestment and the existing energy sector policies and guidelines. Given marked differences in the regulation of the electricity sector in Nepal in 2003 and New Zealand 20 years later, we question the relevance of this study. Zacharaiadias and Poullikas (2012) study the costs of network outages resulting from a generation asset being damaged by an explosion at a nearby military base in Cyprus. This is a one-off event relating to a generation asset and the costs have not been annualised (i.e., this event would not be expected to occur every year in Cyprus). This study represents the high end of Oxera's updated NZ$0.5bn-NZ$21bn range,
- The EPRI (2001), Swaminathan and Sen (1997) and Targosz and Manson (2007) are all power quality studies carried out in the US and EU. Power quality studies survey businesses and households on the costs of hypothetical planned and unplanned network outages and voltage disruptions and use these results to estimate the actual cost of network outages. In all three studies, there is no consideration of what an efficient level of power quality is, so the costs are not the incremental network failures arising from underinvestment.
- The Campbell (2012) and Council of Economic Advisors (2013) both study the economic costs of weather-related network outages in the US. Neither of these papers provide a comparison for the costs given efficient investment, assuming that underinvestment is occurring in the US.
- Reichl et al (2013) models the costs of hypothetical 1-48hr outages in Austria. They do not consider the causes of these outages or how many of these outages would occur in states of the world with efficient or underinvestment.

The academic papers referenced by Oxera also highlight the uncertainty inherit with estimating the costs of network outages:

> *However, there are large gaps in and significant uncertainties about the information currently available. Notably, we were not able to develop an estimate of power-quality events. Sensitivity analysis of some of these uncertainties suggests that the total annual cost could range from less than $30 billion to more than $130 billion.*[27]

> *We applied two independent top-down methods to assess welfare losses, and their results differ by almost an order of magnitude. This is an indication that the assessment of costs is an imprecise exercise that has to be treated with caution.*[28]

Given this, we continue to believe that the academic evidence provided by Oxera in their 2014 framework and now in their response to our update may lead to an overestimation of the true annualised cost of network failure resulting from underinvestment.

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[27] LaCommare et al (2004)

[28] Zacharaiadias and Poullikas (2012)

2.6. Issue: Is a WACC uplift the right regulatory tool?

2.6.1. Oxera's comments on the approach of a WACC uplift

Oxera notes that other regulatory approaches could be used to incentivise appropriate investment and prevent under investment. Oxera considers that any change would create instability, and therefore switching to an alternative would on balance not be beneficial. Second, they report that networks are currently earning in line with their required return[29], or below[30], and to make a change it would need to be ensured that it was at least net present value (NPV) neutral.[31]

2.6.2. Commentary / our response

We agree that predictability is a sound objective from regulators. However, stability cannot require that nothing should ever change but rather change should be well justified, in the public interest, and in line with the best way for the Commission to meet its duties. That means evolution of the regulatory framework, with an open mind to ideas from other regulators provided that there is good evidence for them.

If achieved returns are different from the WACC, that does not provide evidence that the allowed return needs to be set above the WACC, but either that cost estimates were too low, or that companies did not achieve anticipated efficiency savings. If there is an error in one cost category, that is not a reason to change the costs of another category.

2.7. Issue: WACC percentile in gas networks

2.7.1. Oxera's comments on gas transportation

Oxera highlights[32] that gas transportation networks are changing, and may become stranded, or be repurposed. They argue this may lead to under compensation of these networks.

2.7.2. Commentary / our response

The Commission has considered stranding risks in other industries, including fibre and dairy where consideration has been given as to whether to apply a "specific risk premium". This existing mechanism may be a more appropriate for considering these issues than the WACC percentile.

2.8. Issue: Use of EV/RAB ratios to cross-check returns

2.8.1. Oxera's comments on EV/RAB ratios

Oxera claims[33] that "*EV/RAB ratios are …not informative in assessing whether there is an excessive return that is earned by investors…because other factors can explain the ratio being above 1".*

2.8.2. Commentary / our response

EV/RAB ratios are relevant evidence for assessing whether allowed returns are adequate. They need to be interpreted with care, but the reasons that Frontier give are not a reason to reject their use. Moreover, there is regulatory precedent for the use of EV/RAB ratios to assess whether allowed returns are adequate. In the UK, this

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[29] Oxera (2023b) p46.

[30] Oxera (2023a) p3.

[31] Oxera (2023a) p45-46.

[32] Oxera (2023b) p47.

[33] Oxera (2023a) p33.

has been used by Ofgem, and litigated in appeal with the CMA which following a careful review of evidence concluded:

> *"We disagreed with the appellants that little to no inference could be taken from MAR premiums, and concluded that GEMA was not wrong to use MAR evidence as a cross-check to its cost of equity estimate. We also agreed with GEMA's assessment that the MAR evidence available suggests that GEMA's allowed return on equity is not too low*.[34]

The following reasons that Frontier claims that EV/RAB ratios should be disregarded:

- Winners curse. Investors know that they may be optimistic about assumptions and factor that into the price that they are prepared to pay.
- Control premium. Investors bid a price at which they expect to earn at least their required return, if that includes a "control premium", that indicates that their expected returns are lower than they would be if they weren't prepared to pay a premium.
- Stickiness of valuation expectations. If investors pay more because they copy other investors that reflects an expectation of lower returns.
- Financial restructuring. If potential restructuring enhances returns and increases the price that an investor is prepared to pay, that suggests a lower return would have been adequate.
- ESG factors and market sentiment. If bidders are prepared to pay more because of these factors, that means that their expected return is lower.

The other issues that Frontier raises (e.g. the value of non-regulated businesses) can affect EV/RAB and should be adjusted for in using EV/RAB to assess whether returns are adequate. They are not a reason to reject the evidence from the analysis.

[34] CMA (2021) p227, paragraphs 5.686.

3. CEG REPORT

Updating the 2014 WACC percentile (the CEG report) applies Oxera's 2014 framework with updated evidence for New Zealand Electricity Networks Association. The CEG report concluded that to reapply Oxera's framework would increase the optimal percentile from the 67th to an increase to between the 75th and 84th percentile. This was supported by two main lines of argument:

- Growth in peak demand and a transition of distribution networks to DSO leads to materially higher investment needs, which in turn increase the costs of underinvestment (or equivalently, the benefits of avoiding underinvestment).
- Greater uncertainty around the median projection for demand growth and required investment increases the cost of incorrectly estimating the WACC.

Both CEPA and the CEG report conclude that applying Oxera's modelling framework indicates that the importance of network reliability has increased in New Zealand. This has been interpreted by the CEG report as an argument to increase the WACC percentile. The CEPA and CEG reports differ in two main areas:

- CEPA assumes that increased probability of network outages are the key consequence of underinvestment resulting from setting the regulatory WACC below the true cost of capital. This is in line with Oxera's findings in 2014. Accordingly, we assume the costs associated with underinvestment are proportional to GDP and the value of lost load. In contrast, CEG assumes that in addition to increased probability of network outages, underinvestment may also delay distribution networks adopting DSO functions in the New Zealand electricity market. Furthermore, due to decarbonisation and electrification, projects of peak demand are more uncertain. These both represent additional costs to consumers of setting the regulatory WACC below the true cost of capital. CEG assumes that these costs to consumers are proportional to RAB of electricity distribution and transmission companies.
- In line with Oxera's 2014 framework, CEPA considers the regulatory precedent of setting a WACC above the midpoint. We find that other regulators have reduced their support for choosing an allowed return above the midpoint, opting to protect consumers through service quality incentives and uncertainty mechanisms. The CEG report has placed no weight on this evidence, focussing solely on the modelling of marginal costs and benefits of adjusting the WACC percentile.

In response to the CEG report, we comment on three of the issues:

- The cost of underinvesting to consumers are proportional to RAB.
- The cost of underinvesting has increased because projections of demand growth are more uncertain.
- The cost of underinvesting has increased because of delays to EDBs transitioning to DSOs.

3.1. ISSUE: COSTS OF UNDERINVESTMENT GROW WITH RAB

3.1.1. CEG's comments on underinvestment

CEG calculated the marginal cost of increasing the allowed rate of return by a percentile as the change in WACC multiplied by the combined RAB of Transpower and the EDBs. This is the additional allowance that can be recovered from consumers. Hence, marginal costs are proportional to the industry RAB.

To present marginal benefits of increasing the allowed rate of return on the same scale, the CEG report divided the estimated cost of underinvestment by the 2014 industry RAB. Specifically:

> *In 2014 Oxera estimated a low (high) cost of underinvestment at around $1bn pa ($3bn pa). Expressed as a percentage of the 2014 industry RAB this translated to 6.8% (20.4%). (Note, we express costs of underinvestment as a percentage of RAB because the costs of increasing the WACC percentile are*

expressed in the same terms (being the WACC uplift multiplied by RAB). In addition, on the assumption that the RAB grows more or less in line with the value of the electricity supply chain this allows for a simple comparison across periods with different RABs.)[35]

The assumption that marginal costs and marginal benefits of changing the WACC percentile are proportional to the RAB has important implications for what can drive changes in the optimal WACC percentile. The CEG report notes:

> *That, other things equal, the benefit of avoiding underinvestment grows with the RAB as does the cost of underinvestment. Therefore, the only reason for an increase in the percentile is the greater risk of underinvestment.*[36]

3.1.2. Commentary / our response

In our November report[37] we calculated marginal costs in a slightly more sophisticated way, recognising that changing the regulated cost of capital would have a "price effect" and a "demand effect" as consumers substitute away from more expensive electricity. Our price effect, calculated in Table 4.8, is equivalent to CEG's marginal cost. We concluded that the price effect is an order of magnitude greater than the demand effect, and as a result should be the primary concern of the Commission. We therefore agree that marginal costs are, to a first order approximation, proportional to RAB.

On the other hand, the assumption that marginal benefits are proportional to RAB appears misguided. While it is convenient to present marginal costs and marginal benefits on the same scale, this simplification prevents certain dynamics from occurring. For example, in Oxera (2014), the cost of underinvestment to consumers is derived from studies into the cost of network outages, hypothetical and real, as a percentage of GDP. Oxera find that the expected cost of a loss of network reliability may be between 0.4 per cent of GDP and 1.8 per cent of GDP per year.

CEG's simplifying assumption prevents changes in GDP from directly impacting the cost of a loss of network reliability. Instead, an increase in GDP must drive an increase in RAB to increase the costs of underinvestment.

To illustrate that changes to the cost associated with a loss of network reliability may be uncorrelated to changes in RAB, consider an example where factories in NZ transition to manufacturing high value added goods, say for example semiconductors. All else equal, an outage after this transition will have a larger associated cost, while the electricity infrastructure, and hence the RAB, has not changed.

Rather than using RAB-based estimates we have applied the approach taken by Oxera (2014). As a result, the first step in calculating our expected cost of network outages was scaling the 2014 cost of network outages calculated by Oxera by the real changes in New Zealand's GDP.

3.2. Issue: Projections of demand growth are more uncertain

3.2.1. CEGs comments on demand growth and uncertainty

The CEG report claims that the most significant change since 2014 is the size and uncertainty of the "energy transition" that is underway and will continue throughout the next price control period. Decarbonisation and decreasing costs are accelerating investment in renewable generation, while electrification and uptake of electric vehicles will put upward pressure on peak demand.

The CEG report summarises a purported relationship between uncertainty of demand growth and the risks of underinvestment. In a state of the world where the allowed cost of capital is below the actual cost of capital, "*EDBs*

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[35] CEPA (2022) para 11.

[36] CEG (2023). CEG and CEPA's analysis of the percentile, Memorandum, 26 January 2023. Para 8.

[37] CEPA (2022) section 4.4.

will target the midpoint of projected demand in year N"[38]. This most-likely outcome requires less investment than the prudent level of investment[39]. As uncertainty of future demand growth increases, so does this investment gap, and hence the costs of underinvestment increase, expressed as "*for any level of expected demand growth the risk of underinvestment is higher the higher the uncertainty around that expected demand growth*.[40]

The CEG report also argues that if underinvestment were to occur, the magnitude of underinvestment is proportional to the future capex plan:

> *It is obviously true that material underinvestment in growth capex is only possible if the efficient level of growth capex is materially above zero.*[41]

Therefore, CEG argues, preventing underinvestment by setting the WACC above the midpoint provides additional benefits to consumers. CEG acknowledge that these benefits are hard to quantify as a percentage of RAB, but model four scenarios where marginal benefits are 25%, 50%, 100% and 200% higher than in 2014.[42] These figures form the basis of Figure 4-3 and Figure 7-1, which leads to CEG's conclusion that the WACC percentile should be increased to between the 75th and 84th percentile.

3.2.2. Commentary / our response

CEPA has also considered the changing importance of electricity to New Zealand's economy, recognising increased future demand for electricity. The change in electricity usage in New Zealand can be proxied by a change in the value of lost load. Since 2014, New Zealand's VoLL has increased significantly, meaning the cost of network outages to the New Zealand economy has also increased significantly. Hence, CEPA has scaled the cost of a loss of network reliability resulting from underinvestment by the real growth in VoLL (16.8%).

Importantly, this is significantly lower than the four scenarios considered by CEG. However, when both the real increase in VoLL and real increase in GDP are considered, CEPA estimates that the real cost of network failure to have increased by 57.7% (90.0% in nominal terms), which is more aligned to CEG's central cases.

If the Oxera framework is accepted, greater uncertainty of future market conditions should be reflected in the asset beta point estimate and standard error. All else equal, this will lead to a higher WACC standard error, and a greater WACC uplift for a given percentile.[43] So the effects that CEG highlights are already reflected in the Oxera approach.

CEG's approach to quantifying the impact of higher demand growth and uncertainty in projections is to apply an arbitrary increase in the impact of interruptions on customers, and it would be hard to justify the proposed additional costs to customers without associated evidence. Further, the underlying qualitative model used to justify higher WACC percentile is static: in reality as time passes, uncertainty becomes resolved so that what appears to be a wide range of scenarios now does not imply that there is scope for huge under or over investment: plans can evolve in response to what transpires.

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[38] CEG (2023) para 42.

[39] CEG (2023) para 42 suggests that the prudent level of investment may target capacity in year T=N one standard deviation above the median level of expected demand.

[40] CEG (2023) para 47.

[41] CEG (2023) para 48.

[42] CEG (2023) para 61.

[43] For example, assume the WACC is set at the 67th percentile. If the standard error is 1%, the resulting WACC will be 0.44% above the midpoint. If the standard error increased to 1.5%, the WACC uplift would be 0.66%.

3.3. ISSUE: COSTS OF UNDERINVESTMENT ARE NOT LIMITED TO BLACKOUTS

3.3.1. CEGs comments on underinvestment

CEG argued that the costs associated with underinvestment have materially changed since Oxera's 2014 report:

> *Another critical difference between 2014 and 2015 is the changing role of EDBs driven by the integration of a greater share of intermittent distributed energy resources (DER). This process, if well-handled, EDBs, regulators and other stakeholders (including government) has the potential to unlock enormous long-term benefit for consumers. However, at the heart of this process are EDBs evolving from passive "poles and wires" into a distribution system operator (DSO) role.*[44]

CEG estimate that the value of taking efficient actions to becoming a DSO could reduce supply chain costs by 12% to 19%.[45] The report then calculates that this benefit is around 50% of EDB RAB.'

> *Total EDB revenues in New Zealand are 27% of the average retail bill and the total EDB RAB is around 1.4 times total EDB revenues. It follows 19% of total supply chain costs, when expressed as a percentage of the EDB RAB, is around 50% (=19%/(27%*1.4))*[46]

The CEG report states that setting the allowed WACC too low will delay/impede this transition and delay the benefits accruing to consumers. CEG assume that under efficient investment benefits grow by 5% of RAB a year until the full benefits of 50% of RAB are realised after 10 years. In the state of the world where the WACC is set too low, this process is delayed by 10 years. CEG conclude:

> *In this case, at a 6% discount rate, the NPV cost of delayed investment would be 275% of today EDB RAB. If this loss was annualised over perpetuity at the same discount rate it would imply a 16% annual cost of underinvestment. This loss is roughly 3 times the "2014 starting point" estimates of the cost of underinvestment associated supply interruptions.*[47]

3.3.2. Commentary / our response

There are many preconditions to implementing DSOs. There has been at best limited evidence provided that suggests a link between underinvestment and the delay of EDBs adopting/developing DSO capabilities.

We suggest that supporting EDBs in the development of DSO capabilities is not a WACC issue: funding for investment in new software, systems and expertise to facilitate EDBs undertaking a DSO role should be addressed separately in the price control. Uncertainties around the required funding to ensure an efficient transition should not be addressed using the WACC percentile (blunt tool) but could be tackled using uncertainty mechanisms and re-openers as in Ofgem's RIIO-ED2.

[44] CEG (2023) para 66.

[45] CEG (2023) para 83.

[46] CEG (2023) para 114.

[47] CEG (2023) para 117.

4. MAJOR ELECTRICITY USERS REPORT

The Major Electricity Users' Group (MEUG) submission in response to the CEPA report focuses on the question of whether the WACC for regulated electricity businesses should be retained at the 67th or changed to the 50th percentile. The MEUG submission argues that MEUG members are materially impacted by the choice of WACC percentile, and the choice of percentile may impact investment and resource allocation decisions.

The MEUG submission supports choosing lower WACC percentile or the midpoint. In particular:

- It agrees that in contrast with the evidence at the Commissions' last IM review, regulatory precedent no longer supports choosing a WACC above the 50th percentile.
- It supports the concern that Oxera's approach may overestimate the true cost of underinvestment by neglecting to annualise the cost of one-off loss of network reliability costs.

In addition, it highlights that the current framework does not account for dynamic investment decisions made by MEUG members and other industrial users, where a higher price of electricity in the long run may lead to a reallocation of capital away from New Zealand.

The MEUG submission does not comment on the evidence presented in CEPA's report that support setting a WACC percentile above the midpoint, in particular the increased importance of electricity to New Zealand's economy, proxied by an increase in the value of lost load.

On whether climate change policies are relevant when to deciding if a WACC uplift is justified, the MEUG submission suggests that the Commission should rely instead on the estimation of asset betas, which should reflect the market-wide risks of climate change and electrification. MEUG does not believe the expected increase in electrification justifies a WACC uplift.

We respond in more detail on three issues covered in the MEUG submission:

- The WACC should be set at the midpoint.
- The approach does note capture dynamic efficiencies.
- Risks of climate change are captured in asset beta.

4.1. ISSUE: ALLOWED RETURN SHOULD BE SET AT THE MIDPOINT

4.1.1. MEUG considers the allowed return should be set at the midpoint WACC estimate

There are three reasons why MEUG concluded that the allowed return should be set at the midpoint WACC estimate rather than the 67th percentile:

- With respect to the Commission's regulatory regime, MEUG argued that: *In New Zealand the review required of IM's no later than every 7-years, and opportunity at any stage before the comprehensive IM review for bespoke reviews, will ensure over time any over or under-estimation of the true WACC will trend towards zero*.[48]
- MEUG also questioned evidence used by Oxera in their 2014 report (and subsequently used by CEPA) on the cost per year of a loss of network reliability: "*Based on anecdotal reports on network failures overseas and in New Zealand, the cause of such events is usually the result of multiple coincidental failures across a range of issues over time covering poor asset management planning through to real-time operational*

[48] MEUG (2023) 2023 WACC Review, 3 February 2023 p2.

mistakes. To assign the full cost of the failures listed by Oxera to network under-investment failure is an over-exaggeration.[49]

- Additionally, MEUG stated that New Zealand's incentive based regulatory regime would not lead to prolonged underinvestment, which lead to network deterioration and eventually a loss of network reliability. Several features of the regulatory regime outside of the WACC uplift protect against underinvestment including:
    - High quality regularly updated Asset Management Plans (AMP);
    - Applications for Customised Price-Quality Path regulation instead of the Default Price-Quality Path; and
    - Intense scrutiny of Transpower's AMP and Major Capex Proposals.[50]

4.1.2. Commentary / our response

The purpose of our analysis was not to determine a binary choice between the 67th percentile or our midpoint. Instead our update set out to update the Oxera methodology and in turn assist the Commission in determining the appropriate percentile. Our terms of reference did not extend to commenting on the appropriateness of Oxera's methodology. We agree that conditional on the overall WACC methodology producing unbiased estimates of the true cost of capital, aiming straight with regular periodic updates will mean the expected future allowed return should be equal to the expected future WACC.

We agree that some of the interpretation of evidence provided by Oxera in their 2014 report on the annualised cost of a loss of network reliability may lead to this cost being overestimated. In particular, the Oxera report did not annualise the cost of one-off events. For example, a study of blackouts occurring in Ontario and north-eastern USA in 2003 included by Oxera[51] found that the cost of these blackouts was 1.4% of GDP (or NZ$3bn in 2013 prices). This cost was not annualised. For example, if an event of this scale resulting from underinvestment was expected to happen once every 20 years, the annualised cost would be less than 0.1% of GDP (or NZ$150m in 2013 prices).

However, we reviewed evidence on the cost of a loss of network reliability and the link between underinvestment and a loss of network reliability but found little evidence to build on Oxera's assumptions, except for an update to the ASCE (2013) report published in 2020. This found that the updated cost of a loss of network reliability in the United States was 0.4% of GDP. Given the lack of new evidence, we adopted Oxera's assumption that the cost was NZ$1bn.

We agree that there are regulatory options outside choosing a WACC percentile above the midpoint and noted in our report that there has been a shift towards adopting the midpoint in recent regulatory decisions, especially in the UK which was quoted heavily in Oxera's 2014 report.

4.2. Issue: The approach does not capture dynamic efficiencies

4.2.1. MEUG comments on dynamic efficiencies

With respect to CEPA's analysis of the own-price elasticity of demand of electricity, MEUG raised that the concern:

> *MEUG is unsure if the CEPA analysis is complete because it appears to be standard analysis of static efficiency effects and therefore does not capture longer-term investment (and divestment) and innovation dynamic efficiency effects.*

[49] MEUG (2023) p3.

[50] MEUG (2023) p4.

[51] Oxera (2014). Table 5.1. p43.

Regulatory policies and precedents have real-world effects on businesses. Most large electricity intensive businesses in New Zealand are part of multi-national companies and compete for capital with overseas business units in those companies. For example, at the margin given everything else is equal, if the general practice overseas is not to have a WACC uplift, then over time investment by multinational businesses for projects that require regulated lines services will favour other countries to the detriment of New Zealand.

The Oxera methodology and CEPA update do not consider these long-term investment effects on electricity intensive businesses.[52]

4.2.2. Commentary / our response

CEPA has interpreted this comment as pertaining to two separate but related issues. The first issue is about considering the long-term and dynamic impacts of a change in the price of electricity. The second issue is about competitive distortions that may influence companies' decisions to invest within or outside of New Zealand.

On the first issue, CEPA made a conscious decision to focus on academic studies about the long-run own-price elasticity of demand of electricity. Demand for electricity is relatively inelastic in real time (time of use) and short-run time frames. Firms and households need time to adjust their consumption and investment decisions after a change in electricity prices. The evidence we have included accounts for these dynamics, and our resulting range of estimates for the own-price elasticity of demand of electricity was 0.25 – 0.75, which was higher and wider than the range estimated by Oxera in 2014. However, even when the time-frame is long enough for these investment decisions to be considered, we still find that the 'demand effect' is of a smaller magnitude than the 'price effect' and conclude that the Commission should focus on the latter.

On the second issue, Oxera (2014) explicitly considered the risk of competitive distortions resulting from an increase in electricity prices for industrial users. Industries that met the dual criteria of high energy consumption (as a proportion of total inputs) and significant exports were thought to be at risk. CEPA updated this evidence and found the primary metal and metal product manufacturing, gas and water supply, and supermarket and grocery store industries were most at risk. However, an increase in electricity prices of 1%[53] led to at most a 0.2% increase in input costs for the most at risk industries. We concluded that while this may decrease competition or profitability, this decrease is marginal and the focus of the Commission should be on the 'price effect'.

4.3. Issue: Risks associated with climate change and asset beta

4.3.1. Climate change risks should be captured in asset beta

The MEUG submission argued that "*climate change risks and opportunities are complex and keeping a range of options open [rather] than relying only on electrification is a better strategy*".[54] They do not believe that the expected increase in electrification justifies a WACC uplift but should be captured in the asset beta:

With all sectors of the New Zealand and global economy subject to climate change risks and opportunities, the Commission should rely on market observed changes in sector beta including the effect on regulated electricity networks. To justify a WACC uplift because of the importance in New Zealand's case of electrification, would lead to a bias in the economy and unintended consequences such as households and businesses deferring electrification or inefficiently changing to another fuel

[52] MEUG (2023) p2-3.

[53] In-line with the increase expected from setting the WACC at the 67th percentile compared to the midpoint.

[54] MEUG (2023) p5.

because the long-term delivered price of electricity was expected to be higher due to a WACC uplift. Accordingly, MEUG does not believe the expected increase in electrification justifies a WACC uplift.[55]

4.3.2. Commentary / our response

MEUG argues that increasing the WACC percentile above the midpoint will increase electricity prices and distort the transition to electrification in response to climate change. We note that the academic evidence presented in our report on the long-run own-price elasticity of demand for electricity suggests demand for electricity is relatively inelastic, even in the long-run. Hence, current evidence suggests the dynamic set out by MEUG will not eventuate. The MEUG submission does not provide new evidence to change this point of view.

We agree that the risks and opportunities of climate change are likely to be market wide and should be captured within the broader CAPM methodology. The estimated asset beta may increase if electricity companies are more exposed to systematic risks due to climate change. It is also possible that the market risk premium will increase if total systematic risk in the market increases and investors demand compensation for this. In either case, the estimated allowed return would increase through the application of the methodology without an explicit increase in the WACC percentile.

[55] MEUG (2023) p5.

5. MAJOR GAS USERS REPORT

The Major Gas Users' Group's (MGUG) submission in response to the CEPA report focuses on whether the WACC for regulated gas businesses should be retained at the 67th or changed to the 50th percentile, and if evidence using the costs of blackouts resulting from underinvestment in the electricity sector is relevant to the gas sector. The MGUG submission argues that the asymmetric risk assumption of underinvestment for gas consumers is moderated for most mass market consumers given fuel switching options.

The MGUG submission agrees with CEPA's analysis where it supports choosing lower WACC percentile or the midpoint. In particular:

- MGUG agrees with our review of regulatory precedent that found support for choosing a WACC above the 50th percentile had fallen since the Commission's last IM review.

In addition to the evidence presented by CEPA that supports choosing a WACC at the midpoint, MGUG claims that the current framework does not account for the range of other regulatory tools that protect against underinvestment, and that costs of underinvestment are moderated for gas consumers. MGUG argue that the logic of the Oxera framework applied to gas networks "*would not be expected to provide a strong case for going beyond the midpoint*".[56]

We respond to two issues in MGUG submission:

- The WACC should be set at the midpoint.
- The costs of underinvestment are moderated for gas consumers.

5.1. ISSUE: WACC SHOULD BE SET AT THE MIDPOINT

5.1.1. MGUG argue the allowed return should be set at the midpoint WACC estimate

The MGUG report argued that the WACC percentile should be chosen at the midpoint as regulatory support for a WACC uplift had decreased, and there are other incentives decreasing the likelihood of underinvestment.

> *It seems that while the underlying concern for risk of under/over investment remains, the preferred solution to bias the WACC towards suppliers has lost regulator support since 2016 for the reasons outlined above. Instead, alternative approaches are advocated that are removed from the blunt instrument approach of using the cost of capital to mitigate the risk of underinvestment.*[57]
>
> *We also consider that the Oxera methodology fails take into account the other current incentives that regulated businesses have to provide reliable and safe services to consumers that aren't just about individual investment decisions. Investments aren't only made on the basis of individual project economics, but consider the wider strategic risk framework for maintaining a long-term sustainable business.*[58]

The strategic risk framework for maintaining a long-term sustainable business presented by MGUG includes:

- Preserving asset options – GPBs are incentivised to efficiently invest in assets to avoid not just economic stranding, but also physical stranding. If consumers lose confidence in the delivery of safe and reliable gas,

[56] MGUG (2023) 2023 WACC Review, 3 February 2023 p8.

[57] MGUG (2023) p6.

[58] MGUG (2023) p8.

they may switch to LPG or electricity. GPBs are incentivised to keep these customers as they repurpose pipeline for low carbon gases.

- Enterprise risk management – GPBs (Powerco, Vector, Firstgas) operate other businesses under the same brand. They carry a significant reputation risk if they do not maintain a safe and reliable gas network. This is complemented by HSE regulation and price quality regulation, which carry financial penalties associated with a loss of reliability.
- The Commission's monitoring – Annually updated supplier Asset Management Plans (AMPs) provide a 10-year forecast on risk measures for service levels and spending programs that support asset integrity and reliability outcomes.

5.1.2. Commentary / our response

We agree that the evidence shows that regulatory support for setting a WACC above the midpoint has weakened since the last review of the IM's. Furthermore, the CMA's decision to include a WACC uplift in their redetermination of PR19 relied on the Commission's history of setting a WACC above the midpoint and this circular reasoning suggests that this may be an appropriate time for the Commission to reassess their choice of WACC percentile. Recent decisions by Ofgem in the UK and AER in Australia support setting the WACC at the midpoint and using more specific tools for addressing risks of underinvestment. Given the WACC is an unbiased estimate of the true cost of capital, in the long run networks should not be over- or under-compensated by setting the WACC at the midpoint.

The evidence provided by MGUG about the broader strategic risk framework lies outside the scope of what CEPA was asked to update when recalculating the WACC percentile, but we agree that, in general, other tools can be used by regulators to address the risks of underinvestment.

5.2. Issue: Costs of underinvestment are moderated for gas consumers

5.2.1. The focus on electricity rather than gas

MGUG explains that CEPA's updated Oxera analysis focusses entirely on the electricity sector. Additionally, electrification was used by CEPA to justify increasing Oxera's estimated cost of blackouts by the real change in value of lost load. MGUG argue that this does not necessarily translate to the gas sector:

> *CEPA's updated Oxera analysis focuses entirely on EDBs and Transpower, with no analysis for gas and GPBs. CEPA notes that climate policies encourage a greater reliance on electricity infrastructure. CEPA conclude that the cost of (electricity) network outages would be more acute, and this in turn means that ensuring investment in a reliable (electricity) network is more important. This is what leans CEPA towards evidence that a WACC percentile above the midpoint may still be justified (based on Oxera's methodology).*
>
> *Applying the same reasoning to gas, suggests that because government policy regards gas as something that we should [consume] less of, then the cost of (gas) network outages would be less acute, and this in turn means that ensuring investment in a reliable (gas) network is less important. Hence biasing the WACC percentile above the midpoint has less justification (at least for gas).*[59]

MGUG makes the point that for large consumers gas is not an option fuel in the short to medium term so they do not believe network reliability is less important than it was in previous reviews, but that the logic to justify a higher WACC percentile in the electricity sector does not apply to gas.

[59] MGUG (2023) p6-7.

5.2.2. Commentary / our response

Considering the differences between the gas and electricity sectors, and the appropriateness of Oxera's framework to setting a WACC percentile for the gas sector, was outside the scope of CEPA's brief. However, we agree that the substitutability of gas (for the majority of consumers), especially in the medium to short term, mitigates the risks of prolonged underinvestment and the decreases costs of a loss of reliability.

CEPA acknowledges that the first best solution would be to undertake similar analysis for the gas sector but that a lack of available evidence means that the appropriate WACC percentile for gas was estimated using analysis based on the electricity sector.

6. FRONTIER REPORT

Response to CEPA WACC report (the Frontier report) for Transpower New Zealand interprets CEPA's update of Oxera's framework concluding that the net consumer benefit is maximised by adopting the 80th, 90th or 95th WACC percentile. This was supported by two main lines of argument:

- There is record amount of new investment required by electricity networks to support New Zealand's decarbonisation commitments over the coming decade.
- Recent international regulatory decisions are not relevant for the New Zealand context except for the CMA's decision in PR19, which supports setting a WACC percentile above the midpoint.

Both CEPA and the Frontier report conclude that applying Oxera's modelling framework indicates that the importance of network reliability has increased in New Zealand. This has been interpreted by the Frontier report as an argument to increase the WACC percentile. In response to the Frontier report, we outline our view on three issues:

- The update of Oxera's framework supports a shift up in the WACC percentile.
- Regulatory precedent is not relevant to the New Zealand context.
- Underinvestment would occur if the true cost of capital is below the regulatory WACC (i.e., 0% threshold).

6.1. ISSUE: OXERA'S FRAMEWORK SUPPORTS A SHIFT UP IN THE WACC PERCENTILE

6.1.1. Frontier's argument that the WACC percentile should increase

At a high level, the Frontier report argues:

> *We note that CEPA has updated the Oxera (2014) calculations to reflect the most recently available data. CEPA's updated estimates indicate that the net consumer benefit is maximised by adopting the 80th, 90th or 95th percentile depending on which value the Commission might adopt for the under-investment threshold parameter.*
>
> *Thus, the evidence set out in the CEPA report supports a change to at least the 80th percentile. Maintenance of the 67th percentile would involve supplanting the current evidence with the evidence from 2014.*[60]

This is supported by a calculation of 'net benefit' using CEPA tables 4.8 and 4.17 at the 0%, 0.5% and 1.0% underinvestment thresholds. These curves are maximised at the 95th, 90th and 80th percentile respectively.

Frontier agree that CEPA's update of Oxera's framework:

> *Results in a near doubling of the estimated cost of network failure from $1 billion per year to $1.9 billion per year. Thus, the consumer benefits from setting the allowed return above the WACC (to reduce the risk of under-investment) are materially higher under CEPA's updated analysis.*[61]

Frontier notes that CEPA's update reflects current estimates of the value of network reliability, whereas present investment decisions will impact future network reliability. Frontier note that decarbonisation is likely to result in increased reliance on electrification:

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[60] Frontier (2023) Response to CEPA WACC Report, Transpower New Zealand, 1 February 2023 p4.

[61] Frontier (2023) p7.

> *Indeed, a consumer relying entirely on electricity for heating, cooking, transport and communications is likely to place a very high value on network reliability relative to a consumer with gas heating, stove and hot water and a diesel car. This would tend to indicate an even stronger case for the adoption of a higher WACC percentile.*[62]

Frontier agrees with CEPA's recommendation that the Commission considers the qualitative arguments around the importance of network reliability going forward but disagrees with CEPA's argument that increases in distributed energy resources may decrease the costs of network outages.

6.1.2. Commentary / our response

Both CEPA and Frontier take Oxera's 2014 framework as a given. We agree Frontier has interpreted our results correctly and that the conclusions from updating the expected cost of network outages with the most recent evidence supports a higher WACC percentile.

However, the annualised cost of network outages resulting from underinvestment in networks is uncertain and may be overestimated: Oxera's evidence includes studies of one-off events and events that were caused by a variety of factors and whose total cost should not be apportioned to underinvestment in network assets. Further, it seems reasonable to assume that in a state of the world with efficient investment there is still some risk of network outage, and the annualised cost of network outages is not zero. Frontier has not considered these potential sources of bias in the estimation of the expected cost of network outage, and hence the net benefit to consumers of preventing these outages. Given this, we would encourage the Commission not to place full weight on a mechanical application of Oxera's framework.

CEPA agrees that decarbonisation is likely to result in increased reliance on the electricity network, and have accounted for this by scaling Oxera's estimate of the cost of network outages by real changes in value of lost load.

6.2. Issue: The relevance of international regulatory precedent.

6.2.1. Frontier focuses on CMA's redetermination of PR19

Frontier disagree with our finding that support for choosing a WACC estimate above the midpoint has decreased since the Commission's last review, rejecting the interpretation of regulatory precedent as supporting "aiming straight". Frontier argue that the precedent set by the CMA is more compelling than recent Ofgem and Ofwat decisions. *Whereas UK regulators Ofwat and Ofgem have sought to lower the percentile adopted for allowed returns, they have been constrained by the Competition and Markets Authority (CMA). The CMA has set out a strong defence of the practice of setting the allowed return above the mid-point estimate, and has adopted that approach itself*.[63]

Frontier discussed the CMA's redetermination of PR19, which included a 0.25% uplift to the cost of equity (equivalent to the 67th percentile). Additionally, Frontier discussed the RIIO-GD2 appeals of Ofgem's determination in the gas sector, where the CMA removed an 'outperformance wedge', which was effectively Ofgem setting a WACC percentile below the midpoint. Frontier concluded:

> *Thus, the CMA has recently set the allowed return above the mid-point when (re-)making regulatory decisions, but did not overturn the exercise of regulatory judgment when assessing decisions against the specified appeal grounds that apply under UK law.*[64]

[62] Frontier (2023) p11.

[63] Frontier (2023) p4-5.

[64] Frontier (2023) p15.

6.2.2. Commentary / our response

UK regulatory decisions were one of the key pieces of evidence provided by Oxera to justify their design of the analytical framework. In 2014, UK water, gas, electricity, communications, and airport regulators had a history of determining a range for the WACC and selecting a point estimate above the midpoint. In UK regulatory decisions from 2008-2014, the 73rd percentile[65] was chosen on average. Furthermore, the midpoint was not chosen once. Oxera argued that UK regulatory precedent was evidence of "a consistent commitment from the regulators to assume a WACC above the midpoint, and therefore to seek to address the underinvestment problem".[66]

Our report also discussed thoroughly the CMA's redetermination of PR19 and the appeal of RIIO-GD2. The salient takeaway that Frontier has ignored is that the CMA's decision drew extensively on regulatory precedent (including the Commission's previous review). We believe it is prudent to recognise that current regulatory decisions are based, in large part, on previous regulatory decisions, and that the Commission should take this opportunity for a fresh look at the issue of setting WACC percentile.

6.2.3. Frontier rejects the use of AER as precedent

Frontier rejects the use of AER regulatory precedent.

> *In our view, there are two key observations in relation to the AER's approach. The first is that the AER has always adopted a mid-point approach. The AER has never adopted an allowed return above its mid-point WACC estimate – it has always adopted what it considers to be the best unbiased estimate of each WACC parameter. Thus, there is no sense in which this evidence has changed at all since the Commission's last IMs review.*
>
> *Furthermore, unlike the Commission's approach in the past of recognising the inherent uncertainty involved in the task of WACC estimation (and the asymmetric consequences associated with underestimating the true cost of capital), the AER's approach is to simply assume that its methodology for estimating the required rate of return is "unbiased." That is, the AER simply assumes away the underinvestment problem that the Commission seeks to address explicitly. In our view, that is not a sound regulatory precedent to rely upon.*
>
> *The second key observation in relation to the AER's approach is that it produces allowed returns that are materially below those allowed by comparable regulators.*[67]

6.2.4. Commentary / our response

The evidence from the AER's 2018 rate of return determination indicates that Frontier is misrepresenting the AER, it does not "*simply assume[s] away the underinvestment problem*". On the contrary, the AER explicitly consider the risk of underinvestment occurring because of the true cost of capital lying above the allowed return. However, after considering available evidence, the AER decided to not apply an arbitrary adjustment to their WACC estimate and use the midpoint.

It is also a misrepresentation to say that "*there is no sense in which this evidence has changed at all since the Commission's last IMs review*". Firstly, Oxera did not consider Australian regulatory precedent in its 2014 report.

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[65] Oxera assumed WACC estimates were drawn from a uniform distribution for UK regulators, in contrast the Commission assumes that WACC estimates are normally distributed.

[66] Oxera (2014) p25.

[67] Frontier (2023) p15.

Furthermore, the AER's 2018 rate of return determination to which we refer[68], explicitly considered these issues, including the issue of underinvestment was not available in 2014. There has subsequently been a further rate of return determination[69] which took the same approach.

A simple analysis of differences between headline allowed return data is not relevant to the issue here. Differences in underlying economic, market and risk parameters between different companies are valid reasons for differences in the cost of capital. A full comparison is beyond the scope of this paper, but the comment on relativity of allowed returns does not affect our commentary on the WACC percentile.

6.2.5. Frontier argues regulatory frameworks are not comparable

Frontier says that: "*Arguments in support of a mid-point WACC that have been made in the UK rest on a range of other mechanisms that can be used to address the risk of under-investment. Since those mechanisms do not apply in New Zealand, the UK arguments are not relevant to the New Zealand context*.[70]

The UK Regulators Network advise that regulators should only deviate from the midpoint of their WACC estimate if there are strong reasons to do so. Frontier conclude that because some alternative regulatory mechanisms for managing underinvestment risk (including statutory requirements, service delivery incentives, and separate treatment of large one-off projects) do not operate in New Zealand, the UK Regulators Network recommendations "*would seem to have no relevance to New Zealand*".[71]

6.2.6. Commentary / our response

The Commission has implemented incentives to improve reliability on energy networks. For EDBs, these were initially included in 2014 IMs[72], and more recently in 2019[73]. Incentives include:

- High quality regularly updated Asset Management Plans (AMP)
- Applications for Customised Price-Quality Path regulation instead of the Default Price-Quality Path
- The ability for network companies to seek re-openers for additional required capex
- Intense scrutiny of Transpower's AMP and Major Capex Proposals.
- Reliability incentives for EDBs with revenue exposure of + / - 2% of revenue.
- Legal remedies, including an ability to seek financial and compensation remedies from Court processes, and take action against directors and shareholders.

These incentives in combination are likely to ensure that the impact of a failure to invest in quality will be a loss of profit that is larger than the allowed return applied to the capital expenditure saved.

These would fall within the statutory requirements, service delivery incentives and separate treatment of one-off projects that UKRN envisioned when recommending that the WACC should be set at the midpoint unless there were strong reasons to do otherwise. We don't consider that there is evidence that the regulatory regimes are sufficiently different to reject the comparison with respect to WACC percentile.

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[68] AER (2018), Rate of return instrument – Explanatory Statement.

[69] AER (2023), Rate of return instrument.

[70] Frontier (2023) p5.

[71] Frontier (2023) p17.

[72] NZCC (2014) Input methodology amendments for electricity distribution services. Default price-quality paths. Chapter 5.

[73] NZCC (2019) Default price-quality paths for electricity distribution businesses from 1 April 2020 – Final decision. Reasons paper. Chapter 7.

We stand by our original conclusion that regulators in Australia and the UK have shifted towards using the midpoint estimate for WACC except in special cases, and that this has relevance for the situation in New Zealand.

Appendix A References

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