



Response to CEPA WACC report



Report for Transpower New Zealand | 1 February 2023



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1 Executive summary

1. Frontier Economics has been engaged by Transpower Limited to provide our views on aspects of the November 2022 CEPA report that has been prepared for the Commerce Commission (the Commission).

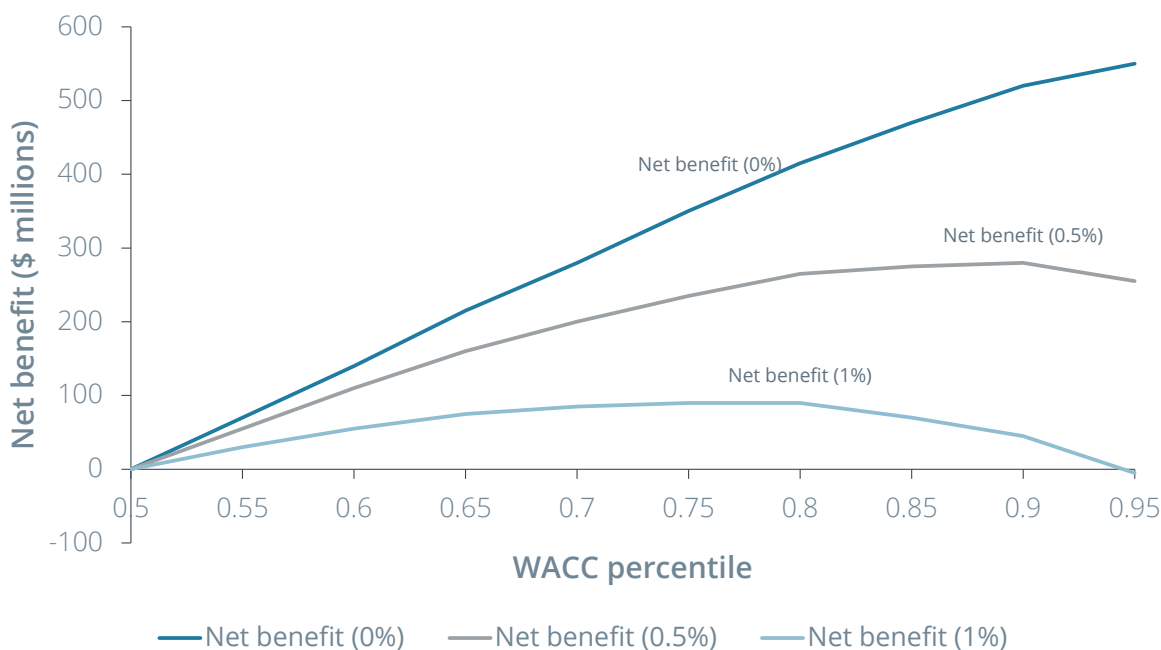
2. In relation to the WACC percentile:

- a 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.

CEPA's results are summarised in **Figure 1** below.

Figure 1: CEPA estimates of net consumer benefits from different WACC percentiles



Source: CEPA report, Table 4.8, p. 35; Table 4.17, p. 45; Frontier Economics calculations.

- b On balance, there would seem to be clear evidence of a likely increase in the future value of network reliability, which supports the adoption of an even higher WACC percentile. This is because electricity networks are likely to become more essential to consumers as the New Zealand economy decarbonises;
- c 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;

- d 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; and
- e Any reduction in the WACC percentile inevitably increases the risk of under-investment. This would have to be considered in light of the record amount of new investment that is required over the next decade to meet New Zealand's decarbonisation commitments.

3. In relation to asset beta:

- a We consider the Commission's current approach to setting the asset beta to be robust and consistent with best practice. In particular, the use of a large sample of international comparators has the benefits of:
 - i Including a broad set of relevant information; and
 - ii Producing estimates that are relatively stable over time, consistent with the likely stability in the true systematic risk of energy network businesses.
- b In our view, it would be appropriate for the Commission to adopt an approach whereby the asset beta is maintained in the absence of significant and sustained evidence that a change is required. Beta estimates can change over time for two reasons:
 - i The true systematic risk of the firm has changed; and/or
 - ii The estimate is affected by random statistical estimation error.

In our view, it is important that the allowed return is affected only by the former and not the latter. It would not be good regulatory practice for the allowed beta to rise and fall from decision to decision as a result of random statistical noise in the estimation process.

- c If the estimates from the electricity and gas sub-samples are not significantly different, there is no statistical basis for concluding that there is any difference between the sub-samples, and consequently no statistical basis for separating the combined sample. Moreover, the sub-samples are small and produce estimates that are imprecise.

Consequently, our view is that the Commission should maintain the approach that it adopted in 2016 in which:

- i The combined sample was used to determine the appropriate asset beta for electricity networks; and
- ii Consideration was given to the extent to which New Zealand gas distribution businesses might be considered to have a relatively higher degree of systematic risk.



2 WACC percentile

2.1 Overview of key issues

4. In its November 2022 report for the Commission, CEPA concludes that there are two key changes in the evidence in relation to the WACC percentile:

Regarding the appropriate WACC percentile, there are two key changes in the evidence which pull in different directions. Firstly, the regulatory precedent from elsewhere has reduced support for selecting a WACC percentile above the mid-point. Secondly, we find evidence that the cost of a loss of network reliability has increased. We also observe that the relative balance between direct costs (which we have also updated) and expected benefits from reduced likelihood of network failure has changed.¹

5. In our view, another essential consideration is the record amount of new investment that is required by electricity networks in particular to support New Zealand's decarbonisation commitments over the coming decade – and how allowed returns determined by the regulator might be relevant to the achievement of those commitments.
6. Thus, in this section of the report:
 - a We summarise CEPA's findings of a shift in the relative weightings of costs and benefits since the Commission last considered the appropriate percentile;
 - b We consider the practice of other regulators in relation to setting allowed returns above their mid-point estimates and we place recent changes in approach in the proper context;
 - c We consider whether the current New Zealand context should be given more weight than the practices of international regulators in relation to this issue; and
 - d We consider the WACC percentile within the context of the record amount of new investment that will be required over the next decade to meet New Zealand's decarbonisation commitments.

2.2 CEPA's update of the Oxera calculations

CEPA's update of the Oxera calculations

7. CEPA notes that the 2014 Oxera report that led to the Commission adopting the 67th percentile is based on a weighing of:
 - a The additional cost to consumers from setting the allowed return above the mid-point WACC estimate; against

¹ CEPA, 29 November 2022, *Review of cost of capital 2022/2023*, p. 25.



- b The benefit to consumers from reducing the probability of network failure caused by under-investment.
- 8. Under the Oxera approach, the additional cost to consumers from setting the allowed return above the mid-point WACC estimate grows in line with the RAB. Thus, the cost of setting the allowed return at (say) 1% above the mid-point WACC has grown since Oxera's 2014 calculation – in line with the increase in the total RAB of Transpower and the EDBs.²
- 9. The expected benefit from avoiding network failure is computed as the product of:
 - a The extent to which an increase in the allowed return reduces the probability of underinvestment; and
 - b The annual cost of system failure.
- 10. The first component of the 'benefit' calculation (probability of under-investment) is a statistical calculation that depends upon the standard deviation of the Commission's WACC estimate. This calculation remains stable over time to the extent that there are no material changes in the statistical precision of the Commission's estimates of each WACC parameter. CEPA adopts the same statistical calculation as Oxera.³
- 11. The second component of the 'benefit' calculation is an estimate of the cost of system failure – for example, the cost of widespread outage lasting for several days. CEPA computes the annual cost of system failure (resulting from under-investment) by updating Oxera's calculations to account for:
 - a The increase in New Zealand GDP; and
 - b The increase in the estimated value of lost load (VoLL).
- 12. This results in a near doubling of the estimated cost of network failure from \$1 billion per year to \$1.9 billion per year.⁴ 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.⁵

Selecting the under-investment threshold

- 13. CEPA reports the consumer benefits for different 'threshold' levels of 0%, 0.5%, 1% and 2%. This 'threshold' is essentially a degree of tolerance to mis-estimation of the true cost of capital by the regulator before under-investment begins to occur. For example, at a 1% threshold, investors are assumed to continue to fully fund efficient investment unless the allowed return is more than 1% below the true cost of capital. It is not clear to us why there would be any such tolerance. It would be irrational for investment to occur in circumstances where the expected return is less than the cost of funds. Indeed, this is the very definition of a negative NPV investment. Many firms have board-approved investment hurdle rates to be used in new investment business cases. If that figure is below the allowed return, there is a clear disincentive for investment.

² CEPA, 29 November 2022, *Review of cost of capital 2022/2023*, Table 4.8, p. 35.

³ CEPA, 29 November 2022, *Review of cost of capital 2022/2023*, pp. 25, 33.

⁴ CEPA, 29 November 2022, *Review of cost of capital 2022/2023*, Table 4.13, p. 41.

⁵ CEPA, 29 November 2022, *Review of cost of capital 2022/2023*, Table 4.17, p. 45.



14. In practice, investment may still occur even where the allowed return is below the true cost of capital in circumstances where:
 - a Investors forecast an increase in allowed returns in future regulatory periods; or
 - b Investors receive other benefits such as payments under incentive schemes.
15. However, the Commission would have to carefully consider the appropriateness of setting allowed returns in violation of the NPV=0 principle based on speculation that investors *may* be able to 'catch up' from incentive schemes or future generosity in allowed returns.
16. In its 2014 report for the Commission, Oxera stated that:

*it is for the Commission to decide which trigger to apply—i.e. whether to assume that a 0.5%, 1% or 2% shortfall is the best assumption for the level at which the underinvestment problem is likely to arise.*⁶

but warned that:

However, for example, a 1% differential would potentially mean an upfront loss of over 10% on any investment made, which will provide clear disincentives to the companies, potentially greater than those that arise from short-term regulatory measures.

17. CEPA observes that:

*Oxera focussed mainly on the 0.5% and 1% thresholds.*⁷

and the CEPA report focuses on figures for these two cases.⁸

18. For the reasons set out above, we consider CEPA's updated figures for the 0%, 0.5% and 1% thresholds.

[Summary of CEPA's updated figures](#)

19. CEPA reports:

⁶ Oxera, June 2014, *Review of the 75th percentile approach*, p. 53.

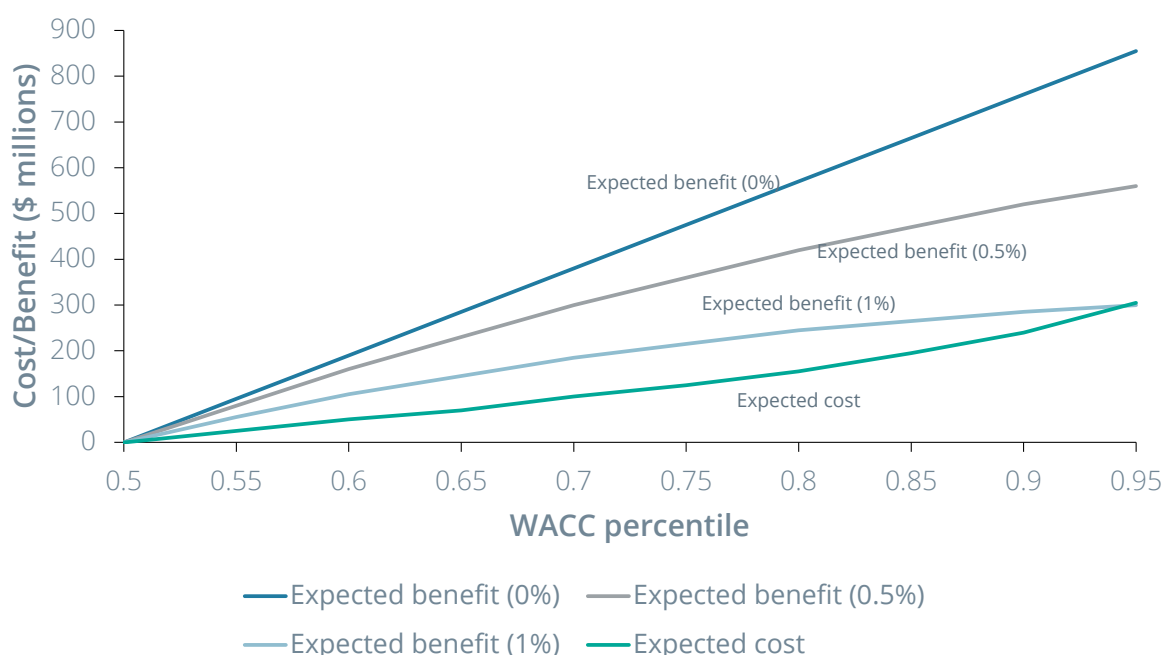
⁷ CEPA, 29 November 2022, *Review of cost of capital 2022/2023*, p. 46.

⁸ CEPA, 29 November 2022, *Review of cost of capital 2022/2023*, p. 46.



- a Updated estimates of the additional cost to consumers from setting the allowed return above the mid-point WACC estimate in its Table 4.8; and
 - b Updated estimates of the benefit to consumers from reducing the probability of network failure caused by under-investment in its Table 4.17.
20. Those estimates are summarised in **Figure 2** below. That figure shows that, for all of the under-investment thresholds, the expected benefit to consumers from adopting the 67th percentile is materially higher than the cost to consumers. That is, consumer welfare is materially higher at the 67th percentile than at the 50th percentile.

Figure 2: CEPA updated estimates of expected costs and benefits of different WACC percentiles

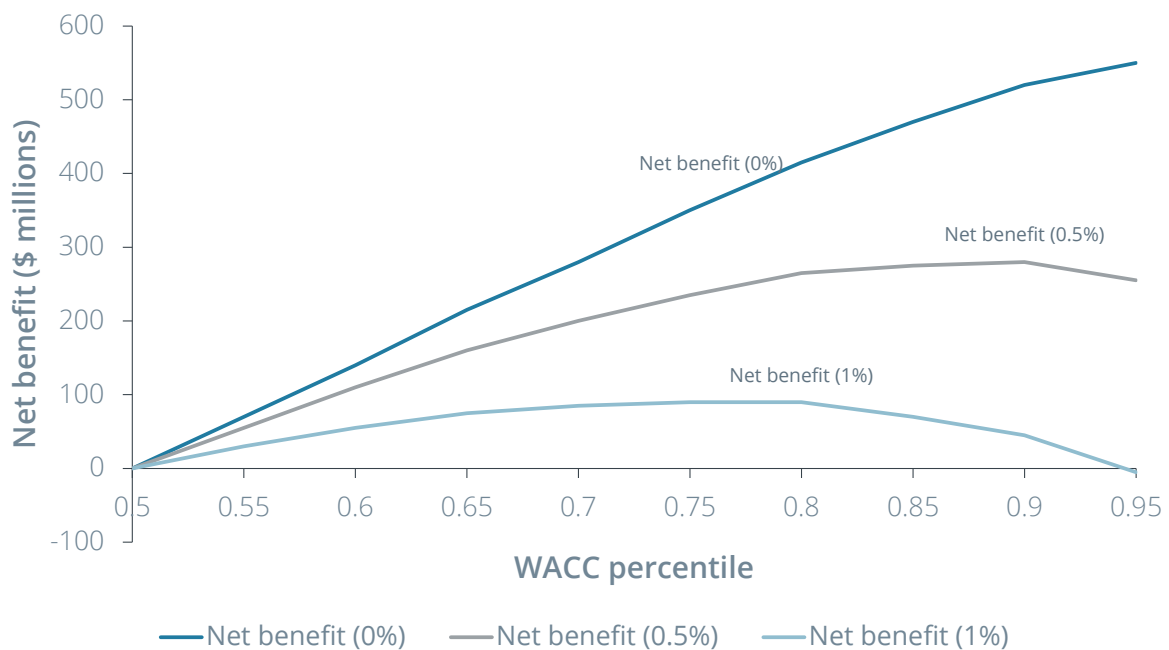


Source: CEPA report, Table 4.8, p. 35; Table 4.17, p. 45.

21. Determining the optimal percentile – at which consumer welfare is maximised – requires a consideration of the expected net benefit. **Figure 3** below plots the net benefit (benefit minus cost) for each of the three under-investment thresholds. That figure shows that net consumer benefits are maximised at the 80th, 90th and 95th percentiles, respectively.
22. Thus, the CEPA update of the Oxera calculations provides clear evidence to support an increase in the WACC percentile. Under the Oxera approach, updated to reflect current data, consumer welfare would be expected to increase if a higher WACC percentile than the existing 67th percentile was adopted.



Figure 3: CEPA estimates of net consumer benefits from different WACC percentiles



Source: CEPA report, Table 4.8, p. 35; Table 4.17, p. 45; Frontier Economics calculations.

23. Moreover, CEPA notes that its calculations have been updated to reflect *current* estimates of the value of network reliability, whereas present investment decisions will impact *future* network reliability. Consequently, it is also important for the Commission to consider how the value of network reliability might change in the future:

The evidence presented above uses historic evidence on real GDP and VoLL to update Oxera’s estimate. However, network companies are making long-term investments and it can be useful to consider whether the value of electricity network reliability is likely to increase or decrease going forward.⁹

24. In this regard, CEPA notes that New Zealand’s decarbonisation commitments are likely to result in consumers increasing their reliance on electricity relative to other fuels such as gas. This would tend to increase the value of network reliability:

New Zealand has set a goal to decarbonise and is aiming to reduce net greenhouse emissions by 50 percent by 2030. In this context, the Climate Change Commission has recommended steps to eliminate fossil gas use in residential, commercial, and public buildings. This suggests that there will be increased reliance on electricity relative to gas for energy purposes going forward. This

⁹ CEPA, 29 November 2022, *Review of cost of capital 2022/2023*, p. 43.



*increased reliance may mean that the costs of a network outage are more acute and in turn mean that ensuring investment in a reliable network is more important.*¹⁰

25. 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.
26. Against the formally stated decarbonisation goals and commitments, CEPA also raises the possibility of future developments in distributed energy resources:

*On the other hand, the overall electricity system is evolving as customers are more able to affordably purchase distributed energy resources. For example, rooftop solar, battery storage and electric vehicles. **It is possible** that ownership of such technologies means consumers are less reliant on the network. For example, a battery **may** be able to provide a sufficient backup for a period of network outage. In an **extreme case** distributed energy resources **may** allow a consumer to forego reliance on the network entirely.*¹¹

27. We agree that “it is possible” that the possibilities that CEPA has identified “may” eventuate. However, these conjectured possibilities would have to be weighed against formally adopted decarbonisation goals and commitments. On balance, there would seem to be clear evidence of a likely increase in the future value of network reliability, which supports the adoption of an even higher WACC percentile.
28. We agree with CEPA’s recommendation that:

*Through the remainder of the Cost of Capital 2022/2023 Review the Commission may want to consider the qualitative arguments around the importance of network reliability going forward.*¹²

2.3 The practice of international regulators

UK regulatory precedents

29. The CEPA report considers a number of UK regulatory decisions that were set aside on appeal to the Competition and Markets Authority (CMA). In our view, it is the final decisions that were adopted that are the relevant precedents, so we focus on them below.

¹⁰ CEPA, 29 November 2022, *Review of cost of capital 2022/2023*, p. 43.

¹¹ CEPA, 29 November 2022, *Review of cost of capital 2022/2023*, p. 43, emphasis added.

¹² CEPA, 29 November 2022, *Review of cost of capital 2022/2023*, p. 43, emphasis added.



CMA Ofwat decision 2021¹³

30. In its decision in relation to Ofwat, the CMA identified the rationale for 'aiming up' (i.e., setting an allowed return above the WACC mid-point) as follows:

The argument for aiming up to ensure capital availability for future investments is as follows:

(a) That there is substantial uncertainty over the level of the WACC, as recognised in the estimated ranges around the cost of equity

(b) That there is also uncertainty around the optimal level of investment that may be required, now and in the future, but with a material probability that companies will need to design and invest in an enhanced capital programme in the coming periods, in particular to meet the challenges raised by climate change;

(c) That if investors do not expect to be fully compensated for future investments over their life, then they may be unwilling to invest in the future to meet these requirements, with two possible scenarios with an adverse effect on consumers:

(i) That investors choose to exit the sector or are unwilling to put in further capital at the allowed WACC, resulting in a higher cost of capital from new investors who are willing to put money into the sector, or a need to pay a premium in future price controls; or

(ii) That the wider social benefits of investment are lost, either because companies do not identify investments or put resources into planning for them, or because the finance to deliver those investments is unavailable.¹⁴

31. The CMA further identified the relationship between allowed returns and potential under-investment as follows:

Expectations of insufficient investment returns based on the current cost of capital may discourage companies from identifying and proposing otherwise desirable investment projects. If overall water asset health deteriorates as a result, this may lead to higher required investment (and so higher

¹³ https://assets.publishing.service.gov.uk/media/60702370e90e076f5589bb8f/Final_Report_---_web_version_-_CMA.pdf.

¹⁴ Competition and Markets Authority, March 2021, *Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations*, p. 1,065.



investor returns) in future periods. In this way, the current cost of capital can have a direct impact on the level of future investment and the future costs to customers.

32. This led the CMA to identify the mechanism via which under-investment might occur:

The mechanism by which a cost of capital set too low could have adverse effects would be:

(a) Investors have a choice of options in where to invest their capital;

(b) Where the cost of capital is low, the preference will be to withdraw capital rather than to increase the level of invested capital over time. This might be achieved, for example, through a high dividend pay-out policy;

(c) In water, there is likely to be some flexibility around the balance between capex and opex, and the sector as a whole will prefer solutions requiring less investment when returns are assumed to be low;

(d) New investments can often bring wider benefits to customers and society, particularly during a period of change, such as is expected with climate change over the coming periods;

(e) Therefore, there will be a risk associated with the cost of capital being too low over time that there will be foregone benefits.¹⁵

33. The CMA ultimately concluded that:

We consider that there are a number of benefits from choosing a point estimate of the cost of equity above the middle of the range. Our view is that this will result in an appropriate balance of risk in the round across the determination, including addressing the level of risk to investment in the sector associated with setting the cost of equity too low.¹⁶

¹⁵ Competition and Markets Authority, March 2021, *Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations*, p. 1,067.

¹⁶ Competition and Markets Authority, March 2021, *Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations*, p. 1,098.



CMA Ofgem decision 2021¹⁷

34. The CEPA report also considers the CMA review of Ofgem’s RIIO-2 decision for electricity and gas networks. The CMA explained that its role was different for the Ofwat and Ofgem decisions. Whereas its role was to perform a re-determination of the Ofwat decision, its role for the Ofgem decision was much more limited:

Unlike in a redetermination (such as the recent PR19 water redeterminations by the CMA), we are limited to finding whether [Ofgem] was wrong on any of the specific grounds raised by the appellants and the appeal is not a re-run of the original investigation or a de novo re-hearing of all the evidence.¹⁸

35. Specifically, the CMA’s role was to determine whether the Ofgem decision was “wrong” in relation to one or more of the specified appeal grounds – the decision failed to have proper regard to required matters, the decision was based on an error of fact or law, or the regulatory instrument does not give proper effect to Ofgem’s decision.¹⁹ Thus, the CMA’s role was not to provide a new regulatory decision based on all of the evidence (as was the case for the Ofwat decision above), but rather to consider whether any element of the Ofgem decision violated one of the specific appeal grounds.
36. In this context, the CMA concluded that:
- a The proposed introduction of an “outperformance wedge” (whereby the allowed return would be reduced for the expected quantum of incentive payments) was wrong. The CMA found that:²⁰
 - i Ofgem had made errors in its quantification of expected outperformance;
 - ii In any event, reducing the allowed return is a poorly designed mechanism for addressing concerns about the quantum of outperformance payments; and
 - iii The introduction of an outperformance wedge may undermine regulatory certainty, resulting in increased costs to consumers over time; and
 - b There is no requirement for regulators to “aim up” (i.e., set an allowed return above the mid-point estimate), so there was no reviewable error in the fact that Ofgem adopted its mid-point estimate. The CMA concluded that the decision to not aim up “was an exercise of regulatory judgment that fell within [Ofgem’s] margin of appreciation.”²¹
37. In summary, the CMA’s views appear to be that:

¹⁷ https://assets.publishing.service.gov.uk/media/61791296d3bf7f55ff1fc099/Energy_appeals_-_Summary_of_final_determination_28.10.21.pdf.

¹⁸ Competition and Markets Authority, October 2021, *Energy license modification appeals*, p. 3.

¹⁹ Competition and Markets Authority, October 2021, *Energy license modification appeals*, p. 3.

²⁰ Competition and Markets Authority, October 2021, *Energy license modification appeals*, p. 7.

²¹ Competition and Markets Authority, October 2021, *Energy license modification appeals*, p. 7.



- a There remain “a number of benefits from choosing a point estimate of the cost of equity above the middle of the range...including addressing the level of risk to investment in the sector associated with setting the cost of equity too low”;²²but that
 - b It is a matter of judgment for each regulator to determine whether to “aim up.”²³
38. 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.

Australian Energy Regulator (AER)

39. CEPA correctly notes that the AER adopts mid-point estimates of each WACC parameter. In its 2018 WACC review, the AER adopted the mid-point approach on the basis that its parameter estimates were unbiased (in that there was an equal chance of each estimate being too high or too low), such that investors should expect to receive an appropriate level of return over the long-run average.²⁴
40. The AER has recently confirmed its intention to continue that approach on the basis that it considers the long-term interests of consumers to be best met by adopting “an unbiased estimate of the expected efficient return.”²⁵
41. 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.
42. 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 under-estimating 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.
43. 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. In 2020, the AER itself commissioned a report from the Brattle Group to compare its regulatory approach with that of other comparable regulators.²⁶ Brattle advised the AER that:
- a The AER’s allowed nominal return on equity is lower than that adopted by every other regulator for which a comparison could be made;²⁷

²² Competition and Markets Authority, March 2021, *Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations*, p. 1,098.

²³ Competition and Markets Authority, October 2021, *Energy license modification appeals*, p. 7.

²⁴ CEPA, 29 November 2022, *Review of cost of capital 2022/2023*, p. 32.

²⁵ Australian Energy Regulator, June 2022, *Rate of return instrument: Draft explanatory statement*, p. 50.

²⁶ Brattle Group, June 2020, *A review of international approaches to regulated rates of return*, available at <https://www.aer.gov.au/system/files/Report%20to%20the%20AER%20-%20A%20Review%20of%20International%20Approaches%20to%20Regulated%20Rates%20of%20Return%20-%2030%20June%202020.pdf>.

²⁷ Brattle Group, June 2020, *A review of international approaches to regulated rates of return*, Table 4, Row 3, p. 49.



- b The AER's allowed real return on equity is lower than that adopted by every other regulator for which a comparison could be made. The closest allowed real return on equity is almost double the AER's allowance;²⁸
- c The AER's allowed nominal equity risk premium is lower than that adopted by every other regulator for which a comparison could be made. (This does not account for other regulators that set the allowed risk-free rate above the prevailing government bond yield.)²⁹; and
- d The AER's allowed real equity risk premium is lower than that adopted by every other regulator for which a comparison could be made. (This also does not account for other regulators that set the allowed risk-free rate above the prevailing government bond yield.)³⁰

2.4 Relevance to the New Zealand setting

- 44. CEPA notes that the UK Regulators Network (UKRN³¹) has published a recommendation that regulators should only deviate from the mid-point of the CAPM cost of equity range if there are strong reasons to do so.³² It is important to properly understand the context of that recommendation and to consider its relevance to the New Zealand setting.
- 45. We begin by noting that the UKRN is alive to the potential for a low allowed return to result in under-investment that is not in the long-run interests of consumers. However, the UKRN proposes that the risk of under-investment can be managed by other mechanisms than the allowed return:

While the welfare impacts from under-investment are important, most regulatory frameworks have developed alternative ways of incentivising investment within the building blocks of a cost-based price control. These reduce or remove the need to explicitly uplift the allowed rate of return.³³

- 46. Specifically, the UKRN identifies four alternative mechanisms, which might collectively obviate the need to consider the allowed return as a mechanism for managing under-investment risk:³⁴
 - a Statutory requirements;
 - b Service delivery incentives;
 - c Separate treatment of large one-off projects; and

²⁸ Brattle Group, June 2020, *A review of international approaches to regulated rates of return*, Table 4, Row 9, p. 49.

²⁹ Brattle Group, June 2020, *A review of international approaches to regulated rates of return*, Table 5, Row 4, p. 50.

³⁰ Brattle Group, June 2020, *A review of international approaches to regulated rates of return*, Table 5, Row 9, p. 50.

³¹ <https://ukrn.org.uk/app/uploads/2022/09/UKRN-guidance-for-regulators-on-the-methodology-for-setting-the-cost-of-capital-consultation.pdf>.

³² CEPA, 29 November 2022, *Review of cost of capital 2022/2023*, p. 31.

³³ UK Regulators Network, 2022, *UKRN guidance for regulators on the methodology for setting the cost of capital – consultation*, p. 24.

³⁴ UK Regulators Network, 2022, *UKRN guidance for regulators on the methodology for setting the cost of capital – consultation*, pp. 24-25.



- d Pricing freedom for new investments when competing infrastructure and/or regulation of legacy services constrains market power.
47. However, a number of these mechanisms do not operate in New Zealand – at least not in the form envisaged by the UKRN. Consequently, the UKRN recommendation would seem to have no relevance to New Zealand.
48. Moreover, the UKRN also noted that there are other features of the UK regulatory setting that serve to support investment:

There are also other features of the regulatory model which are favourable towards maintaining incentives to invest. The current practice of allowing for both embedded and new debt costs in the calculation of the allowed returns provides significant protection against interest rate risk and also means that the marginal cost of financing new investment has been less than the allowed return on debt given the historical declining interest rate environment. This is likely to persist for some time, even as interest rates start to rise, given the long maturity profiles of debt in most sectors.³⁵

49. These features also do not operate in New Zealand, where the regulatory allowance is independent of the cost of embedded debt.
50. The UKRN concluded that an allowed return above the mid-point WACC would be relevant in circumstances where there is:
- a Uncertainty about whether the allowed return is sufficient for cost recovery of the investment; and
 - b A lack of alternative mechanisms to incentivise investment.³⁶
51. This seems to be precisely the case in New Zealand.

2.5 New investment required to support decarbonisation commitments

Government policy on decarbonisation

52. The Climate Change Response (Zero Carbon) Amendment Act of 2019 and the Nationally Determined Contribution (NDC1) set out three main emissions reduction targets for New Zealand:
- a 50 per cent reduction of net emissions below gross 2005 levels by 2030;
 - b Net zero emissions of all greenhouse gases excluding biogenic methane by 2050; and
 - c 24 to 47 per cent reduction below 2017 biogenic methane emissions by 2050, including 10 per cent reduction below 2017 biogenic methane emissions by 2030.

³⁵ UK Regulators Network, 2022, *UKRN guidance for regulators on the methodology for setting the cost of capital – consultation*, p. 25.

³⁶ UK Regulators Network, 2022, *UKRN guidance for regulators on the methodology for setting the cost of capital – consultation*, p. 25.



53. In May 2022, New Zealand released its First Emissions Reduction Plan, which establishes emissions budgets (as shown in **Table 1** below) and sets out how New Zealand aims to achieve its emissions targets.

Table 1: First three emissions budgets by subsectors (Mt CO₂-e)

Sector	Emissions Budget 1 (2022–2025)	Emissions Budget 2 (2026–2030)	Emissions Budget 3 (2031–2035)
Transport	65.9	76	56.8
Energy and industry	70.1	72.8	63.3
Agriculture	159.4	191	183
Waste	13.7	14.9	12.7
Fluorinated gases	6.8	7.5	5.9
Forestry	-26.4	-57.2	-81.6
Total	290	305	240

Source: New Zealand Government, May 2022, Aotearoa New Zealand's First Emissions Reduction Plan.

54. The Plan sets a 50 per cent target on total final energy consumption to come from renewable sources by 2035, with an aspirational target of 100 per cent by 2030. The electrification of transport is a key focus of the Plan and is expected to place increased demand on lines companies, including Transpower. The Plan sets a target of increasing the share of electric vehicles to 30 per cent of the total light vehicle fleet by 2035. This will be achieved through the continuation of government incentives such as the Clean Car Discount, which provides rebates to hybrids and electric vehicles.
55. A second emissions reduction plan is due to be published by 31 December 2024.
- [The scale of network investment that is required](#)
56. New Zealand produces just over 82 per cent of its electricity through renewable sources, however only 28 per cent of total energy consumption (including transport and heat) comes from renewable sources.
57. The Climate Change Commission recognises that electrifying transport and process heat will require significant expansion in electricity generation capacity. It also recognises that increased demand and generation must be accompanied by expanding infrastructure and distribution.
58. Transpower estimates that an additional 70 per cent of renewable generation is required to electrify process heat and transport, to decarbonise the New Zealand economy.
59. Transpower's submission to the Climate Change Commission stated that New Zealand's electricity sector will need to build and deliver "as much new electricity generation in the next 15 years as they have in the last 40 years."
60. Transpower also estimates that 60 to 70 new grid scale connections will be required before 2035 to meet the increased electricity demand.



61. BCG's 2022 report into New Zealand's decarbonisation roadmap estimates that an investment of \$42 billion across generation, transmission and distribution will be required before the end of the decade. This amount includes:³⁷
- a \$10.2 billion in new utility-scale renewable generation capacity;
 - b \$1.9 billion in new flexible generation and demand resources;
 - c \$8.2 billion in transmission infrastructure; and
 - d \$22 billion in distribution infrastructure.
62. BCG expects this investment to increase in the 2030s and 2040s as shown in Table 2 below.

Table 2: BCG analysis of investment required to reach net zero by 2050

Decade	Transmission Investment (NZ \$ billion)	Distribution Investment (NZ \$ billion)
2020s	8	22
2030s	10	25
2040s	11	24

Source: Boston Consulting Group, *Climate Change in New Zealand: The Future is Electric*, 25 October 2022.

63. BCG modelling also indicates that by 2050, annual generation must increase by 79 per cent and annual capacity must increase by 163 per cent.
64. To put this level of investment into perspective, New Zealand's EDB regulatory asset base as of 2021 was \$13.5 billion, with total capex in 2021 of \$1.1 billion. BCG's estimated \$30 billion transmission and infrastructure spend in the 2020s would require annual capex to ramp up by more than triple the 2021 expense of \$1.1 billion. It is clear that this level of expenditure is not business-as-usual capex, rather an extensive augmentation of the existing network.
65. Similar record levels of new investment are required in Australia where Origin Energy CEO Frank Calabria has recently likened the required investment to "the wartime construction effort."³⁸

2.6 Conclusions and recommendations

66. The CEPA report concludes that:

Regarding the appropriate WACC percentile, there are two key changes in the evidence which pull in different directions. Firstly, the regulatory precedent from elsewhere has reduced support for selecting a WACC percentile above the mid-point. Secondly, we find evidence that the cost of a loss

³⁷ Boston Consulting Group, *Climate Change in New Zealand: The Future is Electric*, 25 October 2022.

³⁸ <https://www.afr.com/companies/energy/deep-pockets-of-global-capital-keen-to-fund-transition-origin-ceo-20221121-p5bzvj>.



*of network reliability has increased. We also observe that the relative balance between direct costs (which we have also updated) and expected benefits from reduced likelihood of network failure has changed.*³⁹

67. Our view is that, when interpreting the evidence set out in the CEPA report, the Commission should consider the following points:
- a CEPA's update of the Oxera calculations demonstrates that consumer welfare is maximised by setting the allowed return in the range of the 80th to 95th percentile;
 - b On balance, there would seem to be clear evidence of a likely increase in the future value of network reliability, which supports the adoption of an even higher WACC percentile;
 - c Whereas UK regulators Ofwat and Ofgem have sought to lower the percentile adopted for allowed returns, they have been constrained by the 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;
 - d 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; and
 - e Any reduction in the WACC percentile inevitably increases the risk of under-investment. This would have to be considered in light of the record amount of new investment that is required over the next decade to meet New Zealand's decarbonisation commitments.
68. In light of the above considerations, our view is that 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.

³⁹ CEPA, 29 November 2022, *Review of cost of capital 2022/2023*, p. 25.



3 Asset beta

3.1 Overview

69. We consider the Commission's current approach to setting the asset beta to be robust and consistent with best practice. In particular, the use of a large sample of international comparators has the benefits of:
- a Including a broad set of relevant information; and
 - b Producing estimates that are relatively stable over time, consistent with the likely stability in the true systematic risk of energy network businesses.
70. In our view, it would be appropriate for the Commission to adopt an approach whereby the asset beta is maintained in the absence of significant and sustained evidence that a change is required. Beta estimates can change over time for two reasons:
- a The true systematic risk of the firm has changed; and/or
 - b The estimate is affected by random statistical estimation error.

In our view, it is important that the allowed return is affected only by the former and not the latter. It would not be good regulatory practice for the allowed beta to rise and fall from decision to decision as a result of random statistical noise in the estimation process.

71. If the estimates from the electricity and gas sub-samples are not significantly different, there is no statistical basis for concluding that there is any difference between the sub-samples, and consequently no statistical basis for separating the combined sample. Moreover, the sub-samples are small and produce estimates that are imprecise.

Consequently, our view is that the Commission should maintain the approach that it adopted in 2016 in which:

- a The combined sample was used to determine the appropriate asset beta; and
- b Consideration was given to the extent to which New Zealand gas distribution businesses might be considered to have a relatively higher degree of systematic risk.

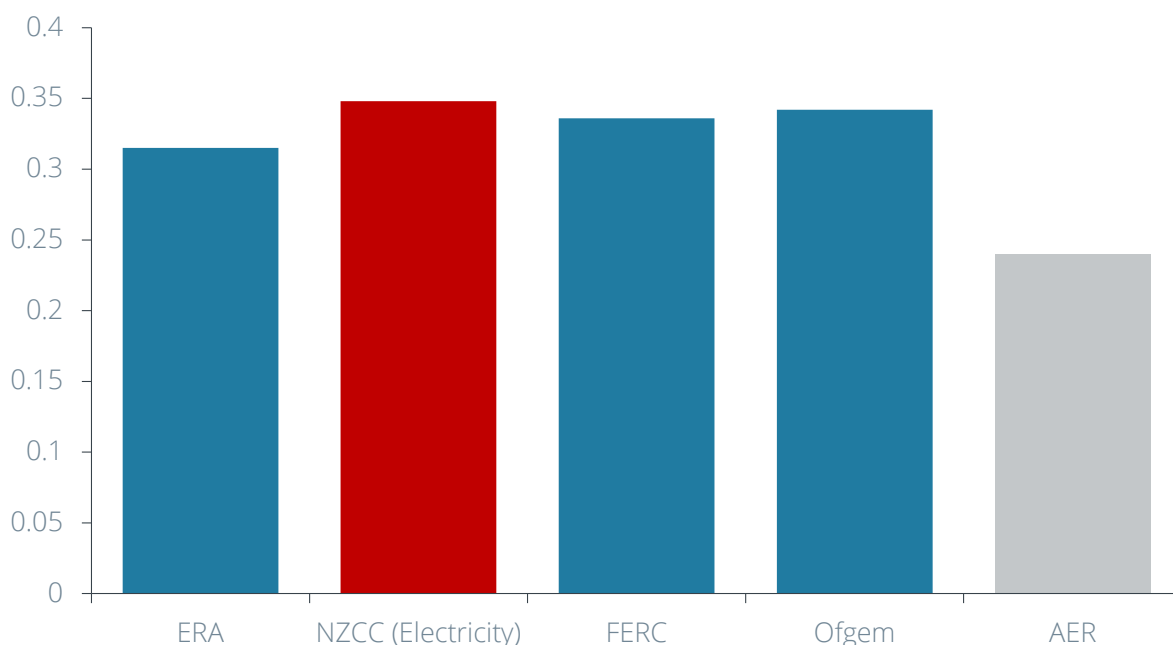
3.2 A large sample of international comparators is best practice

72. In our view, the Commission's approach to using a large sample of international comparators is consistent with best practice beta estimation. This approach has the benefits of:
- a Including a broad set of relevant information; and
 - b Producing estimates that are relatively stable over time, consistent with the likely stability in the true systematic risk of energy network businesses.
73. The benefits of this approach have recently manifest in the Australian setting where the two regulators of energy networks have adopted very different approaches:



- a The ERA (Western Australia) estimates equity beta using a set of international comparators and obtains an estimate similar to that of the Commission and other comparable regulators; and
- b The AER uses only domestic comparators wherein the current sample consists of a single firm – APA Group. We note that CEPA proposes to remove that firm from the Commission’s sample on the basis that its revenues are largely from unregulated investments. Rather than considering international evidence, the AER has regard to a set of domestic firms that are now de-listed, with beta estimates frozen in time on the day they de-listed, which in some cases is decades ago. The AER’s approach produces a beta estimate that is materially out of step with the estimates adopted by other comparable regulators as illustrated in **Figure 4** below.

Figure 4: Regulatory estimates of asset beta



Source: Various regulatory determinations.

- 74. Australian regulators other than the AER all have regard to international comparators in the same way the Commission does. For example, the Queensland Competition Authority has concluded that, although there are some differences between international and domestic firms, the international firms are likely to be broadly similar in terms of their risk profile:



Despite these differences, we would expect many of the international energy firms to have broadly similar operational risks as a regulated energy business operating in Australia, such as Jemena or Ausgrid.⁴⁰

and further that:

This arrangement is not dissimilar to regulated energy businesses in Australia that operate transmission and distribution infrastructure within specified areas as *monopolists*.⁴¹

75. The QCA has also observed that a number of international regulatory regimes share many of the same key features as the Australian framework:

Additionally, while there may be differences in regulatory frameworks across countries, we generally find that most international regulated energy businesses are regulated in such a manner that allows them to recover their efficient costs, including a return on capital commensurate with the risks they face. Many businesses are allowed to recover costs where they depart from forecast levels and some have 'decoupling' mechanisms that allow the business to recover revenue independent of volume—similar in effect to a revenue cap.⁴²

76. IPART has also concluded that a broad sample of firms, including international firms, should be included in the comparator set:

We agree that a broad sample method is more objective, more likely to yield statistically reliable estimates, and more resistant to problems caused by companies dropping out of the sample over time (for example, because they become de-listed).⁴³

77. The ERA has identified a number of advantages of including a broad set of international firms in the comparator set:

⁴⁰ QCA, December 2021, *Rate of return review: Final report*, p.72.

⁴¹ QCA, December 2021, *Rate of return review: Final report*, p.72.

⁴² QCA, December 2021, *Rate of return review: Final report*, pp.72-73.

⁴³ IPART, February 2018, *Review of our WACC method: Final report*, p.7.



The ERA considers that the international sample option has the following advantages:

- *An extended sample size could result in equity beta estimates that are more reliable and less sensitive to individual equity beta estimates of the Australian energy network sample.*
- *Using international samples could be a more robust approach over time, given the decreasing number of listed Australian energy networks.*
- *Other regulators have been using international comparators for their equity beta estimation, largely driven by the difficulty in finding a sufficient number of comparable businesses to estimate equity beta using a purely domestic sample.⁴⁴*

78. The ERA concluded that:

On balance, given the smaller Australian domestic sample, as a working view the ERA considers that examining both domestic and international listed energy networks may be useful when estimating the equity beta for Australian energy networks.

The ERA proposes to use the following method:

- *To use a domestic CAPM model for each country to estimate the equity beta.*
- *The use of an international CAPM would introduce complexity without substantial benefits as it relies on stronger assumptions than the domestic CAPM*
- *To only include firms where the majority of the observations are present in the estimation window.*
- *Consistent with the manner in which domestic equity beta estimates are unlevered and re-levered to the benchmark gearing level, international equity beta estimates will also undergo the same procedure.⁴⁵*

3.3 Beta estimates are subject to statistical imprecision

79. Beta estimates can change over time for two reasons:

⁴⁴ ERA, December 2021, 2022 gas rate of return instrument review: Discussion Paper, p. 75.

⁴⁵ ERA, December 2021, 2022 gas rate of return instrument review: Discussion Paper, p. 76.



- a The true systematic risk of the firm has changed; and/or
 - b The estimate is affected by random statistical estimation error.
80. In our view, it is important that the allowed return is affected only by the former and not the latter. It would not be good regulatory practice for the allowed beta to rise and fall from decision to decision as a result of random statistical noise in the estimation process.
81. For example, CEPA has set out rolling asset beta estimates in its Figure 2.3.⁴⁶ That figure documents that the asset beta *estimate* for electricity networks begins at 0.4, the falls by 30% to 0.28, then rises by more than 40% back to 0.4 – all within a 10-year period. It seems highly unlikely that the true systematic risk of electricity networks varied in such dramatic fashion. Rather, the variation is likely to be primarily due to the effect of random statistical noise on the estimation process.
82. In this regard, IPART⁴⁷ has recently noted that:

Noting that beta estimates are imprecise and volatile, and that small changes in beta can lead to large changes in prices, we are aware of the possibility that new analysis could result in departures from the status quo beta that are driven by noisy data rather than genuine market trends.⁴⁸

83. This has led IPART to adopt an approach whereby its allowed beta will only change due to evidence of a significant and sustained change in the evidence. The key elements of IPART's to setting the allowed beta are as follows:⁴⁹
- a Changing an established equity beta would only be contemplated if the established value was more than one standard deviation from the new mean estimate.
 - b Stakeholder submissions and preference for stability would be taken into account.
 - c Departure from the status quo would only be contemplated if the evidence supporting a different value was persistent over a long timeframe (i.e., a regulatory period or longer).
84. In our view, this approach is sensible and consistent with best practice.

3.4 Sub-sample estimates for gas and electricity

85. The CEPA report provides separate beta estimates for sub-samples of gas and electricity businesses, noting that the two sub-samples are very small and that the estimates are imprecise and not statistically significantly different:

⁴⁶ CEPA, 29 November 2022, *Review of cost of capital 2022/2023*, p. 16.

⁴⁷ <https://www.ipart.nsw.gov.au/sites/default/files/documents/final-report-estimating-equity-beta-august-2020.pdf>.

⁴⁸ IPART, August 2020, *Estimating equity beta for the weighted average cost of capital*, p. 6.

⁴⁹ IPART, August 2020, *Estimating equity beta for the weighted average cost of capital*, p. 6.



The Commission asked us to consider the evidence for establishing separate sub-samples for electricity and gas. The two sub-samples for gas and electricity are relatively small with 11 or 12 comparators each depending on period examined. We find some evidence that the asset beta for gas is greater than that for electricity, but this is not statistically significant.⁵⁰

86. CEPA reaches the same conclusion in relation to the rolling beta estimates:

We find that the difference between the electricity and gas asset betas are not statistically significant. The confidence intervals for the gas sample are particularly wide. Indeed, there are periods where at the 95% confidence interval level the asset beta for the gas sample is statistically indistinguishable from both 0 and 1 at the same time. This may suggest that the gas sub-sample cannot be used alone to estimate asset beta.⁵¹

87. Our view is that tests of statistical significance are performed for a reason. If the estimates from the electricity and gas sub-samples are not significantly different, there is no statistical basis for concluding that there is any difference between the sub-samples, and consequently no statistical basis for separating the combined sample. Moreover, the sub-samples are small and produce estimates that are imprecise.
88. Consequently, our view is that the Commission should maintain the approach that it adopted in 2016 in which:
- a The combined sample was used to determine the appropriate asset beta; and
 - b Consideration was given to the extent to which New Zealand gas distribution businesses might be considered to have a relatively higher degree of systematic risk.

⁵⁰ CEPA, 29 November 2022, *Review of cost of capital 2022/2023*, p. 4.

⁵¹ CEPA, 29 November 2022, *Review of cost of capital 2022/2023*, p. 16.

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