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Amendment to the WACC percentile for price-quality regulation for electricity lines services and gas pipeline services

Reasons paper

Publication date: 30 October 2014

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Regulation Branch
Commerce Commission

Contents

List of abbreviations used

AER	Australian Energy Regulator
CAPM	Capital asset pricing model
CPP	Customised price-quality path
DPP	Default price-quality path
EBET	Eastern Bay Energy Trust
EDB	Electricity distribution business
ENA	Electricity Networks Association
FCM	Financial capital maintenance
GPB	Gas pipeline business
IMs	Input methodologies
IPP	Individual price-quality path
IRIS	Incremental rolling incentive scheme
KCEPT	King Country Electric Power Trust
MAR	Market-to-asset ratio
MEUG	Major Electricity Users Group
NPV	Net present value
RAB	Regulatory asset base
TAMRP	Tax adjusted market risk premium
TCSD	Term credit spread differential
TLC	The Lines Company
UBA	Unbundled bitstream access
UCLL	Unbundled copper local loop
VoLL	Value of lost load
WACC	Weighted average cost of capital
WESCT	Waitomo Energy Services Customer Trust

Foreword

The Commission commenced this review of the WACC percentile in response to the criticism of our 2010 decision in the High Court's December 2013 input methodologies judgment. Our rationale for responding immediately to the judgment, and seeking to complete the work before the November 2014 price-quality path resets, has been well traversed in other documents. We are, however, well aware of the concerns raised by a number of stakeholders about:

- the timing of our proposed amendment to the WACC percentile, ie, commencing this work prior to the 7-year IMs review, and the impact of that timing on investor confidence in the Part 4 regime;
- the timeframe we have completed the work in, including our consultation timeframes; and
- our consideration of the WACC percentile only, and not the other points raised by the High Court (eg, the use of the simplified Brennan-Lally CAPM model, and the existence of the TCSD), or that are still of concern to submitters (eg, cost of debt parameters).

As stated previously, we consider this review of the WACC percentile to be exceptional, and do not anticipate having to undertake a similar process again. In our view, though, we had little choice given:

- the High Court clearly indicated it expected the Commission to take its comments into account in next reviewing the WACC percentile. That created heightened uncertainty until our review was completed. We consider that resolving the Court's concerns about the evidential basis for the WACC percentile as soon as possible will promote certainty;
- our own acceptance of the Court's fundamental criticism. On reflection, we acknowledge that the 2010 decision on the WACC percentile was not well supported by analytical and empirical evidence, in that we relied primarily on the judgements made by our experts, and other experts we heard from;
- the impact of the High Court's judgment on the very incentives the WACC percentile uplift was meant to create. Our experience is that investors pay close attention to the implications of judicial comments. We consider that the High Court's comments created asymmetric expectations regarding the probable outcome of the next review of the WACC percentile, ie, that the percentile was likely to be reduced; and
- the materiality of the WACC percentile decision to all parties.

While fundamental uncertainty will always exist in respect of setting the WACC percentile, the evidence we have gathered, which was not available to us during the initial IMs development, has given us confidence in selecting a new WACC percentile for the price-quality regulation of electricity lines businesses and gas pipeline businesses. Further, we do not consider that anything material would have been gained for consumers or suppliers by extending the timeframe for completing our work. We are not aware of any other jurisdiction that has a better evidential basis for setting a WACC percentile than we now do.

The conclusion of this review is another important step in the bedding down of the Part 4 regime. This decision addresses the most significant remaining loose end following three years of IMs appeals, and serves to promote certainty in respect of the WACC percentile at this point in time.

Dr Mark Berry

Chair, Commerce Commission

Sue Begg

Deputy Chair, Commerce Commission

Executive Summary

X1 This paper explains the reasons for our decision on the appropriate percentile estimate of the weighted average cost of capital (WACC) for price-quality regulation of electricity lines and gas pipeline businesses under Part 4 of the Commerce Act.

X2 Our decision is that the specified WACC for electricity lines and gas pipeline businesses should be amended, in light of evidence we have gathered since the IMs were first determined in December 2010. Our decision is that the 67th percentile of our estimated WACC distribution should be used for price-quality path regulation (the 75th percentile is currently used). Our decision has been given effect by amending the cost of capital IMs applying to those businesses.

We have reconsidered the WACC percentile following the High Court's IMs judgment

X3 The cost of capital IMs specify how we will estimate the WACC for regulated businesses. The WACC applied under the cost of capital IMs is an estimate, because the actual cost of capital is not observable. Consequently, our WACC estimate under the cost of capital IMs could be higher or lower than the true cost of capital.

X4 The cost of capital IMs currently specify a WACC above the mid-point estimate for price-quality paths because we expected the costs to consumers of under-estimating WACC to be greater than the costs to consumers of over-estimating WACC, given the uncertainty in estimating WACC. Our expert advisors at the time of the original IMs decision supported using a WACC above the mid-point.

X5 Our previous decision to use the 75th percentile for price-quality regulation was a matter of judgement. At the time of our original decision we had limited empirical or analytical information to assist us in determining the specific WACC percentile, including on the likely response of regulated businesses (in terms of their investment behaviour) to the WACC estimates that would result from applying the cost of capital IMs.

X6 Use of the 75th percentile WACC estimate for price-quality regulation was challenged in merits appeals to the High Court. In particular, the Major Electricity Users' Group (MEUG) argued that the mid-point WACC estimate should be used (or alternatively, the 75th percentile should be applied to new investment only).

X7 In its judgment on the IMs merits appeals, the High Court had some sympathy with MEUG's position based on the lack of evidential support for the 75th percentile. While the Court did not find that a lower percentile was materially better, it stated its expectation that we would re-examine this issue when we next review the IMs.

X8 Following the Court's judgment, several consumer groups requested that we urgently review the cost of capital IMs.[1] The consumer groups suggested that uncertainty regarding the WACC percentile will remain until investors know our views regarding the issues raised by the High Court, reducing the positive investment incentives associated with the 75th percentile in the interim.

X9 An urgent review was requested so that any amendments to the WACC percentile can apply to the next five-year regulatory period for electricity distribution businesses and Transpower, which begins on 1 April 2015.[2] This is necessary to avoid a situation where the prices faced by consumers continue to reflect the 75th percentile WACC for the next five years, but the intended investment benefit is not obtained.

We have gathered significant new evidence in response to the Court's judgment

X10 In response to the Court's judgment, we have gathered a considerable amount of new analytical and empirical evidence to assist in forming our view regarding the appropriate WACC percentile. This evidence was not previously available to us when first determining the IMs in December 2010, or to the Court during the IMs merits appeals.

X11 The evidence we have collected includes:

X11.1 relevant academic literature, notably a 2011 paper by Professor Ian Dobbs regarding welfare loss asymmetries arising from uncertainty in the regulatory WACC;

X11.2 independent reports prepared by our expert advisors: Oxera, Professor Ingo Vogelsang, Professor Julian Franks, Dr Martin Lally, Economic Insights, and Professor Ian Dobbs (who expanded on some of the key points regarding his 2011 paper, in the context of our current review); and

X11.3 expert reports submitted on behalf of interested parties, in response to our draft decision and other consultation papers we released.

X12 We now also have experience operating under the IMs we determined in 2010. We have been able to observe the investment of regulated businesses under the 75th percentile WACC, and other relevant market information, when forming our view regarding the WACC percentile.

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1 The consumer groups that requested an urgent review of the cost of capital IMs were MEUG, Consumer NZ, the Employers and Manufacturers Association Northern (EMA) and the Board of Airline Representatives New Zealand (BARNZ).

2 The price-quality path resets for EDBs and Transpower are due to be determined by the end of November this year.

X13 Consequently, we are now in a position to make a more informed decision regarding the appropriate WACC percentile than when the IMs were originally determined. We now have significantly more information than was available to us when setting the original cost of capital IMs.

Judgement is required when determining the appropriate WACC percentile

X14 Although we now have substantially more information, judgement is still required when deciding the appropriate WACC percentile.

X15 There are several key relationships which directly influence the 'optimal' WACC percentile, but which are subject to fundamental uncertainty. For example, it is extremely difficult to empirically estimate the link between the WACC allowed by the regulator, the level of investment by regulated suppliers, and how this affects quality of service.

X16 Additional work will not resolve all of the uncertainty surrounding these key relationships. Although we now have significantly more information to assist us in making a decision, we must still exercise judgement when selecting the WACC percentile.[3] However, the information we have gathered has helped narrow the scope of judgement required when selecting the WACC percentile.

The 67th percentile WACC is appropriate for price-quality path regulation

X17 In our view, it is appropriate to use a WACC significantly above the mid-point estimate for price-quality path regulation. This is because the potential costs of under-investment from a WACC that is too low are likely to outweigh the harm to consumers (including any over-investment) arising from a WACC that is too high.

X18 We consider that the main reason to set a WACC percentile above the mid-point is to mitigate against the risk of under-investment relating to service quality generally, and contributing to major supply outages in particular. However, compared to setting the WACC at the mid-point, a WACC uplift should also reduce the risk of under-investment in other types of investment as well.

X19 Any uplift to the WACC above the mid-point will apply to the entire regulatory asset base (RAB), and in advance of any incremental investment expected to not otherwise occur without the uplift. Therefore, to the extent that any additional positive incentives to actively promote greater investment might be justified, targeted ex post incentive mechanisms might be more effective than a WACC uplift for some types of investment. However, a targeted ex post incentive scheme is unlikely to be ideal for mitigating the risk of major supply outages, because by the time the mechanism is applied, consumers will have already incurred significant costs.

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3 As far as we are aware, no other regulator has ever attempted to empirically estimate the optimal WACC percentile. Rather, regulators typically apply judgement when selecting a WACC within the reasonable range they have defined.

X20 The available evidence provides substantial support for using a WACC above the mid-point. In summary:

X20.1 all our independent expert advisors who commented on this issue agree that a WACC above the mid-point should be used;

X20.2 there have been a large number of submissions, and expert reports submitted by interested parties, which provide analytical (and some empirical) support for using a percentile above the mid-point; and

X20.3 overseas regulators often exercise judgement by adopting a WACC above the mid-point of the range, sometimes by using estimates of individual parameters which are generous in favour of suppliers.

X21 On balance, we consider that the evidence we have collected suggests that the WACC for price-quality path regulation should sit somewhere between the 60th percentile and 75th percentile that currently applies under the IMs.

X22 However, there is evidence that the WACC should be reduced below the 75th percentile estimate.

X22.1 The enterprise values for Powerco, Vector and OtagoNet (as implied by AMP Capital's acquisition of a minority stake in Powerco, Vector's equity market valuation plus net debt, and Marlborough Lines' sale of its 51% stake in OtagoNet), are significantly greater than the corresponding RAB values.[4] This strongly suggests that the current regulatory settings (including the 75th percentile WACC estimate) are more than sufficient to compensate investors for putting their capital at risk, and there is significant scope to reduce the size of the WACC uplift.

X22.2 Oxera has recommended using a WACC between the 60th and 70th percentile estimate, based on empirical analysis of the expected losses to consumers from under- and over-estimating the 'true' cost of capital (at various percentiles of the WACC distribution). Oxera's report adopts a form of the loss analysis approach supported by the Court, and has been peer-reviewed by Professor Vogelsang.[5] We have drawn on Oxera's framework, and other relevant factors, when forming our conclusions regarding the WACC percentile.

X22.3 There are other tools to help incentivise efficient investment from regulated suppliers, in addition to the WACC percentile. For example, required quality

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4 Powerco and Vector together comprise about 40% of the total RAB for EDBs.

5 Professor Vogelsang and a number of submitters have identified several off-setting considerations which may affect the conclusions of Oxera's analysis but, on balance, we place weight on Oxera's view that a percentile below the 75th is appropriate.

standards (and associated penalties) help reduce the risk of under-investment. We are able to monitor the investment of regulated businesses and take action if we become concerned about under-investment or declining quality of service.

X22.4 A range of other factors, including investors' long-term ownership interests, suppliers' need to credibly forecast expenditure in future price resets, and the desire of Boards and management to ensure the lights do not go out, also combine to produce incentives to invest efficiently and to provide services at the quality consumers demand. In our view, continued use of the 75th percentile estimate would place too much emphasis on the WACC as the source of incentives to invest, relative to the contribution from these other factors.

X23 We have considered interdependencies with other aspects of the regulatory regime when deciding on the appropriate WACC percentile. In our view, there is not such a direct link between the WACC percentile and the other parameters of the IMs that the percentile cannot be amended at this time.[6] The percentile was, and continues to be, the last decision made regarding the WACC (after reaching a view on all other parameters).

X24 In our view, a percentile around the middle of the reasonable range we have defined (ie, from the 60th to the 75th percentile) appropriately balances the relative costs to consumers of under- and over-investment, in light of the overall purpose of Part 4, which is to promote the long-term benefit of consumers of regulated services.

X25 In conclusion, we have determined that the 67th percentile WACC estimate is appropriate. The main factors that influenced this decision are:

X25.1 due to fundamental uncertainty, it is not possible to determine the optimal WACC percentile based on empirical analysis alone (rather, we must apply judgement); and

X25.2 Oxera, who developed our main analytical framework for assessing the appropriate percentile, has recommended using a WACC between the 60th and 70th percentile estimates; and

X25.3 the available RAB multiples suggest there is significant scope to reduce the WACC uplift below the 75th percentile estimate; but

X25.4 given that the potential long-term costs to consumers of under-estimating WACC are substantial, some conservatism (ie, erring on the high side) remains appropriate when determining the WACC percentile.

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6 Further, we consider that any potential bias in the mid-point WACC estimate, and the risks of catastrophic events, do not require continued use of the 75th percentile.

Our revised draft decision on the appropriate WACC range for information disclosure is in a separate paper

X26 Under the cost of capital IMs, a WACC range is used for information disclosure regulation. The current range is symmetric around the mid-point WACC estimate, and is bounded by the 25th and 75th percentile WACC estimates.

X27 While our draft decision was to change the WACC percentile for both price-quality regulation and information disclosure regulation of electricity lines services and gas pipeline services, this decision only applies to price-quality regulation. After having considered submissions on our draft decision in respect of the appropriate WACC percentile range for information disclosure, we have decided to issue a revised draft decision on that matter. Our revised draft decision is set out in a separate paper, released alongside this paper.[7]

The WACC percentile for airports will be addressed separately

X28 This decision addresses the WACC percentile for regulated electricity lines and gas pipeline businesses only.[8] Given that the price-quality paths for electricity distribution businesses and Transpower are being reset later this year, we have focused on regulated suppliers in the energy sector at this stage.[9]

X29 Submissions, and advice from some of our experts, have raised several airport-specific considerations which may affect the appropriate WACC percentile for specified airport services (including, in particular, the role of using a 'dual-till' approach to regulation). We have not yet fully considered the airport-specific aspects of submissions at this stage.

X30 Therefore, we are taking additional time to consider the WACC percentile for specified airport services. We will release a process update paper on the WACC percentile for airports in due course.

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7 Commerce Commission "Proposed amendment to the WACC percentile range for information disclosure regulation for electricity lines services and gas pipeline services" (30 October 2014).

8 This decision applies equally to electricity distribution businesses, Transpower and gas pipeline businesses. We have not identified compelling reasons for using a different percentile for these sectors.

9 We are currently undertaking separate work on the WACC for two regulated telecommunications services: the unbundled copper local loop (UCLL) and unbundled bitstream access (UBA) services. See http://www.comcom.govt.nz/regulated-industries/telecommunications/regulated-services/standard-terms-determinations/unbundled-copper-local-loop-and-unbundled-bitstream-access-services-final-pricing-principle for further information regarding the UCLL and UBA pricing reviews.

1. Introduction

Purpose of this paper

1.1 This paper explains the reasons for our decision on the WACC percentile for price-quality path regulation of electricity lines and gas pipeline businesses under Part 4 of the Commerce Act.[10] Our review of the WACC percentile was undertaken in response to the High Court's comments regarding the WACC percentile, expressed in its IMs judgment.[11]

Approach to the WACC percentile in our 2010 IMs determinations

1.2 The return investors require from an investment depends on the riskiness of that investment. The required return cannot be observed, instead it must be estimated. We estimate the returns required by providers of debt and equity, and weight these by the assumed proportions of debt and equity to form the WACC. The WACC is our estimate of the returns required by investors.

1.3 Under the current cost of capital IMs we also estimate the standard error of our estimate of WACC. The standard error of our estimate of WACC incorporates our assessments of the standard errors of our estimates of asset beta, the debt premium, and the tax adjusted market risk premium (TAMRP). The standard error of WACC is used to define the distribution of our estimate of WACC.

1.4 When setting price-quality paths, we choose an estimate of WACC that is above the mid-point to reduce the risk that our estimate is lower than the true (but unobservable) return required by investors. We acknowledge that our estimate of the standard error, and therefore the percentiles we calculate, is subject to uncertainty.[12]

1.5 We select a percentile of the distribution to use as the value of WACC for price-quality path regulation (the 'WACC percentile'). Prior to this decision, we applied the 75th percentile.

1.6 We originally specified use of a WACC for price-quality paths that is above the mid-point estimate because we expected the costs to consumers of a WACC that is

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10 As noted in our process update paper on 23 June 2014, this decision does not apply to airport services regulated under Part 4 of the Commerce Act, see Commerce Commission "Further work on cost of capital input methodologies: Process update" (23 June 2014).

11 *Wellington International Airport Ltd & Ors v Commerce Commission* [2013] NZHC [December 2013].

12 The High Court, in its merits appeals decision, and several submitters highlight that the distribution from which the percentile is chosen is not a true statistical distribution. As is discussed further in Chapter 4, we agree; however, we consider that it represents a reasonable estimate of the likely estimation errors. We use the term 'WACC percentile' as short-hand only, not in its true statistical meaning.

too low to be greater than the costs to consumers of using a WACC that is too high (given the uncertainty in knowing what the true WACC is).[13]

1.7 We noted that the WACC percentile "is a matter of judgement" and our use of the 75th percentile estimate reflected:[14]

1.7.1 the view that under-estimating WACC when setting price-quality paths would damage dynamic efficiency, creating a more severe cost to consumers in the long run than the costs to consumers from over-estimating WACC;[15]

1.7.2 the Part 4 Purpose (the long-term benefit of consumers);

1.7.3 the uncertainty in estimating the true cost of capital; and

1.7.4 that in workably competitive markets, not all risks can be passed on to the consumer in the form of higher prices. Instead, in workably competitive markets, firms have to manage some risks.[16]

High Court's comments regarding the WACC percentile

1.8 MEUG challenged our use of the 75th percentile WACC in the merits appeals to the High Court. MEUG argued that the mid-point WACC estimate should be used (or alternatively, the 75th percentile be applied to new investment only).

1.9 Airports, on the other hand, argued that the 75th percentile WACC estimate is too low, and they should be required to report against the 75th to 85th percentile range (or an upper band materially higher than the 75th percentile).[17]

1.10 In considering the WACC percentile, the Court:

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13 Commerce Commission "Input methodologies (Electricity Distribution and Gas Pipeline Services): Reasons Paper" (December 2010), paragraph H13.44.

14 Commerce Commission "Input methodologies (Electricity Distribution and Gas Pipeline Services): Reasons Paper" (December 2010), paragraph H11.65.

15 Commerce Commission "Input methodologies (Electricity Distribution and Gas Pipeline Services): Reasons Paper" (December 2010), paragraph 6.7.12.

16 A number of submissions have asserted that our 2010 decision to select the 75th percentile is related to other parameter decisions, such as model error and asymmetric risk. We respond to those submissions in Chapter 4.

17 *Wellington International Airport Ltd & Ors v Commerce Commission* [2013] NZHC [December 2013], paragraph 1425. Transpower also argued for the 90th percentile in its notice of appeal and written submissions, but not in oral submissions. The Court therefore did not consider this submission further, see paragraph 1424.

1.10.1 was sceptical that using a point substantially higher than the mid-point was necessary to incentivise investment,[18] and stated that no analysis was provided to support this assertion;[19]

1.10.2 sympathised with MEUG's submission that the use of the 75th percentile lacked a solid basis;[20]

1.10.3 noted that there was nonetheless, strong (but not evidenced) expert support for the 75th percentile; [21]

1.10.4 noted that the in-principle objections to deliberately erring on the side of over-estimating the WACC suffered from the same lack of empirical support as our approach;[22]

1.10.5 noted that, in establishing the new regulatory regime, it is understandable that we did not wish to run the risk of deterring investment by providing a rate of return that is too low;[23]

1.10.6 was unable to be satisfied that moving away from the 75th percentile would be materially better in meeting the purpose of Part 4 and/or the purpose in s 52R;[24] and

1.10.7 stated its expectation that we will consider the Court's scepticism of using a WACC substantially above the mid-point when we review the cost of capital IMs.[25]

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18 *Wellington International Airport Ltd & Ors v Commerce Commission* [2013] NZHC [December 2013], paragraphs 1479-1481.

19 *Wellington International Airport Ltd & Ors v Commerce Commission* [2013] NZHC [December 2013], paragraphs 1462-1463.

20 *Wellington International Airport Ltd & Ors v Commerce Commission* [2013] NZHC [December 2013], paragraph 1470.

21 *Wellington International Airport Ltd & Ors v Commerce Commission* [2013] NZHC [December 2013], paragraph 1470.

22 *Wellington International Airport Ltd & Ors v Commerce Commission* [2013] NZHC [December 2013], paragraph 1482.

23 *Wellington International Airport Ltd & Ors v Commerce Commission* [2013] NZHC [December 2013], paragraph 1482.

24 *Wellington International Airport Ltd & Ors v Commerce Commission* [2013] NZHC [December 2013], paragraphs 1483-1484.

25 *Wellington International Airport Ltd & Ors v Commerce Commission* [2013] NZHC [December 2013], paragraph 1486.

1.11 While the Court put forward a number of its own 'tentative' and 'in-principle' observations, including scepticism regarding the case for an uplift as noted above, its strongest view was that we needed to do further work, including:

1.11.1 seeking empirical or analytical evidence to support our asymmetric costs reasoning (eg, loss analysis[26]), or abandoning that reasoning;[27]

1.11.2 considering, and if possible estimating, the inter-sectoral effects;[28]

1.11.3 expanding the review of overseas practice;[29] and

1.11.4 considering the two-tier proposal put forward by MEUG, which sets a different WACC for new and sunk investment.[30]

1.12 This decision responds to the Court's call for a more evidentially-based decision on the WACC percentile.

Why we are reviewing the percentile now

1.13 As noted in our 31 March 2014 process update paper, we consider it necessary to have consulted on an amendment to the WACC percentile now because of the uncertainty the Court's judgment created.[31] This uncertainty can be characterised as an asymmetry in expectations as to the outcome of the next review of the WACC percentile, given that the Court's judgment can be understood as sympathetic to a reduction in the WACC percentile.

1.14 We consider that this asymmetry and resulting uncertainty is likely to have reduced the enhanced investment incentives we sought to achieve by using the 75th percentile WACC estimate. The heightened risk that the WACC percentile to be applied in the future may be lower is likely to weaken the business case for new

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26 In the current context, a loss function estimates the harm to consumers incurred by over-estimating and under-estimating the WACC and provides guidance as to where the expected harm would be minimised.

27 *Wellington International Airport Ltd & Ors v Commerce Commission* [2013] NZHC [December 2013] paragraphs 1464-1468, and 1486.

28 *Wellington International Airport Ltd & Ors v Commerce Commission* [2013] NZHC [December 2013], paragraphs 1475-1476.

29 *Wellington International Airport Ltd & Ors v Commerce Commission* [2013] NZHC [December 2013], paragraphs 1477.

30 *Wellington International Airport Ltd & Ors v Commerce Commission* [2013] NZHC [December 2013], paragraph 1486.

31 Commerce Commission "Further work on the cost of capital input methodologies: Process update and invitation to provide evidence on the WACC percentile" (31 March 2014).

investment by regulated suppliers, who regularly make long-lived investments which last for many regulatory control periods. [32]

1.15 If the Court's concerns regarding the WACC percentile were not addressed prior to the next price-quality path resets for electricity distribution businesses (EDBs) and Transpower, the 75th percentile would continue to apply in the next regulatory period (from 1 April 2015 to 31 March 2020). In this situation:

1.15.1 the prices faced by consumers would continue to reflect the 75th percentile WACC for the next five years; but

1.15.2 due to investors and managements recognising the High Court's comments as implying a heightened risk of a reduction in the WACC percentile that would apply in future regulatory periods, any positive investment incentives for regulated suppliers resulting from using the 75th percentile would likely be diminished.

1.16 We received requests from several consumer groups arguing on grounds similar to the above analysis that we should address the Court's concerns before the price-quality path resets for EDBs and Transpower later this year.[33] The consumer groups argued that failing to do so would mean consumers paying higher prices for another five years, without corresponding benefits in terms of investment incentives, because the next statutory review of the IMs will not be completed until after those resets.[34]

1.17 We have previously responded to a number of submissions about whether it was appropriate for the Commission to commence this review prior to the 7-year IM review.[35] We also received a number of submissions on our draft decision expressing concern to the effect that to review and amend the WACC percentile outside of the

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32 We note that some submitters disagree that the Court's judgment has created uncertainty and reduced the incentives for investment. See for example, PwC (on behalf of EDBs) "Submission to the Commerce Commission on proposed amendment to the WACC percentile for electricity lines services and gas pipeline services" (29 August 2014), paragraph 11. These submissions appear to reflect a view that managements and investors will not have assessed the High Court's comments as modifying the probabilities of the outcome of the review of the issues that the High Court expects the Commission to undertake. This view does not accord with our experience of investors' sophisticated attention to judicial comments.

33 Board of Airline Representatives New Zealand Inc "Request for Review of Cost of Capital Input Methodology" (23 December 2013); and Consumer NZ, Employers and Manufacturers Association Northern Inc, and Major Electricity Users Group Inc "Energy Prices and Urgent Review of Cost of Capital Input Methodology" (19 December 2013).

34 Commerce Act 1986, s 52Y.

35 See Commerce Commission "Further work on the cost of capital methodologies: Process update and invitation to provide evidence on the WACC percentile" (31 March 2014).

7-year review creates more uncertainty than it resolves.[36] We address submissions on the timing of the review and its impact on certainty in Chapter 2.

Our decision reflects the evidence and submissions received to date

1.18 We now have a significantly greater body of evidence on the WACC percentile than previously available to us and the Court. We have invited three rounds of submissions, a round of cross-submissions, and a round of further submissions on particular topics. We have commissioned several expert reports, conducted our own analysis, and have had the benefit of considering a significant volume of evidence provided by submitters and their expert advisors.

1.19 An outline of the process we have followed in reaching this decision is as follows:

1.19.1 We began further work on the WACC percentile in February 2014. Our first paper sought views on whether we should consider reviewing or amending the cost of capital IMs.[37] We received a number of submissions on this question from consumers and suppliers of services regulated under Part 4.

1.19.2 Following consideration of submissions received, we decided to proceed with further work on a potential amendment. In March 2014, we issued a notice of intention[38] to do further work on the cost of capital IMs and also issued another paper inviting further submissions providing evidence regarding the appropriate WACC percentile.[39]

1.19.3 We commissioned further expert work to assist in forming our view regarding the appropriate WACC percentile. We requested independent advice from a number of experts, whose reports we published in late June 2014, prior to our draft decision.

1.19.4 Before reaching our draft decision, we also conducted our own analysis. In particular, we considered:

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36 For example, see Powerco's submission on "Proposed amendments to the WACC percentile for electricity lines services and gas pipelines services" (29 August 2014), paragraph 21; and AMP Capital "Submission to Commerce Commission on proposed amendment to the WACC percentile for electricity lines services and gas pipelines services' (26 August 2014), paragraph 1.30.

37 Commerce Commission "Invitation to have your say on whether the Commerce Commission should review or amend the cost of capital input methodologies" (20 February 2014).

38 Commerce Commission "Notice of intention: Potential Amendments to Input Methodologies for Electricity Distribution Services, Gas Pipeline Services, Airports, and Transpower" (31 March 2014).

39 See Commerce Commission "Further work on the cost of capital methodologies: Process update and invitation to provide evidence on the WACC percentile" (31 March 2014).

1.19.4.1 the relevant literature—notably, a 2011 paper by Professor Ian Dobbs, which was not available when the IMs were first set;[40]

1.19.4.2 available evidence on investor valuations of regulated businesses, relative to their RABs;

1.19.4.3 observed level of investment of regulated businesses under the IMs to date; and

1.19.4.4 the balance of the regulatory regime in light of the expected incentives to invest in network assets.[41]

1.19.5 On 22 July 2014 we published our draft decision, and invited interested parties to provide their views in:

1.19.5.1 submissions, by 29 August 2014; and

1.19.5.2 cross-submissions, by 12 September 2014.

1.19.6 On 19 September2014, we invited additional submissions on further evidence that had become available on three specific topics.[42]

Scope of this decision

1.20 Consistent with the notice of intention, this decision is limited to the WACC percentile.[43] A review of other aspects of the cost of capital IMs will be undertaken as part of the wider IMs review that we are required to complete before December 2017.[44]

1.21 However, in reaching our decision, we have considered relevant interdependencies. This includes interdependencies with other aspects of the IMs, but also wider interdependencies with decisions made in the regulatory instruments themselves

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40 Dobbs, I., Modelling Welfare Loss Asymmetries Arising from Uncertainty in the Regulatory Cost of Finance, Journal of Regulatory Finance 39 (2011), pages 1-28.

41 Commerce Commission "Regulatory Incentives and the Cost of Capital: Working Paper" (23 June 2014).

42 Commerce Commission “Further work on cost of capital input methodologies: Invitation for submissions on further evidence” (19 September 2014). The further evidence was: (i) a report prepared by Professor Ian Dobbs commenting on analysis undertaken by Frontier Economics based on an amended version of the model discussed in his 2001 paper (referred to above); (ii) further information that had become available on investor valuations of regulated businesses; and (iii) information raised in MEUG’s cross-submission that could be considered new material.

43 Commerce Commission "Notice of intention 31 March 2014: Potential Amendments to Input Methodologies for Electricity Distribution Services, Gas Pipeline Services, Airports, and Transpower" (31 March 2014).

44 As required by the Commerce Act, s 52Y.

(eg, price-quality paths), such as the role of quality standards, and investment incentives.

Our decision addresses the WACC percentile for price-quality path regulation only

1.22 While our draft decision was to change the WACC percentile for both price-quality regulation and information disclosure regulation of electricity lines services and gas pipeline services, this decision only applies to price-quality regulation. After having considered submissions on our draft decision in respect of the appropriate WACC percentile range for information disclosure, we have decided to issue a revised draft decision on that matter.

1.23 Our revised draft decision on the appropriate WACC percentile range for information disclosure regulation is set out in a separate paper, released alongside this paper.[45] That paper invites submissions on the revised draft decision. We expect to reach a final decision on the WACC percentile range for information disclosure for electricity lines and gas pipeline businesses by 12 December 2014.

Our decision addresses the WACC percentile for price-quality path regulation for electricity lines and gas pipeline services

1.24 Most of the evidence gathered on the WACC percentile has been on electricity lines businesses. We consider this appropriate because price-quality paths for EDBs and Transpower are being reset later this year. This will be the first time that any amended WACC percentile could be applied to a price-quality path.

1.25 This decision applies equally for EDBs and Transpower. We have considered the specific points raised in respect of Transpower but, in our view, these differences are not significant enough to justify a different percentile.

1.26 This decision also covers gas pipeline businesses. While we accept that there may be differences in the evidence between the electricity lines and gas pipelines sectors, we consider that the issues relevant to the decisions for these services to be similar enough for the same percentile to apply.[46] We note that we received no submissions advocating that gas should be treated differently to electricity lines services.

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45 Commerce Commission "Proposed amendment to the WACC percentile range for information disclosure regulation for electricity lines services and gas pipeline services" (30 October 2014).

46 This aligns with comments made by both Dr Lally and Professor Ingo Vogelsang, who argue that applying the same margin across industries may be beneficial to improve simplicity and practicality. See Dr Martin Lally "The Appropriate Percentile for the WACC Estimate" (Report prepared for the Commerce Commission, 19 June 2014), page 16; and Professor Vogelsang "On the economic effects of allowing a WACC above the midpoint" (12 June 2014), pages 5-6.

We will consult on the appropriate WACC percentile for airports at a later date

1.27 This decision does not cover specified airport services regulated under Part 4. This is because some of the submissions and expert advice we have received indicate that different WACC percentiles may be appropriate for airports (where a dual-till approach to regulation applies). These differences require further consideration, so we intend to consult on the appropriate percentile for airports at a later date.

Determinations affected by our decision

1.28 Following the discussion above, the specific determinations affected by this draft decision are:

1.28.1 *Electricity Distribution Services Input Methodologies Determination 2012* [2012] NZCC 26 (EDB IM Determination);[47]

1.28.2 *Transpower Input Methodologies Determination* [2012] NZCC 17;[48]

1.28.3 *Gas Distribution Services Input Methodologies Determination 2012* [2012] NZCC 27;[49] and

1.28.4 *Gas Transmission Services Input Methodologies Determination 2012* [2012] NZCC 28.[50]

Implementation of the new WACC percentile

Application to default price-quality paths for electricity distributors and Transpower

1.29 The new WACC percentile will apply to electricity distributors on a default price-quality path and to Transpower's individual price-quality path when the resets of those price-quality paths take effect in 2015. The WACC estimate determination that will apply to those resets will be published soon after this decision.

Application to default price-quality paths for gas pipeline businesses

1.30 The new WACC percentile will apply to gas pipelines businesses on a default price-quality path when those default price-quality paths are reset in 2017. The WACC

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47 For the most recent consolidated version of this determination, please refer to our website at: http://www.comcom.govt.nz/regulated-industries/input-methodologies-2/electricity-distribution/.

48 For the most recent consolidated version of this determination, please refer to our website at: http://www.comcom.govt.nz/regulated-industries/input-methodologies-2/transpower-input-methodologies/.

49 For the most recent consolidated version of this determination, please refer to our website at: http://www.comcom.govt.nz/regulated-industries/input-methodologies-2/gas-pipelines-2/.

50 For the most recent consolidated version of this determination, please refer to our website at: http://www.comcom.govt.nz/regulated-industries/input-methodologies-2/gas-pipelines-2/.

determinations that will apply to those price-quality path resets are due to be determined by the Commission in March 2017.

Application to customised price-quality paths

1.31 The new WACC percentile will apply to CPP applications as we next determine WACC estimates for CPPs over the next 12 months. The IMs currently require us to next determine WACC estimates to apply to CPP applications as follows:

1.31.1 for electricity distributors, in September 2015;

1.31.2 for Vector (gas transmission and gas distribution) and GasNet (gas distribution), in December 2014;

1.31.3 for Powerco (gas distribution), in March 2015; and

1.31.4 for MDL (gas transmission), in June 2015.

1.32 As signalled in our recent reasons paper for amending the WACC determination date for electricity lines services,[51] our intention, subject to consultation, is to amend the date when we are due to next determine a WACC rate for CPP proposals by electricity distributors. The aim of that amendment would be to allow a new WACC estimate to be determined at the 67th percentile in time for the May 2015 CPP application window.

1.33 We will also consider whether to consult on a similar amendment to the dates we are due to next determine estimates of WACC for CPP applications by gas pipeline businesses.

Approach to future reviews of the WACC percentile

1.34 We are confident in the position we have reached on the WACC percentile for price-quality regulation for electricity lines services and gas pipeline services. The conclusion of this review ties up the most significant remaining loose end following three years of IM appeals, and puts the WACC percentile on the same footing as other parameters of the input methodologies. We consider the reasons for this review of the WACC percentile to be exceptional,[52] and we do not anticipate having to undertake a similar process again.

1.35 As previously signalled, we will examine the split cost of capital approach as part of the 7-year review.[53] We expect to reach a final decision on the WACC percentile

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51 Commerce Commission "Amendment to the WACC determination date for electricity lines services, including Transpower – Reasons paper" (29 September 2014), paragraphs 2.9-2.10.

52 This point is discussed further at paragraphs 2.20–2.22.

53 Our intention to consider the split cost of capital issue as part of the 7-year review has been signalled previously, including in our draft decision.

applicable to information disclosure for electricity lines services and gas pipeline services in December 2014, having issued a revised draft decision alongside this paper. As noted above, we will consult on the appropriate WACC percentile range for airports information disclosure regulation separately at a later date.

1.36 Our approach to future reviews of the WACC percentile is discussed further in Chapter 4.

Structure of this paper

1.37 The main body of this paper has five more chapters.

1.37.1 Chapter 2 provides the framework we have used for coming to our draft decision.

1.37.2 Chapter 3 sets out the problem the WACC percentile is intended to address.

1.37.3 Chapter 4 explains why we can make a decision on the WACC percentile now.

1.37.4 Chapter 5 explains why we still consider it appropriate to use a WACC above the mid-point estimate.

1.37.5 Chapter 6 explains why we decided on the 67th percentile as the appropriate WACC percentile for gas pipeline services and electricity lines services.

1.38 The paper also has four attachments.

1.38.1 Attachment A extends the discussion in Chapter 2 on the role of consumer and total welfare in any loss analysis undertaken to inform our decision.

1.38.2 Attachment B discusses how Professor Dobbs' model informed our decision.

1.38.3 Attachment C provides further discussion on our analysis of the RAB multiples evidence.

1.38.4 Attachment D describes the reasonableness tests that we have undertaken to ensure that adopting the 67th percentile of WACC will not move our overall estimate of WACC outside of the realistic range of estimates of the cost of capital for businesses of comparable risk.

1.38.5 Attachment E sets out our responses to a number of key points raised in submissions, relating specifically to Transpower's investment and incentives to invest.

Other documents released along with this decision

1.39 Along with this reasons paper, we have also published on our website:

1.39.1 the amendment determination that gives effect to our decision;[54]

1.39.2 Professor Vogelsang's peer review of our final decision;[55]

1.39.3 Oxera's review of submissions on its earlier paper;[56]

1.39.4 Professor Vogelsang's review of submissions on his earlier paper;[57]

1.39.5 Economic Insights review of submissions on its previous paper;[58]

1.39.6 Spreadsheets showing how we calculated the RAB multiples analysis; and

1.39.7 our revised draft decision on the WACC percentile range for information disclosure regulation of electricity lines services and gas pipeline services (referred to in paragraph 1.23 above).

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54 Commerce Commission "Electricity Lines Services and Gas Pipeline Services Input Methodologies Determination Amendment (WACC percentile for price-quality regulation) 2014" [2014] NZCC 27 (29 October 2014).

55 Professor Ingo Vogelsang, "Review of New Zealand Commerce Commission 'Amendment to the WACC percentile for electricity lines services and gas pipeline services', Reasons paper published on October 30, 2014" (24 October 2014).

56 Oxera "Review of expert submissions of the input methodologies: Prepared for New Zealand Commerce Commission" (27 October 2014).

57 Professor Ingo Vogelsang "Reply to Comments on my June 12, 2014, paper 'On the economic effects of allowing a WACC above the mid-point', Prepared for the New Zealand Commerce Commission" (20 October 2014).

58 Economic Insights "Regulatory Precedents for Setting the WACC within a Range" (Report prepared for the Commerce Commission, 11 October 2014).

2. Framework for our decision on the WACC percentile

2.1 This chapter describes the framework we have used in making our decision on the appropriate WACC percentile.

Statutory context for our decision

2.2 The IMs for each sector regulated under Part 4 of the Commerce Act were required to be set by the end of December 2010.[59] That included IMs relating to the cost of capital.[60] The WACC percentile is one aspect of the cost of capital IMs.

2.3 As with all input methodology decisions, the WACC percentile set by the Commission must be consistent with both the purpose of Part 4 and the purpose of IMs.[61]

2.4 The Commission is able to amend IMs by making a material change, provided that it follows the statutory process.[62] The Commission issued its notice of intention to do further work on the WACC percentile in March this year under this amendment power. We subsequently published a draft methodology and gave interested parties the opportunity to provide their views. We then invited cross-submissions, followed by an additional round of submissions on further material raised in cross-submissions. We have had regard to all views received within the timeframes specified.

The questions we had to answer

The starting point for our decision

2.5 As set out in paragraphs 1.10 and 1.11, the Court was not satisfied that our 2010 decision on the cost of capital range was supported by appropriate evidence.

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59 Commerce Act 1986, s52U. A six month extension to the 30 June 2010 deadline was granted by the Minister of Commerce on 10 December 2009.

60 Commerce Act 1986, s52T(1)(a)(i). The regulated airports unsuccessfully argued that the Commission should not have set cost of capital IMs for airports in the High Court: see Commerce Commission "Input methodologies (Electricity Distribution and Gas Pipeline Services): Reasons Paper" (December 2010), paragraphs 1125-1149.

61 Commerce Act 1986, s52A and s52R.

62 Commerce Act 1986, s52X. We note Wellington Electricity's submission that the Commission's powers under s 52X may not be so broad as to allow the Commission "to amend an IM at any time and for any reason": see Wellington Electricity "Proposed amendment to the WACC percentile for electricity lines services and gas pipelines services" (29 August 2014), pages 16-18. We agree that the s 52R purpose of IMs is relevant to the exercise of the Commission's powers to amend IMs under s 52X; however, we disagree with the contention that s 52R prevents the Commission from making the current amendment to the IMs under s 52X. We discuss the role of s 52R in the Commission's decision-making further in paragraphs 2.19 to 2.21.

2.6 The consequence of the Court's judgment is that the Commission's previous choice of the 75th percentile does not logically have any special standing as the status quo. We have therefore approached the evidence afresh,[63] and re-asked the fundamental questions relating to the WACC percentile:

2.6.1 Is there any reason to depart from the mid-point ie, the best parameter based estimate we have of the cost of capital?

2.6.2 If so, what is the most appropriate percentile?

2.7 This is the same approach we followed for our draft decision.

A number of submitters challenged our starting point

2.8 We received a number of submissions on our draft decision suggesting that the Commission asked itself the wrong question.[64] In general, these submissions suggested that, rather than asking the questions described in paragraph 2.6 above, the Commission should consider whether the existing IM (ie, the 75th percentile) is wrong. These submissions generally suggest that the current IM has special standing as the status quo either in law or as a matter of good regulatory practice.[65]

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63 Though some of the evidence we have, such as the RAB multiples analysis, necessarily starts from the 75th percentile, because that evidence reflects the market response to having set the percentile at that level.

64 See, for example: NZ Airports "Submission on Commerce Commission's proposed amendment to the WACC percentile for electricity lines services and gas pipeline services" (29 August 2014), paragraph 34; Powerco "Proposed amendment to the WACC percentile for electricity lines services and gas pipeline services" (29 August 2014), paragraph 32; Orion "Submission on Commission's draft decision on the WACC percentile" (29 August 2014), paragraph 8. Although, at the same time, a number of submitters, on behalf of consumers, agreed that the mid-point, rather than the 75th percentile, is the appropriate starting point; see, for example: Franks & Ogilvie (on behalf of MEUG) "Commerce Commission review of WACC percentile – Specific legal issues arising from submissions (12 September 2014), paragraphs 31-32; BARNZ "Cross-submission to submissions from regulated suppliers on the proposed amendment to the WACC percentile for energy businesses (12 September 2014, pages 6-7; MEUG "Submission on proposed amendment to WACC percentile" (29 August 2014), paragraph 24.

65 See, for example: Vector "Submission on Draft Determination to amend the WACC percentile" (29 August 2014), paragraphs 94-95; Sapere (on behalf of Vector) "Proposed amendment to the WACC percentile - Commerce Commission's draft decision" (29 August 2014, section 5.5.3; Orion "Submission on Commission's draft decision on the WACC percentile" (29 August 2014), paragraphs 8–18; Unison "Submission on WACC percentile input methodology draft decision (29 August 2014), pages 2-3; Powerco "Proposed amendment to the WACC percentile for electricity lines services and gas pipeline services" (29 August 2014), paragraphs 25-32; NZ Airports "Submission on Commerce Commission's proposed amendment to the WACC percentile for electricity lines services and gas pipeline services" (29 August 2014) paragraphs 27-32; ENA "ENA submission on Commerce Commission draft decision on choice of WACC Percentile" (29 August 2014), page 2; Wellington Electricity "Proposed amendment to the WACC percentile for electricity lines services and gas pipelines services" (29 August 2014), pages 25-26; NZ Airports "Cross-submission on Commerce Commission's proposed amendment to the WACC percentile for electricity lines services and gas pipeline services" (12 September 2014), paragraph 14; Russell

2.9 Most submissions that supported starting from the 75th percentile argued that the Commission must demonstrate that the existing IM is wrong or that the proposed new IM is better. A number of variations on the standard to which the Commission must prove this came through in those submissions; including standards based on the materially better test, standards based on the balance of probabilities, and standards going to the confidence of the Commission that it has sufficient evidence to support a change.[66]

We consider that we have started from the right point, and asked ourselves the right questions

2.10 We do not agree that the correct starting point for the Commission is to consider whether there is probative evidence to move away from the current 75th percentile.

2.11 While it could be argued that consistency supports starting from the current IM, in the current circumstances other factors point strongly towards starting from the mid-point.

2.11.1 The first is that the current IM has been assessed by the Court as lacking a sufficient evidential basis and, on reflection, we agree. That assessment by the Court led to the review. It therefore does not make sense to start our analysis from a previous decision that has been substantially undermined, even though the Court did not have a materially better alternative IM before it at the time.

2.11.2 The second is the nature of the aspect of the IM in question. The WACC percentile is an adjustment applied to the mid-point, which is the best estimate of the cost of capital. Analytically and logically it therefore makes

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McVeagh (on behalf of the ENA and NZ Airports) "Review of Franks & Ogilvie advice dated 12 September 2014" (30 September 2014), paragraph 24(d); Transpower "Commerce Commission consultation: proposed amendment to the WACC percentile" (29 August 2014) page 11.

66 See, for example: AMP Capital "Submission to Commerce Commission on proposed amendment to the WACC percentile for electricity lines services and gas pipeline services" (26 August 2014), paragraph 1.9; QIC "Submission in relation to the Commerce Commission's Draft Determination 'Proposed amendment to the WACC percentile for electricity lines services and gas pipeline services'" (29 August 2014), pages 3-4; NZ Airports "Submission on Commerce Commission's proposed amendment to the WACC percentile for electricity lines services and gas pipeline services" (29 August 2014), paragraph 27; Vector "Submission on Draft Determination to amend the WACC percentile" (29 August 2014), paragraphs 94(c) and 95(b); CEG (on behalf of NZ Airports) "Economic Review of Draft Decision on the WACC Percentile" (29 August 2014), paragraph 4; Orion "Submission on Commission's draft decision on the WACC percentile" (29 August 2014), paragraph 18; Unison "Submission on WACC percentile input methodology draft decision (29 August 2014), pages 2-3; Transpower "Commerce Commission consultation: proposed amendment to the WACC percentile" (29 August 2014), page 25.

sense to start at the mid-point, and then consider whether there is good reason to depart from it. [67]

2.12 Further, we observe that in our view there is no specific standard of proof or threshold that must be discharged before an IM can be amended under s 52X. No such standard of proof or threshold is referred to in s 52X, and the reference in that section to the s 52V process applying to an amendment "as if the amendment were a new IM" is consistent with our approach.

2.13 More specifically, we do not believe that the materially better test provided for in s52Z(4) in respect of appeals against IM determinations applies. That threshold was put in place specifically for the bespoke IM appeals regime. The s 52X process, which the Commission must follow in amending IMs, does not contain a similar threshold.[68]

2.14 While we do not consider that there is a mandated starting point or threshold for reviewing and amending an IM, we do recognise the benefits of consistency. Where an existing IM was established on a sound evidential basis, it would generally be appropriate to use that as the starting point.

2.15 Based on the range of empirical and analytical evidence we have gathered directly or via submissions, as well as observed investor and supplier behaviour, we are satisfied that our decision is evidentially robust. However, where the evidence does not provide a consistent and unequivocal answer, or only indicates a range of appropriate answers, the Commission inevitably had to use its judgement in balancing the evidence and reaching a view.[69]

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67 As noted above, a number of submitters, on behalf of consumers, agreed that the mid-point is the appropriate starting point. See footnote 64.

68 See BARNZ "Cross-submission to submissions from regulated suppliers on the proposed amendment to the WACC percentile for energy businesses" (15 September 2014), page 7.

69 NZ Airports said of our draft decision that, "NZ Airports is deeply concerned that the Commission appears to have established a situation where it will be impossible to convince it to change its mind through this consultation": NZ Airports "Submission on Commerce Commission's proposed amendment to the WACC percentile for electricity lines services and gas pipeline services" (29 August 2014), paragraph 46. We reject that proposition and suggest that NZ Airports has misinterpreted paragraph 2.9.3 of our draft decision: Commerce Commission "Proposed amendment to the WACC percentile for electricity lines services and gas pipeline services" (22 July 2014). At the draft decision stage, we were confident that the evidence supported the 67th percentile. We were open to moving from our draft decision had evidence been presented that, in our view, better supported another position. Having considered the evidence provided since our draft decision, we are still of the view that the evidence supports the 67th percentile.

Our choice of starting point does not, in any case, determine the outcome

2.16 While we received a large number of submissions on the issue of starting point, we do not consider that the starting point issue is as significant as the volume of submissions might suggest. We consider that, even if we had started from the 75th percentile, the evidence before us would have led us to reduce the WACC percentile: Chapter 6 sets out the range of factors that have ultimately convinced us that the current percentile is too high.[70]

The role of purpose statements in the Commission's decision-making

2.17 Both the IMs purpose statement[71] and the Part 4 purpose statement[72] are important in considering an amendment to the IMs.

2.18 To the extent there is a conflict between the two purpose statements, the Part 4 purpose takes precedence.[73]

The input methodologies purpose statement

2.19 In considering an amendment to the WACC percentile, the Commission has been conscious of the purpose statement for IMs, and its emphasis on certainty. A number of submissions from suppliers argued that to review and amend the WACC percentile outside of the 7-year review process undermines regulatory certainty in the Part 4 regime.[74]

2.20 We agree in principle that, in the normal course of events, regular changes to significant 'fixed' IM parameters are not desirable. But the current scenario is not 'normal' given the High Court's comments that the Commission's initial WACC

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70 We therefore disagree with the view of some submitters that the starting point determines the outcome of this review; see, for example: Powerco "Proposed amendment to the WACC percentile for electricity lines services and gas pipeline services" (29 August 2014), paragraph 27.2; NZ Airports "Cross-submission on Commerce Commission's proposed amendment to the WACC percentile for electricity lines services and gas pipeline services" (12 September 2014), paragraph 15.

71 Commerce Act 1986, s 52R.

72 Commerce Act 1986, s 52A.

73 In *Wellington International Airport Ltd & Ors v Commerce Commission* [2013] NZHC [December 2013], paragraph [165], the High Court noted, using the example of appeals against the cost of capital IMs, that: "we consider that in this context the s 52R purpose of certainty is conceptually subordinate to the s 52A purpose of the long-term benefit of consumers. We say that because promoting the long-term benefits of consumers in accordance with s 52A is the central purpose of Part 4 as a whole. IMs must be designed with that in mind. Subject to that, a materially more certain IM is to be preferred to a less certain IM."

74 See for example: AMP Capital (26 August 2014), paragraphs 1.7-1.8; Vector "Submission on Draft Determination to amend the WACC percentile" (29 August 2014), paragraphs 112-120; QIC "Submission in relation to the Commerce Commission's Draft Determination 'Proposed amendment to the WACC percentile for electricity lines services and gas pipeline services'" (29 August 2014), pages 4-5; Powerco "Proposed amendment to the WACC percentile for electricity lines services and gas pipeline services" (29 August 2014), paragraphs 5, 21.

percentile lacks a sufficient evidential basis and its expectation that the Commission would reconsider it.

2.21 The observations of the High Court meant that reconsidering the WACC percentile was inevitable—it was just a question of timing. Our view remains that it was best to reconsider the percentile now rather than wait until the 7-year review.

2.22 Had we not reviewed the WACC percentile prior to the next price-quality path resets for electricity distributors and Transpower, the 75th percentile would have continued to apply for the next 5-year regulatory period (from 1 April 2015 to 31 March 2020). In this situation, consumers would have continued to pay for the 75th percentile WACC, but derived little benefit from it because:

2.22.1 the prices faced by consumers would continue to reflect the 75th percentile for the next five years; but

2.22.2 uncertainty about the WACC percentile that will apply in future regulatory periods following the Court's comments meant that any positive investment incentives for regulated suppliers resulting from using the 75th percentile are likely to have been diminished.

2.23 Whatever approach the Commission took would have involved some short-term uncertainty. Completing the review now cures that uncertainty, and gets to the best position relative to the Part 4 purpose statement, more quickly.

2.24 We therefore do not agree with the views of some submitters that to review and amend the WACC percentile now is inconsistent with the statutory purpose of the IMs:[75]

2.24.1 Part 4 does contemplate mid-cycle IM amendments: it provides for one-off amendments (s 52X); as well as a regular review process, which must be completed once every 7 years (s 52Y); and

2.24.2 the High Court referred to the consultation process leading up to this final decision as "appropriate" in rejecting MEUG's application to appeal the merits appeal judgment.[76]

The Part 4 purpose statement

2.25 As is discussed further in Attachment A, the High Court has confirmed that the overriding purpose of Part 4, which provides the context for our decision on the appropriate WACC percentile, is the long-term benefit of consumers of regulated

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75 See, for example: Wellington Electricity "Proposed amendment to the WACC percentile for electricity lines services" (29 August 2014), pages 16-18.

76 *MEUG v Commerce Commission & Ors*, NZHC [2014] 1765, 28 July 2014, at [65].

services. The High Court also emphasised the tension between the regulatory objectives in sections 52A(1)(a) and (d) in setting the WACC percentile—ie, providing incentives to invest (and innovate) may drive you in a different direction than limiting excessive profits.[77]

2.26 We agree that the investment and profitability limbs of section 52A are particularly relevant when setting the WACC percentile, and must be balanced. The High Court understandably queried the basis upon which we were compromising the interests of consumers in lower prices. But, as emphasised in supplier submissions (discussed in Attachment A), we are also very aware of the longer-term benefit to consumers of incentivising the continued supply of reliable, efficient infrastructure services, as well as innovations in the supply of those services.

The framework for loss analysis – consumer welfare versus total welfare standard

The Court recognised loss analysis might assist in balancing s 52A(1)(a) and (d)

2.27 The High Court observed that the rationale for our approach in providing a WACC uplift came closest to having a clear basis, so far as the materials before it were concerned, in terms of a 'loss function' (or 'loss analysis'). A loss analysis approach, which seeks to quantitatively determine the costs and benefits to consumers of a higher or lower percentile, is theoretically a valuable tool in better determining the right balance between s52A(1)(a) and (d). Our concern about loss analysis, recognised by the Court, has always been simply about whether we would have reliable evidence on which to base the loss analysis.[78]

2.28 For both our draft and final decisions we have therefore focused our further work on testing the extent to which we have the evidence to enable a loss analysis to provide a robust basis for a WACC percentile decision, and on comparing this to other expert analysis and the factual evidence before us. Given the Court's criticism, we consider that this was a more appropriate way to determine the WACC percentile than engaging in further theoretical debate about whether our previous approach of allowing a WACC uplift to the level of the 75th percentile was correct in principle.

Loss analysis results are affected by whether a consumer or total welfare approach is applied

2.29 The outcome of a loss analysis will differ depending on whether a total welfare or consumer welfare standard is used, or some weighting of the two.

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77 *Wellington International Airport Ltd & Ors v Commerce Commission* [2013] NZHC [December 2013], paragraphs [1460]-[1461].

78 *Wellington International Airport Ltd & Ors v Commerce Commission* [2013] NZHC [December 2013], paragraphs [1438]-[1439] and [1464]-[1470].

2.29.1 A total welfare standard is consistent with an objective of maximising economic efficiency benefits for both consumers and producers,[79] where any distributional benefits (or costs) associated with transfers of wealth between consumers and producers due to price changes are ignored.

2.29.2 A consumer welfare standard is consistent with maximising benefits to consumers only, from both an efficiency and distributional standpoint. In particular, any financial benefit consumers might receive due to avoiding wealth transfers associated with producers setting higher prices in future will be taken into account.

2.30 In simple economic models, such as static supply and demand curve diagrams, 'total welfare' is often represented by 'total surplus' (ie, the combination of 'consumer surplus' and 'producer surplus').[80] In such static economic models, a total welfare approach is consistent with maximising total surplus and with maximising static efficiency (ie, allocative and productive efficiency). Wealth transfers, which are represented by a transfer in surplus between consumers and producers, are ignored. If the static efficiency consequences of higher prices are small, a total welfare approach would therefore imply that the costs to consumers of higher prices are not very significant. A consumer welfare approach is consistent with maximising consumer surplus only, where both the distributional and efficiency effects on consumers of higher prices are taken into account.

2.31 Dynamic efficiency considerations are often ignored, or not represented well, in static models. Static models may therefore have significant shortcomings in informing our view on the appropriate WACC percentile for price-quality regulation in the context of the s 52A overall purpose—ie, promoting the long-term benefits to consumers of regulated services.

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79 Economic efficiency is typically identified in terms of three dimensions: allocative efficiency, productive efficiency, and dynamic efficiency. Allocative efficiency occurs when resources are allocated within the economy to the uses in which they have the highest value. Productive efficiency is present when producers use inputs in such a manner as to minimise costs, subject to technological constraints. Dynamic efficiency refers to decisions made over time and includes decisions relating to investment and/or innovation that can improve productivity as well as the range and quality of services (eg, Commerce Commission "Input methodologies (Electricity Distribution and Gas Pipeline Services): Reasons Paper" (December 2010) paragraph 2.5.8).

80 For example, Carlton, D.W. and Perloff, J.M., *Modern Industrial Organization*, Pearson Addison Wesley, Boston, 4th ed. 2005, Chapter 3. 'Consumer surplus' reflects the aggregate amount above the price paid that consumers would willingly spend, if necessary, to consume the units purchased of a service. In static supply and demand diagrams, consumer surplus is typically represented by the area below the demand curve and above the price paid. 'Producer surplus' reflects the aggregate difference between what suppliers are willing to supply the service for, and the price they receive. In static supply and demand diagrams, producer surplus is typically represented by the area above the supply curve and below the price paid.

Overview of our conclusions on consumer welfare versus total welfare

2.32 In our draft decision, we explained that we consider benefits to consumers from wealth transfers due to lower prices are relevant to our analysis. Some submitters (on behalf of regulated suppliers) have stated that we should only use a total welfare standard when undertaking any loss analysis—ie, take no account of avoiding future wealth transfers from consumers to suppliers. Other submitters (on behalf of consumers) have argued that s52A requires a consumer welfare standard. Given the significant number of submissions we have received on this topic, we have considered them separately in Attachment A. However, we provide a summary of our key conclusions in the remainder of this section.

A WACC uplift can potentially be consistent with the s 52A purpose

2.33 The overriding purpose that provides the context for our decision on the appropriate WACC percentile, and for any loss analysis that informs that decision, is promoting the long-term benefit of consumers of the relevant regulated services.

2.34 As is discussed in more detail in Chapter 3, we set a WACC uplift to mitigate the risk that the WACC is set 'too low', which could result in consumers of regulated services suffering significant losses due to under-investment. A WACC uplift will be consistent with the s 52A purpose to the extent that the additional costs to consumers from the uplift are exceeded by the additional benefits the higher prices produce, compared to prices without the uplift, over the long term. Section 52A(1)(a) will be appropriately balanced with s 52A(1)(d), in light of the overriding purpose, if the incentives for additional investment caused by the uplift result in greater long-term net benefits to consumers.

A consumer welfare approach is more consistent with the s 52A purpose

2.35 The use of a consumer welfare approach in any loss analysis is in principle more consistent with that overriding purpose than a total welfare approach. Section 52A does not restrict the relevant benefits to consumers from limiting the ability of suppliers to extract excessive profits, and from associated lower prices, to the efficiency effects only. The direct financial benefits to consumers from those lower prices (ie, the distributional effects) are also relevant. As is noted above, these combined efficiency and distributional effects are typically represented in theoretical or analytical economic models by consumer surplus.

Producer surplus may provide a proxy for consumer benefits in the absence of better information

2.36 It is not necessarily inconsistent with s 52A to give some weight to producer surplus, as represented or quantified in such an economic model, because 'consumer surplus' is not directly equivalent to the 'long-term benefit to consumers'. In particular, there are limitations to the extent to which any theoretical representation or analytical model of *static* consumer surplus can adequately take into account all the relevant efficiency and distributional benefits to consumers over the long term, such as dynamic efficiency benefits from innovation or improvements to service quality, as well as all relevant inter-temporal effects.

2.37 Therefore, notwithstanding our in principle view that using the consumer welfare standard is more consistent with an overall objective of the long-term benefit to consumers, it may be appropriate in practice to give some weight to producer surplus. However, this would only be to the extent producer surplus provides an appropriate proxy for some otherwise difficult to quantify (or unquantifiable) long-term (net) benefit to consumers, in particular as an indicator of the margin for error regarding incentives to invest. In the current context, the effect of giving some weight to producer surplus would be a higher WACC percentile than would otherwise be the case.

Our final decision balances s 52A(1)(a) and (d) in the context of the long-term benefit to consumers

2.38 In practice, and consistent with our draft decision, our final decision on the appropriate WACC percentile does not rely on giving some numeric weight to quantitative estimates of producer surplus and consumer surplus that are produced by one or more (imperfect) economic models. Seeking to specify such a weighting would give an appearance of false precision at best.

2.39 Rather, our decision on the appropriate WACC percentile involves the exercise of judgement in light of the s 52A purpose and the evidence available to us. In exercising our judgement, we consider some conservatism in selecting the percentile (ie, erring on the high side) remains appropriate. Doing so recognises there is fundamental uncertainty regarding the appropriate WACC percentile, and that the long-term costs to consumers of under- and over-estimating the WACC are asymmetric. Therefore, erring on the high side is likely to be in consumers' interests. Doing so reflects otherwise unquantified (or unquantifiable) factors that are likely to result in greater benefits to consumers in the long term, in terms of efficient investment and innovation that meets current and future consumers' demand at the quality that they want.

3. What is the problem the WACC percentile is intended to address?

3.1 This chapter introduces:

3.1.1 the potential costs and risks associated with setting the WACC too high or too low;

3.1.2 the loss function analysis supported by the Court for assessing the relative costs of under-and over-estimating WACC;

3.1.3 wider incentives operating under price-quality regulation that may affect our decision regarding the WACC percentile; and

3.1.4 our main purpose in setting the WACC at a percentile above the mid-point estimate (ie, the 'WACC uplift').

There are risks associated with setting WACC too high or too low

3.2 As WACC cannot be observed, it must be estimated. This raises the risk of estimation error: our estimate of WACC could be too high or too low relative to the 'true' (but unobservable) WACC.

3.3 The consequences of setting WACC too high are different from the consequences of setting WACC too low.

3.4 If the allowed WACC is too high, the prices paid by consumers of regulated services will be too high. As a result:

3.4.1 regulated suppliers are likely to earn above-normal returns at the expense of consumers;

3.4.2 due to the high returns they can earn on their investment, suppliers may also invest more than consumers would like;

3.4.3 as consumers pay for the investment suppliers make, higher investment leads to higher prices. While there may be some benefit to consumers from this greater investment, the cost to consumers of this investment may be greater than the benefits over the long term; and

3.4.4 therefore, consumers may suffer a loss if the WACC is too high.

3.5 Consumers may also suffer loss if the allowed WACC is too low.

3.5.1 If the WACC is too low, suppliers may conclude they cannot expect to achieve investors' required cost of capital and cannot therefore justify investment. In that case they are likely to struggle to attract capital.

3.5.2 Over time, any such under-investment is likely to result in declines in the quality of service provided to consumers (subject to constraints imposed by quality standards), which consumers may not be compensated for by the reduction in prices due to the lower value of the RAB. The reduction in quality could take many forms, including more frequent supply outages, longer outages (perhaps due to lower levels of network redundancy) and higher maintenance costs (which lead to further spending and eventually higher prices).

3.5.3 With the lower available returns on investment, suppliers may also be less likely to innovate through investment, and the development and introduction of new services and/or technologies may be deferred. Under-investment may mean that opportunities are missed to reduce transmission grid congestion and enhance competition in generation. Overall, consumers may suffer a loss if under-estimation of WACC results in suppliers under-investing when the benefit of the investment foregone would exceed its cost.[81]

Why we consider increasing the WACC for asymmetric losses

3.6 Given the potentially significant losses to consumers if our WACC estimate is wrong, we have considered the relative consequences of setting the WACC too high or too low.[82] In particular, we have considered:

3.6.1 how the expected losses from over-estimating WACC compare to the expected losses from under-estimating WACC; and

3.6.2 whether the expected losses are broadly symmetric so they offset each other (on an ex ante basis), or whether they are different (asymmetric).

3.7 If the expected losses from the WACC being wrong are symmetric, then we should choose the mid-point estimate of WACC. Doing so would provide suppliers subject to price-quality regulation with an expectation that they will be able to earn a normal return. Doing so would also minimise the expected losses to consumers.

3.8 However, if the expected losses are asymmetric, we should choose a WACC percentile that reflects the asymmetry in the respective losses of over- or under-estimating WACC.

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81 As is set out in paragraphs 3.38-3.44 below, we do not consider that a higher WACC percentile is necessarily the most effective way to incentivise these types of investment.

82 In addition to asymmetric losses from mis-estimating WACC, there can be asymmetric consequences from natural disasters. Such losses are discussed briefly in paragraphs 4.35 to 4.37 below, and in more detail in our decision on a customised price-quality path for Orion. See Commerce Commission "Setting the customised price-quality path for Orion New Zealand Limited Final reasons paper – [2013] NZCC 21", (29 November 2013), Attachments B and C.

3.9 For example, if under-estimating WACC leads to greater losses than over-estimating it, we should increase the WACC estimate we use. Doing so will reduce the likelihood that the allowed WACC is set below the 'true' WACC, and will reduce the likelihood that consumers incur significant costs as a result of under-investment.

3.10 Ideally, if there are asymmetric losses, we would like to adjust the WACC to ensure that the losses expected at the margin from under-estimating WACC (given the probability of the WACC being under-estimated) are equal to the losses expected at the margin from over-estimating WACC (given the probability of WACC being over-estimated).

We have examined a loss function approach, as suggested by the Court

3.11 By estimating the long-term harm to consumers of regulated services from over- and under-estimating WACC, we can seek to determine the WACC percentile that minimises the expected harm.

3.12 However, undertaking this loss analysis is not straightforward. This is because the relationship between WACC and the losses from getting WACC wrong is not well understood (at least as regards the quantification which is required to determine the optimal percentile).

3.12.1 To undertake robust loss analysis, we need to know and quantify all the potential losses to consumers if the WACC is wrong, and then set the WACC which (in combination with other aspects of the overall regime) minimises the expected harm.

3.12.2 In our 2009 draft cost of capital guidelines we commented that the loss analysis is "too mechanical and suggests a misplaced sense of precision and mathematical rigour".[83] Therefore, we did not undertake a quantified loss analysis at that time.

3.13 However, the High Court indicated we should consider loss analysis when we review the choice of WACC percentile under the IMs.[84] We understand these comments to advocate that the decision on the percentile would benefit from a fuller exploration of empirical evidence than was undertaken in setting the IMs.

3.14 Therefore, in reaching our judgement on the appropriate WACC we have explored quantification of the loss analysis framework supported by the Court, discussed in submissions, and developed by our expert advisors. There were submissions on behalf of both consumers and regulated suppliers which agree that, at least in

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83 Commerce Commission "Revised Draft Guidelines: The Commerce Commission's Approach to Estimating the Cost of Capital", (19 June 2009), paragraph 242.

84 *Wellington International Airport Ltd & Ors v Commerce Commission* [2013] NZHC [11 December 2013], paragraphs 1486-1487.

principle (and possibly in practice), a loss function approach could potentially inform our decision on the appropriate WACC percentile. However, consumers and suppliers disagree on the weight we should give to the analysis and results available to us, and on the conclusions we should draw from the insights provided by such analysis.

3.15 The two main quantitative analyses based on a loss function approach that have been undertaken to inform our final decision on the appropriate WACC percentile are as follows.

3.15.1 Oxera undertook a 'probability of loss' approach for us to specifically assist us in setting an appropriate WACC percentile for suppliers of electricity transmission and distribution services. Oxera describes its approach as consistent with the 'social loss approach' outlined by Professor Dobbs, Professor van Zijl and others, but explains that it "gives weight to the practical issues involved in estimating the parameters" within the analysis.[85] Oxera's approach assesses the costs and benefits to consumers over time on an annualised basis. Oxera's approach, and critiques of its analysis, are discussed in Chapter 5, and in two reports Oxera prepared in response to submissions.[86] Overall, we consider Oxera's analysis is well suited to the question before us, in light of the s 52A purpose.[87]

3.15.2 Frontier Economics, for Transpower, built a loss function model based on a 2011 model developed by Professor Dobbs.[88] The 2011 Dobbs model was a theoretical model originally developed with the telecommunications sector in mind.[89] Critiques of the Frontier Economics implementation of the 2011 Dobbs model ('Frontier/Dobbs model'), are summarised in Chapter 5, and are discussed in detail in Attachment B. Although the model provides valuable insights, we consider there are significant limitations in the model's 'goodness of fit' to the question before us, in light of the s 52A purpose.

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85 Oxera "Input methodologies, Review of the '75th percentile' approach, Prepared for New Zealand Commerce Commission" (23 June 2014), page 66.

86 Oxera "Oxera review of submissions: the appropriate WACC percentile, Prepared for the New Zealand Commerce Commission" (17 July 2014); and Oxera "Review of expert submissions of the input methodologies, Prepared for New Zealand Commerce Commission" (27 October 2014).

87 Oxera "Review of expert submissions of the input methodologies, Prepared for New Zealand Commerce Commission" (27 October 2014), pages 14 and 42.

88 Frontier Economics "Application of a loss function simulation model to New Zealand, a report prepared for Transpower" (August 2014).

89 Professor Ian Dobbs "Proposed amendment to the WACC percentile for the Allowed Rate of Return, Comments on the Application of the Dobbs [2011] model" (Report prepared for the Commerce Commission, 17 September 2014), paragraph 8.

3.16 The loss function approach considers the cost of under-estimating WACC (eg under-investment which results in lower reliability, and/or deadweight loss from under-pricing) against the cost of over-estimating WACC (eg, over-investment, deadweight loss from over pricing, and wealth transfers). As is discussed in Attachment A, the quantitative results of a loss function approach are significantly affected by whether a consumer welfare or total welfare standard underpins the analysis (ie, whether or not wealth transfers are taken into account), and how welfare is measured in terms of 'surplus'.

3.17 Due to difficulties in estimating the relative costs of under and over-estimating WACC, loss analysis can only be used to define an appropriate range of WACC percentiles (rather than a specific percentile). NERA (for NZ Airports) stated:[90]

> The perceived rigour of undertaking an empirical evaluation of the optimal percentile should not detract from the fact that any such analysis will remain heavily reliant on a range of estimates and assumptions. Any resultant estimate will be only as meaningful as the information and assumptions underpinning it. The output of such an exercise is therefore likely to be a range for the 'optimal' percentile rather than a definitive point.

How a WACC uplift affects incentives under price-quality regulation

The WACC uplift is only one of many regulatory factors that determine investment incentives

3.18 In deciding whether an uplift to the mid-point WACC is required, we have therefore also considered other broader aspects of the overall regime and the extent to which these create and affect suppliers' incentives to invest and manage costs.[91] Although our decision on the appropriate WACC percentile is intended to strike the right balance between s 52A(1)(a) and (d), we do this recognising there are other financial, as well as non-financial, factors from a range of sources which influence the investment decisions of regulated suppliers. For example, Professor Vogelsang has observed that:

> The Commission, in my view, goes beyond the High Court's queries by not only considering the best WACC uplift in isolation but also taking into consideration other policies in place for

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90 NERA Economic Consulting "Review of the WACC Percentile: A Report for the New Zealand Airports Association" (report prepared for New Zealand Airports Association, 5 May 2014), page v. And see page 31 in that report for further discussion. Incenta (for ENA) makes a similar point: "attempting to undertake a robust cost-benefit analysis of how marginal changes in the regulatory WACC will affect outcomes is a very difficult exercise, and one that is most likely impossible" Incenta Economic Consulting "Rationale for setting the regulatory WACC above the midpoint value" (report prepared for Electricity Networks Association, May 2014), page 1.

91 A fuller discussion of the broader regime was set out in a discussion paper issued in June 2014. Commerce Commission "Regulatory Incentives and the Cost of Capital: Working Paper" (23 June 2014). Available at http://comcom.govt.nz/regulated-industries/input-methodologies-2/further-work-on-wacc/.

achieving the same purposes, for example, the purpose of a high level of grid reliability. This relieves the burden placed upon the WACC uplift as a policy tool.[92]

3.19 We also note Professor Dobbs' observation about a WACC uplift based on loss analysis, that: "there are other ways in which reliability and investment can be influenced by the regulator, because decision makers do not necessarily behave as Neoclassical economic theory predicts."[93]

3.20 CPI-X regimes such as price-quality regulation under Part 4 involve an inherent conflict between providing incentives for investment in network assets and incentives for cost reduction.

3.21 This conflict is played out between the short-term and long-term incentives that act upon suppliers. In the New Zealand context these incentives operate in a low cost default price-quality path regime with the business-exercised option of a customised price-quality path for EDBs and gas pipeline businesses, or in an individual price-quality path setting for Transpower.

3.22 The overall regulatory framework involves multiple potential incentives that operate at different levels of the businesses. The framework also seeks to balance difficult trade-offs between quality, network investment and price.

3.23 Under price-quality regulation, incentives to reduce capital (and operating) expenditure always arise during a regulatory period (once allowed revenues have been set). However, these incentives are mitigated by:

3.23.1 investors in regulated suppliers having a longer-term focus, and being unlikely to concentrate on incremental incentives for investment (whether positive or negative);

3.23.2 quality standards, and the consequent penalties for breaching these;

3.23.3 the need for a regulated business to credibly argue for an investment allowance at the beginning of the next regulatory period;

3.23.4 summary and analysis of relative supplier performance (including scrutiny of asset management plans), and of supplier performance over time, under information disclosure regulation; and

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92 Professor Ingo Vogelsang "Review of New Zealand Commerce Commission 'Proposed amendment to the WACC percentile for electricity lines services and gas pipeline services', paper published on July 22, 2014" (31 July 2014), paragraph 6.

93 Professor Ian Dobbs "Proposed amendment to the WACC percentile for the Allowed Rate of Return, Comments on the Application of the Dobbs [2011] model" (Report prepared for the Commerce Commission, 17 September 2014), paragraph 4.

3.23.5 other factors outside the Part 4 regulatory regime (including, for example, mandated safety standards and the potential for reputational harm to directors if "the lights go out").[94]

3.24 These incentives have implications for how a WACC uplift might affect investment incentives. In particular, for an uplift to be effective, investors in a gas or electricity lines business must care about the long-term value of the business (their investment).[95] This longer-term focus can mitigate any incentive to run down the network for short-term gain provided by the price or revenue cap regulatory regime.

3.25 We develop quality standards when setting price-quality paths, and these can create incentives to invest. For a variety of reasons (including the asymmetry of information between the regulator and the supplier), these standards are difficult to specify.[96] As quality becomes better understood, for example through further information disclosure and summary and analysis, the incentives and controls on quality are likely to improve.[97] In future, we would expect to be in a better position to link incentives to service quality and other outputs for suppliers subject to price-quality regulation. For instance, the scheme we have recently introduced for Transpower links asset health and performance measures to revenues. As such measures are developed and disclosed, we should also be in a better position to identify issues with, or risks to, network performance early.

3.26 The relative importance of each of these differing incentives will vary from supplier to supplier, for example reflecting the ownership structure of the firm and the differing investment needs of each network and its consumers. Opportunities to innovate can take a variety of forms, and can vary over time and between suppliers.

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94 These are discussed in more detail in Commerce Commission "Regulatory Incentives and the Cost of Capital: Working Paper" (23 June 2014). A number of submissions for regulated suppliers characterised our view that Boards and investors will want to ensure the "lights do not go out" as taking advantage of firms' reputational and social concerns to push them to make 'sub-normal returns' over an extended period (eg, Vector "Submission on Draft Determination to amend the WACC percentile" (29 August 2014), paragraph 65). This was not our intention. Our point was that the incentives influencing investment decisions of regulated suppliers act at range of levels (including investors, Boards, and management) and not all these incentives are purely financial. We do not consider it to be consistent with the long-term benefit of consumers for suppliers subject to price-quality regulation to not have an ex ante opportunity to earn normal returns, although suppliers may earn more or less than normal returns ex post. However, a WACC uplift is only needed to the extent that other incentives are not sufficient to mitigate the risk of under-investment.

95 Commerce Commission "Regulatory Incentives and the Cost of Capital: Working Paper" (23 June 2014), paragraphs 9-14.

96 Commerce Commission "Regulatory Incentives and the Cost of Capital: Working Paper" (23 June 2014), paragraph 42.47. We are proposing to put in place an incentive scheme for electricity distribution businesses that rewards performance on quality better than the standards, and penalises performance that does not meet the standards.

97 Commerce Commission "Regulatory Incentives and the Cost of Capital: Working Paper" (23 June 2014), paragraph 48-50.

The relative importance of the incentives to invest and innovate for each supplier is therefore also likely to vary over time.

3.27 The incentives on suppliers from the uplift on WACC also vary during the regulatory cycle. This was noted by Oxera.[98]

3.27.1 *Prior to the price control period:* A business has an informational advantage over the regulator in developing its investment plan for the next regulatory period. If the WACC is set higher, this will strengthen the business' incentive to convince the regulator of the need to expand investment.

3.27.2 *During the regulatory period:* During the price control period, the business has incentives to economise on investment—ie, capex.[99] This incentive is a central feature and rationale for CPI-X regulation. This rationale is based on the expectation that the incentive is constrained by the quality standards the supplier must meet. While a higher WACC may mitigate this incentive, generally the WACC uplift incentive is much weaker than the incentive to delay investment during the regulatory period. (If the WACC uplift provided a stronger incentive to invest that would negate the central role of CPI – X regulation in encouraging economising of capex.) For the regulated entity, unduly deferring investment may undermine the credibility of future investment allowance requests, approval of which opens the way to NPV-positive investment in the future, assuming WACC is set above the mid-point.

3.27.3 *At the end of the regulatory period:* The regulator may seek additional commitments to invest, if under-investment is observed. It may tighten quality requirements. It will take into account the actual investment undertaken relative to the business' previous forecast in resetting the price path.[100]

3.28 In summary, there are numerous factors influencing suppliers' overall incentives to invest. The relative significance of these incentives varies from supplier to supplier, and over time. There are potentially complex interactions between investment, capital expenditure incentives, quality incentives, innovation, and the uplift to WACC.

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98 Oxera "Input Methodologies: Review of the '75th percentile' approach" (23 June 2014), page 13.

99 However, it does not follow that under-investment will necessarily result. In Australia the main concern has been that the industry has over-invested. See, for example: AER "Economic regulation of transmission and distribution network service providers AER's proposed changes to the National Electricity Rules" (September 2011) and Australian Productivity Commission "Electricity Network Regulatory Frameworks" (April 2013).

100 We note a difference between actual and forecast investment could represent either more efficient investment or under-investment.

3.29 In our view, the uplift to WACC has a role in determining a supplier's overall incentives to invest, but it is only one part of the mix. Other factors also create and influence suppliers' incentives to invest.

The relationship between a WACC uplift and targeted incentive schemes

3.30 The IMs include an incremental rolling incentives scheme (IRIS), which provides a mechanism by which regulated suppliers subject to a price-quality path are able to retain the benefits of efficiency gains beyond the end of a regulatory period.[101] We have also recently introduced a number of new incentive measures specifically for Transpower that link grid outputs and quality standards (relating to asset performance, grid performance and asset health) to revenues.[102] In addition, as part of setting default price-quality paths for EDBs from April 2015, we are proposing new targeted incentive schemes for network reliability, as well as for demand side management and energy efficiency.[103]

3.31 The IRIS increases the incentives on suppliers to economise on operating expenditure. We have proposed extending the IRIS to include capital expenditure.[104] In our draft decision on the WACC percentile, we noted that some expenditure is discretionary and a supplier may reduce expenditure to achieve short-term profit targets. The ability to defer expenditure creates a buffer if returns are falling short of target, or the allowed WACC for that period is too low.[105] Therefore, we suggested that the deferred or reduced expenditure induced by the IRIS could also offset a shortfall in WACC and reduce the risk of under-investment from too low a WACC.

3.32 A number of submissions for regulated suppliers argued that the existence of an IRIS scheme should not be a reason to set the WACC at a lower level than it otherwise

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101 Electricity Distribution Services Input Methodologies Determination 2012 [2012] (NZCC 26); Gas Distribution Services Input Methodologies Determination 2012 [2012] (NZCC 27); and Gas Transmission Services Input Methodologies Determination 2012 [2012] (NZCC 28); and Transpower Input Methodologies Determination 2012 [2012] (NZCC 17).

102 Commerce Commission, Setting Transpower's individual price-quality path for 2015 – 2020, [2014] NZCC 33, (29 August 2014), Chapter 4.

103 Commerce Commission, Proposed Default Price-Quality Paths for Electricity Distributors from 1 April 2015, (4 July 2014), Chapters 6 and 7.

104 Commerce Commission, "Proposed amendments to input methodologies: Incremental Rolling Incentive Scheme" (18 July 2014).

105 We noted that even if the expected return is less than the WACC, investment may occur.

should be.[106] Others have submitted that we should not take into account aspects of the regime that are not yet in place.[107]

3.33 We agree with those submitters that consider the main role of these kinds of incentive schemes, whether already in place or proposed for the future, is to provide a reward or penalty for investments at the margin. These schemes are not intended to compensate for a WACC that is consistently set too low.[108]

3.34 Our intention is to set the most appropriate WACC percentile that balances s 52A(1)(a) and (d) in light of the long-term benefit of consumers, as opposed to relying on other mechanisms to compensate for an inadequate WACC uplift. However, given the uncertainties in the WACC estimate, in the link between the WACC uplift and investment, and in the relationship between investment and consumer benefits, there could be some types of investment which a WACC uplift is not particularly effective in promoting.

3.35 As is explained in the next section, we consider that targeted incentive schemes are likely to be more effective than a WACC uplift where the objective is to provide an explicit positive incentive for a specific type of investment. We also note Professor Vogelsang's observation that, even if our decision on the appropriate WACC percentile results in a reduction from the current 75th percentile:[109]

> …if the allowed WACC were set at 67% then reliability incentive regulation could increase the achieved WACC relative to the allowed WACC and therefore could under very good reliability performance even get the firms back to something like the 75th percentile. Thus, a further advantage of using the 67th instead of the 75th percentile is that it provides more room for the NZCC to use positive incentives ("carrots") for improving reliability. Thus, the grid owners may come closer to their old profitability via reliability incentives. Since reliability is the result

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106 For example, PwC "Submission to the Commerce Commission on proposed amendment to the WACC percentile for electricity lines services and gas pipeline services, made on behalf of 20 Electricity Distribution Businesses" (29 August 2014), paragraph 40.

107 For example: Orion "Submission on Commission's Draft Decision on the WACC Percentile" (29 August 2014), paragraph 47.

108 For example, Incenta submitted that: "A key component of financial incentive schemes for service performance that are normally implemented is that, irrespective of the marginal incentive during the regulatory period not to spend, the regulated firm will make a normal return if it spends at the level that it is forecast to be required. Therefore, the role of the schemes are to provide a reward or a penalty for improvements or detriments to service performance *at the margin*. Such controls and incentives are not normally applied, however, to make up for shortcomings elsewhere in the regulatory scheme, such as a low WACC. Indeed, there is good reason to suggest that such tools are likely to be ineffective for this task" (Incenta Economic Consulting "Rationale for setting the regulatory WACC above the midpoint value, Response to Draft Decision, Report prepared for ENA" (August 2014), page 12).

109 Professor Ingo Vogelsang "Review of New Zealand Commerce Commission 'Proposed amendment to the WACC percentile for electricity lines services and gas pipeline services', paper published on July 22, 2014" (31 July 2014), paragraph 21.

of both dedicated investments and better operating procedures, using a too high WACC uplift may bias the achievement of reliability in favor of investment.

The WACC uplift mitigates the risk of high costs to consumers from under-investment

3.36 We have set a WACC uplift in the expectation that doing so will mitigate the risk that the WACC is 'too low', which could result in consumers of regulated services suffering significant losses due to under-investment. We consider the most likely area where consumers might suffer higher costs in future as a result of under-investment is service quality, with the most significant costs resulting from major supply outages.[110]

3.37 As is discussed in more detail in Chapter 5, submitters for regulated suppliers have drawn our attention to a range of different types of investment which they consider require positive incentives through a WACC uplift. These include:

3.37.1 *quality*: investments to provide services at the quality consumers demand, which could include investments to maintain service quality, and investments to improve service quality;

3.37.2 *demand growth*: investments to meet current and future consumer demand for regulated services, which could include increased demand from existing consumers, and increased demand due to new consumers;

3.37.3 *innovation*: innovation investments, in either regulated services or related unregulated services;[111] and

3.37.4 *economic investments*: investments that have a positive net benefit to consumers of regulated services, and/or to the wider economy (eg, investments to reduce transmission grid congestion and which enhance competition in generation).

3.38 A number of submissions from regulated suppliers have suggested that a WACC uplift should be used to avoid the risk that, without the uplift, specific investments with a positive net benefit to consumers would not occur. In their view this is particularly the case for certain innovation investments, economic investments, and for investments made to meet new demand. According to these submissions, we

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110 A number of submitters agree. For example, Vector has submitted that "as many of the expert reports have set out, the most significant cost of under-investment is likely to be a major failure of supply with a substantial cost to the economy" (Vector "Further WACC percentile cross-submission" (23 September 2014), paragraph 9).

111 We note that, in the context of the s 52A purpose, a WACC uplift has no explicit role to play in providing incentives for investments in new *unregulated* services. Incentives to invest in unregulated services are dealt with under Part 4 solely through s 52T(3), which requires that the input methodologies for cost allocation do not unduly deter investment in unregulated services by a supplier of regulated services.

should be concerned about investments 'at the margin' and ensure that positive incentives are in place to stimulate such investments.[112]

3.39 We are mindful that a WACC uplift will apply to the entire RAB, and not just to any incremental investment that is expected to not otherwise occur without the WACC uplift. With a WACC uplift, consumers pay a significant ex ante 'premium', in the form of higher prices over the long term, to mitigate the risk of under-investment.[113] As Oxera observes, "the WACC is something of a 'blunt instrument'".[114] Similarly, Professor Vogelsang explains that:[115]

> Using the WACC uplift is a very broad policy tool. Unless one uses it on a case-by-case basis it addresses all of the regulated firm's investments, those that are highly valuable and central to the public and those that are more tangential. Thus, the consumers may have to pay more for all the firm's investments in order to incentivize just a few of them. Thus, there may exist more targeted tools to achieve the same outcome or those targeted tools may complement the WACC uplift. I see this as a particular task and opportunity if different industries like transmission and distribution grids receive the same WACC uplift but may be characterized by different investment problems. In that case policies other than the WACC uplift may be able to bridge some of the differences.

3.40 Professor Vogelsang also highlights that consumers derive benefits from the stock of assets, not from the ongoing investments.

> However, the ongoing investments increase the stock of assets, while without investments the passage of time and the ongoing use decrease the stock of assets. Thus, the effect of a reduction in investment on consumer welfare depends on the amount of the investment reduction and on the time during which investment was lowered. A small reduction in investment will generally have a substantive effect only if it persists for a long time, while a large reduction will already have sizable effects after a moderate amount of time.[116]

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112 For example, Vector "Submission on Draft Determination to amend the WACC percentile" (29 August 2014), paragraphs 44-46.

113 One way to address this issue might be to set a 'two-tier' or 'split' cost of capital. As is explained in Chapter 4, during the consultation process on the current decision, no submitters supported considering a split cost of capital now. We intend to consider this approach further as part of 7-year review of IMs. We note, however, that a split cost of capital would still be set ex ante. Therefore, compared to a more targeted ex post approach, there is a risk that consumers might not be better off in the long term.

114 Oxera "Review of expert submissions of the input methodologies, Prepared for New Zealand Commerce Commission" (27 October 2014), page 2.

115 Professor Ingo Vogelsang "Review of New Zealand Commerce Commission 'proposed amendment to the WACC percentile for electricity lines services and gas pipeline services', paper published on July 22, 2014" (31 July 2014), paragraph 22.

116 Professor Ingo Vogelsang "Reply to Comments on my June 12, 2014, paper 'On the economic effects of allowing a WACC above the mid-point'" (Report prepared for the Commerce Commission 20 October 2014), paragraph 14.

3.41 Consequently, we recognise there is a risk that consumers pay the premium due to the WACC uplift but:

3.41.1 the WACC uplift makes little or no difference to marginal investment incentives and future investment levels, or

3.41.2 the incremental investment occurs but that investment makes little or no difference to the likelihood that future costs are avoided (eg, the costs of major supply outages), or

3.41.3 more generally, the incremental investment occurs but, over time, the benefits to consumers do not equal, let alone exceed, the costs of the uplift through higher prices.

3.42 To the extent that any additional positive incentives to actively promote greater investment might be justified, we consider that targeted ex post investment incentive mechanisms (involving rewards and/or penalties that affect allowable revenue) are likely to be more effective for some types of investment than an ex ante WACC uplift. This is because, with a targeted ex post investment incentive mechanism:

3.42.1 any rewards or penalties can be specifically linked to a particular benefit/outcome having occurred, or to the investment that is expected to result in that benefit/outcome having occurred;[117]

3.42.2 the scheme would not require consumers paying a premium through higher prices without those benefits (or investments) occurring; and

3.42.3 because the premium relates to the marginal investment/benefit (rather the entire RAB), in circumstances where the expected benefit arises (or the investment occurs) it would be more cost effective way of delivering that benefit than a WACC uplift.

3.43 On the other hand, a targeted ex post incentive scheme is unlikely to be ideal for avoiding major supply outages because:

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[117] For instance, for Transpower's forthcoming regulatory period (ie, RCP2), we have set 23 very specific revenue-linked asset performance, grid performance and asset health measures for Transpower—eg, some of these are linked to Transpower commissioning a certain number of assets (such as transformers, circuit breakers etc) within a particular timeframe. Our decision also recognises that additional measures could be introduced for Transpower in the future—eg, we have included a number of asset health measures that are not linked to revenue in RCP2, but which we have indicated could be linked to revenue in RCP3 (refer: Commerce Commission "Setting Transpower's individual price-quality path for 2015 – 2020" [2014] NZCC 33 (29 August 2014), Chapter 4). Similar targeted incentive schemes could potentially be introduced for EDBs as well, particularly in the context of a customised price-quality path. For instance, we have noted that suppliers may provide information on possible incentive, innovation, or quality mechanisms (under s 53M(2)) in their CPP proposals (IM Reasons Paper, paragraph 9.2.5).

3.43.1 it is difficult to link an effective reward mechanism to the avoidance of a major outage occurring;

3.43.2 where an ex post penalty is applied, the cost to consumers will have already been incurred once any penalty takes effect;

3.43.3 it can be difficult to determine the liability for an outage, whether the outage was due to negligence, or what prudent actions the supplier should have taken to mitigate the risk and impact of the outage; and

3.43.4 any ex post penalty would potentially be very large, but the level at which the penalty can realistically be set is likely to be significantly lower than the cost incurred by consumers due to the outage.[118]

3.44 Therefore, the main reason we have set a WACC uplift is to mitigate against the risk of under-investment relating to service quality generally, and contributing to major supply outages in particular. However, as Oxera observes, "a higher WACC may incentivise greater investments of all kinds".[119] We agree. Compared to setting the WACC at the mid-point, a WACC uplift should also reduce the risk of under-investment in other types of investment as well.

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118 This does not mean there is no role to play for quality incentive mechanisms to be applied. However such schemes may be more effective at providing incentives for more gradual changes in average network reliability.

119 Oxera "Review of expert submissions of the input methodologies, Prepared for New Zealand Commerce Commission" (27 October 2014), section 5.3.

4. Why we can make a decision on the WACC percentile now

4.1 This chapter explains:

4.1.1 why we have sufficient evidence to make a decision on the appropriate WACC percentile now;

4.1.2 our view that there are no significant interdependencies with other aspects of the cost of capital IMs (or the wider regulatory regime) which prevent us from amending the WACC percentile now; and

4.1.3 our approach to future reviews of the WACC percentile.

We have sufficient evidence to make a decision on the WACC percentile now

Significant new evidence since the IMs were originally set

4.2 Since the IMs were originally set in 2010, we have gathered a significant amount of new evidence regarding the appropriate WACC percentile.

4.3 This new evidence and analysis is significantly more extensive than that previously available to us and the Court. The evidence includes relevant academic literature, independent expert reports and modelling we commissioned, further analysis of available data by us, observations of market transactions since the IMs were set and expert reports submitted by interested parties.[120] Therefore, we are now in a much better position to make an evidentially-robust decision regarding the appropriate WACC percentile.

4.4 Our independent experts, and interested parties' experts, have a range of views, and adopt analytical frameworks which differ on certain aspects. The lack of consensus among experts is unsurprising, because there are "known unknowns" that cannot be resolved with empirical or theoretical analysis (Oxera refers to this as "fundamental uncertainty" in its report). Further, as far as we are aware, no regulator has ever attempted to empirically estimate the 'optimal' WACC percentile before.

4.5 Although there are gaps in the available evidence, this is always going to be the case due to the fundamental uncertainty referred to above. For example, Professor Vogelsang notes there are some empirical relationships, which can be crucial to the analysis, but which we know very little about. For example:

[120] The available evidence is summarised in Chapter 5.

4.5.1 little is known about the relationship between under-estimating the WACC and the resulting change in investment;

4.5.2 little is known about the relationship between under-investment and any change in reliability;[121] and

4.5.3 there is some knowledge about how a change in reliability may change welfare (the costs to consumers of outages) but quantification is subject to significant error margins.

4.6 Similar uncertainties arise in assessing the effect of under-estimating WACC on possible changes to long-term benefits to consumers resulting from factors such as innovation and increased competition.

The process has allowed enough time for stakeholders to provide their views and for the Commission to make a robust decision

4.7 Some submissions argued that the review has been rushed, with the result that:

4.7.1 stakeholders have not had enough time to meaningfully engage in the process, particularly given other regulatory obligations facing suppliers during the review; and

4.7.2 the Commission has not had enough time to develop appropriately robust evidence and reach a robust decision.

4.8 In this light, we note that the Electricity Networks Association (ENA) has requested that the Commission release another draft decision for further consultation.[122]

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121 As part of its cross-submission on our draft decision, NZIER provided some analysis regarding the link between investment and network reliability, and the value to consumers of supply interruptions and reliability investment. Given this analysis might be considered new material, we invited further submissions. Covec responded that there is still very little evidence on the link between investment and reliability, and that the work on the potential value consumers place on extra reliability was "preliminary" (Covec "Cross-submission on Dobbs and NZIER" (Report prepared for BARNZ, 30 September 2014), page i). Vector considered that NZIER had not focused on the most significant cost to consumers of under-investment—a major failure of supply—and disputed some of NZIER's data (Vector "Further WACC percentile cross-submission" (23 September 2014), paragraph 9), and Transpower submitted that NZIER's analysis is solely focused on electricity distribution and not transmission (Transpower "Proposed amendment to the WACC percentile: Invitation for submissions on further evidence "(30 September 2014), page 5). We note that NZIER itself simply describes its 'brief cross-submission' as providing a 'way forward' (NZIER "Valuing investments in network reliability, and approach to estimating the value of reliability in electricity networks subject to WACC IM, (Report prepared for MEUG, 9 September 2014), page 14).

122 ENA "ENA cross-submission on recent submission to the Commerce Commission on choice of WACC percentile" (30 September 2014), page 6.

4.9 When considering when to undertake this review, one of the factors we took into account was the upcoming price-quality path resets for electricity distributors and Transpower which take effect from April 2015. When we decided on the timeframes for this review process, we expressed our strong preference to complete this process so that any resulting change to the percentile could be implemented in time for the electricity price-quality path resets.[123] Our preference to complete the review in time for the resets, which we have revisited since considering submissions, has always been subject to the Commission being confident that it has sufficient evidence, in light of the High Court's comments, to make a robust decision on the appropriate percentile.

4.10 The process has generated a significant new volume of evidence on the WACC uplift issue. The review has engaged economic, finance and legal experts from a number of jurisdictions, and examined the practice of other comparable regulators. We are confident that we have heard a wide range of views and the best available evidence on the topic of WACC uplifts. We have also received and considered a variety of types of evidence (empirical, analytical and theoretical), and been able to observe market-based responses to the WACC percentile that was set in 2010.[124]

4.11 We have tested our thinking and evidence with stakeholders over an extended consultation period, and have considered all of the expert reports and submissions we have received. We observe that:

4.11.1 interested parties have been aware since late March 2014 that we were further considering the choice of WACC percentile, and particularly seeking to develop a loss analysis model. We have sought their input repeatedly since that point, over approximately six months;

4.11.2 our expert reports were released in late June 2014, four weeks before our draft decision, to give submitters almost ten weeks to respond to them;[125]

4.11.3 following our draft decision, we invited submissions, cross-submissions, and another limited consultation round on specific topics (as requested by some submitters);

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123 Commerce Commission "Further work on the cost of capital input methodologies: Process update and invitation to provide evidence on the WACC percentile" (31 March 2014), paragraphs 9-10.

124 As noted by Webb Henderson, we consider that the probative value of any evidence depends on the quality of the evidence, rather than simply the type of evidence. (Webb Henderson "Commerce Commission reopening of WACC percentile estimate" (Advice prepared for Transpower, 30 September 2014), pages 3-5).

125 We note Wellington Electricity's submission ("Proposed amendment to the WACC percentile for electricity lines services and gas pipelines services" (29 August 2014), page 15) that it would have been helpful if the Commission held a conference of experts prior to reaching its draft decision. We appreciate that conferences can be a useful way for experts to engage with each other; although, we consider that in the course of the current review, experts have still had the opportunity to critique each other's work.

4.11.4 submitters have strongly engaged with the review process and have generated a large volume of submissions, including a significant amount prepared by expert advisors and consultants; and

4.11.5 submitters have not in our view identified further useful analysis that could have been undertaken had the review process been longer that would have made a material difference to the robustness of our decision.[126]

4.12 We continue to hold the view that further work cannot resolve all aspects of the fundamental uncertainty regarding the key empirical relationships referred to by Professor Vogelsang. Although the amount of information will increase and improve over time, fundamental uncertainty will remain.

4.13 Therefore, we must ultimately exercise judgement when selecting the WACC percentile. This is always going to be the case and is acknowledged in submissions. For example, Incenta (for the ENA) observe that:[127]

> given the difficulty of quantifying the link between the regulatory WACC and investment levels, it would most probably be an impossible exercise to attempt to derive a scientific answer to the question of the extent to which the regulatory WACC should be set above the mid-point level, and should instead be a matter where the Commission exercises judgement.

We are confident we have sufficient evidence to support amending the WACC percentile now

4.14 Submissions on behalf of regulated suppliers and investors generally argue that the evidence before us is not sufficiently robust to justify moving from the current 75th percentile (and may even indicate the 75th percentile is 'too low').[128] On the other hand, submissions on behalf of consumers generally argue that the evidence does not support moving from the appropriate 'starting point' for our decision, namely

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126 A number of submitters have identified areas for possible further work, such as: work on the link between investment and reliability, and the value consumers place on reliability (refer footnote 121); and further refinements to the Dobbs model (eg, Frontier Economics "A submission on Prof Ian Dobbs' comments on our implementation of his loss function model" (Prepared for Transpower, September 2014), p iii and vi-vii).

127 Incenta Economic Consulting "Rationale for setting the regulatory WACC above the midpoint value" (report prepared for Electricity Networks Association, May 2014), page 4. See also NERA Economic Consulting "Review of the WACC Percentile: A Report for the New Zealand Airports Association" (report prepared for New Zealand Airports Association, 5 May 2014), pages 31-32. Auckland UniServices Ltd "Comment on "Further work on the Cost of Capital Input Methodologies. Commerce Commission invitation to provide evidence on the WACC percentile"" (report prepared for New Zealand Airports Association, 1 May 2014), pp.4-5, 12. Frontier Economics "Evidence on the WACC percentile: A Report prepared for Transpower in response to the Commerce Commission consultation" (report prepared for Transpower New Zealand Ltd, May 2014), page 18.

128 For example: ENA "ENA cross-submission on recent submission to the Commerce Commission on choice of WACC percentile" (30 September 2014), pages 5-6; and Infratil "Infratil Limited Submission to the Commerce Commission on the WACC percentile to be applied in respect of energy distribution assets" (12 September 2014), paragraph 4.

the mid-point estimate, and therefore we should amend the WACC percentile used in price-quality regulation now, by setting it to the mid-point.[129] Any subsequent change from the mid-point, or from the current 75th percentile—depending on whether a consumer or supplier perspective is taken—should therefore only be considered (if at all) as part of the 7-year IM review.

4.15 Suppliers and consumers also imply that the credibility of, or the certainty provided by, the Part 4 regime will be undermined if based on the evidence currently before us we, on the one hand, shift from the current 75th percentile,[130] or on the other, provide any uplift from the mid-point.[131]

4.16 On balance, it is our view that the available evidence is sufficient to proceed with making a decision on an amendment to the WACC percentile now. This is because:

4.16.1 much more information to choose a percentile is available now, compared to when we determined the 75th percentile in 2010;

4.16.2 given the Court's questioning of the future use of the 75th percentile, it is appropriate to reconsider the appropriate percentile now (especially because the price-quality paths for EDBs and Transpower are being reset later this year);

4.16.3 the evidence now available is sufficient in our view to confidently define a range, and to inform our exercise of judgement within that range;

4.16.4 in particular, we consider the evidence currently before us supports a WACC uplift from the mid-point, at least to the 60th percentile, and supports our conclusion that the 75th WACC percentile is 'too high';[132] and

4.16.5 based on the evidence we have seen, and the suggestions made by submitters, the benefit of substantial extra work now in terms of further narrowing the range is likely to be low, in our view, and would not remove the need for us to ultimately exercise our judgement.

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129 For example: NZIER "No case for WACC uplift, a brief review of the 17 September Dobbs paper in the context of the WACC uplift question. (Report prepared for MEUG, 30 September 2014), paragraph 58; BARNZ "Further submission from BARNZ on cost of capital input methodology" (30 September 2014), pages 5-6.

130 For example: ENA "ENA cross-submission on recent submission to the Commerce Commission on choice of WACC percentile" (30 September 2014); and Vector "Submission on Draft Determination to amend the WACC percentile" (29 August 2014), paragraph 89.

131 For example, MEUG "Cross-submission on proposed amendment to WACC percentile" (29 August 2014), paragraph 30.

132 We reject Vector's submission that placing the most weight on this evidence is being 'selective' (Vector "Submission on Draft Determination to amend the WACC percentile" (29 August 2014), paragraph 85). Inevitably when we exercise judgement, we have to decide which evidence is the most compelling.

4.17 It was also important that, provided we felt confident doing so, we concluded the review and reached a decision before the price-quality paths for electricity lines services are reset for the next five years. We consider that the benefits of reaching a decision now outweigh the possibility that more conclusive evidence may come to light if we further extend the consultation. In these circumstances, we do not consider it appropriate for the benefits of lower prices to consumers of electricity lines services from a lower WACC uplift to be delayed until the following regulatory period beginning in 2020.

Why can we make a decision on the appropriate WACC percentile only

4.18 We have made a decision on the appropriate WACC percentile separately from a review of other aspects of the cost of capital IMs (or of other IMs). We can do so as we consider:

4.18.1 establishing a WACC distribution is a transparent and replicable way of determining the WACC uplift;

4.18.2 the choice of percentile is not materially interdependent with other aspects of the IMs such that we cannot make a decision to amend the percentile now;

4.18.3 the mid-point estimate of WACC is not biased;

4.18.4 we can set the uplift without it needing to reflect other sources of uncertainty in the standard error; and

4.18.5 that catastrophic events and other asymmetric risks are best addressed through cash flows (eg, by resetting price paths) rather than an uplift to the mid-point estimate of WACC.

A WACC distribution provides a transparent and replicable way of setting a WACC uplift

4.19 As noted in Chapter 1, under the current cost of capital IMs we estimate a mid-point WACC and a standard error of our estimate of WACC. The standard error of our estimate of WACC incorporates our assessments of the standard errors of our estimates of asset beta, the debt premium, and the TAMRP. The standard error is used to assess the distribution of our estimate of WACC. In particular, it provides an indication of how adding various uplifts to our central estimate of WACC would reduce the risk that the value we adopt for WACC is lower than the true (but unobservable) WACC, given this determines the cost that consumers have to bear to mitigate the risks of under-investment. We acknowledge that our estimate of the standard error, and therefore the percentiles we calculate, are subject to uncertainty.

4.20 A number of submissions have argued that when we describe our estimated WACC distribution and WACC percentile, we imply a level of statistical precision beyond what can be reasonably justified.[133]

4.21 We agree that descriptions of WACC estimates and the WACC distribution should not imply a level of statistical precision beyond what is reasonably justified. As is set out in our 2010 IMs reasons paper, we selected the current approach, compared to simpler approaches, because it makes greater use of statistical information regarding the level of uncertainty of individual parameter estimates, and it is transparent and still easy to replicate.[134] We acknowledged that the main disadvantages of the approach are that:[135]

> …although greater use is made of statistical information, the use of such information might create a sense of precision that is not warranted. Also, some degree of judgment is still involved when applying this approach. Finally, the assumption of the overall cost of capital estimate being normally distributed is unlikely to be satisfied in reality.

4.22 When we issued our draft decision on the amendment to the WACC percentile, we also noted that the WACC percentile does not represent a precise statistical estimate.[136]

4.23 The main purpose of assuming a WACC distribution continues to be to set the WACC uplift in a way that is easily understood, transparent and can be replicated by stakeholders. The statistical accuracy of the approach is second order. We consider addressing a number of points raised by submitters about the approach generally, and the way the standard error is determined (discussed further below), *might* result in improved statistical accuracy of the WACC distribution. However it would not support the main purpose of the WACC distribution–ie, allowing us to set the WACC uplift in a way that is simple, transparent and easily replicated.

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133 For example: Sapere "Proposed amendment to the WACC percentile – Commerce Commission's draft decision (Report prepared for Vector, 29 August 2014), sections 5.1.1-5.1.2; and HoustonKemp "Comment on the Commerce Commission's Proposed WACC Percentile Amendment" (Report prepared for Powerco, 29 August 2014), page 3.

134 Commerce Commission "Input methodologies (Electricity Distribution and Gas Pipeline Services): Reasons Paper" (December 2010), paragraph H11.21.

135 Commerce Commission "Input methodologies (Electricity Distribution and Gas Pipeline Services): Reasons Paper" (December 2010) paragraph H11.22.

136 In our draft decision on the WACC percentile, we explained that we "use the term 'WACC percentile' as a short-hand only, not in its true statistical meaning" (Commerce Commission "Proposed amendment to the WACC percentile for electricity lines services and gas pipeline services" (22 July 2014), footnote 11).

There are no interdependencies which prevent amending the WACC percentile now

4.24 Some submissions argued that we should not amend the WACC percentile now due to interdependencies with other aspects of the regulatory regime. We are not persuaded by these arguments.

4.24.1 In the 2010 IMs, the percentile was the last decision that was made regarding WACC, after having reached a view on all other parameters. The value for those other parameters was not a function of our choice of the 75th percentile estimate for DPP and CPP regulation.[137]

4.24.2 The rationale for an uplift to the WACC has not changed (ie, the costs to consumers of under-investment, due to setting the WACC 'too low', are likely to be higher than the costs to consumers of over-investment, due to setting the WACC 'too high'), but we have more evidence to determine the appropriate size of the uplift.

4.24.3 We do not accept that there is such a direct link between the 75th percentile and the other parameters of the IMs that the percentile cannot be amended at this time. In particular, we do not accept that we need to alter our allowance for the cost of debt, for example, the notional credit rating, if we amend our choice of WACC percentile for the reasons below.[138]

4.24.3.1 Uncertainty over the true level of the WACC stems primarily from uncertainty over the cost of equity, rather than over the cost of debt.[139]

4.24.3.2 The uplift to WACC is to encourage equity investment.

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137 A number of submitters consider that stating the WACC percentile was the 'last' decision ignores that the IM decisions, and particularly the WACC IM decisions, were consulted on 'as a package'. Therefore, if the Commission adopts a different point estimate it is removing 'one of the planks' that is rested on when making those decisions. Consequently, the Commission can only review the WACC percentile decision at the same time as it reviews its decision to use the simplified Brennan-Lally CAPM, and the individual parameters used in that model (eg, Powerco "Proposed amendment to the WACC percentile for electricity lines services and gas pipeline services" (29 August 2014), paragraphs 110-116). We note that the Court's approach, when considering the WACC percentile, was to treat this independently of the other parameters (*Wellington International Airport Ltd & Ors v Commerce Commission* [2013] NZHC [December 2013], paragraphs 1458-1459). To the extent that parties want to further submit on these other parameters the IM review under section 52Y is the appropriate place to do so.

138 CEG "Review of the use of the 75th percentile: A Report for Orion" (report prepared for Orion New Zealand Limited, May 2014), pp.17-18.

139 Of the three components of the standard error of the WACC, two (in respect of the asset beta and TAMRP) relate to the cost of equity, whereas the standard error of the debt premium relates to the cost of debt. The latter has an immaterial impact on the standard error of the WACC (removing it reduces the WACC by 0.01%).

4.24.3.3 The uplift to the 75th percentile estimate was not introduced to ensure financeabilty of debt at the BBB+ credit rating assumed in the IMs.

No bias in mid-point estimate

4.25 Throughout the consultation process, several submissions have argued that our mid-point WACC estimate is biased downwards, and the 75th percentile is needed to help offset this.[140] Some submissions reiterate factors that were considered at the time the 75th percentile was set, and during the merits appeals, such as the term of debt used in the WACC IM. Submissions on behalf of regulated suppliers consider the cost of debt should be based on a longer debt term than the IM currently provides.[141]

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140 CEG (for Wellington Electricity) submit, by reference to comparative data from other regulators, that we should not be considering removing the 75th percentile from the IM WACC without also revisiting the IM mid-point WACC. We discuss the comparative data from other regulators in Attachment D.

141 For example: Powerco "Proposed amendment to the WACC percentile for electricity lines services and gas pipeline services" (29 August 2014), paragraph 127-128; and CEG "Economic Review of Draft Decision on the WACC percentile, a Report for NZ Airports" (August 2014), section 5.1. In support of its submission, CEG states that the High Court found the Commission's "construction and explanation for the inclusion of the TCSD" (ie, the term credit spread differential) in the WACC IM "problematic". The TCSD allowance accommodates the additional debt premium and the interest rate swap execution costs that a regulated supplier may incur if it issues debt with a term exceeding five years (which is the standard debt term in the WACC IM), irrespective of whether the supplier actually incurs those costs. CEG submits that we have ignored deficiencies identified in the TCSD and that addressing these might have caused us to reach a different conclusion on the appropriate WACC percentile (from para 164 of CEG's submission). We do not consider that the TCSD should have been reconsidered alongside the WACC percentile:

- The High Court did not identify deficiencies in the TCSD that the 75th percentile was required to compensate for. Indeed, the High Court was not persuaded of the need for a TCSD at all. (*Wellington International Airport Ltd & Ors v Commerce Commission* [2013] NZHC [December 2013], at [1285]). (Further, the High Court was not persuaded that it would be materially better for the term of the risk-free rate and debt premium to be greater than the term of the regulatory period (*Wellington International Airport Ltd & Ors v Commerce Commission* [2013] NZHC [December 2013], at para [1287]).
- If, at the next IM review, we reach the view that the parts of the IM relating to the TCSD, or the cost of debt more generally, need to be amended, we would seek to make such amendments directly to the parts of the IM relating to the cost of debt, rather than indirectly compensating for these through our choice of a WACC percentile.
- Dr Lally's comments on the TCSD with respect to the UBA and UCLL services relate to a different Act, especially the definition of TSLRIC in Schedule 1 of the Telecommunications Act 2001 which requires us to estimate "forward-looking costs", whereas the design of the TCSD for the energy companies reflects the fact that many regulated suppliers have not issued longer-term debt.
- CEG's estimate of the additional debt premium on longer-term debt relative to the TCSD is likely overstated: by the use of Australian BBB estimates rather than New Zealand BBB+ estimates, by including the costs of "maintaining a swap portfolio" rather than entering a swap transaction, and by making no allowance for the reallocation of issuance costs to reflect the less frequent issuance of debt (this latter consideration alone would reduce CEG's estimates of additional costs by around 15 basis points per annum, if the average initial tenor of debt was 8.5 years).

4.26 We continue to consider the mid-point is the best estimate.

4.26.1 While there is uncertainty around the true WACC, we do not agree that the mid-point is biased downwards. There is uncertainty as to whether the mid-point is biased or not. The evidence regarding the existence (and direction) of bias is hard to interpret and sometimes conflicting. Certainly, no bias has been clearly demonstrated.[142]

4.26.2 If such a bias was demonstrated, we consider this bias should be addressed directly (so that an unbiased mid-point was determined for all regulatory instruments under Part 4), rather than indirectly through the choice of WACC percentile used in setting price-quality paths.

4.27 Although some submitters suggest the 75th percentile was selected to respond to the potential for model error, the IM reasons paper states that the reasons for selecting the 75th percentile for setting price-quality paths reflected:[143]

4.27.1 that the costs from the point of view of consumers associated with under-estimation of the cost of capital in the Part 4 regulatory setting, are likely to outweigh the short-term costs of over-estimation;

4.27.2 the Part 4 Purpose (the long-term benefit of consumers);

4.27.3 the uncertainty in estimating the true cost of capital; and

4.27.4 that in workably competitive markets not all risks can be passed on to the consumer in the form of higher prices.

We can set the uplift without it reflecting other sources of uncertainty in the standard error

4.28 A number of submissions responding to our view about bias in the mid-point argue that, even if one assumes model error is not biased downwards, this does not mean model error can be ignored. The key point of these submissions is that the

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142 Powerco, supported by HoustonKemp, considers that we cannot simply observe that recommendations differ slightly, or that other studies conflict (Powerco "Proposed amendment to the WACC percentile for electricity lines services and gas pipeline services" (29 August 2014), paragraphs 121-126; and HoustonKemp "Comment on the Commerce Commission's Proposed WACC Percentile Amendment" (Report prepared for Powerco, 29 August 2014), section 3.2.1). In the absence of a clear direction of bias it would not be in the long-term benefit of consumers to make a further upward adjustment.

143 Commerce Commission, "Input Methodologies (Electricity Distribution and Gas Pipeline Services) Reasons Paper" (December 2010), paragraphs H11.62 and H11.65.

uncertainty about whether the mid-point is biased downwards itself affects the distribution around the mid-point.[144]

4.29 More generally, a number of submissions (on behalf of regulated suppliers) have argued that our estimate of the WACC standard error is too low because it does not consider all possible sources of uncertainty associated with estimating the WACC. These submissions point to a selection of factors (eg, potential model misspecification and financial market volatility) that they contend are not currently reflected in the Commission's estimate of the WACC standard error.[145]

4.30 A related argument from Sapere (on behalf of Vector) is that, because the Commission is estimating two unknown variables, the WACC mid-point and the WACC uplift, the standard error we use to arrive at the WACC percentile should be larger than our current standard error estimate, which reflects uncertainty in the WACC estimate alone.[146] Covec (on behalf of BARNZ) noted that Sapere's conclusion depends on the assumption that the WACC estimate and the WACC uplift estimate are independent variables. Covec suggests that may not be the case.[147]

4.31 Sapere presented the results of a market-based regression model in order to re-estimate the standard errors used by Oxera in its loss analysis.[148] Sapere demonstrated that based on its standard error estimates, the risks of under-estimating the 'true' WACC were higher than reported by Oxera. Oxera considered the argument and alternative probability of loss estimates presented by Sapere. In its final report, Oxera concludes that even if Sapere's conclusions are valid, the overall

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144 For example: Orion "Submission on Commission's Draft Decision on the WACC Percentile" (29 August 2014), paragraphs 35-39; and CEG "Economic Review of Draft Decision on the WACC percentile (Report prepared for NZ Airports, August 2014), section 5.2.

145 For example, CEG submits that our estimate of the standard error of the WACC does not capture variations in the risk-free rate, or in the debt premium and market risk premium during the regulatory period (CEG "Economic Review of Draft Decision on the WACC Percentile" (Report prepared for NZ Airports, August 2014), paras 185-186). This point was considered when the IMs were set, and was challenged in the merits review. Neither we nor the High Court was persuaded that variations in the risk-free rate or the market risk premium, for example, should be included in the standard error of the WACC. Consistently, we do not think this variation should be reflected in the choice of WACC percentile either.

146 Sapere "Proposed amendment to the WACC percentile – Commerce Commission's draft decision" (Report prepared for Vector, 29 August 2014), section 5.4.2.

147 Covec "Cross Submission on WACC Percentile Issues" (Report prepared for BARNZ, 11 September 2014), pages 9-10.

148 We note that Sapere did not report details of the data used to estimate this model or summary statistics on the model's 'goodness of fit'. The model's results are very sensitive to the choice of input values. Regarding Sapere's choice to use 20% standard deviation for the market, it provides references to two estimates of US share market volatility (standard deviation of around 20%). Regarding Sapere's choice to use 30% standard deviation for 'asset *i*', no explanation or reference for this input value is provided.

effect this would have on the net benefit of the WACC uplift is not material enough to change Oxera's recommended WACC percentile range.[149]

4.32 Further, if uncertainty over the true WACC is greater, and the WACC distribution is widened, then a WACC uplift becomes a less effective means of incentivising investment. It means that consumers have to pay more to achieve the investment incentives we are trying to provide. As the effectiveness declines, this would suggest we should pay greater attention to other approaches to incentivising investment. If, on the other hand, the WACC distribution were narrow, we might primarily rely on the WACC uplift, because it would be a cost effective incentive mechanism from the point of view of consumers.

4.33 We note that all the various factors that influence uncertainty in both directions should be considered together and that a fixed WACC uplift may not be the most effective or efficient means of addressing any such sources of uncertainty. More importantly, we also bear in mind that the cost of capital range is itself not a precise statistical estimate and, as recognised in 2010, involves an exercise of judgement. As was the case with the original WACC IM decision,[150] we also consider the potential for model error when undertaking our reasonableness tests (which for the purpose of this decision are described in Attachment D).

4.34 We note that we could have estimated the uplift to the WACC as a basis point adjustment (similar to how Economic Insights has compared WACC uplifts across jurisdictions). Doing so would have avoided debates about the statistical accuracy of the standard error, but could have resulted in a similar magnitude WACC uplift.[151] As we noted earlier, our approach was selected because it was the best available means to set the allowed WACC in a way that is transparent, easily understood and able to be replicated by stakeholders. To the extent that the choice of this approach introduces some uncertainty, we do not consider that it warrants consumers paying an additional premium to mitigate the potential costs of under-investment.

Catastrophic events and other asymmetric risks are best dealt with in cash flows, not WACC

4.35 Throughout the consultation process, submissions on behalf of regulated suppliers have also argued that we should select a higher percentile to cater for catastrophic

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149 Refer: Oxera "Review of expert submissions of the input methodologies" (27 October 2014), section 7.3. Oxera also notes Covec's submission questioning whether the estimates of WACC and the percentile mark-up are statistically independent, as Sapere assumes.

150 Commerce Commission "Input methodologies (Electricity Distribution and Gas Pipeline Services): Reasons Paper" (December 2010), paragraph H11.7.

151 As a reasonableness check on our current standard error, we note Figure 3.2 in Oxera's July 2014 report which illustrates that, based on a sample of regulatory determinations which involved moving away from the mid-point WACC, the Commission had the widest WACC range (Oxera "Input methodologies, Review of the '75th percentile' approach, Prepared for New Zealand Commerce Commission" (23 June 2014), page 22).

and other risks.[152] They have noted that our Orion CPP decision referred to the practical effect of using the 75th percentile as providing a buffer for catastrophic events. We consider that our observations in the Orion paper are correct. We do not agree that they require continued use of the 75th percentile as a minimum uplift to WACC. Nor do we agree that we need to make an additional allowance for bearing asymmetric cash-flow risks from catastrophic events.

4.36 It is our view that catastrophic events and other asymmetric risks are best dealt with through cash flows (eg, by resetting price paths), rather than as an addition to WACC. In the case of Orion:[153]

4.36.1 we allowed Orion to recover the prudent opex and capex costs that it incurred from the time of the earthquakes until the price path was reset;

4.36.2 we allowed Orion to recover un-recovered transmission costs (for the same period);[154]

4.36.3 the reset path for 2014-2019 reflected allowance for further prudent opex and capex;[155]

4.36.4 Orion continued to earn a return on and of capital on assets that are damaged beyond repair (but which are not disposed of).[156] Further, assets that are stranded for other reasons (such as technological change) are also not removed from the RAB, but rather remain in the RAB and continue to

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152 For example: CEG "Economic Review of Draft Decision on the WACC percentile" (Report prepared for NZ Airports, August 2014), section 5.3; HoustonKemp "Comment on the Commerce Commission's Proposed WACC Percentile Amendment," (Report prepared for Powerco, 29 August 2014), section 3.3.1; and Incenta "Rationale for setting the regulatory WACC above the midpoint value – Response to Draft Decision" (Report prepared for the ENA, August 2014), section 4.

153 Commerce Commission "Setting the customised price-quality path for Orion New Zealand Limited Final reasons paper" [2013] NZCC 21, (29 November 2013), paragraphs B59-B70.

154 Commerce Commission "Setting the customised price-quality path for Orion New Zealand Limited" [2013] NZCC 21 (29 November 2013), paragraphs B136-B140.

155 We propose to allow EDBs to recover prudent opex and capex from the time of a catastrophic event path until the path is reset. This can be done through: the DPP re-opener provision that the High Court required; the proposed recoverable cost provision we are consulting on; or through the reset of the DPP via a catastrophic event CPP. For further discussion, see: Commerce Commission "Proposed Default Price-Quality Paths For Electricity Distributors From 1 April 2015" (4 July 2014), chapter 8, pages 49-53. How Transpower's price-quality path would change if there was a catastrophic event is discussed in: Commerce Commission "Setting Transpower's individual price-quality path for 2015—2020", [2014] NZCC 23 (29 August 2014), in Attachment F.

156 Commerce Commission "Setting the customised price-quality path for Orion New Zealand Limited Final reasons paper" [2013] NZCC 21, (29 November 2013), paragraph B56.2.

earn a return on and of capital.[157] Suppliers can also apply to have depreciation recovered more quickly);[158] and

4.36.5 only some demand risk (from the time of the earthquakes until the price-quality path was reset) was borne by Orion.[159]

4.37 In respect of the residual demand risk that Orion was not able to recover, our decision on Orion's customised price-quality path:

4.37.1 explained how the impact of the Canterbury earthquakes would have only a minor impact on a diversified investor, and that such an investor would require minimal or no compensation for bearing such risks.[160] It was in this context that we noted that the practical effect of using the 75th percentile WACC was to provide a buffer against the financial impact of catastrophic events;[161]

4.37.2 explained that consumers should not bear all the risks and costs associated with catastrophic events as investors are better able to diversify their investments and manage demand risk from such events than consumers;[162] and

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157 A number of submissions and expert reports do not acknowledge this feature of the Part 4 regime. See, for example, NERA Economic Consulting "Expert Report on Cost of Capital Input Methodologies" (Report prepared for Powerco, 1 May 2014), page 17-18. The treatment of stranded assets under the IMs is discussed in: Commerce Commission "Input Methodologies (Electricity Distribution and Gas Pipeline Services) Reasons Paper", (December 2010), at paragraphs E11.1 to E11.16. CEG observes that stranding due to technological change could occur over a 10 to 20 year timeframe, whereas assets are typically depreciated over 45 years on average (CEG "Economic Review of Draft Decision on the WACC percentile" (Report prepared for NZ Airports, August 2014), section 5.3.1). Should this prospect become more likely before the next regulatory period, we consider a more appropriate response would likely be to consider changing the depreciation profile. We note that the IMs already provide for suppliers to seek an alternative depreciation profile as part of a customised price-quality path proposal (refer: Commerce Commission "Input methodologies (Electricity Distribution and Gas Pipeline Services): Reasons Paper" (December 2010), paragraph H12.28).

158 This is done through an application for a CPP with non-standard depreciation. Non-standard depreciation is discussed in the IM Reasons Paper at paragraphs E10.61 to E10.71.

159 Transpower and GTBs are subject to a revenue cap and therefore are exposed to little or no demand risk. These businesses therefore face little residual catastrophic risk.

160 Commerce Commission "Setting the customised price-quality path for Orion New Zealand Limited Final reasons paper" [2013] NZCC 21, (29 November 2013), paragraphs B73-B97.

161 Commerce Commission "Setting the customised price-quality path for Orion New Zealand Limited Final reasons paper" [2013] NZCC 21, (29 November 2013), paragraph C5.2.

162 Commerce Commission "Setting the customised price-quality path for Orion New Zealand Limited Final reasons paper" [2013] NZCC 21, (29 November 2013), from paragraph B20. Suppliers subject to revenue caps are exposed to little or no demand risk.

4.37.3 noted that the expected cost of catastrophic events is expected to have a relatively minor impact when compared to the observed cost of capital.[163]

4.38 A number of submissions continue to argue that diversification does not make these risks go away.[164] We do not consider any of the points raised by submitters change our views as expressed in the November 2013 Orion CPP decision.

4.39 CEG's submission on behalf of the New Zealand Airports Association (NZ Airports) restates its view that we have not adequately addressed how asymmetric cash-flow events are addressed, including the catastrophic events and the costs of financial distress.[165] The former was discussed above. In respect of the costs of financial distress, the IM specifies the debt premium as the promised yield on bonds. The promised yield on corporate bonds comprises the expected return to bondholders plus an allowance for bankruptcy costs plus an allowance for the value of the default option possessed by equity holders.[166] That is, debt holders know that they bear a substantial part of the costs of financial distress (including all costs after the company has defaulted on its debt) and they raise the promised yield on debt so as to provide ex ante compensation to themselves for those costs. As a result of using the promised yield, the IM already includes an allowance for much of the costs of financial distress (without the need for a separate adjustment in cash flows for the costs of financial distress).

Alternative approaches to addressing asymmetric losses from under-investment

4.40 There are a range of regulatory tools for addressing the risks associated with setting WACC too high or too low. For example:

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163 Commerce Commission "Setting the customised price-quality path for Orion New Zealand Limited Final reasons paper" [2013] NZCC 21, (29 November 2013), paragraph C31.

164 For example: CEG "Economic Review of Draft Decision on the WACC percentile" (Report prepared for NZ Airports, August 2014), section 5.3.3; HoustonKemp "Comment on the Commerce Commission's Proposed WACC Percentile Amendment" (Report prepared for Powerco, 29 August 2014), section 3.3.1; and Incenta "Rationale for setting the regulatory WACC above the midpoint value – Response to Draft Decision, (Report prepared for ENA" (August 2014), section 4. On the other hand, Covec considers the Commission's views on the notion that a percentile above the mid-point provides a buffer for investors, and on the implications of investor diversification, are strong (Covec "Cross Submission on WACC Percentile Issues" (Report prepared for BARNZ, 11 September 2014), pages 2-3). Also, Spark submits that the impact of natural disasters are a systematic risk because they are a risk to which the entire market or an entire market segment is exposed. Therefore, these risks should be compensated for under the CAPM approach to estimating WACC (Spark "Proposed amendment to the WACC percentile for electricity lines services and gas pipeline services: response to Chorus submission" (12 September 2014), paragraph 43).

165 CEG "Economic Review of Draft Decision on the WACC Percentile" (Report prepared for NZ Airports) (August 2014), paragraph 196.

166 Commerce Commission "Cost of capital Workshop (transcript)" (12 November 2009), p 182; and Lally, M., "Leverage and WACC for Transpower" (20 June 2012), p.15.

4.40.1 a requirement to supply reduces the asymmetric risk of under-investment, without the need to increase WACC;

4.40.2 quality standards, with penalties, also reduce the risk of under-investment. The changes to the Consumer Guarantees Act will similarly provide businesses with incentives to deliver quality (and invest to do so); and

4.40.3 suppliers' ability to ask for consumer contributions also provides some protection against under-investment.

4.41 Using these tools, especially changing regulated quality standards, may be a better way to mitigate the risks of under-investment than a WACC uplift (or a partial substitute to such an uplift). This is because, as Professor Vogelsang notes and as is discussed in Chapter 3, the cost to consumers of the uplift to WACC is considerable and may not be worthwhile relative to the size of the incremental investment that results.[167]

Approach to future reviews of the WACC percentile

4.42 A full review of the cost of capital IMs is required to be completed by December 2017. This will cover all aspects of the cost of capital IMs, including:

4.42.1 all the parameters and their values (including, the use of the simplified Brennan-Lally CAPM model, the term credit spread differential (TCSD), the TAMRP, the asset beta, the risk-free rate, the leverage, debt issuance costs and the debt premium);

4.42.2 estimation of the standard error of the WACC (which we use to generate the WACC distribution); and

4.42.3 the choice of percentile used in setting price-quality paths.

4.43 During that review we will reconsider any significant new information relevant to the WACC percentile, to see whether change is warranted. This is the same approach as we are required to take for all aspects of the IMs and could lead to the IMs producing higher or lower WACC estimates. We note that:

4.43.1 providing regulated services requires investment in assets with long lives;

4.43.2 the stability and predictability of the WACC supports the incentives to invest in the supply of regulated services; and

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[167] Professor Ingo Vogelsang "On the economic effects of allowing a WACC above the midpoint" (Report prepared for the Commerce Commission, 12 June 2014), paragraph 19. Also refer to Attachment C of our draft decision.

4.43.3 that large and/or frequent changes in the uplift (or other aspects of the IM) could affect this incentive.

4.44 On the other hand, regulators overseas typically revisit their WACC estimates as part of each price path reset. Their estimates for key parameters, and the overall WACC, can therefore change from period to period to reflect changes in market conditions.[168]

4.45 We acknowledge the submissions to the effect that we should only consider amending the WACC percentile as part of an IM review. We explained our reasons for undertaking this review now in paragraphs 4.2 to 4.17. In respect of possible future IM amendments being made outside of a statutory review, we will give further consideration as to the circumstances when we would or would not consider making such amendments and anticipate we will formally seek the views of interested parties on this in due course.[169]

We will consider the split cost of capital in the wider review of the IMs

4.46 The Court indicated that it expects us to consider the split cost of capital approach proposed by MEUG when reviewing the IMs.

4.47 We intend to address the split cost of capital issue in the wider review of the IMs to be completed by the end of 2017. As Professor Vogelsang highlighted in his review of our draft decision,[170] if we were to implement a split cost of capital approach, we would also need to reconsider the appropriate WACC percentiles that would apply under the split cost of capital.

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168 We too have sought to respond to substantial changes in market conditions when necessary. In particular, in recognition of the effects of the Global Financial Crisis, we introduced a 0.5% temporary uplift to the tax-adjusted market risk premium.

169 We note that NZ Airports raised a criticism that the Commission's review of the WACC percentile is inconsistent with its previous guidance on when it would review an IM (NZ Airports, para 11 and para 67(c), referring to the Commission paper "Process for amendments and clarifications of Part 4 determinations", 8 March 2011, available at http://www.comcom.govt.nz/dmsdocument/6135). That guidance provides that, while IM amendments should generally be avoided, urgent amendments may be made when required. Given the likely impact of the High Court's comments on investment (see paragraph 1.15), we consider that undertaking the current review urgently was appropriate. In deciding to undertake the review and confirming our review process, we also necessarily considered the factors contemplated in paragraph 15 of that guidance. We therefore disagree that the current review is inconsistent with that guidance.

170 Professor Vogelsang also indicated that he would have liked to have seen the Commission "definitively dispose of the split cost of capital approach in the current proceeding" (Professor Ingo Vogelsang "Review of New Zealand Commerce Commission 'Proposed amendment to the WACC percentile for electricity lines services and gas pipeline services', paper published on July 22, 2014" (31 July 2014), paragraphs 3 and 13). We note that no respondents to our paper "Invitation to have your say on whether the Commerce Commission should review or amend the cost of capital input methodologies" (20 February 2014) supported resolving the split cost of capital issue now. Therefore, our notice of intention was limited to the WACC percentile.

5. The case for using a WACC above the mid-point estimate

5.1 This chapter considers the case for using a WACC above the mid-point estimate, in light of:

5.1.1 comments made by the High Court in the IMs merits appeals judgment; and

5.1.2 the significant body of evidence we have gathered in response to the Court's judgment, including submissions on our draft decision (and other consultation papers we have released).

5.2 The key evidence we have received during our review of the appropriate WACC is discussed, in some cases cross-referring to more detailed explanations of our views contained throughout the rest of this paper.

5.3 In our view, the available evidence supports using a WACC significantly above the mid-point estimate, but highlights that the role and effectiveness of a WACC uplift is likely to vary across different categories of investment. We consider the main justification for applying an uplift to the mid-point WACC is to mitigate the risk of under-investment in network quality, which could potentially have significant adverse consequences for consumers (due to major supply outages).

The Court was sceptical about using a WACC above the mid-point estimate

5.4 In the IMs merits appeals judgment, the High Court was sceptical regarding whether it is appropriate to use a WACC above the mid-point. The Court stated that it expected us to consider its "scepticism about using a WACC substantially higher than the mid-point" the next time the IMs are reviewed.[171]

5.5 Although the Court put forward some "tentative in-principle arguments" against our use of the 75th percentile WACC estimate, its strongest view was that we need to do further work on the WACC percentile. A more detailed summary of the Court's comments is contained in paragraphs 1.8 to 1.11 above.

5.6 When indicating that we should conduct further analysis regarding the WACC percentile, the Court referred to a decision from the Australian Competition Tribunal (regarding Telstra) which stated:[172]

> …there exists as a matter of theory the potential for asymmetrical consequences should the WACC be set too low or too high. Which of these consequences will carry with it the greatest

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171 *Wellington International Airport Ltd & Ors v Commerce Commission* [2013] NZHC [11 December 2013], paragraph 1486.

172 *Telstra Corporation Ltd (No 3)* [2007] ACompT 3 at [457].

social damage is not a matter solely for theory, however, but for robust empirical examination, well-guided by theory, of the actual facts of any particular case.

5.7 The Court concluded that "…further analysis and experience may support the Commission's original position. But they may not".[173]

We have gathered significantly more expert evidence following the Court's judgment

5.8 In response to the Court's judgment, we have gathered a substantial body of expert evidence regarding whether a WACC above the mid-point estimate should be used. This body of evidence includes:

5.8.1 relevant academic literature, notably a 2011 paper by Professor Ian Dobbs regarding welfare loss asymmetries arising from uncertainty in the regulatory WACC; and

5.8.2 independent expert reports prepared by our advisors, and expert reports submitted on behalf of interested parties (in response to our draft decision and other consultation papers we released). Our independent expert advisors included: Oxera, Professor Ingo Vogelsang, Professor Julian Franks, Dr Martin Lally, Economic Insights, and Professor Ian Dobbs (who expanded on some of the key points regarding his 2011 paper, in the context of our current review).

Relevant academic literature regarding the WACC percentile

5.9 Prior to our draft decision, we asked Dr Martin Lally to conduct a review of relevant literature regarding the WACC percentile.[174] Dr Lally referred to three main papers: Wright *et al* (2003),[175] LECG (2007),[176] and Dobbs (2011).[177] These papers were outlined in paragraph 5.8 of our draft decision.[178]

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173 *Wellington International Airport Ltd & Ors v Commerce Commission* [2013] NZHC [11 December 2013], paragraph 1486.

174 Dr Martin Lally "The appropriate percentile for the WACC estimate" (Report prepared for the Commerce Commission, 19 June 2014), pages 4-7.

175 Wright, S., Mason, R., and Miles, D., 2003. A Study into Certain Aspects of the Cost of Capital for Regulated Utilities in the U.K., report prepared for the UK economic regulators.

176 LECG "Response on Behalf of Vector Ltd to the Commerce Commission's Estimate of WACC in the Draft Authorisation for the Control of Supply of Natural Gas Distribution Services by Powerco Ltd and Vector Ltd" (26 November 2007), section 4.

177 Dobbs, I., 2011. Modelling Welfare Loss Asymmetries Arising from Uncertainty in the Regulatory Cost of Finance, *Journal of Regulatory Finance* 39, pages 1-28.

178 Commerce Commission "Proposed amendment to the WACC percentile for electricity lines services and gas pipeline services" (22 July 2014), pages 47-48, paragraph 5.8.

5.10 When summarising his findings, Dr Lally concluded that "[t]he best available analysis on this matter is provided by Dobbs (2011)".[179] Professor Dobbs' paper considered the welfare consequences of the regulator allowing a high or low cost of capital. Professor Dobbs used Monte Carlo simulation to estimate the welfare-maximising WACC relative to the mean of the calculated range.

5.11 Expert reports submitted by interested parties generally agreed that the 2011 Dobbs paper provides a useful analytical framework for considering the WACC percentile.[180] However, they highlighted limitations of Professor Dobbs' analysis in the specific context of this review, given that some of Dobbs' assumptions and input values did not appear to be well suited to electricity lines and gas pipeline services (for example, the demand elasticity range applied).[181]

5.12 In response to our draft decision, Frontier Economics (on behalf of Transpower) submitted a revised version of Professor Dobbs' model, which was intended to contain amendments to reflect the New Zealand electricity sector.[182] We commissioned Professor Dobbs to review the model prepared by Frontier Economics. Professor Dobbs' conclusions are summarised in paragraphs 5.47 to 5.52 below.

5.13 Professor Dobbs' 2011 model, and Frontier Economics' extension of it, were very helpful in informing our thinking on the appropriate WACC percentile, and supported our conclusion that an uplift to the mid-point is appropriate. However, Professor Dobbs' own review, as well as some submissions on the models, highlighted that they do not provide a 'good fit' to the question before us, in light of the s 52A purpose. Therefore, we ultimately placed little weight on the quantitative results of these models when reaching our decision. The shortcomings of these models in the specific context of this review are described in detail in Attachment B.

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179 Dr Martin Lally "The appropriate percentile for the WACC estimate" (Report prepared for the Commerce Commission, 19 June 2014), page 2.

180 NZIER "Review of evidence in support of an appropriate WACC percentile: Response to Commission invitation of 31 March 2014" (report prepared for Major Electricity User's Group, May 2014), page 11; Frontier Economics Pty Ltd "Evidence on the WACC percentile: A Report prepared for Transpower in response to the Commerce Commission consultation" (report prepared for Transpower New Zealand Ltd, May 2014), page vi.

181 Covec "Estimating WACC for Airports in New Zealand" (report prepared for Board of Airline Representatives New Zealand Inc, 30 April 2014), page 7; NZIER "Review of evidence in support of an appropriate WACC percentile: Response to Commission invitation of 31 March 2014" (report prepared for Major Electricity User's Group, May 2014), page 7, 14.

182 Frontier Economics "Application of a loss function simulation model to New Zealand: A report prepared for Transpower" (August 2014). The Frontier Economics model is described in more detail in Attachment B.

Expert evidence received during our current review of the appropriate WACC percentile

5.14 We received advice from several independent experts to assist us in reaching our decision on the appropriate WACC percentile. These experts were:

5.14.1 European economic consulting firm, Oxera. Oxera developed our main analytical framework for undertaking quantitative analysis of the appropriate WACC percentile, adopting a form of the loss function approach supported by the High Court. Oxera also provided us with reports responding to submissions, both before and after our draft decision.

5.14.2 Professor Ingo Vogelsang of Boston University. Professor Vogelsang peer-reviewed both Oxera's analysis and our draft and final decisions. Prior to our draft decision, Professor Vogelsang provided an additional report considering the economic effects of allowing a WACC above the mid-point. He also provided us with a report responding to submissions on his views.

5.14.3 Professor Julian Franks of London Business School and Dr Martin Lally of Victoria University. Professor Franks and Dr Lally were both on a 2008 expert panel that advised us on the appropriate WACC percentile. Prior to our draft decision, we asked them to elaborate on the reasons for their previous recommendations, in light of the Court's comments that the panel members had not explained their reasoning in any detail.[183] We also asked Dr Lally to include a review of relevant academic literature in his report, as introduced in paragraph 5.9 above).

5.14.4 Australian economic consultancy firm, Economic Insights. Prior to our draft decision, Economic Insights conducted a review of overseas regulatory decisions, focusing on whether other regulators use WACC estimates above, below, or at the mid-point. Economic Insights subsequently provided an updated version of its review, responding to relevant submissions.

5.14.5 Professor Ian M Dobbs, from Newcastle University. Professor Dobbs commented on the relevance of his 2011 model, and the extended version submitted by Frontier Economics in response to our draft decision, to our selection of the appropriate WACC percentile for electricity lines and gas pipeline businesses.

5.15 We also received a large number of expert reports submitted on behalf of interested parties during this process, including in response to our draft decision. These expert reports either:

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183 *Wellington International Airport Ltd & Ors v Commerce Commission* [2013] NZHC [11 December 2013], paragraph [1436].

5.15.1 supported an uplift to the mid-point WACC. These submissions were generally made on behalf of regulated suppliers, and typically argued that the 75th percentile WACC estimate (or higher) should be applied; or

5.15.2 did not support an uplift to the mid-point WACC, which were generally submitted on behalf of consumer groups.[184]

5.16 The key findings of the expert reports received during our review of the WACC percentile are summarised below. The expert reports submitted by interested parties following our draft decision are discussed first, followed by our independent experts' reports.

Expert reports and evidence submitted on behalf of interested parties

5.17 Given the large volume of expert reports that have been submitted during our review of the WACC percentile, this section focusses on the main themes in submissions received following our draft decision.[185] These submissions:

5.17.1 challenged the starting point for our decision, suggesting that we should consider whether the existing IM (ie, the 75th percentile) is wrong, instead of whether to depart from the mid-point. A number of submissions also argued that reviewing the WACC percentile outside of the 7-year IMs review process undermines regulatory certainty under the Part 4 regime. Submissions on the starting point for our decision, and regulatory certainty, are addressed in Chapter 2;

5.17.2 provided contrasting views regarding how the Part 4 purpose statement should guide our decision, particularly regarding whether a consumer welfare or total welfare approach should be used in any loss analysis that informs the appropriate WACC percentile.[186] Submissions on whether a consumer or total welfare approach should be applied are discussed in Chapter 2 and Attachment A;

5.17.3 argued that our review of the WACC percentile has been rushed, not allowing sufficient time for meaningful consultation or for an appropriately

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184 For example, NZIER and Ireland, Wallace and Associates provided submissions on behalf of MEUG. Covec submitted on behalf of BARNZ.

185 A brief summary of earlier expert reports submitted on behalf of interested parties is contained in paragraph 5.39 of our draft decision.

186 Submissions on behalf of regulated suppliers generally stated that we should only use a total welfare standard when undertaking any loss analysis (ie, take no account of avoiding future wealth transfers from consumers to suppliers). For example: Incenta "Rationale for setting the regulatory WACC above the midpoint value" (Report prepared for the ENA, May 2014), page 12. Other submissions (on behalf of consumers) have argued that section 52A of the Act requires a consumer welfare standard. For example, BARNZ "Submission on proposed amendment to the WACC percentile for energy businesses" (29 August 2014), pages 8-10.

robust decision. Chapter 4 responds to these submissions, explaining why we have sufficient evidence to make a decision on the WACC percentile now;

5.17.4 expressed views on the role of the WACC uplift for incentivising different types of investment. For example, Castalia (for Transpower) noted that different considerations apply to reliability investments (which Oxera focussed on), and 'economic investments' undertaken by Transpower.[187] Submissions on the potential role of a WACC uplift across different categories of investment are discussed in paragraphs 5.53 to 5.77 below;

5.17.5 raised several criticisms regarding the assumptions, input values and calculations applied in Oxera's analysis. For example, HoustonKemp (for Powerco) stated that Oxera's analysis "…is insufficiently robust to form a useful basis for sound regulatory decision-making…" due to "…problems with the structure of the model that Oxera has used, the assumptions that have been incorporated into that model, and the way in which the results have been interpreted".[188] Oxera's approach, and the critiques contained in submissions, is discussed in paragraphs 5.18 to 5.29 below;

5.17.6 proposed extensions to Professor Dobbs' 2011 model assessing the appropriate regulatory cost of capital. In particular, Frontier Economics submitted a revised version of Professor Dobbs' model which was intended to contain amendments to reflect New Zealand electricity lines businesses.[189] The Dobbs and Frontier Economics models are discussed in paragraphs 5.47 to 5.52 below, and in Attachment B;

5.17.7 provided opposing views on the significance of available evidence regarding RAB multiples for business regulated under Part 4. Submissions on behalf of regulated suppliers raised concerns regarding the weight we placed on RAB multiples in our draft decision[190], while IWA (for MEUG) and Covec (for

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187 Castalia "Response to proposed WACC percentile amendment" (Report prepared for Transpower, 29 August 2014), page 1.

188 HoustonKemp "Comment on the Commerce Commission's Proposed WACC Percentile Amendment" (Report prepared for Powerco, 29 August 2014), page iii. Similarly, Sapere (for Vector) raised concerns regarding Oxera's analysis. Sapere "Proposed amendment to the WACC percentile - Commerce Commission's draft decision" (Report prepared for Vector, 29 August 2014), pages 22-28.

189 Frontier Economics "Application of a loss function simulation model to New Zealand: A report prepared for Transpower" (August 2014); and Frontier Economics "A submission on Prof Ian Dobbs' comments on our implementation of his loss function model: A report prepared for Transpower New Zealand" (September 2014).

190 For example, HoustonKemp "Comment on the Commerce Commission's Proposed WACC Percentile Amendment" (Report prepared for Powerco, 29 August 2014), page iv; and CEG "Economic Review of Draft Decision on the WACC Percentile" (Report prepared for NZ Airports, August 2014), pages 30-31.

BARNZ) supported using RAB multiples to inform our decision.[191] Submissions on RAB multiples are discussed in more detail in Chapter 6 and Attachment C;

5.17.8 commented on Professor Vogelsang's 12 June 2014 paper regarding the economic effects associated with allowing a WACC above the mid-point. Submissions challenged Professor Vogelsang's starting point that current investment is at (or in the neighbourhood of) the welfare-optimal level, as discussed in paragraphs 5.30 to 5.32 below;[192]

5.17.9 raised issues regarding interdependencies between the WACC percentile and other aspects of the IMs or the wider regulatory regime.[193] Submissions on interdependencies are discussed in Chapter 4;

5.17.10 commented on the findings of Economic Insights' review of overseas regulatory decisions, including questioning Economic Insights' approach of comparing basis point uplifts to mid-point WACC estimates across jurisdictions.[194] Economic Insights' findings are discussed in paragraphs 5.43 to 5.46 below; and

5.17.11 objected to the approach used to undertake reasonableness tests of our decision. Submissions on reasonableness tests are discussed in paragraphs 6.52 to 6.57 and Attachment D.

Oxera developed our main analytical framework for assessing the appropriate percentile

5.18 Oxera developed a framework for identifying the appropriate WACC percentile, using available quantitative evidence. Oxera's general approach is to empirically estimate the expected losses to consumers from over- and under-estimating the true cost of capital for various percentiles of the WACC distribution, on an annualised basis.

5.19 Oxera's report is based on a 'probability of loss' approach, which it describes as consistent with the 'social loss approach' used by Professor Dobbs, Professor van Zijl

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191 IWA "Commerce Commission's proposed amendment to the WACC percentile for electricity lines services and gas pipeline services dated 22 July 2014" (Report prepared for MEUG, 29 August 2014), page 21; and Covec "Cross submission on WACC percentile issues" (11 September 2014), page iii.

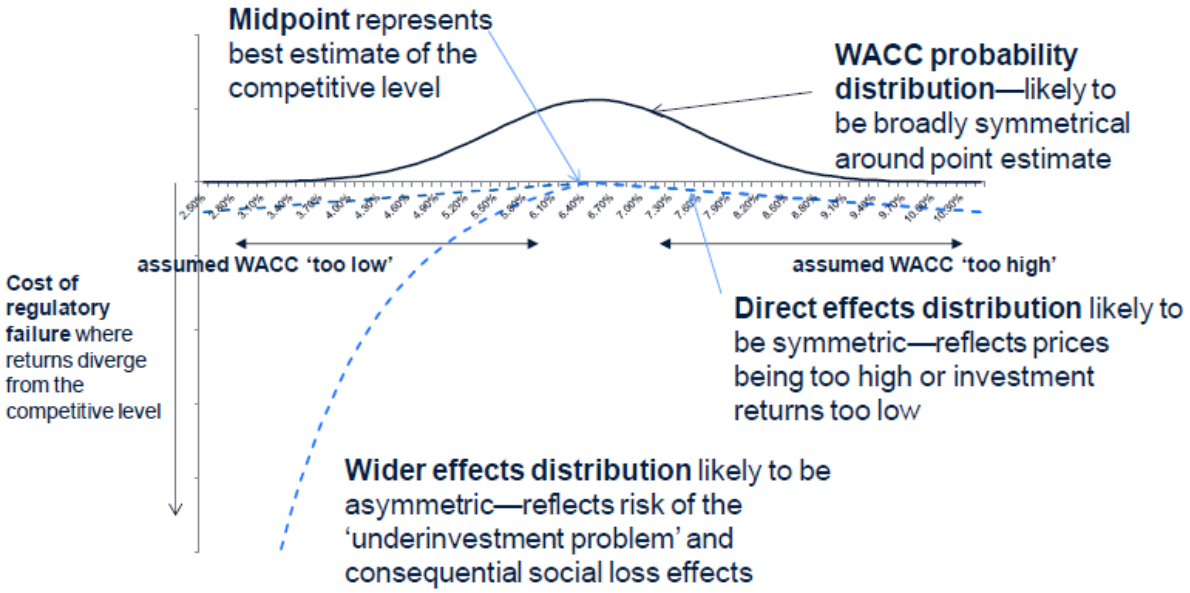
192 For example, Sapere "Proposed amendment to the WACC percentile - Commerce Commission's draft decision" (Report prepared for Vector, 29 August 2014), page 6.

193 For example, HoustonKemp submitted that "…the Commission has not given due consideration in its draft decision to other aspects of the regulatory regime that tend to dampen firms' incentives to invest or reduce the costs associated with setting the regulated WACC above the true WACC…". HoustonKemp "Comment on the Commerce Commission's Proposed WACC Percentile Amendment" (Report prepared for Powerco, 29 August 2014), page 6.

194 For example, Frontier Economics "Regulatory Precedents for Setting the WACC Within a range: A Response to Issues raised by Economic Insights" (Report prepared for Transpower, July 2014); and Sapere "WACC percentile Cross Submission" (Report prepared for Vector Limited, 12 September 2014).

(and others). However, Oxera notes that its approach "gives weight to the practical issues involved in estimating the parameters" within the analysis.[195] Oxera's framework is illustrated in Figure 5.1 below.

Figure 5.1: Illustration of Oxera's framework for the WACC percentile



Source: Oxera[196]

5.20 When describing the framework it used, Oxera noted that a downside risk is likely to result from a shortfall between the actual and assumed WACC. Oxera explained that:[197]

5.20.1 this downside risk is likely to be skewed, and increase sharply as the gap between actual and assumed WACC grows (since this will quickly increase the incentive for the companies to under-invest);[198] and

5.20.2 in electricity, this risk is derived from the consequential effect that, over time, under-investment will lead to failures on the network, with potentially significant social and economic costs.

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195 Oxera "Input methodologies, Review of the '75th percentile' approach" (Report Prepared for New Zealand Commerce Commission, 23 June 2014), page 66.

196 Oxera "Input methodologies, Review of the '75th percentile' approach" (Report Prepared for New Zealand Commerce Commission, 23 June 2014), page 2.

197 Oxera "Input methodologies, Review of the '75th percentile' approach" (Report Prepared for New Zealand Commerce Commission, 23 June 2014), page 3.

198 Consistent with Oxera's analysis, Sapere's discussion of loss functions supports the view that the loss is small for low over or under-estimation, but is exponential for significant under-estimation. Sapere Research Group "Setting the WACC percentile for Vector's price quality path" (report prepared for Vector Limited, 5 May 2014), pages 6 and 18-20.

5.21 Oxera utilised data from a range of sources to estimate the effects shown in Figure 5.1 above, and form recommendations regarding the appropriate WACC percentile.[199] Oxera's analysis is based on the probability of exceeding or falling short of the true WACC, for various possible WACC percentiles. In addition, Oxera considered the amounts by which the allowed WACC is likely to exceed or fall short of the true WACC.

5.22 On the basis of its analysis, Oxera concluded that a point estimate around the 60th to 70th percentile provides a suitable balance between the costs and benefits of mitigating the significant risks associated with under-investment. In reaching this conclusion, Oxera noted that:[200]

5.22.1 **The 50th percentile is likely to be too low.** At the 50th percentile, the incentives to invest will be relatively low as new investment adds no value to the business. The potential costs of under-investment are material. Evidence from actual events and analysis of potential events in other countries suggests that a severe outage event resulting from under-investment could result in a cost with an annualised economic value of approximately NZ$1bn.[201] Some premium for customers to reduce these costs appears reasonable and proportionate.

5.22.2 **The 90th percentile is likely to be too high.** Even at the 80th percentile, the cost of protection appears relatively high compared with the level of benefits, given the wider measures put in place by the Commission.[202]

5.22.3 **The proposed form of economic impact analysis has limitations, but some of these relate to points of fundamental uncertainty, rather than points that can be readily addressed with further analysis.** It will be difficult to identify a probability that a particular value for the assumed WACC directly results in under-investment. However, it is instinctively consistent with the workings of financial markets and the competition for capital that a shortfall of 0.5–1% (or more) is likely to increase the risk of triggering a rebalancing

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199 Oxera "Input methodologies, Review of the '75th percentile' approach" (Report Prepared for New Zealand Commerce Commission, 23 June 2014), pages 3-4.

200 Oxera "Input methodologies, Review of the '75th percentile' approach" (Report Prepared for New Zealand Commerce Commission, 23 June 2014), page 6.

201 Oxera's October 2014 report contains further details regarding the $1 billion estimated cost of severe outage events. Oxera "Review of expert submissions of the input methodologies" (Report prepared for New Zealand Commerce Commission, 27 October 2014), pages 22-24.

202 For example, Oxera notes that the under-investment problem will be (or could be) in part mitigated by output and quality incentives (including incentive schemes such as IRIS) and asset stewardship requirements. Oxera "Input methodologies, Review of the '75th percentile' approach" (Report Prepared for New Zealand Commerce Commission, 23 June 2014), pages 65-66.

of medium-term investment plans, and a move by investors towards deferring investment as far as possible.

5.22.4 **Any premium should be applied to all RAB assets and applied consistently**, as the expected whole-life return on assets should be the relevant test for investors. This also strongly points to the New Zealand approach of providing certainty over the need for a premium, rather than a case-by-case basis, as applied more generally by other regulators.

5.23 Prior to our draft decision, Professor Vogelsang conducted a peer-review of Oxera's report, concluding that it goes a significant way towards addressing the High Court's comments regarding the WACC percentile. He stated (emphasis added):[203]

> The Oxera Report may be the first serious empirical attempt towards providing a cost-benefit analysis of the policy of setting a regulated WACC above its expected measured value. In doing so Oxera goes a significant way towards fulfilling the High Court's aspirations for a NZCC decision on the optimal percentile of the WACC distribution. It provides for some sound empirical base for a decision.
> …
> The report is careful in describing the various steps involved in doing the empirical analysis and in highlighting the problems incurred. While the costs to consumers from higher prices associated with a higher WACC turn out to be conceptually straightforward and measurable, the costs to consumers from a WACC below the true cost of capital are complex and, according to Oxera, fraught with "fundamental" uncertainty, leaving an ultimate assessment to the regulator's judgement.
>
> Thus, while Oxera's analysis is likely to inform the regulator about the nature of the problem, it is only weakly suggestive of the outcome, which is for the NZCC to set an allowed WACC between the 60th and the 70th percentile of the WACC distribution. In my view, **the report's main insight is that only some of the relationships necessary for a sound decision can empirically be estimated and that for the remaining relationship the NZCC needs to its use judgement**.

5.24 However, Professor Vogelsang highlighted some limitations of Oxera's analysis, including:

5.24.1 Oxera's model lacks an explicit treatment of the effects of investments on the RAB. In particular, Oxera has not addressed the annual cost savings to consumers, due to reduced investment in the future, that would result if a WACC lower than the 75th percentile is used. Instead, Oxera only addresses static consumer welfare effects of price changes (from a change in WACC)

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[203] Professor Ingo Vogelsang "Review of Oxera's Report, Input methodologies - Review of the '75th percentile' approach" (Report prepared for the Commerce Commission, 10 July 2014), page 1, paragraphs 2-5.

for a given RAB value.[204] Professor Vogelsang stated that this weakens "…Oxera's soft recommendation of a WACC in the 60th to 70th percentile range…" and instead indicates "…a somewhat lower percentile".[205]

5.24.2 The analysis would be substantially enhanced by information on the probability of outages, which could be supplied by New Zealand EDBs and Transpower. International benchmarking could also assist in estimating outage probabilities and their effects.[206]

5.25 Submissions received in response to our draft decision commented on Oxera's analysis. The main criticisms of Oxera's report, and Oxera's responses, are summarised below.

5.25.1 A total welfare approach, or an approach which gives greater weight to total welfare, should have been used (instead of giving most weight to consumer welfare).[207] In response, Oxera noted that when setting the allowed WACC, the aim is to estimate the benchmark return required to provide incentives to invest (relative to alternative markets with comparable risks). Oxera concluded that a consumer welfare approach better reflects the Commission's role in regulating electricity lines businesses than a total welfare approach.[208]

5.25.2 Innovation investment should have been considered explicitly, instead of focussing on reliability investments.[209] Oxera's assessment was that the

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204 Professor Ingo Vogelsang "Review of Oxera's Report, Input methodologies - Review of the '75th percentile' approach" (Report prepared for the Commerce Commission, 10 July 2014), page 7-8, paragraphs 14-18.

205 Professor Ingo Vogelsang "Review of Oxera's Report, Input methodologies - Review of the '75th percentile' approach" (Report prepared for the Commerce Commission, 10 July 2014), page 3, paragraph 14.

206 Professor Ingo Vogelsang "Review of Oxera's Report, Input methodologies - Review of the '75th percentile' approach" (Report prepared for the Commerce Commission, 10 July 2014), page 2.

207 For example, CEG "Economic Review of Draft Decision on the WACC Percentile" (Report prepared for NZ Airports, August 2014), paragraphs 10 and 82; HoustonKemp "Comment on the Commerce Commission's Proposed WACC Percentile Amendment" (Report prepared for Powerco, 29 August 2014), page iii; Incenta "Rationale for setting the regulatory WACC above the midpoint value – Response to Draft Decision" (Report prepared for ENA, August 2014), pages 2, 10; and NZIER "Changing the WACC percentile: Advice to MEUG regarding Commerce Commission proposal to amend the regulatory WACC for electricity line & gas pipeline services" (29 August 2014), page 2.

208 Oxera "Review of expert submissions on 'Input methodologies: Review of the 75th percentile approach" (Prepared for the Commerce Commission, 27 October 2014), pages 6, 11-15.

209 For example, CEG "Economic Review of Draft Decision on the WACC Percentile" (Report prepared for NZ Airports, August 2014), page 24, paragraph 81; Castalia "Response to proposed WACC percentile amendment" (Report prepared for Transpower, 29 August 2014); and NZ Airports "Submission on Commerce Commission's proposed amendment to the WACC percentile for electricity lines services and gas pipeline services" (29 August 2014), page 3, paragraph 9(b)(i).

more proportionate approach is to focus on reliability, noting that to the extent this results in an uplift from the mid-point, innovation investments will also be promoted. Oxera stated that if there is a need for explicit *ex ante* promotion of innovation, this would arguably be better addressed through specific incentives (rather than a general WACC uplift which applies across all assets).[210]

5.25.3 Multi-year analysis should have been conducted, rather than calculating annual costs and benefits.[211] While Oxera agreed that a multi-year analysis has merits, in its view this would not result in a 'better' outcome. Oxera noted that under its assumptions, multi-year analysis would increase both the costs and benefits of additional investment, and would be unlikely to change the appropriate percentile.[212]

5.25.4 The effect of changes in investment on the RAB should be considered, consistent with comments made by Professor Vogelsang in his peer-review review of Oxera's analysis.[213] Oxera noted that although Professor Vogelsang's argument is correct, his assessment does not explicitly consider the associated benefits of increased investment. In Oxera's view, the effect of changes in investment on the RAB is only likely to become material where the optimal WACC and actual WACC start to diverge sharply, which is unlikely given the Commission's range.[214]

5.25.5 Oxera's assumptions are unproven, and better evidence should have been identified.[215] In response, Oxera noted that its approach was intended to provide a suitable framework for assessing the appropriate WACC percentile and, unlike other technical models (such as Dobbs/Frontier Economics), it

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210 Oxera "Review of expert submissions on 'Input methodologies: Review of the 75th percentile approach" (Prepared for the Commerce Commission, 27 October 2014), pages 6, 27-32.

211 For example, HoustonKemp "Comment on the Commerce Commission's Proposed WACC Percentile Amendment" (Report prepared for Powerco, 29 August 2014), page 18, section 4.3.2.

212 Oxera "Review of expert submissions on 'Input methodologies: Review of the 75th percentile approach" (Prepared for the Commerce Commission, 27 October 2014), pages 6, 43-44.

213 For example, Sapere "Proposed amendment to the WACC percentile - Commerce Commission's draft decision" (Report prepared for Vector, 29 August 2014), page 26; and NZIER "Changing the WACC percentile: Advice to MEUG regarding Commerce Commission proposal to amend the regulatory WACC for electricity line & gas pipeline services" (29 August 2014), page 22.

214 Oxera "Review of expert submissions on 'Input methodologies: Review of the 75th percentile approach" (Prepared for the Commerce Commission, 27 October 2014), pages 6, 33-41.

215 For example, HoustonKemp "Comment on the Commerce Commission's Proposed WACC Percentile Amendment" (Report prepared for Powerco, 29 August 2014), page iii; and NZIER "Changing the WACC percentile: Advice to MEUG regarding Commerce Commission proposal to amend the regulatory WACC for electricity line & gas pipeline services" (29 August 2014), page 9.

explicitly recognises that there are certain assumptions which are subject to fundamental uncertainty.[216]

5.25.6 More weight should have been given to the top end of the range (from $1 billion to $3 billion) of potential costs of outage events.[217] However, Oxera's view is that the upper end of the range is sufficiently unlikely that adopting an estimate from the upper end would tend to over-compensate investors.[218]

5.25.7 The wrong standard error and probability of loss were used in Oxera's analysis.[219] Oxera noted it took the Commission's standard error as an input assumption, and that it has not seen any evidence that this could not be applied in the percentile assessment. Oxera also stated that Sapere's submission misinterpreted the intention of the expected loss calculation.[220]

5.26 After conducting a thorough review of submissions, Oxera concluded that "…the 60th to 70th percentile remains a suitable focal point for the Commission in coming to its view on the WACC".[221] Oxera highlighted the following points when reviewing submissions on its analysis:[222]

• the WACC may not be the most effective mechanism for promoting unusual forms of investment, such as true innovation, given that, in traditional network assets, any premium would also need to be applied to the significant majority of the capital base;

• the choice of a WACC percentile away from the 50th percentile is not designed to promote over-investment, but to offset the risk of under-investment. At the percentiles proposed by Oxera (and the Commission), we would expect that any difference between the incremental costs and benefits of the additional investment which may result from the choice of

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216 Oxera "Review of expert submissions on 'Input methodologies: Review of the 75th percentile approach" (Prepared for the Commerce Commission, 27 October 2014), page 7.

217 For example, Incenta "Rationale for setting the regulatory WACC above the midpoint value – Response to Draft Decision" (Report prepared for ENA, August 2014), pages 13-15; Sapere "Proposed amendment to the WACC percentile - Commerce Commission's draft decision" (Report prepared for Vector, 29 August 2014), pages 27-28.

218 Oxera "Review of expert submissions on 'Input methodologies: Review of the 75th percentile approach" (Prepared for the Commerce Commission, 27 October 2014), pages 7, 22-24.

219 For example, Sapere "Proposed amendment to the WACC percentile - Commerce Commission's draft decision" (Report prepared for Vector, 29 August 2014), pages 5, 19-22.

220 Oxera "Review of expert submissions on 'Input methodologies: Review of the 75th percentile approach" (Prepared for the Commerce Commission, 27 October 2014), pages 7, 44-47.

221 Oxera "Review of expert submissions on 'Input methodologies: Review of the 75th percentile approach" (Prepared for the Commerce Commission, 27 October 2014), page 2.

222 Oxera "Review of expert submissions on 'Input methodologies: Review of the 75th percentile approach" (Prepared for the Commerce Commission, 27 October 2014), page 2.

percentile would be relatively small, and should not have a material effect on the Commission's decision;

• there are limitations on the extent to which any evidence can identify the 'correct' WACC. However, the evidence that exists can provide additional support to the Commission in informing its judgment;

• it should not be necessary to set the percentile at a level based on the potential of the most severe impacts from under-investment, as there is potential flexibility within the wider regulatory framework to help manage such risks that should arise only across multiple periods.

5.27 Although submissions contained a range of criticisms regarding the assumptions used in Oxera's analysis, only Frontier Economics (for Transpower) provided an alternative analytical model for considering the appropriate WACC percentile. However, due to significant limitations of the Frontier Economics' model, we ultimately placed little weight on it when reaching our decision on the size of the WACC uplift (for the reasons described in Attachment B).

5.28 We consider that Oxera's analysis provides the best available analytical model available to us for considering the appropriate WACC percentile. This is because Oxera's analysis:

5.28.1 is directly focussed on our main reason for applying a WACC uplift, which is to mitigate the risk of under-investment in network quality (which could lead to significant adverse consequences to consumers due to major supply outages);

5.28.2 is based on a consumer welfare standard, which is conceptually more consistent with the s 52A purpose than a total welfare standard. Oxera's approach is well suited to the question we are asking in light of s 52A, as it assesses costs and benefits to consumers of regulated services over time; and

5.28.3 explicitly recognises the need to apply judgement, due to fundamental uncertainty regarding several key relationships which influence the appropriate WACC percentile.

5.29 However, as discussed in Chapter 6, there are several off-setting factors we have considered which potentially impact on our view regarding the range recommended by Oxera, as well as the choice of percentile within that range. These factors are described in paragraph 6.9.

Professor Ingo Vogelsang considered the economic effects of allowing a WACC above the mid-point

5.30 In his 12 June 2014 paper, Professor Vogelsang considered the economic effects associated with allowing a WACC above the mid-point. His conclusions are summarised below.[223]

5.30.1 Any attempt at empirical investigation of the effects of setting the allowed WACC at specific percentiles will produce highly uncertain results that may suggest more precision than attainable. This is because there are some empirical relationships which can be crucial, but which we know little about (for example, the relationship between under-estimation of WACC and the resulting change in investment, and the change in investment and resulting change in reliability).

5.30.2 If reliability investment is currently at the optimum level, the marginal cost of additional investment is just balanced by the marginal benefits of a reliability increase. This suggests that there will be no great net gain from additional investment, because the cost of investment (in terms of price increases for consumers) will be just as high as the benefits resulting from a reduction in the probability of outages. Therefore, any argument for using the WACC percentile as a major tool to increase investment has to be based either on a large investment effect, or on some inherent deviation of investment from the welfare optimum.[224]

5.30.3 Since market failures vary from industry to industry and from type of investment to type of investment, the allowed WACC should be differentiated on a case-by-case basis in order to correct for market failures.

5.30.4 If a common WACC percentile is chosen across industries and different forms of investment, this should be above the 50th percentile of the WACC distribution, but probably below the 75th percentile estimate.

5.30.5 The case for allowing a WACC above the mid-point estimate may be much weaker than the conventional arguments state and may be restricted to

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223 Professor Ingo Vogelsang "On the economic effects of allowing a WACC above the midpoint" (Report prepared for the Commerce Commission, 12 June 2014), pages 10-11.

224 Professor Vogelsang notes that steep marginal benefit and/or steep marginal cost curves for investment may provide justification for allowing a WACC above the mid-point. This is because under steep marginal benefit and/or marginal cost curves, there is a significant welfare effect from reducing investment below the optimal level (relative to the case of flat marginal benefit and/or marginal cost curves). Professor Ingo Vogelsang "On the economic effects of allowing a WACC above the midpoint" (Report prepared for the Commerce Commission, 12 June 2014), pages 5-6. As is highlighted below (paragraph 5.59), we note that Vector implies investment in respect of reliability (at least in its network) is not sub-optimal, or alternatively the prices consumers pay for the current level of reliability are already too high, as its consumers appear not willing to pay for improved reliability.

specific types of investment (such as innovations, reliability, or particularly lumpy investments). However, a switch from consumer welfare to total welfare would strengthen the case for potentially going up to the 75th percentile, because of the resulting price effect on the whole output produced by the firm.

5.31 Submissions on Professor Vogelsang's 12 June 2014 paper, received in response to our draft decision, generally focussed on Professor Vogelsang's starting point that current investment is at the optimal level. For example, Sapere submitted:[225]

> The Commission admits it does not know if investment levels at the margin are optimal. Economic theory suggests that it is highly unlikely that investment at the margin is optimal, where a single entity is providing a common service to multiple customers, as is the case with electricity and gas networks. This theoretical finding accords with evidence describing decision-making in practice and anecdotal evidence on the welfare impact of investments at the margin. We are not aware of any empirical evidence provided to the Commission that would suggest a reduction in investment would have other than an asymmetric impact on consumer welfare.

5.32 After reviewing submissions, Professor Vogelsang concluded that none of that arguments raised have caused him to change his views regarding the main theoretical statements contained in his 12 June 2014 paper.[226] He stated that "the challenges to these statements contained in the submissions largely refer only to the empirical weight given to the various parts of my statements".[227]

Professor Julian Franks and Dr Martin Lally elaborated on their 2008 recommendations regarding the WACC percentile

5.33 Prior to our draft decision, Professor Julian Franks and Dr Martin Lally provided reports elaborating on the reasons for their previous recommendations regarding the WACC percentile. In 2008, Professor Franks, Dr Martin Lally and Professor

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225 Sapere "Proposed amendment to the WACC percentile - Commerce Commission's draft decision" (Report prepared for Vector, 29 August 2014), page 6.

226 In response to Sapere's submission regarding economic theory and the optimality of investment, Professor Vogelsang noted that the paper by Spence referred to by Sapere was published over forty years ago, and does not take into account regulation of quality (in addition to price). Therefore, Professor Vogelsang stated that "…the Spence model is unlikely to apply to the current situation of the New Zealand electricity sector". Professor Vogelsang "Reply to Comments on my June 12, 2014, paper "On the economic effects of allowing a WACC above the midpoint": Prepared for the New Zealand Commerce Commission" (20 October 2014), page 4, paragraph 10.

227 Professor Ingo Vogelsang "Reply to Comments on my June 12, 2014, paper "On the economic effects of allowing a WACC above the midpoint"" (Report prepared for the Commerce Commission, 20 October 2014), page 3, paragraph 5.

Stewart Myers provided us with recommendations on the approach to estimating the cost of capital.[228]

5.34 In his 2008 recommendations, Professor Franks:[229]

5.34.1 agreed with the Commission's policy of setting the WACC equal to, or greater than, the mid-point of the estimated range, in recognition of the asymmetric costs of setting the WACC too low; and

5.34.2 recommended that the Commission evaluate how far above the mid-point of the range it moves on a case-by-case basis.

5.35 Dr Lally recommended that we choose "WACC values that are strictly greater than the mid-point of the range".[230]

5.36 The Court noted that the 2008 recommendations from our expert advisors were expressed in very conclusionary terms, and the reasoning was not explained in any detail.[231] Therefore, we asked Professor Franks and Dr Lally to expand on their reasons.[232] We also asked Dr Lally to conduct a review of relevant literature regarding the WACC percentile (see paragraphs 5.9 to 5.10 above).

5.37 Professor Franks reiterated his support for a WACC above the mid-point, although he did not specify a particular range. He explained:[233]

> My view was that the under-investment problem was more costly to consumers than the over-investment problem. I felt this to be the case because regulated industries such as electricity, gas and telephony were so important that we could not afford to have 'the lights go out' or the equivalent. In that event we might wish to set a cost of capital above the mean WACC so as to reduce the possibility of under-investment.

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228 Professor Franks, Dr Lally and Professor Myers "Recommendations to the New Zealand Commerce Commission on an Appropriate Cost of Capital Methodology" (18 December 2008).

229 Professor Franks, Dr Lally and Professor Myers "Recommendations to the New Zealand Commerce Commission on an Appropriate Cost of Capital Methodology" (18 December 2008), pages 36-37, recommendations 53 and 55.

230 Professor Franks, Dr Lally and Professor Myers "Recommendations to the New Zealand Commerce Commission on an Appropriate Cost of Capital Methodology" (18 December 2008), page 37, recommendation 54.

231 *Wellington International Airport Ltd & Ors v Commerce Commission* [2013] NZHC [11 December 2013], paragraph 1436.

232 As discussed in footnote 36 of our draft decision, we did not seek further explanation from Professor Myers, as we were primarily seeking new analyses and empirical work from our experts (which Professor Franks and Dr Lally were both directly involved in).

233 Professor Julian Franks "Memorandum" (20 June 2014), page 1.

5.38 Professor Franks noted that the size and cost of the under-investment problem will be affected by a number of factors, including the length of the price control, volatility in the cost of capital, the level of investment, and the degree of competition.[234] Professor Franks concluded that:[235]

5.38.1 these factors suggest there is good reason to set a WACC above the mean of the distribution; and

5.38.2 some of these factors affect industries differentially, so the amount of headroom set may vary across industries (and even change over time).

5.39 In his June 2014 report, Dr Lally continued to support a WACC substantially above the mid-point, suggesting that the 75th percentile is likely to be too low. He concluded:[236]

> …it would be difficult to be definite about the appropriate WACC margin in general, and even more so for specific industries and new versus existing assets, but my sense is that these points collectively suggest that the uniform WACC percentile currently used by the Commission (the 75th percentile) is likely to be too low.

5.40 In reaching this view, Dr Lally built on Professor Dobbs' analysis because he considered this to be the best available evidence in the literature. However, he highlighted several limitations of Dobbs' analysis (in the context of our decision).[237]

5.41 Dr Lally also concluded that difficulties in estimating different margins for different industries precludes this course of action, except in circumstances where the appropriate margin is considered to be much lower than normal. He referred to dual-till operations as a possible example of this.[238]

5.42 We did not receive any substantive submissions on Professor Franks' or Dr Lally's views following our draft decision.

Economic Insights reviewed overseas regulatory decisions

5.43 In June 2014, Economic Insights conducted a review of overseas regulatory decisions, focusing on whether other regulators use WACC estimates above, below, or at the mid-point. The Economic Insights report assessed regulatory precedents from other

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234 Professor Julian Franks "Memorandum" (20 June 2014), pages 1-2.

235 Professor Julian Franks "Memorandum" (20 June 2014), page 2.

236 Dr Martin Lally "The appropriate percentile for the WACC estimate" (Report prepared for the Commerce Commission, 19 June 2014), page 3.

237 Dr Martin Lally "The appropriate percentile for the WACC estimate" (Report prepared for the Commerce Commission, 19 June 2014), page 2.

238 Dr Martin Lally "The appropriate percentile for the WACC estimate" (Report prepared for the Commerce Commission, 19 June 2014), page 3.

jurisdictions, which was one of the main topics raised in the submissions we had received at that stage.[239]

5.44 The main conclusions of Economic Insights' June 2014 report are summarised below.[240]

5.44.1 Most regulators present a range for either the WACC or key parameters in its calculation. Most ranges focus on the return on equity and its underlying parameters. Ranges that are presented are generally not formal statistical confidence intervals, particularly for the WACC as a whole.[241]

5.44.2 The New Zealand Commerce Commission is an exception, because it makes use of a normal distribution and an assumed standard error for the WACC to calculate a range defined by the 25th and 75th percentiles.

5.44.3 Many decisions make no or a relatively small adjustment to the mid-point of a reported range. This often reflects adopting a conservative view of the market risk premium and equity beta that are used in CAPM for determining the return on equity (where 'conservative' means erring on the high side).

5.44.4 The 75th percentile used in New Zealand corresponds to uplifts above the mid-point ranging from 71 to 99 basis points. Basis point uplifts of this size are generally higher than estimates of the uplifts applied in other jurisdictions.

5.45 Several submissions commented on Economic Insights' findings, including Frontier Economics, Sapere, CEG, HoustonKemp and Covec. For example, Frontier Economics and Sapere questioned the validity of comparing basis point uplifts across jurisdictions, arguing that the basis point approach is misleading where the width of WACC ranges is very dissimilar across regulatory decisions.[242]

5.46 Economic Insights updated their June 2014 report in response to submissions received following our draft decision. Economic Insights concluded that "…the broad conclusions of the June 2014 report are still regarded as reasonable", but noted that "…it is important to use supplementary information on investment outcomes in

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239 Oxera "Oxera review of submissions: the appropriate WACC percentile" (17 July 2014), pages 1-2.

240 Economic Insights Pty Ltd "Regulatory Precedents for Setting the WACC within a Range" (16 June 2014).

241 Rather, ranges used by other regulators are generally estimates from a uniform distribution, where every observation has the same weight.

242 Frontier Economics "Regulatory Precedents for Setting the WACC Within a range: A Response to Issues raised by Economic Insights" (Report prepared for Transpower, July 2014); Sapere "WACC percentile Cross Submission" (Report prepared for Vector Limited, 12 September 2014).

determining an appropriate allowed rate of return".[243] For example, Economic Insights referred to the RAB multiples evidence presented in our draft decision as supporting the view that existing allowed rates of return exceed what is required to attract efficient investment.[244]

Professor Ian M Dobbs commented on the Frontier Economics model

5.47 Following our draft decision, we sought Professor Dobbs' views on the Frontier Economics submission given that it built on the analytical framework he originally developed.[245] Specifically, we asked Professor Dobbs to review the Frontier Economics submission (including the associated model) and provide views on:

5.47.1 whether Frontier Economics correctly interpreted and applied the framework used in the 2011 Dobbs paper;

5.47.2 the reasonableness of the assumptions Frontier Economics used when re-calibrating the 2011 Dobbs model to reflect New Zealand electricity lines services; and

5.47.3 the validity of Frontier Economics' conclusions, in light of what the 2011 Dobbs model was intended to address.

5.48 Although Professor Dobbs concluded that the Frontier Economics model appears to be soundly constructed, he pointed out a number of limitations in the context of our decision on the appropriate WACC percentile for New Zealand energy businesses. In particular, Professor Dobbs:

5.48.1 questioned the 'goodness of fit' of the model to electricity lines and gas pipelines services, given that his model was originally developed for telecommunications. The model assumes that new investment is in a new service, for which there is demand independent from the existing service(s). Professor Dobbs noted that for electricity lines and gas pipelines businesses, new investment is more likely to be related to strengthening capacity and reliability of the existing network, or reducing costs;[246] and

5.48.2 noted that his 2011 model assumes that there is a service obligation on the supplier, such that investment to maintain adequate capacity is not

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243 Economic Insights "Regulatory Precedents for Setting the WACC within a Range" (Report prepared for the Commerce Commission, 11 October 2014), page v.

244 Economic Insights "Regulatory Precedents for Setting the WACC within a Range" (Report prepared for the Commerce Commission, 11 October 2014), page 26.

245 As noted in paragraph 5.12 above, Frontier Economics submitted a revised version of Professor Dobbs' 2011 model in response to our draft decision.

246 Professor Dobbs "Proposed amendment to the WACC percentile for the Allowed Rate of Return: Comments on the Application of the Dobbs [2011] model" (17 September 2014), page 4, paragraph 5.

optional. Therefore, the model does not in any way model reliability and the impact of quantity rationing.[247]

5.49 Professor Dobbs raised two additional main concerns regarding the model – the treatment of willingness to pay when demand is assumed inelastic, and the weight put on consumer surplus compared to profits in the welfare criterion.[248] He also noted that "…the idea that the uncertainty in the cost of finance is resolved totally as in the model is somewhat unrealistic".[249]

5.50 Importantly, Professor Dobbs stated that he was concerned with the extent to which the model can be used as a quantitative guide for the optimal WACC percentile, noting that "the precise quantitative predictions of the model should be regarded as indicative at best". Professor Dobbs explained (emphasis added):[250]

> This kind of model articulates why a significant uplift is warranted, but in my opinion, **it is unclear how much quantitative significance should be placed on the model predictions**. For example, there are reasons for considering the uplift should be greater (because there are sources of uncertainty, notably over future demand and technology, that are explicitly ignored in the model), and reasons for why it should be smaller (because there are other ways in which reliability and investment can be influenced by the regulator, because decision makers do not necessarily behave as Neoclassical economic theory predicts etc.).

5.51 On 19 September 2014 we invited submissions on Professor Dobbs' report.[251] Frontier Economics undertook some further modelling work in response to the issues raised by Professor Dobbs, noting that "Professor Dobbs' report is a thoughtful and helpful analysis of our work, and raises a number of points and challenges that are worthy of further consideration".[252]

5.52 Our views, Professor Dobbs' views, and submitters' views, on the Frontier Economics model are discussed in more detail in paragraph 6.22 and Attachment B.

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247 Professor Dobbs "Proposed amendment to the WACC percentile for the Allowed Rate of Return: Comments on the Application of the Dobbs [2011] model" (17 September 2014), page 4, paragraph 5.

248 Professor Dobbs "Proposed amendment to the WACC percentile for the Allowed Rate of Return: Comments on the Application of the Dobbs [2011] model" (17 September 2014), page 3, paragraphs 2-4.

249 The model assumes that the regulator sets an allowed rate of return, and then the firm's actual cost of finance is 'observed'. Professor Dobbs "Proposed amendment to the WACC percentile for the Allowed Rate of Return: Comments on the Application of the Dobbs [2011] model" (17 September 2014), page 9, paragraphs 23-24 and footnote 9.

250 Professor Dobbs "Proposed amendment to the WACC percentile for the Allowed Rate of Return: Comments on the Application of the Dobbs [2011] model" (17 September 2014), pages 3-4, paragraph 4.

251 Commerce Commission "Further work on cost of capital input methodologies: Invitation for submissions on further evidence" (19 September 2014).

252 Frontier Economics "A submission on Prof Ian Dobbs' comments on our implementation of his loss function model: A report prepared for Transpower New Zealand" (September 2014).

The role of a WACC uplift differs across categories of investment

5.53 As noted in Chapter 3, one of the key themes arising in submissions, and reports from our experts, is that different types of investment undertaken by electricity lines businesses could potentially be affected by a WACC uplift in different ways.[253] For example:

5.53.1 Oxera's report was primarily focussed on using a WACC uplift to mitigate the risk of under-investment in network reliability, and the resulting costs to consumers of outages.

5.53.2 Castalia's submission (for Transpower) focussed on the impact a WACC uplift could have on 'economic investments', which have a positive net benefit to consumers (or the wider economy). Castalia stated that "the reliability effects quantified in the Oxera analysis are quite different from the effects assessed in our evidence (and the evidence of other experts)".[254]

5.53.3 The Frontier Economics report (for Transpower) considered demand served by 'existing investment' and demand served by 'new investment'. Frontier Economics treated demand served by new investment as "…demand that would be left unserved if investment in distribution and transmission networks were reduced", for example new customer connections.[255]

5.54 Submissions from NZIER (for MEUG) and Sapere (for Vector) also discussed how firms' investment decisions may differ across categories of investment. NZIER suggested breaking down capex into its components, and considering how to regulate investment levels for each component.[256] Sapere defined five broad categories of network investment (network growth, network integrity, new technology and innovation, relocations, and undergrounding) and discussed the relationship to regulated revenue for each category.[257]

5.55 In light of these submissions, we have considered the potential role of a WACC uplift for each of the main categories of investment which are likely to be relevant to our decision. As described in Chapter 3, the four categories of investment which we

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253 We did not receive any submissions providing evidence regarding specific investments undertaken by gas pipeline businesses.

254 Castalia "Response to proposed WACC percentile amendment" (Report prepared for Transpower, 29 August 2014), page 1.

255 Frontier Economics "Application of a loss function simulation model to New Zealand" (Report prepared for Transpower, August 2014), page 16.

256 NZIER "Changing the WACC percentile: Advice to MEUG regarding Commerce Commission proposal to amend the regulatory WACC for electricity line & gas pipeline services" (29 August 2014), pages 25-26.

257 Sapere "Proposed amendment to the WACC percentile - Commerce Commission's draft decision" (Report prepared for Vector, 29 August 2014), pages 47-48.

consider to be most relevant are quality, demand growth, innovation, and economic investments.

5.56 Other factors, in addition to the allowed rate of return, will influence suppliers' investment decisions across these categories of investment. For example, these factors include required quality standards and associated penalties. The influence of these factors differs across investment categories, as discussed below.

Investment in network quality

5.57 This category captures investments to provide services at the quality consumers demand, which could include investments to maintain or improve service quality. Examples include:

5.57.1 replacement or renewal of existing assets due to physical deterioration or obsolescence; and

5.57.2 investments in longer-term network enhancement, or improving network resilience (to reduce the risk of catastrophic network failure).

5.58 Investment in network quality potentially has very significant benefits to consumers, by reducing the risk of outages (and the associated welfare loss for consumers). In the context of electricity distribution and transmission, Oxera notes that "…the primary output of the electricity network is continued operation (and the primary risk associated with under-investment is an increasing gap between network quality and the socially and economically optimal level of network quality)".[258]

5.59 We note that Vector, New Zealand's largest electricity distributor, submitted that "as many of the expert reports have set out, the most significant cost of under-investment is likely to be a major failure of supply with a substantial cost to the economy". Vector also notes that "the risk with reducing the WACC percentile is that the rate of more preventable outages increases". On the other hand, Vector appears more sceptical about the use of a WACC uplift to provide incentives for investments that *improve* quality, noting that: "A scheme that sought to increase reliability would increase prices and there is no sign that consumers are willing to pay for such an outcome."[259]

5.60 In our view, Oxera's analysis provides the best analytical model for considering the appropriate WACC percentile for network quality investments.[260] Oxera's analysis is

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258 Oxera "Input methodologies: Review of the '75th percentile' approach" (17 June 2014), page 64.

259 Vector "Further WACC percentile cross-submission" (23 September 2014), paragraphs 7-9.

260 As part of its cross-submission on our draft decision, NZIER provided some analysis regarding the link between investment and network reliability, and the value to consumers of supply interruptions and reliability investment. This cross-submission, and responses from other parties, are discussed in footnote 121 on page 52 above.

directly focussed on using an uplift to the mid-point WACC to reduce the risk of under-investment in network quality, and the associated costs to consumers of outages. In contrast, the Frontier Economics model does not consider the costs and benefits of ongoing reliability investments in existing electricity lines and gas pipeline businesses (but rather, is focussed on new services not currently provided by the regulated supplier).

5.61 The allowed WACC is not the only factor which will influence investment in network quality. Other factors which are likely to mitigate the need for a WACC uplift for these investments include:

5.61.1 required quality standards, and associated Court-ordered penalties and compensation, which provide incentives for regulated suppliers to maintain network reliability;

5.61.2 proposed revenue-linked quality incentive schemes, which may have a role in improving network reliability;[261]

5.61.3 in the case of Transpower, transmission Grid Reliability Standards (which are discussed in Attachment E;

5.61.4 information disclosure and summary and analysis, which can be used to identify poor asset management planning (and potentially under-investment) before it affects quality; and

5.61.5 the desire of Boards and management to ensure the lights do not go out, due to potential reputation issues.[262]

5.62 Covec also stated that "…EDBs already have quite high-powered incentives to invest in network reliability if this would avoid operating costs". Covec noted for the 2013 year EDBs spent 2.7 times more on outage-related operating costs (for outage avoidance and outage recovery) than reliability investments.[263]

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261 For example, as part of the current price-quality path resets for EDBs and Transpower we have proposed revenue-linked quality incentive schemes. These schemes provide increased incentives for suppliers to efficiently invest in service quality.

262 Some submissions raised concerns about our reference to boards and management not wanting to let the lights go out. For example, PwC "Submission to the Commerce Commission on proposed amendment to the WACC percentile for electricity lines services and gas pipeline services: Made on behalf of 20 Electricity Distribution Businesses" (29 August 2014), page 9, paragraphs 35-58. See footnote 94 on page 43 for further details.

263 Covec "Cross-submission on Dobbs and NZIER" (Report prepared for BARNZ, 30 September 2014), pages 1-2.

5.63 Although there are other factors which mitigate the risk of under-investment in network quality, our view is that the best case for applying a WACC uplift is for this category of investment. This is because:

5.63.1 the costs to consumers of major supply outages are very significant (for example, Oxera notes that the major outage events could result in annualised economic costs of approximately $1 billion); and

5.63.2 as described in Chapter 3, targeted *ex post* incentive schemes are unlikely to be ideal for avoiding major supply outages.

5.64 Further, small investments in network quality can potentially have large benefits to consumers. For example, Orion reported that $6m of expenditure on seismic protection before the Canterbury earthquakes saved $60-$65m in direct asset replacement costs after the earthquakes.[264] It is likely to be relatively difficult to incentivise expenditure to protect against major outages such as those caused by high impact low probability events using regulated quality standards, which strengthens the case for a WACC uplift for investments in network quality.[265]

Investment to meet demand growth

5.65 This category includes investments to meet current and future consumer demand for regulated services, such as:

5.65.1 demand for new connections to the network (for example, connecting new subdivisions); and

5.65.2 increased demand for network capacity from the existing customer base.

5.66 The benefits to consumers from investment to meet demand growth are potentially large, because there would be a significant welfare loss if demand for new connections or increased capacity went unmet. This is demonstrated by the substantial consumer surplus increase from new investment predicted by the Frontier Economics model.[266]

5.67 However, there are a range of factors which limit the need for a WACC uplift for investments to meet demand growth. These other factors include:

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264 Orion "Proposal for a customised price-quality path" (19 February 2013), p.23; Vector "Further WACC percentile cross-submission" (23 September 2014), paragraph 10.

265 However, as noted by Professor Vogelsang, a WACC uplift is a very broad policy tool, and more targeted tools could potentially be used to achieve the same outcome (or complement the WACC uplift). Professor Ingo Vogelsang "Review of New Zealand Commerce Commission 'Proposed amendment to the WACC percentile for electricity lines services and gas pipeline services', paper published on July 22, 2014" (31 July 2014), page 7, paragraph 22.

266 The Frontier Economics model considers investment to meet demand growth as 'new investment'.

5.67.1 a weighted average price cap (which is applied in the case of electricity and gas distribution businesses) provides incentives to invest in new infrastructure and connect new consumers to the network, as it provides regulated suppliers with additional revenue for new consumers and new volume immediately;[267] and

5.67.2 the cash-flow impacts of expanding supply to new consumers can be mitigated by the approach in the asset valuation IMs to capital contributions and vested assets. The incremental cost of consumer connections can be partially funded upfront via (cash) capital contributions, with the value of the assets (net of the contribution) entering the RAB.[268] Reticulation of new residential, commercial or industrial subdivisions is sometimes undertaken by a third party developer, and the assets then 'vested' to the distributor, sometimes for only a small financial consideration, which is the amount at which the assets enter the RAB.[269]

5.68 In our view, the strength of these other factors suggests that there is little need to apply a WACC uplift to mitigate the risk of suppliers not undertaking investment to meet demand growth. To the extent that demand growth results in a need to reinforce the networks to maintain service quality, this is already captured by Oxera's analysis.

Innovation investments

5.69 Most innovation investments from regulated suppliers are likely to either:

5.69.1 result in meeting demand growth or maintaining/improving network quality more efficiently (ie, cheaper on a life-cycle basis);[270] or

5.69.2 relate to new services which fall outside the scope of regulation.[271]

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267 Commerce Commission "Input Methodologies (Electricity Distribution and Gas Pipeline Services): Reasons paper (December 2010), page 192, paragraph 8.3.8; and Commerce Commission "Regulatory Incentives and the Cost of Capital: Working Paper" (23 June 2014), pages 7-8, paragraph 23.1.

268 Commerce Commission "Regulatory Incentives and the Cost of Capital: Working Paper" (23 June 2014), pages 7-8, paragraph 23.1. In Transpower's case, the assets associated with new investment contracts with Transpower customers are, subject to certain conditions, left out of the regulated asset base entirely, and the transmission charges received by Transpower for those contracts are excluded from forecast and actual revenue in the individual price-quality path (Commerce Commission "Input Methodologies (Transpower) Reasons Paper" (December 2010), paragraphs 4.4.4-4.4.14.

269 Commerce Commission "Input Methodologies (Electricity Distribution and Gas Pipeline Services): Reasons paper (December 2010), section E7.

270 As noted by Oxera, technological innovation is less relevant in electricity distribution and transmission than other sectors, such as telecommunications.

271 Given that these services are unregulated, any uplift we apply to the regulatory WACC is not applicable. Section 52T(3) requires the cost allocation IM to not unduly deter investment by a supplier of regulated

5.70 The long-term benefits to consumers from innovation investments may be significant, to the extent these investments reduce the life-cycle costs of providing regulated services. s52A(1)(c) requires suppliers to share with consumers the benefits of efficiency gains in the supply of regulated good and services, including through lower prices.

5.71 However, suppliers already have incentives to undertake cost-reducing innovation investments under price-quality path regulation. Such investments could lead to outperformance of the opex and capex benchmarks used to determine the price-quality path, generating increased profits for the regulated supplier.

5.72 In our view, a WACC uplift applied to the entire asset base is unlikely to be the most efficient mechanism for incentivising innovation investments (to the extent any additional positive incentive might be justified). As signalled in Chapter 3, targeted *ex post* investment incentive mechanisms (involving rewards and/or penalties that affect allowable revenue) are likely to be more effective for some types of investment, such as innovation investments, than an *ex ante* WACC uplift.[272] Targeted *ex post* incentives mechanisms could potentially be implemented for EDBs or GPBs under a CPP, and added to the existing revenue-linked grid output measures in the IPP for Transpower.

5.73 Further, Oxera's response to submissions on our draft decision explained that:

5.73.1 it is appropriate to focus on reliability, rather than explicitly focussing on innovation, when considering whether to apply a WACC uplift. Any uplift to the mid-point WACC for reliability will also promote innovation;[273]

5.73.2 to the extent innovation contributes to medium- to long-term network reliability, this is already captured in Oxera's analysis;[274] and

5.73.3 in the Great Britain energy sector, Ofgem has acknowledged that that price cap regulation may not sufficiently incentivise innovation. This led it to introduce an innovation stimulus package under its revenue = incentives +

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goods or services in the provision of other goods or services. The cost allocation IM was upheld in the IMs merits appeal judgement from the High Court.

272 See paragraphs 3.36 to 3.44 above for further details.

273 Oxera "Review of expert submissions on 'Input methodologies: Review of the 75th percentile approach" (Prepared for the Commerce Commission, 27 October 2014), page 6.

274 Oxera "Review of expert submissions on 'Input methodologies: Review of the 75th percentile approach" (Prepared for the Commerce Commission, 27 October 2014), page 27.

innovation + outputs (RIIO) framework, which involves companies competing for access to funding for innovative projects.[275]

Economic investments

5.74 Economic investments have a positive net benefit to consumers of regulated services and/or the wider economy (for example, investments to reduce transmission grid congestion and which enhance competition in generation).

5.75 Economic investments primarily relate to Transpower, where they involve investments in the grid whose primary purpose is other than to reduce expected unserved energy. The significance of Transpower's economic investments compared to its reliability investments, as well as the incentives for Transpower to invest in economic investments, are discussed in Attachment E.

5.76 In summary, we agree with submissions which argue that Transpower has the most discretion around economic investments. However, we consider that there are sufficient incentives that make it difficult for Transpower to avoid economic investments where there is a clear demand and also a positive net benefit produced. Further, the materiality of this category of investment is relatively small, and has been appropriately taken into account by Oxera in its recommendations on the appropriate WACC percentile.[276]

5.77 Finally, we have recently introduced a number of new incentive measures for Transpower that link grid outputs and quality standards to revenue, and in future, similar incentive schemes could potentially be linked to other types of investment as well.

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275 Oxera "Review of expert submissions on 'Input methodologies: Review of the 75th percentile approach" (Prepared for the Commerce Commission, 27 October 2014), page 31. This type of scheme may not be possible or appropriate in the New Zealand context, but is illustrative of how more targeted schemes may be better suited for incentivising innovation investments.

276 Oxera "Review of expert submissions on 'Input methodologies: Review of the 75th percentile approach" (Prepared for the Commerce Commission, 27 October 2014), pages 29-31.

The evidence we have gathered supports using a WACC above the mid-point estimate

5.78 After gathering further evidence, and conducting additional analysis, our view remains that it is appropriate to use a WACC above the mid-point estimate. This is because:

5.78.1 the quantitative analysis conducted by Oxera demonstrates that applying a WACC uplift to mitigate significant risks to consumers that could result from under-investment in network quality is 'reasonable and proportionate';

5.78.2 overall, the other available evidence provides substantial support for using a WACC above the mid-point estimate for electricity lines and gas pipeline businesses; and

5.78.3 the impact on downstream industries of using a WACC above the mid-point is unlikely to be material to our decision.

A WACC above the mid-point helps mitigate significant risks of under-investment in network quality

5.79 In our view, it is appropriate to use a WACC above the mid-point estimate to mitigate significant risks to consumers that could result from under-investment in network quality (due to a WACC that is too low). As described in Chapter 3, we consider that network quality is the most likely area where consumers may suffer higher costs in the future due to under-investment (with the most significant costs resulting from major supply outages).

5.80 In its report, Oxera traded-off the likely costs and benefits of using a WACC above the mid-point estimate, for various percentiles. When assessing the possible benefits of using a WACC uplift, Oxera's primary focus was on network reliability (in particular, mitigating the risks of major outage events).

5.80.1 Although Oxera noted that the costs to consumers from under-estimating WACC are difficult to measure, it stated that the "…potential costs of under-investment are material…" and evidence from events in other countries suggests that a severe outage resulting from under-investment "…could result in a cost with an annualised economic value equivalent to over NZ$1bn".[277]

5.80.2 On the other hand, if the allowed WACC is too high consumers will pay higher prices, and suppliers may over-invest due to the high returns they are able to earn. Oxera directly estimated the costs to consumers resulting from using various WACC estimates above the mid-point.

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[277] Oxera "Input methodologies, Review of the '75th percentile' approach" (Report Prepared for New Zealand Commerce Commission, 23 June 2014), page 6.

5.80.3 Overall, Oxera concluded that the mid-point WACC estimate is likely to be too low, and some premium for customers to reduce the risk of under-investment appears "reasonable and proportionate".[278]

5.81 We agree with Oxera's conclusion that a WACC above the mid-point estimate should be used, primarily to mitigate the risk of under-investment leading to major supply outages. Although other factors (such as required quality standards) will also help mitigate this risk, our view is that the potential for significant adverse consequences for consumers means that there is strong justification for applying an uplift to the mid-point WACC.

5.82 Submissions from regulated suppliers (and their expert advisors) also suggested a WACC uplift should be used to provide positive investment incentives for other types of investment (such as demand growth, innovation, and economic investments). For the reasons described in paragraphs 5.53 to 5.77 above, our view is that the case for a WACC uplift (in addition to any uplift applied for investments in network quality) is relatively weak for these categories of investment. This is because:

5.82.1 other incentives already faced by regulated suppliers are likely to sufficiently mitigate the risk of under-investment; or

5.82.2 other more targeted *ex post* incentive schemes are likely to be more effective than an *ex ante* WACC uplift applied to the entire RAB.

5.83 However, we note that to the extent any uplift from the mid-point WACC is applied to reduce the risk of under-investment in network quality, this will also help mitigate the risk of under-investment for other categories of investment.

The available evidence supports using a WACC above the mid-point estimate

5.84 In summary, the available evidence provides substantial support for adopting a WACC above the mid-point estimate.

5.84.1 All our independent expert advisors who commented on this issue agree that a WACC above the mid-point should be used.[279]

5.84.2 There have been a large number of submissions and expert reports which provide analytical (and some empirical support) for using a percentile above the mid-point.

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[278] Oxera “Input methodologies, Review of the ‘75th percentile’ approach” (Report Prepared for New Zealand Commerce Commission, 23 June 2014), page 73.

5.84.3 Overseas regulators often adopt a WACC above the mid-point of the range, sometimes by using estimates of individual parameters which are generous in favour of suppliers.

5.85 In our view, none of the submissions we have received provide compelling evidence or reasons for using a WACC at (or below) the mid-point estimate for energy businesses.

5.86 MEUG, and its expert advisor NZIER, are the main parties that have argued that the mid-point WACC should be applied for electricity lines and gas pipeline businesses. NZIER's primary reason for suggesting that the mid-point should be used appears to be perceived deficiencies in the available empirical evidence in favour of a WACC uplift. NZIER submitted:[280]

> Despite the considerable effort that has been applied to developing an analytical approach by Dobbs, and most recently by Oxera on behalf of the Commission, we do not see persuasive evidence that a percentile other than the mid-point should be used. Nor do we see evidence that mis-estimating the WACC mid-point will result in losses or that potential losses will be asymmetric about the mid-point.

5.87 Although we acknowledge that there are limitations of the available empirical evidence, in our view this is primarily due to fundamental uncertainty regarding several key relationships which affect the optimal WACC percentile. For example, it is extremely difficult to empirically estimate the link between the WACC allowed by the regulator, the level of investment by regulated suppliers, and how this affects quality of service.

5.88 As outlined in paragraphs 5.18 to 5.29, we consider that Oxera's analysis demonstrates that there is a strong justification for applying an uplift to the mid-point WACC estimate. Further, all the expert reports submitted during this process (which commented on the appropriate WACC percentile for electricity lines and gas pipeline services) concluded that a WACC above the mid-point estimate should be applied to price-quality regulation for electricity lines and gas pipeline businesses, apart from NZIER.

5.89 The submissions from Covec and Professor Sudarsanam argued for using the mid-point WACC for specified airport services, however, this is at least partly due to airport-specific factors (such as the role of using a dual-till approach to regulation). As discussed earlier, we have not yet fully considered the airport-specific parts of these submissions, so airports are not addressed in this decision.

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280 NZIER "Changing the WACC percentile: Advice to MEUG regarding Commerce Commission proposal to amend the regulatory WACC for electricity line & gas pipeline services" (29 August 2014), page 9.

The impact on downstream industries is unlikely to be material to our decision

5.90 One 'in-principle argument' that the Court presented against using a WACC above the mid-point was that, as well as being used by final consumers, the outputs of regulated suppliers are inputs to numerous other sectors of the economy. The Court stated:[281]

> If the prices paid by user industries are higher than the resource cost of producing the outputs (viz, electricity and gas transmission and distribution), then inefficiency is promulgated throughout the economy. That is what is implied by higher than normal expected returns.
>
> At the least, the inter-sectorial effects ought to be considered, and if possible estimated. This has not been done in the present regulatory processes.

5.91 As we noted in our February 2014 consultation paper, we have previously focused solely on costs and benefits that occur directly in the relevant regulated market.[282] The flow-on effects in other markets are, under certain assumptions, fully reflected in the primary market.

5.92 In our draft decision, we noted that the Court's comments regarding downstream industries were considered by our advisors, Dr Lally and Oxera. Dr Lally and Oxera both concluded that the impact on downstream industries is unlikely to be material to our decision regarding the WACC percentile.

5.92.1 Dr Lally acknowledged, as suggested by the Court, that the outputs of regulated businesses are inputs to other sectors of the economy (as well as to final consumers) and therefore WACC margins will be likely to induce allocative inefficiency throughout other sectors of the economy. However, he argued that as long as the price elasticity for the product in question is properly estimated, and reflected in the choice of WACC margin, there is no need to additionally consider the extent to which the product is used as an input to other sectors of the economy.[283]

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281 *Wellington International Airport Ltd & Ors v Commerce Commission* [2013] NZHC [11 December 2013], paragraphs 1475-1476.

282 Commerce Commission "Invitation to have your say on whether the Commerce Commission should review or amend the cost of capital input methodologies" (20 February 2014), pages 16-17, paragraphs 46-48.

283 Dr Martin Lally "The Appropriate Percentile for the WACC Estimate" (Report prepared for the Commerce Commission, 19 June 2014), page 18.

5.92.2 Oxera undertook empirical analysis of two possible indirect effects resulting from prices to downstream industries being different to the competitive level: investment incentives across the supply chain, and the competitiveness of New Zealand companies (with high energy consumption) that export a significant amount of their product. Oxera noted that these secondary effects are likely to be small, relative to any direct price effect. Oxera concluded that the scale of any such effects is unlikely to be material to the decision on an appropriate percentile for the WACC.[284]

5.93 We also noted that cost-benefit analysis theory supports the view that the impact on downstream markets is unlikely to be material to our decision regarding the WACC percentile. For example, a relevant text book on the subject discusses the approach to valuing benefits and costs in secondary markets, concluding that effects in secondary markets "…often can (and indeed should) be ignored in conducting [cost-benefit analysis]".[285]

5.94 Submissions did not disagree with our view that the impact on downstream markets is unlikely to be material to our decision. Therefore, for the reasons described above, considering the likely effects of a higher WACC on the rest of the economy does not change our view regarding the appropriate percentile.

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284 Oxera "Input Methodologies: Review of the 75th percentile approach" (17 June 2014), pages 35-39.

285 Boardman A., Greenberg D. H., Vining A. R., Weimer D. L., *Cost-Benefit Analysis: Concepts and Practice*, Prentice Hall, 4th Edition, 2011, page 115.

6. Our view regarding the appropriate WACC percentile

6.1 Chapter 5 concluded that a WACC above the mid-point should be used, primarily to reduce the risk of the allowed WACC being too low, leading to under-investment in network reliability (and the resulting costs to consumers of major supply outages).

6.2 Having concluded that a WACC above the mid-point estimate should be used, this chapter describes our final decision on the appropriate WACC percentile for price-quality regulation under Part 4. In reaching our view we:

6.2.1 first consider reasonable lower and upper bounds for the WACC percentile for price-quality regulation, based on the evidence we have collected that is most relevant to our main reason for applying a WACC uplift;

6.2.2 discuss the available RAB multiples for businesses subject to price-quality regulation, which provide evidence that the current regulatory settings (including the 75th percentile WACC uplift) are more than sufficient to compensate investors for putting their capital at risk; and

6.2.3 apply judgement to reach a view regarding the appropriate point estimate of the WACC percentile for price-quality regulation.

6.3 This chapter also presents our estimate of the impact on consumer payments and supplier returns from reducing the WACC from the 75th percentile to the level we now consider appropriate (the 67th percentile).

Evidence suggests the appropriate WACC percentile is between the 60th and 75th

6.4 We have used the available evidence to determine reasonable lower and upper bounds for the WACC percentile for price-quality regulation. In our view, the evidence suggests that:

6.4.1 the lower bound is the 60th percentile WACC estimate; and

6.4.2 the upper bound is the 75th percentile WACC estimate.

The lower bound is the 60th percentile WACC estimate

6.5 Consistent with the draft decision, our view is that the 60th percentile is an appropriate lower bound when considering the WACC percentile for price-quality regulation. We consider that the 60th percentile is the minimum percentile that might balance the relative costs of over- or under-estimating WACC, in light of the s 52A purpose.

6.6 In reaching our draft view that the 60th percentile is an appropriate lower bound, we highlighted Oxera's conclusions that:[286]

6.6.1 the 50th percentile is likely to be too low, noting that some premium for consumers to reduce the risk of severe outage events appears reasonable; and

6.6.2 a range from the 60th to the 70th percentile appears to provide a suitable balance between the costs and benefits of using a WACC above the mid-point estimate.

6.7 Submissions raised several criticisms of Oxera's analysis, which are addressed in Oxera's October 2014 report.[287] After considering submissions, Oxera's view is that "…the 60th to 70th percentile remains a suitable focal point for the Commission in coming to its view on the WACC". Our views on the submissions on Oxera's analysis are addressed in greater detail in Chapter 5.

6.8 We consider that Oxera's analysis provides the best analytical model available to us for considering the appropriate WACC uplift. Our main reasons are described below.

6.8.1 Oxera's analysis is focussed on using an uplift to the mid-point WACC to reduce the risk of under-investment in network quality, and the associated costs to consumers of outages. For the reasons described in Chapter 3, we agree that the main reason for applying a WACC uplift is to mitigate this risk.

6.8.2 Oxera's analysis is based on a consumer welfare, rather than a total welfare, standard. A consumer welfare standard, incorporating both distributional and efficiency objectives, is conceptually more consistent with the s 52A purpose than a total welfare standard. In practice, Oxera's approach is well suited to the question we are asking in light of s 52A, as it assesses costs and benefits to consumers of regulated services over time.

6.8.3 Oxera's approach explicitly recognises the need to apply judgement, due to fundamental uncertainty regarding several key relationships which influence the appropriate WACC percentile.

6.9 However, there are several off-setting factors we have considered which potentially impact on our view regarding the range recommended by Oxera, as well as the choice of percentile within that range. In particular:

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286 Oxera "Input Methodologies: Review of the 75th percentile approach" (Report prepared for the Commerce Commission 23 June 2014), page 73.

287 Oxera "Review of expert submissions on 'Input methodologies: Review of the 75th percentile approach" (Prepared for the Commerce Commission, 27 October 2014). Submissions on Oxera's analysis are discussed in paragraph 5.25 above.

6.9.1 Oxera's analysis is based on the assumption that severe outage events resulting from under-investment could result in annualised economic costs of $1 billion. However, our view is that $1 billion could be considered at the high end of the potential economic cost of outages resulting from under-investment (in the New Zealand context). The $1 billion economic cost of outages is based on US estimates, where there is evidence of an investment gap for electricity infrastructure.[288] As discussed below, there is no evidence before us of systematic under-investment for New Zealand electricity lines and gas pipeline businesses.[289]

6.9.2 In his review of Oxera's June 2014 report, Professor Vogelsang noted that Oxera has not considered cost savings to consumers, due to reduced investment in the future, that would result if a lower WACC percentile was used. Instead, Oxera considered only static consumer welfare effects resulting from a change in the WACC percentile, for a given RAB value.[290] In response, Oxera noted that additional investments also convey additional benefits to consumers which should be considered.[291] However, Professor Vogelsang's final peer review indicated that, in his view, there will still be a substantial net investment cost.[292]

6.9.3 Oxera has not modelled the possible effect of over-investment resulting from a higher WACC percentile, although it notes that this is a possibility. Factoring in the risk of over-investment will tend to reduce the preferred WACC range.

6.9.4 There are also other financial and non-financial incentives to maintain reliability which Oxera has not explicitly incorporated into its quantitative analysis, but did have regard to when reaching its recommended WACC range. For example, under price-quality regulation we set quality standards

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288 The American Society of Civil Engineers (ASCE) notes that "…extending current trends leads to funding gaps in electric generation, transmission, and distribution that are projected to grow over time to a level of $107 billion by 2020, about $11 billion per year, and almost $732 billion by 2040…". ASCE "Failure to act: The economic impact of current investment trends in electricity infrastructure" (2011), page 5.

289 Even at the optimal level of investment, severe outages can potentially occur. These are not always caused by under-investment.

290 Professor Ingo Vogelsang "Review of Oxera's Report, Input methodologies - Review of the '75th percentile' approach" (Report prepared for the Commerce Commission, 10 July 2014), pages 8-9, paragraph 18.

291 Oxera "Review of expert submissions on 'Input methodologies: Review of the 75th percentile approach" (Prepared for the Commerce Commission, 27 October 2014), page 6.

292 Professor Ingo Vogelsang, "Review of New Zealand Commerce Commission "Amendment to the WACC percentile for electricity lines services and gas pipeline services", Reasons paper published on October 30, 2014" (24 October 2014), page 8, paragraph 22(d).

which suppliers are required to meet.[293] Oxera noted that "if anything, it could be that our approach is cautious, as the Commission potentially has other approaches to avert under-investment".[294]

6.9.5 Oxera referred to "…other factors that are not explicitly reflected in the current approach to defining the percentile, but which might nevertheless point to a cautious approach in setting the percentile…".[295] Oxera noted that this could include things such as the risk of model error, or incremental risks within regulatory periods around parameters such as the risk-free rate.[296]

6.9.6 Oxera's recommended range is based on applying its judgement.[297] We recognise that others may interpret the results from Oxera's model and reach different conclusions as to the appropriate WACC percentile. For example, HoustonKemp submitted that its replication of Oxera's model demonstrates that its analysis provides "…only weak support for Oxera's recommended range of a percentile between the 60th and 70th"and applying the extreme estimates of the underlying parameters "…would suggest a range of between the 70th and the 95th percentile…".[298]

6.9.7 Oxera's analysis is primarily focused on reliability investments, which are targeted at reducing the risk of outages (and the resulting costs to consumers). Although we think reliability investments are the appropriate focus, potential benefits from other types of investment (for example increased innovation, or investment designed to reduce grid congestion) may further strengthen the case for using a WACC above the mid-point estimate.

6.10 Considering all of these factors, on balance we consider that the 60th percentile is a reasonable lower bound for the WACC percentile for price-quality regulation.

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293 See paragraphs 5.53 to 5.77 above for further discussion on the role of other factors, in addition to the allowed rate of return, which are likely to influence suppliers' investment decisions across different categories of investment.

294 Oxera "Review of expert submissions on 'Input methodologies: Review of the 75th percentile approach" (Prepared for the Commerce Commission, 27 October 2014), page 26.

295 Oxera "Review of expert submissions on 'Input methodologies: Review of the 75th percentile approach" (Prepared for the Commerce Commission, 27 October 2014), page 74.

296 However, as discussed in paragraph 4.26 above, the mid-point is our best estimate of WACC; in our view, no bias in the mid-point has been demonstrated.

297 Oxera "Review of expert submissions on 'Input methodologies: Review of the 75th percentile approach" (Prepared for the Commerce Commission, 27 October 2014)), page 7.

298 HoustonKemp "Comment on the Commerce Commission's proposed WACC percentile amendment" (Report prepared for Powerco, 29 August 2014), pages iii and 27.

The upper bound is the 75th percentile WACC estimate

6.11 In our view, the 75th percentile is an appropriate upper bound when considering the WACC percentile for price-quality regulation (that is, we consider that using a percentile above the 75th would result in an allowed WACC that is too high). In reaching this view, we note that:

6.11.1 evidence of observed investment suggests that the 75th percentile WACC is more than sufficient to incentivise investment (and therefore, there is no need to increase the uplift above the 75th percentile);[299] and

6.11.2 although there is some analytical support for using a WACC above the 75th percentile estimate, this is primarily based on the framework developed by Professor Dobbs which, although it has provided valuable insights, has several significant limitations when considered in the specific context of our decision.

Observed investment suggests the 75th percentile is more than sufficient to incentivise investment

6.12 Our decision to use the 75th percentile WACC estimate in the 2010 IMs was made at the beginning of the new regulatory regime under Part 4. It was made at a time when we had limited information on the likely response of regulated businesses (and investors) to the 75th percentile WACC.

6.13 However, we now have experience operating under the IMs determined in 2010. As discussed in the draft decision, there is no evidence before us of systematic under-investment, or of declining service reliability, from businesses subject to price-quality regulation under Part 4. Rather, evidence suggests that regulated energy businesses have continued to undertake significant capital expenditure under the 75th percentile WACC.[300]

6.14 Recent expenditure proposals from Orion and Transpower also suggest that there is no disincentive to invest at the 75th percentile WACC estimate.

6.14.1 In its customised price-quality path proposal, Orion proposed a significant amount of capital expenditure. We considered that the extent and timing of the proposed expenditure had not been adequately justified. Our final

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299 As noted in paragraph 2.6, the 75th percentile does not logically have any special standing as the status quo. However, the evidence of observed investment we have (such as the RAB multiples analysis) necessarily starts from the 75th percentile, because this evidence reflects the market response to having set the percentile at that level.

300 Commerce Commission "Proposed amendment to the WACC percentile for electricity lines services and gas pipeline services" (22 July 2014), pages 75-77, paragraphs 6.23-6.26, and Figures 6.2 and 6.3.

decision allowed total capex over a five-year period which was $149.2 million lower than Orion's proposal.[301]

6.14.2 Transpower proposed a broadly similar amount of capital expenditure for regulatory control period 2 (RCP2) as it did for RCP1.[302]

6.15 Submissions on the draft decision did not provide evidence of under-investment or a decline in network reliability at the 75th percentile WACC estimate. A number of submissions on behalf of regulated suppliers did, however, dispute what conclusions we could draw from the disclosed information we presented on investment and reliability, for instance arguing that:

6.15.1 increasing RAB values say little about whether investment levels are sufficient;[303]

6.15.2 it is invalid to draw conclusions about recent investment levels without defining the counterfactual (ie, what the appropriate level of investment is);[304] and

6.15.3 investments were made prior to the outcome of the merits appeals being known.[305]

6.16 On the other hand, although disagreeing that our observations about investment and reliability imply the 75th percentile should be interpreted as a reasonable upper bound for the appropriate WACC percentile, HoustonKemp accepted our reasoning that "there is no evidence that the EDBs or Transpower are running their RAB's down post-2010 or that network reliability has declined since 2005".[306]

6.17 Evidence from recent transactions between investors in regulated businesses also suggests that the 75th percentile WACC estimate is more than sufficient to incentivise investment. In particular:

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301 Commerce Commission "Setting the customised price-quality path for Orion New Zealand Limited" (29 November 2013), page 6, paragraph X13.

302 Transpower, "Expenditure Proposal: Regulatory Control Period 2", (December 2013), page 41.

303 PwC "Submission to the Commerce Commission on Proposed Amendment to the WACC percentile for electricity lines services and gas pipeline services, Made on behalf of 20 electricity distribution businesses" (29 August 2014), paragraphs 44-50.

304 Incenta "Rationale for setting the regulatory WACC above the midpoint value – Response to Draft Decision" (Report prepared for ENA, August 2014), page 24.

305 Vector "Submission on Draft Determination to amend the WACC percentile" (29 August 2014), paragraph 7(e).

306 HoustonKemp "Comment on the Commerce Commission's proposed WACC percentile amendment" (Report prepared for Powerco, 29 August 2014), page 33.

6.17.1 there was strong investor interest from a range of parties (including international players) in purchasing a 42% stake in Powerco, and favourable comment on regulatory settings in New Zealand;[307] and

6.17.2 enterprise values for regulated businesses are significantly greater than the corresponding RAB values (particularly for Powerco and OtagoNet), indicating that the regulatory settings are more than sufficient to compensate investors for putting their capital at risk. Further discussion regarding the enterprise values for regulated businesses, relative to their RAB values, is contained in paragraphs 6.26 to 6.36 below and in Attachment C.

6.18 In our view, the significant and ongoing capital expenditure from regulated suppliers, and observed RAB multiples significantly above 1, outweigh any theoretical arguments for increasing the WACC uplift above the 75th percentile estimate. This evidence strongly suggests that the current regulatory settings (including the 75th percentile WACC estimate) are more than sufficient to raise equity capital and meet the rate of return expectations of investors (and their agents).

Analytical evidence supporting a WACC above the 75th percentile has significant limitations

6.19 There is some analytical support for using a WACC above the 75th percentile estimate. For example:

6.19.1 the Frontier Economics model, submitted on behalf of Transpower, indicates that the optimal WACC is likely to be significantly higher than the 75th percentile estimate; and

6.19.2 some other submissions suggest that we should adopt at least the 75th percentile WACC estimate.

6.20 In reaching its conclusions, Frontier Economics built on the analysis conducted by Professor Dobbs, which is also indicative of using a WACC estimate higher than the 75th percentile under certain assumptions.[308] Frontier Economics made adjustments to Professor Dobbs' model to reflect the New Zealand electricity sector when investigating the optimal WACC percentile.[309]

6.21 Professor Dobbs' model, and the extended version submitted by Frontier Economics, provide some interesting insights regarding the WACC percentile. In particular,

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307 Acquisition International "Power Grab - AMP Capital's acquisition of Powerco stake" (October 2013), page 9.

308 Dobbs, I., 2011. Modelling Welfare Loss Asymmetries Arising from Uncertainty in the Regulatory Cost of Finance, *Journal of Regulatory Finance* 39, 1-28.

309 Frontier Economics "Application of a loss function simulation model to New Zealand" (Report prepared for Powerco, August 2014).

exploring these models in the context of this review has helped shed light on a number of complex issues, including:

6.21.1 how consumer and producer surplus relate to the long-term benefits of consumers;

6.21.2 how different options to defer investment can affect the preferred WACC uplift; and

6.21.3 the role a WACC uplift might play in providing incentives to meet new demand that is independent of existing demand, where there is an option to delay that investment and a WACC uplift is the only available regulatory tool to provide such incentives.

6.22 However, we have significant concerns regarding the relevance of analysis based on Professor Dobbs' model in the context of the specific problem we are aiming to address by applying a WACC uplift.

6.22.1 Professor Dobbs' model, and Frontier Economics' extension of that model, address the situation where a regulator sets the WACC at the beginning of the regulatory period, but parameters in the WACC subsequently change—potentially providing incentives for the regulated firm to delay investments until the next regulatory period. Professor Dobbs notes that if the WACC were indexed to account for changes in financing conditions, "the rationale for the uplift would disappear".[310] In contrast, the problem the WACC uplift is intended to address is the effect mis-estimation of the WACC at the beginning of the regulatory period might have on investment, given the uncertainty in estimating the WACC. Professor Dobbs' model does not address this issue.

6.22.2 Professor Dobbs' model was originally based on a total surplus approach. Although weight can be given to consumer surplus in the Dobbs/Frontier model, it is not possible to do this robustly. Professor Dobbs highlights that, in the extreme case (ie, the absence of any new investment), the model would "recommend complete exploitation of the sunk nature of the network",[311] which would be inconsistent with the principle of ex ante financial capital maintenance. Therefore, even if the other concerns above were resolved, the model is not well suited to addressing the question of

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310 Ian Dobbs "Proposed amendment to the WACC percentile for the Allowed Rate of Return, Comments on the Application of the Dobbs [2011] model" (Report prepared for the Commerce Commission, 17 September 2014), paragraph 23.

311 Ian Dobbs "Proposed amendment to the WACC percentile for the Allowed Rate of Return, Comments on the Application of the Dobbs [2011] model" (Report prepared for the Commerce Commission, 17 September 2014), paragraph 20.

the appropriate WACC percentile in light of the overall purpose of Part 4 in s 52A—namely, the long-term benefit of consumers.[312]

6.22.3 The key role of the WACC uplift in Professor Dobbs' model is to reduce the incentive to delay investment in new services, which stemmed from the model originally being developed with the telecommunications sector in mind. In contrast, we consider the most effective role of the WACC uplift is to mitigate the risk of under-investment in network quality, which could potentially lead to large scale costly outages. The Dobbs/Frontier model assumes that quality of service is able to be costlessly maintained and that there is a universal service obligation. Professor Dobbs notes that modelling in the absence of service obligations would require modelling of the costs and benefits of allowing 'quantity rationing' or degradation in reliability in the electricity supply context.[313] Frontier Economics' analysis did not directly address this issue.

6.23 Consequently, our view is that limited weight should be placed on quantitative results from models based on Professor Dobbs' framework when considering the appropriate WACC percentile for electricity lines and gas pipeline businesses in New Zealand. Professor Dobbs himself states that "it is unclear how much ***quantitative*** significance should be placed on the model's predictions".[314] A more detailed examination of the 'goodness of fit' of Professor Dobbs' model in the current context is provided in Attachment B.

6.24 Further, Oxera considered the case for using a WACC above the 75th percentile, but concluded that this appears to result in "…a potentially excessive level of protection…" against the under-investment problem. For example, when considering the case for using the 80th percentile, Oxera stated that this would imply that:[315]

> …customers are paying as much for protection within a seven-year IM period as our analysis indicates could be the potential annualised cost of material outages. Given that the Commission has other regulatory measures in place to offset the risk of under-investment, and is strengthening these measures, this appears to be a potentially excessive level of protection.

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312 Refer to Attachment A, which discusses the principle of financial capital maintenance, and the consistency of a total surplus approach with the s 52A purpose.

313 Ian Dobbs "Proposed amendment to the WACC percentile for the Allowed Rate of Return, Comments on the Application of the Dobbs [2011] model" (Report prepared for the Commerce Commission, 17 September 2014), paragraph 11.

314 Ian Dobbs "Proposed amendment to the WACC percentile for the Allowed Rate of Return, Comments on the Application of the Dobbs [2011] model" (Report prepared for the Commerce Commission, 17 September 2014), paragraph 4.

315 Oxera "Input Methodologies: Review of the 75th percentile approach" (Report prepared for the Commerce Commission 23 June 2014), pages 73-74.

6.25 In conclusion, although there is some analytical support for a WACC higher than the 75th percentile, we consider this analysis does not directly relate to the issue of concern to us. Further, an uplift beyond the 75th percentile is not supported by observed investment from both regulated businesses and investors (see paragraphs 6.12 to 6.18 above). Therefore, we consider the 75th percentile to be a reasonable upper bound for the appropriate WACC percentile.

RAB multiples evidence suggests the 75th WACC percentile is too high

6.26 As indicated above (paragraph 6.18), when determining the appropriate WACC uplift, we have considered estimates of the implied commercial values of businesses subject to price-quality regulation under Part 4, relative to each company's RAB (ie, RAB multiples). The available RAB multiples are one factor we considered when determining the appropriate WACC percentile, within the range we defined (ie, from the 60th to the 75th percentile).

6.27 The RAB multiple of a regulated business is the ratio of its enterprise value to its RAB.[316] RAB multiples can provide a useful indicator of whether the allowed rate of return has been set at a level sufficient to adequately compensate investors for putting their capital at risk.

6.28 At its simplest, the concept is that (in the absence of other factors) a business will deliver returns close to its 'true' cost of capital. That is, the net present value of expected cash flows should, if the regulator's assumptions hold, equal the value of the RAB (ie, the RAB multiple should be 1.0).

6.29 However, in an incentive-based regulatory regime, the RAB multiple will not only reflect the relationship between the regulatory allowed rate of return and investors' views of WACC, but also the market's expectations of the company's ability to over- or under-perform relative to the regulator's cash flow and other modelling assumptions. On this basis, a RAB multiple of greater than 1.0 could imply either:

6.29.1 the regulatory allowed rate of return was too high; or

6.29.2 the market expected the company to outperform cash flow or other model assumptions used in the regulatory determination.

6.30 In the draft decision we considered available RAB multiples for businesses subject to price-quality regulation under Part 4, including Powerco, Vector, and Horizon. We

316 The enterprise value is calculated as the sum of the market value of net debt and the market value of the shareholders' equity.

concluded that the available RAB multiples for Powerco and Vector suggested that "…the 75th percentile WACC estimate is above these businesses' actual WACCs".[317]

6.31 Submissions from regulated suppliers raised concerns regarding the weight we placed on RAB multiples in our draft decision, given the limited number of data points, magnitude of the multiples for businesses other than Powerco, and other reasons which (in theory) could explain why a firm's enterprise value exceeds its RAB. CEG (for NZ Airports) also suggested that we placed "extreme" reliance on RAB multiples compared to other regulators.[318]

6.32 Covec (for BARNZ), on the other hand, submitted that the RAB multiples analysis was "treated appropriately" in our draft decision, noting that RAB multiples greater than one suggest that investor capital is not being expropriated (regardless of the specific cause).[319] IWA (for MEUG) proposed adjustments to the estimated RAB multiples to reflect other sources of finance, and concluded that:[320]

> The long persistence and consistency of strong positive RAB multiples suggests that there is no practical problem of inadequate return to incentivise investment by suppliers at any regulatory WACC setting near to current levels, or indeed levels derived without an uplift from the mid-point of the WACC data range.

6.33 Our detailed responses to submissions on RAB multiples are contained in Attachment C. In summary:

6.33.1 more RAB multiples data points are now available, following the recent OtagoNet transaction and the December 2013 The Lines Company transaction (raised by PwC in submissions);

6.33.2 the observed premiums over RAB for Powerco and OtagoNet (in particular) are significant;

6.33.3 the available RAB multiples represent over half of both the electricity distribution and gas pipelines sectors. Powerco, Vector, OtagoNet and The Lines Company together constitute approximately 56% of the total RAB

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317 Commerce Commission "Proposed amendment to the WACC percentile for electricity lines services and gas pipeline services" (22 July 2014), page 79, paragraph 6.35. Limited weight was placed on Horizon's RAB multiples for several reasons, including the very low liquidity in Horizon's shares (which likely impairs the price discovery function of the market).

318 CEG "Economic Review of Draft Decision on the WACC Percentile" (Report prepared for NZ Airports, August 2014), page 31, paragraph 100.

319 Covec "Cross submission on WACC percentile issues" (11 September 2014), page iii.

320 IWA "Commerce Commission's proposed amendment to the WACC percentile for electricity lines services and gas pipeline services dated 22 July 2014" (Report prepared for MEUG, 29 August 2014), page 21.

value for EDBs subject to price-quality regulation. Powerco and Vector constitute approximately 80% of the total RAB for GPBs;[321]

6.33.4 other regulators also consider similar market-based evidence when assessing the appropriate cost of capital;[322]

6.33.5 we consider that both IWA's approach of adjusting RAB multiples for other sources of finance and our standard approach both provide useful evidence, although we consider the actual RAB multiple is likely to lie somewhere in between our standard and adjusted estimate for each supplier;

6.33.6 the observed RAB multiples suggest that there are no issues with financing additional investment under the current regulatory settings (including the 75th percentile WACC); and

6.33.7 reducing the WACC uplift from the 75th to the 67th percentile would have a relatively small impact on observed RAB multiples (ie, we would expect a RAB multiple of 1.20 to fall to approximately 1.16).

6.34 Our updated analysis of RAB multiples based on both standard and adjusted estimates is summarised Table 6.1 below.[323]

Table 6.1: Summary of observed RAB multiples

Name of EDB	Date of transaction	RAB multiple (standard)	RAB multiple (adjusted)
Vector	June 2013	1.14	1.36
Powerco	July 2013	1.30	1.48
The Lines Company	December 2013	0.77	1.03
OtagoNet	September 2014	1.89	1.91
Average (simple)		**1.28**	**1.45**
Average (weighted)		**1.20**	**1.40**

Note: the weighted average RAB multiples are weighted using 2013 RAB values.
Source: publicly available information and Commerce Commission analysis.

321 These proportions are calculated using RAB values for EDBs and GPBs based on 2013 disclosures.

322 For example, in its February 2014 report on the split cost of capital, the QCA referred to the UK and Australian RAB multiples as evidence of above normal returns. The Chairman of Ofwat has also referred to RAB multiples for UK water companies as evidence that regulator's adopted cost of capital is too high. See Attachment C for further details.

323 Further details regarding these RAB multiples, including how both the standard and adjusted RAB multiples were estimated, are contained in Attachment C. Consistent with our draft decision, we have placed little weight on RAB multiples for Horizon, due to the lack of liquidity in its shares.

6.35 We acknowledge that there are limitations of our RAB multiples analysis. For example:

6.35.1 due to the relatively short history of the IMs, there are a limited number of data points available;

6.35.2 there are a range of factors which could potentially influence RAB multiples (in addition to the allowed rate of return), including outperformance of opex and capex benchmarks;

6.35.3 it can be difficult to isolate the enterprise value of the regulated activities of a business, due to uncertainty over the value of unregulated activities.

6.36 However, this review is focussed on the appropriate magnitude of any uplift from the mid-point WACC estimate, to limit the risk of negative consequences to consumers associated with under-investment. In our view, the observed RAB multiples provide a useful indicator that there is significant scope to reduce the size of the WACC uplift.

Our judgement is that the 67th percentile WACC estimate is appropriate

6.37 Considering all of the available evidence, our view is that the 75th percentile WACC estimate is too high. Therefore, we intend to adopt a lower WACC percentile for price-quality regulation.

6.38 In reaching this view, we note that the main focus of the WACC uplift is to reduce the risk of setting the allowed WACC below the actual WACC, and the consequent risk to consumers of major outages caused by under-investment in network quality.

6.39 There are a range of other types of investment which submissions have suggested should also influence the size of the WACC uplift. As discussed in Chapter 5, we consider that other factors substantially mitigate the need to increase the uplift for these forms of investment.[324] For example:

6.39.1 a weighted average price cap provides incentives to invest in new infrastructure and to connect new consumers to the network, as it provides regulated suppliers with additional revenue for new consumers and new volume immediately. In addition, the cash-flow impacts of expanding supply to new consumers can be mitigated by the approach in the asset valuation IMs to capital contributions and vested assets;[325]

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[324] The role of other factors, in addition to the allowed rate of return, which are likely to influence suppliers' investment decisions across different categories of investment are discussed in Chapter 5.

[325] See paragraph 5.67.2 above for further details.

6.39.2 most innovation investments from regulated suppliers are likely to result in meeting demand or maintaining/improving network reliability more efficiently (cheaper on a life-cycle basis). Suppliers already have incentives to undertake cost-reducing investments, assuming these investments lead to outperformance of the opex and/or capex benchmarks used to determine the price-quality path.

6.40 Further, we are able to monitor the investment of regulated suppliers and take action if we become concerned about under-investment or declining quality of service. Possible changes to elements of the IMs and price-quality paths can be consulted on in response to observed investment levels and quality, if required, with any changes taking effect from the beginning of the next regulatory period.[326]

6.41 The two key pieces of evidence which influenced our decision to reduce the WACC percentile are:

6.41.1 The quantitative analysis conducted by Oxera, adopting a 'probability of loss' approach consistent with the use of a loss function as supported by the Court, which indicates that a WACC below the 75th percentile estimate is appropriate.[327] Specifically, Oxera recommends using a WACC between the 60th and 70th percentile estimates. We have drawn on Oxera's framework, and other relevant factors, when forming our conclusions regarding the WACC percentile. There are several off-setting considerations which may affect the conclusions of Oxera's analysis (as discussed in paragraph 6.9 above) but, on balance, we place weight on Oxera's view that a percentile below the 75th is appropriate.

6.41.2 Analysis of RAB multiples indicates that there are no issues with financing additional investment under the current regulatory settings (including the 75th percentile WACC). Rather, the magnitude of the Powerco and OtagoNet RAB multiples (in particular) suggests that there is significant scope to reduce the size of the WACC uplift.

6.42 Due to fundamental uncertainty regarding the link between the WACC allowed by the regulator, the level of investment by regulated suppliers, how this affects quality of service, and the resulting impact on the long-term benefit of consumers, it is not possible (based on the available data) to define a specific WACC percentile based

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326 We also note that, when setting a customised price-quality path, we can vary an IM with the agreement of the regulated supplier (s 53V(2)(c)).

327 In his peer review Professor Vogelsang noted that Oxera's report "…goes a significant way towards fulfilling the High Court's aspirations for a NZCC decision on the optimal percentile of the WACC distribution" and provides a "…sound empirical base for a decision". Professor Ingo Vogelsang "Review of Oxera's Report, Input methodologies - Review of the '75th percentile' approach" (Report prepared for the Commerce Commission, 10 July 2014), page 1, paragraph 2.

purely on empirical evidence. Rather, for the reasons described in paragraphs 4.5 to 4.13 above, judgement is required when determining the appropriate WACC percentile.[328]

6.43 After exercising judgement in light of the available evidence, we have concluded that a percentile around the middle of the reasonable range we have defined (ie, from the 60th to the 75th percentile) appropriately balances the relative costs to consumers of under- and over-investment.

6.44 We note that although the expert reports submitted on behalf of regulated suppliers generally asserted a strong case for using a WACC above the mid-point estimate for electricity lines and gas pipeline businesses, they provided limited analytical or empirical evidence to support the specific choice of the 75th percentile estimate.[329]

6.44.1 Many advocated remaining at the 75th percentile on the grounds that, in their view, there was insufficient evidence to support reduction to a particular level.[330] However, as discussed in Chapter 4, our view is that there is unlikely to be any material net long-term benefit to consumers from undertaking additional analysis of the appropriate WACC percentile at this stage.

6.44.2 Further, those submitters who argued for the 75th percentile (or higher) generally used a total welfare approach when conducting their analysis. As discussed in paragraphs 2.32 to 2.39 and Attachment A, we consider that a consumer welfare approach is more consistent with the Part 4 purpose.

6.45 We have considered whether a WACC estimate towards our lower bound of the 60th percentile should be applied. However, in our view some conservatism in selecting the percentile remains appropriate, particularly given that there is fundamental uncertainty regarding the appropriate WACC percentile, and the long-term costs to consumers of under- and over-estimating WACC are asymmetric (so erring on the higher side is likely to be in consumers' interests).

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328 As noted in paragraph 4.13 above, submissions acknowledge that judgement is required when determining the WACC percentile.

329 The model submitted by Frontier Economics indicated that a WACC significantly above the 75th percentile is optimal. However, we have placed limited weight on the quantitative results of this model, for the reasons explained in Attachment B.

330 For example, HoustonKemp "Comment on the Commerce Commission's Proposed WACC Percentile Amendment" (Report prepared for Powerco, 29 August 2014), page v; CEG "Economic Review of Draft Decision on the WACC Percentile" (Report prepared for NZ Airports, August 2014), page 2, paragraph 7; and PwC "Submission to the Commerce Commission on Proposed amendment to the WACC percentile for electricity lines services and gas pipeline services: Made on behalf of 20 Electricity Distribution Businesses" (29 August 2014), page 3.

6.46 In conclusion, we have determined that the 67th percentile WACC estimate is appropriate. As outlined above, the main factors that influenced this decision are:

6.46.1 due to fundamental uncertainty, it is not possible to determine the optimal WACC percentile based on empirical analysis alone (rather, we must apply judgement); and

6.46.2 Oxera, who developed our main analytical framework for assessing the appropriate percentile, has recommended using a WACC between the 60th and 70th percentile estimates; and

6.46.3 the available RAB multiples suggest there is significant scope to reduce the WACC uplift below the 75th percentile estimate; but

6.46.4 given that the potential long-term costs to consumers of under-estimating WACC are substantial, some conservatism (ie, erring on the high side) remains appropriate when determining the WACC percentile.

6.47 The 67th percentile lies around the middle of the range which we consider the evidence supports—ie, between the 60th and 75th percentiles. We have chosen a round number, rather than selecting the precise middle of the range, as we consider specifying the WACC percentile to one decimal place for price-quality regulation would provide spurious accuracy for what is ultimately an exercise of judgement.

Our decision applies to EDBs, Transpower and GPBs

6.48 One of the themes raised in submissions is that risks and incentives to invest may differ on a sector-by-sector basis. Oxera noted that it may be helpful to supplement the energy market analysis that has been conducted with examples from other industries, when considering whether the WACC percentile for energy businesses should be applied across other sectors.[331]

6.49 Our decision to reduce the WACC from the 75th to the 67th percentile estimate applies to electricity lines businesses (EDBs and Transpower) and GPBs. However, as discussed in paragraph 1.27 above, we are taking additional time to consider the WACC percentile for airports, because we have not yet fully considered the airport-specific aspects of submissions at this stage (for example, the role of using a dual-till approach to regulation).

6.50 We considered the specific points raised regarding Transpower when deciding to apply the same percentile to both EDBs and Transpower. However, in our view, the differences in the mix of investments and incentives to invest between EDBs and Transpower (which are discussed further in Attachment E), do not justify a different WACC percentile.

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331 Oxera "Oxera review of submissions: the appropriate WACC percentile" (17 July 2014), page 2.

6.50.1 On the one hand, the majority of Transpower's forthcoming investment is reliability-driven. Transpower faces more stringent regulatory obligations in respect of many of its reliability-driven investments than EDBs, given it is subject to the Grid Reliability Standards set out in the Electricity Industry Participation Code. This might suggest a lower WACC percentile might be appropriate.

6.50.2 On the other hand, discretionary economic investments are a more significant factor for Transpower than EDBs. The significance of economic investments is not currently as material as a number of submitters suggest, plus we consider that more targeted incentive schemes would likely be more effective in providing incentives for those types of investments (should it become evident in future that some additional incentive is warranted). Nonetheless, this factor, when combined with the greater scrutiny of Transpower's capex (which arguably mitigates the risk of over-investment by Transpower to a greater degree than EDBs), implies a higher WACC percentile might be appropriate.

6.50.3 On balance, our judgement is to set the WACC percentile for Transpower at the same level as for EDBs.

6.51 Further, while we accept that there are differences between electricity lines and gas pipelines, in our draft decision we considered these industries to be similar enough for the same WACC percentile to apply. We did not receive any submissions suggesting that a different WACC percentile should be applied to gas pipeline businesses.[332] Therefore, on balance, and applying judgement based on the evidence before us, our final decision is that the same WACC percentile should be applied to EDBs, Transpower, and GPBs, under price-quality regulation.

Reasonableness tests of the 67th percentile WACC percentile estimate

6.52 We have updated the reasonableness tests used in 2010 to see whether our 67th percentile WACC estimate is within the reasonable range of cost of capital estimates from independent analysts.[333] The reasonableness tests we have conducted are described in detail in Attachment D.

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[332] We note that there may be some factors which imply the WACC percentile for gas pipeline businesses could be higher (eg, demand for gas pipeline services is unlikely to be as inelastic as for electricity lines services), but there are also likely to be other factors which suggest it could be lower (eg, the significance of safety concerns in gas supply, which are likely to provide strong incentives for investment in network quality).

[333] Commerce Commission "Input Methodologies (Electricity Distribution and Gas Pipeline Services): Reasons Paper" (December 2010), pages 578 to 603, paragraphs H13.1 to H13.106.

6.53 When undertaking the reasonableness checks, greatest weight has been given to:

6.53.1 New Zealand sourced WACC estimates; and

6.53.2 WACC estimates for businesses which are closest to pure-play providers of regulated electricity lines services (for example, Transpower).[334]

6.54 We have also standardised all WACC estimates using the risk-free rate we estimated under the IMs as at 1 April 2014.[335] This is necessary because the cost of capital IMs use a spot risk-free rate, but some analysts use long-term averages. The purpose of the reasonableness checks is not to highlight differences in the risk-free rates which are used by different analysts.

6.55 Forsyth Barr objected to our standardisation methodology, noting that they adjust their market risk premium estimate in response to changes in the risk-free rate.[336] However, Forsyth Barr stated that their standardised WACC estimate would be approximately 6.6%, which is almost identical to our 67th percentile WACC estimate of 6.57% (for EDBs, as at 1 April 2014).

6.56 In summary, using the 67th percentile results in a WACC estimate for EDBs and Transpower that is within the range of independent estimates provided by:[337]

6.56.1 Northington Partners, Forsyth Barr and First NZ Capital, for Transpower;

6.56.2 PwC, for Vector and Horizon; and

6.56.3 broker WACC estimates for Vector's entire business, even though a significant proportion of Vector's activities are higher risk than its regulated electricity distribution business (such as gas pipelines, for which we allow a higher WACC).

6.57 Overall, the available comparator information indicates that moving from the 75th to the 67th percentile will not result in a WACC estimate that is out of line with independent estimates of the WACC for electricity lines and gas pipeline services in New Zealand.

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334 Other (unregulated) businesses are generally likely to have a higher cost of capital than regulated businesses. Although both Transpower and Horizon have unregulated businesses, these are proportionately small relative to other comparators (such as Vector).

335 *Cost of capital determination for information disclosure year 2015 for specified airport services (March year-end) and electricity distribution services* [2014] NZCC 10. As at 1 April 2014, the risk-free rate for a five year term was 4.21%.

336 Forsyth Barr "Submission on draft decision relating to WACC percentile for electricity lines and gas pipeline services" (25 August 2014).

337 As noted in paragraphs D28 to D29 below, based on the available evidence, we conclude that moving from the 75th to the 67th percentile will also result in commercially realistic WACC estimates for GPBs.

Impact of using the 67th percentile WACC estimate instead of the 75th percentile

6.58 Across energy businesses subject to price-quality regulation under Part 4 (excluding Orion), we estimate that reducing the WACC from the 75th to the 67th percentile would lead to a reduction in payments by consumers of approximately $45 million per annum.[338]

6.59 The estimate of $45 million per annum is based on the following assumptions.[339]

6.59.1 The combined RAB for EDBs subject to default price-quality regulation and Transpower is approximately $11.3 billion, and the combined RAB for all GPBs is approximately $1.6 billion.[340]

6.59.2 For EDBs and Transpower, using the 67th percentile instead of the 75th percentile reduces the WACC by 25 basis points.[341] The 75th percentile corresponds to an uplift from the mid-point WACC estimate of 72 basis points and the 67th percentile corresponds to an uplift of 47 basis points.

6.59.3 For GPBs, using the 67th percentile instead of the 75th percentile reduces the WACC by 28 basis points. The 75th percentile corresponds to an uplift from the mid-point WACC estimate of 81 basis points and the 67th percentile corresponds to an uplift of 53 basis points.

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338 Because revenues are pre-tax amounts, the reduction in payments by consumers is estimated by grossing up the change in post-tax returns for the tax effect. We have used the statutory corporate tax rate of 28% when grossing up for the tax effect, and rounded down to the nearest $1m.

339 We note that any changes to the WACC percentile for GPBs would not take effect until the next default price-quality path reset in 2017 (unless there is a customised price-quality path set prior to then). Orion is currently on a CPP which will not end until 2019.

340 The RAB values for EDBs and GPBs are based on 2013 disclosures. We have used Transpower's forecast opening RAB for RCP2 of $4.64 billion. Transpower "2015/16 to 2019/20 Transmission Revenue" (9 December 2013), page 1.

341 As an example of the impact on the overall WACC, using the 67th percentile instead of the 75th percentile reduces the post-tax WACC for EDBs as at 1 April 2014 by 3.7% (from 6.82% to 6.57%). The corresponding reduction in the vanilla WACC is 3.2% (from 7.60% to 7.36%). The 75th percentile WACC estimates for EDBs as at 1 April 2014 are available in *Cost of capital determination for information disclosure year 2015 for specified airport services (March year-end) and electricity distribution services* [2014] NZCC 10.

Attachment A: Consumer welfare vs total welfare

Purpose and scope of this Attachment

A1 A significant number of the submissions received during consultation on our WACC percentile decision have expressed a view on whether any loss analysis undertaken to inform that decision should be based on a 'consumer welfare' (ie, 'consumer surplus') approach or a 'total welfare' approach (ie, a total surplus approach, combining both consumer and producer surplus). The purpose of this Attachment is to consider the key points in those submissions in light of the guidance provided by the Part 4 purpose in s 52A.

A2 This attachment:

A2.1 outlines the guidance provided to us by the Part 4 purpose statement in making our decision on the appropriate WACC uplift;

A2.2 introduces the framework for loss analysis, and how such analysis is affected by taking a consumer welfare or total welfare approach, as well as by the way consumer surplus and producer surplus are measured; and

A2.3 explains how both our draft and final decisions have focused on balancing the long-term interests of consumers due to under- or over-investment, rather than giving some numeric weight to quantitative estimates of consumer or producer surplus.

Guidance from the Part 4 purpose statement

The overriding purpose is the long-term benefit to consumers

A3 The High Court has made it clear that:

A3.1 the 'overall', 'central' or 'overriding' purpose of Part 4 is the long-term benefit to consumers in markets where there is little or no competition;

A3.2 that purpose is to be achieved by promoting outcomes that are consistent with outcomes in workably competitive markets;

A3.3 the relevant outcomes to be achieved are those listed in s 52A(1)(a) to (d); and

A3.4 those outcomes are expressed by reference to the way in which suppliers are affected by Part 4 regulation—ie, it is suppliers of regulated services who are to have incentives to innovate and to invest (s 52A(1)(a)), who are to have incentives to improve efficiency and to provide services at a quality that reflects consumer demands (s 52A(1)(b)), who are to share efficiency

gains with consumers (s 52A(1)(c)), and who are to be limited in their ability to extract excessive profits (s 52A(1)(d)).[342]

The relevant consumers are consumers of regulated services

A4 The High Court has also confirmed that the relevant interests (or benefits) to be promoted are the interests of consumers of regulated services, and not the broader interests of those consumers as participants in New Zealand's wider economy, or the interests of consumers of unregulated services.[343]

A5 An argument has been made that our decision on the appropriate WACC percentile should recognise the fact that consumers may also be providers of labour and/or owners of the factors of production. Therefore we should take into account the benefits to them in that role, not just in their role as consumers.[344] To the extent that regulated suppliers consume regulated services themselves, we agree that the benefits to them of doing so are captured by s 52A. But the reference to the 'long-term benefit of consumers' in s 52A does not refer to:

A5.1 the benefits to regulated suppliers of supplying regulated services;

A5.2 the benefits to regulated suppliers as consumers of other services in the wider New Zealand economy; or

A5.3 the benefits to consumers of regulated services in supplying other services in the economy, where those consumers are themselves producers of other services.

A6 A related point made is that, in the case of regulated suppliers of electricity distribution services, consumers of those services are often partial owners of the

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342 *Wellington International Airport Ltd & Ors v Commerce Commission* [2013] NZHC [December 2013] (*Wellington International Airport Ltd & Ors v Commerce Commission* [2013] NZHC [December 2013],) paragraphs [10], [222] and [233]-[234]. For example, in the current context, refer to: Russell McVeagh "Review of Franks & Ogilvie advice dated 12 September 2014, to Electricity Networks Association and NZ Airports Association" (30 September 2014), paragraph 7.

343 In particular: "To use the wording discussed in *Powerco Limited v Commerce Commission*, the interests to be promoted here are those of the 'acquirers' of goods and services in the relevant markets, not the broader interests of those acquirers as participants in New Zealand's wider economy" (HC paragraph [222]); and "the overall purpose of Part 4 is to promote the long-term benefit of consumers of regulated goods and services, and not the interests for example, of consumers of unregulated services or to provide more general incentivising effects which may be considered to be in the interests of the wider New Zealand economy" (*Wellington International Airport Ltd & Ors v Commerce Commission* [2013] NZHC [December 2013], paragraph [686]).

344 For example, Incenta Economic Consulting "Rationale for setting the regulatory WACC above the midpoint value – Response to Draft Decision" (Report prepared for the ENA, August 2014), page 2.

company too.[345] However, the reference to the 'long-term benefit of consumers' in s 52A does not refer to any additional benefit those consumers might receive from their ownership stake in any company, including their local regulated supplier. In that role they are not consumers in the market for a regulated service. Rather they are participants in a market for owning companies that supply regulated services. In any event, Parliament has made it clear under what circumstances, and in what way, we are to take consumer ownership into account.[346]

The outcomes in s 52A(1)(a) to (d) are to be balanced in light of that purpose

A7 The High Court cited that the need to balance s 52A(1)(a) and (d) was reflected in the legislative history to Part 4.

> The Select Committee recognised the need to balance promoting the outcome of regulated suppliers having incentives to invest with that of limiting their ability to extract excessive profits – consistent in both cases with outcomes produced in workably competitive markets when it observed:
>
> Most submitters supported the purpose statement as drafted. Others argued that the primary objective in the purpose statement should be investment. Although we agree that incentives to invest are important, we consider they need to be balanced against the need to protect consumers from excessive prices.[347]

A8 In the current context, the High Court has made it clear that the Commission's justification of a WACC uplift, which involves balancing 'limiting the ability of suppliers to extract excessive profits' in s 52A(1)(d) with the s 52A(1)(a) outcome of providing regulated suppliers with incentives to invest and operate, "is to be decided within the context of what best promotes the long-term benefit of consumers, the overriding purpose of Part 4."[348]

A9 Consequently, s 52A(1)(a) does not imply that we should ensure regulated suppliers have incentives to innovate and invest, including in replacement, upgraded, and new assets, without limitation. Subparagraphs (a) to (d) provide guidance on the characteristics of investments that would be expected to provide benefits to consumers in the long term. As is explained in the IM reasons paper, where investments "are made at an efficient level and time, and are employed to provide

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345 Incenta Economic Consulting "Rationale for setting the regulatory WACC above the midpoint value – Response to Draft Decision" (Report prepared for the ENA, August 2014), page 2.

346 Part 4 defines the criteria for what makes a regulated supplier of electricity line services 'consumer-owned' (s 54D), makes clear those suppliers are exempt from price-quality regulation and subject to information disclosure regulation only (ss 54F and 54G), and puts in place provisions for how that exempt status can be lost (s 54H).

347 *Wellington International Airport Ltd & Ors v Commerce Commission* [2013] NZHC [December 2013], paragraph [685].

348 *Wellington International Airport Ltd & Ors v Commerce Commission* [2013] NZHC [December 2013], paragraph [1461].

services at the appropriate quality, then consumers will benefit over the long term."[349]

A10 The outcomes in s 52A(1)(a) to (d) reflect a number of long-term benefits to consumers, including:

A10.1 efficient investment and innovation that meets current and future demand for regulated services, and which contributes to the provision of those services at a quality that reflects consumer demands (s 52A(1)(a) and (b));

A10.2 lower prices due to the sharing of efficiency gains made by regulated suppliers (s 52A(1)(c)); and

A10.3 the consequential benefits of prices being lower than they otherwise would be because regulated suppliers are limited in their ability to extract excessive profits (s 52A(1)(d). These benefits are not explicitly limited in s 52A to the efficiency benefits to consumers only, and so the direct financial benefits to consumers from lower prices (ie, the distributional effects) are also relevant.[350]

A11 To the extent that consumers pay higher prices to ensure that beneficial investments consistent with s 52A(1)(a) and (b) are made by regulated suppliers, those investments will only be consistent with the s 52A purpose to the extent that the benefits to consumers from those investments exceed the associated costs to consumers from higher prices, where all relevant benefits and costs are taken into account over the long term.[351]

The interests of producers and investors are protected by the application of ex ante FCM

A12 The High Court referenced a part of the Explanatory Note which indicated the s 52A purpose statement implied the interests of suppliers and investors also needed protecting.[352]

> (d) Part 4 regulation sought to preserve incentives for suppliers to invest while at the same time protecting consumers, where required, from excessive prices and poor quality service.

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349 Commerce Commission "Input methodologies (Electricity Distribution and Gas Pipeline Services): Reasons Paper" (December 2010) paragraph 2.6.32.

350 The efficiency benefits are sometimes referred to as eliminating the deadweight loss. From a consumer's perspective this reflects the quantity of a service they no longer purchase because the price is higher. By contrast, the distributional effects are the higher price they pay for the quantity they do continue to purchase.

351 A benefit to consumers may be reflected in terms of the probability of an avoided cost—for example, an investment that reduces the likelihood of a supply outage that would have a detrimental impact on consumers.

352 *Wellington International Airport Ltd & Ors v Commerce Commission* [2013] NZHC [December 2013], paragraphs [680] and [663].

(e) More generally, the option chosen for the purpose statement was one that explicitly stated that the objective of regulation was to improve efficiency and to protect consumers from excessive prices, similar to the Part 4A purpose statement. That included both efficiency and distributional objectives, to provide for an appropriate balance between the protection of consumers and that of producers and investors. …

A13 In our view, in the context of the overriding purpose of the long-term benefit of consumers, the interests of regulated suppliers and investors are appropriately protected by our application of the principle of financial capital maintenance (FCM)—also referred to as 'NPV = 0'—on an ex ante basis.

A14 The High Court referenced our discussion of the ex-ante FCM principle in the IM reasons paper at some length.[353] For instance:

[260] … NPV=0 reflects the situation where a firm is – in a workably competitive market – earning its cost of capital, ie making normal but not excessive profits.

[261] The concept of FCM is similar. Again, in the Principal Reasons Papers the Commission explains:

Over the lifetime of its assets, a typically efficient firm in a workably competitive market would expect *ex ante* to earn at least a normal rate of return (i.e. its risk-adjusted cost of capital). Because allowing a firm the expectation of being able to earn normal returns over the lifetime of an investment provides it with the chance to preserve its 'financial capital' in real (not nominal) terms, such an outcome is often referred to as 'financial capital maintenance' or 'FCM'. In a regulatory context, FCM is achieved, on an *ex ante* basis.

[262] The Commission, in a footnote, provides examples of commentary on the FCM principle:

For example: "In defining the costs of depreciation and allowed return, regulators should adopt rules that meet the accounting principle of 'Financial Capital Maintenance' (FCM), i.e. rules which allow investors to maintain the real value of their capital. This principle is a necessary condition for total cost recovery – meaning for efficient investment and for the prevention of monopoly profits. … FCM therefore provides the standard by which investors effectively measure whether the regulatory regime is allowing them to recover their costs including a rate of return comparable with that offered by other companies and sectors" (Shuttleworth, G., supra n 95, pp. ii and 13). The concept of FCM underpins the decisions of regulators in many OECD countries (e.g. refer: Diewert E., Lawrence D. and Fallon J., *Asset Valuation and Productivity–Based Regulation Taking Account of Sunk Costs and Financial*

353 *Wellington International Airport Ltd & Ors v Commerce Commission* [2013] NZHC [December 2013], paragraphs [256] – [265]. The Court noted that the acceptance of the Commission's explanation of FCM as an ex ante concept was reflected in the absence of appeals as to how the initial regulatory asset base values are rolled forward (*Wellington International Airport Ltd & Ors v Commerce Commission* [2013] NZHC [December 2013], paragraph [266]). Also refer: Commerce Commission "Input methodologies (Electricity Distribution and Gas Pipeline Services): Reasons Paper" (December 2010), paragraphs 2.6.28 and 2.8.18.

Capital Maintenance, Report to the Commerce Commission, Economic Insights, Canberra, 11 June 2009, pp. 39-47).

[263] Thus as with NPV=0, FCM is seen as an outcome consistent with the making of normal but not excessive profits and is therefore an outcome that will also efficiently promote the purpose of, and outcomes sought by, s 52A(1).

A15 Application of the FCM principle ex ante means that, when we set price-quality paths, we expect our decisions will give regulated suppliers the opportunity to earn a normal return on their efficient investments, consistent with outcomes in workably competitive markets.

A WACC uplift can potentially be consistent with the s 52A purpose

A16 As is discussed in more detail in Chapter 3, the main problem that the WACC uplift is trying to address is:

A16.1 the risk that setting the WACC at the mid-point estimate means the allowed WACC is less than the 'true' WACC, and that results in under-investment, and;

A16.2 the risk that such under-investment results in significantly greater costs to consumers than over-investment. This could occur if that under-investment contributes to, for example, major outages in supply (or more generally to service quality that is lower than consumers demand). On the other hand, we observe that, where investment is currently at higher levels than is optimal, to the extent this is just a timing issue such over-investment would still be likely to provide some benefits to consumers over time, and this would partly offset the increased costs to consumers due to higher prices.

A17 This problem arises because:

A17.1 the WACC cannot be observed—it must be estimated, and there is uncertainty in that estimate; and

A17.2 the costs to consumers from under-investment due to a WACC that is 'too low' are worse than the costs to consumers from over-investment due to a WACC that is 'too high' (ie, the consequences to consumers of getting the WACC wrong are 'asymmetric').

A18 We set a WACC uplift in the expectation that doing so will positively affect the incentives for regulated suppliers to invest in a way that mitigates the risk of under-investment, thereby mitigating the risk that consumers will suffer significant losses from such under-investment. However, we are mindful that the WACC uplift applies to the entire RAB, and not just to the incremental investment that is expected to not otherwise occur without the WACC uplift. Consumers therefore pay a significant

'premium' in advance, in the form of higher prices over the long term, to mitigate these risks.[354]

A19 A WACC uplift will be consistent with the s 52A purpose to the extent that the additional costs to consumers from the uplift are exceeded by the additional benefits the higher prices produce (eg, avoiding major outages in future), compared to prices without the uplift, over the long term.[355] Section 52A(1)(a) will be appropriately balanced with s 52A(1)(d), in light of the overriding purpose, because the incentives for additional investment caused by the uplift result in greater long-term net benefits to consumers. Therefore, to the extent the uplift also results in regulated suppliers making higher profits, those profits should not be viewed as 'excessive'.[356]

The framework for loss analysis - consumer welfare versus total welfare

The Court recognised loss analysis might assist in balancing s 52A(1)(a) and (d)

A20 The High Court observed that the rationale for our approach in providing a WACC uplift came closest to having a clear basis, so far as the materials before it was concerned, in terms of a 'loss function' (or 'loss analysis'). A loss analysis approach, which seeks to quantitatively determine the costs and benefits to consumers of a higher or lower percentile, is theoretically a valuable tool in better determining the right balance between s52A(1)(a) and (d). Our concern about loss analysis,

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354 We recognise there is a risk that consumers pay the premium and it makes little or no difference to future investment levels, or that the additional investment occurs but makes little or no difference to the likelihood that future costs are avoided. As is discussed in Chapter 4, one way to address this issue might be to set a 'two-tier' or 'split' cost of capital, but submitters did not support considering this option further at this stage.

355 The primary purpose of the WACC uplift is to reduce the risk that the allowed WACC falls short of the actual WACC, and by doing so to reduce the risk that regulated suppliers under-invest. This would mitigate the risks that consumers will face significant costs caused by under-investment. As is discussed in Chapter 3, we also recognise that, under Part 4, there may be a role to play for more targeted incentive schemes/mechanisms intended to provide greater incentives for undertaking particular types of investments associated with positive net long-term benefits to consumers. Unlike an ex ante WACC uplift, which increases prices to consumers irrespective of whether the expected benefits actually occur, such schemes might directly link an ex post reward or penalty to a specific investment occurring or to a specific benefit being realised.

356 Franks and Ogilvie have argued that we are not authorised to offer an incentive for investment "by way of excess profits" (Franks and Ogilvie "Commerce Commission Review of WACC percentile – Specific Legal Issues Arising from Submission" (1 September 2014), paragraph 13). Webb Henderson (Webb Henderson "Commerce Commission reopening of WACC percentile estimate, Memorandum of advice to Transpower Limited" (30 September 2014)) and Russell McVeagh provide contrary arguments. We broadly agree with Russell McVeagh's description of our position and the relevant economic evidence (Russell McVeagh "Review of Franks & Ogilvie advice dated 12 September 2014, to Electricity Networks Association and NZ Airports Association" (30 September 2014), paragraph 4(e)).

recognised by the Court, has always been simply about whether we would have reliable evidence on which to base the loss analysis.[357]

A21 For both our draft and final decision we have therefore focused our further work on testing the extent to which we have the evidence to enable a loss analysis to provide a robust basis for a WACC percentile decision, and on comparing this to other expert analysis and factual evidence before us. Given the Court's criticism, we consider that this was a more appropriate way to determine the WACC percentile than engaging in further theoretical debate about whether our previous approach of allowing a WACC uplift to the level of the 75th percentile was correct in principle.[358]

Loss analysis results are affected by whether a consumer or total welfare approach is applied

A22 In our draft decision, we highlighted that the outcome of a loss analysis will differ depending on whether a 'total welfare' or 'consumer welfare' standard is used. Some mix of the two approaches could also be applied—ie, where some weighting is assigned to the results of both approaches.

A22.1 A total welfare standard is consistent with an objective of maximising economic efficiency benefits for both consumers and producers, where any distributional benefits (or costs) associated with transfers of wealth between consumers and producers due to price changes are ignored.

A22.2 A consumer welfare standard is consistent with maximising benefits to consumers only, from both an efficiency and distributional standpoint. In particular, any financial benefit consumers might receive due to avoiding wealth transfers associated with producers setting higher prices in future will be taken into account.[359]

A23 Economic efficiency is typically identified in terms of three dimensions: allocative efficiency, productive efficiency and dynamic efficiency.

A23.1 Allocative efficiency occurs when resources are allocated within the economy to the uses in which they have the highest value.

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357 *Wellington International Airport Ltd & Ors v Commerce Commission* [2013] NZHC [December 2013], paragraphs [1438] – [1439] and [1464] – [1470].

358 The Court's tentative, in principle observations regarding how incentives to invest for suppliers are best promoted are not uncontroversial. See for example Dr Martin Lally "The Appropriate Percentile for the WACC Estimate" (Report prepared for the Commerce Commission, 19 June 2014), pages 17 - 20; Transpower New Zealand Ltd "Further work on the cost of capital input methodologies: Request for further evidence" (1 May 2014), section 4.

359 Commerce Commission "Proposed amendment to the WACC percentile for electricity lines services and gas pipeline services" (22 July 2014), paragraph 2.14. We note that none of our experts or submissions have raised, and we have not taken into account, any potential wealth transfers directly between consumers and government due to the associated tax benefits or costs to consumers resulting from price changes.

A23.2 Productive efficiency is present when producers use inputs in such a manner as to minimise costs, subject to technological constraints.

A23.3 Dynamic efficiency refers to decisions made over time and includes decisions relating to investment and/or innovation that can improve productivity as well as the range and quality of services.[360]

A24 In simple economic models, such as static supply and demand curve diagrams, 'total welfare' is often represented by 'total surplus' (ie, the combination of 'consumer surplus' and 'producer surplus').[361]

A24.1 'Consumer surplus' reflects the aggregate amount above the price paid that consumers would willingly spend, if necessary, to consume the units purchased of a service. In static supply and demand diagrams, consumer surplus is typically represented by the area below the demand curve and above the price paid.

A24.2 'Producer surplus' reflects the aggregate difference between what suppliers are willing to supply the service for, and the price they receive. In static supply and demand diagrams, producer surplus is typically represented by the area above the supply curve and below the price paid.

A25 In such static economic models, a total welfare approach is consistent with maximising total surplus and with maximising static efficiency (ie, allocative and productive efficiency). Wealth transfers, which are represented by a transfer in surplus between consumers and producers, are ignored. If the static efficiency consequences of higher prices are small, a total welfare approach would therefore imply that the costs to consumers of higher prices are not very significant. A consumer welfare approach is consistent with maximising consumer surplus only, where both the distributional and efficiency effects on consumers of higher prices are taken into account.

A26 Dynamic efficiency considerations are often ignored, or not represented well, in static models. As is discussed further below, static models may therefore have significant shortcomings in informing our view on the appropriate WACC percentile for price-quality regulation in the context of the s 52A overall purpose—ie, promoting the long-term benefits to consumers of regulated services.

A27 The magnitude of the inefficiency effects of monopoly pricing (or from a WACC uplift that is 'too high') increases as the elasticity of demand increases although the distributional effects will usually be larger than the efficiency effects. In the

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360 For example, Commerce Commission "Input methodologies (Electricity Distribution and Gas Pipeline Services): Reasons Paper" (December 2010) paragraph 2.5.8.

361 For example, Carlton, D.W. and Perloff, J.M., *Modern Industrial Organization*, Pearson Addison Wesley, Boston, 4th ed. 2005, Chapter 3.

regulated markets that are the subject of this WACC percentile decision, the distributional effects exceed the efficiency effects by a very significant amount, because demand in these markets is typically highly inelastic (or at least more inelastic than most competitive markets). In the current context, where the price-quality path is based on an estimated WACC, it is the uncertainty about the 'true' WACC which introduces the possibility of a divergence between the efficiency maximising WACC percentile and the percentile that maximises the long-term benefit to consumers of regulated services.

A28 Loss analysis results will therefore be highly sensitive to whether a consumer welfare approach or a total welfare approach is applied,[362] or to the choice of weight if both the results of both approaches are taken into account. That is because:

A28.1 under a consumer welfare approach, distributional effects dominate; but

A28.2 under a total welfare approach, efficiency effects dominate (even though they are much smaller than distributional effects), given that distributional effects are ignored entirely.

Loss analysis results will be affected by how 'surplus' is defined and measured

A29 As is discussed further below (paragraph A47), another significant factor is how welfare is measured and represented in any loss analysis, in terms of surplus. In the current context, the consumer welfare versus total welfare debate arises in light of an overall purpose of promoting the long-term benefit to consumers, because it is not easy to know what all the relevant types of benefits (and costs) to consumers over the long term are, or how to quantify them accurately.

A30 That is especially true for our decision on the appropriate WACC uplift. There are fundamental uncertainties and incomplete information associated with the decision. The extent to which a WACC uplift will provide the desired incentives to invest in different types of assets, and the extent to which those assets would deliver the desired benefits to consumers over the long term (such as meeting current and future demand at the appropriate service quality) is not currently fully quantifiable, and most likely will never be.

A31 In particular, there are limitations to the extent to which any theoretical representation or analytical model of *static* consumer surplus can adequately take into account all the relevant benefits to consumers over the long term, and all relevant dynamic and inter-temporal effects.[363] For instance, one submitter

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362 For example, refer Professor Ingo Vogelsang "Review of New Zealand Commerce Commission 'Proposed amendment to the WACC percentile for electricity lines services and gas pipeline services', paper published on July 22, 2014" (31 July 2014), paragraph 18.

363 For instance, Professor Vogelsang (Professor Ingo Vogelsang "Review of New Zealand Commerce Commission 'Proposed amendment to the WACC percentile for electricity lines services and gas pipeline

highlighted that s 52A does not involve a "pure maximisation of static consumer surplus"—consequently, one should take some care to define the consumer surplus standard in a way that is consistent with the 'long term', otherwise "we are not giving the consumer surplus standard a fair chance".[364]

A32 Some submitters (on behalf of regulated suppliers) have argued that a consumer welfare approach provides an inappropriate basis for loss analysis by referencing examples where consumer surplus is defined in some 'pure' or 'strict' way. In these examples, which apply a narrow and/or static measure of consumer surplus, a mechanical application of the resultant WACC percentile would not allow regulated suppliers to make a return on their sunk assets.[365] Such an outcome would clearly be inconsistent with ex ante FCM, and would likewise not be consistent with the long-term benefit of consumers.

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services', paper published on July 22, 2014" (31 July 2014), paragraph 19) observes that: "The total surplus objective is usually justified by a long-term dynamic approach, where the outlook of profits is viewed as necessary for future consumer benefits. However, static consumer surplus concerns from 'costs to consumers from over-estimating WACC' are just as much 'long-term' effects as those from investments. I see both of these effects as being 'long-term', because the investments have a long life, for which the consumers have to pay over this lifetime. The beneficial investment effects may, however, occur with a lag and the capital costs decline with depreciation (although replacement sets in so that annuities may be appropriate)." Also, as CEG notes, the short-term and long-term effects are 'interdependent' (CEG "CEG, Economic Review of Covec Report, A Report for the NZ Airports Association and the Electricity Networks Association" (June 2014), paragraph 40).

364 Covec "WACC Percentile Issues, Prepared for BARNZ" (28 August 2014), page 4. For instance, in commenting on Frontier Economics' implementation of his 2011 model, Professor Dobbs noted that: "there is a real problem with focusing purely on consumer surplus within this type of model (and ignoring entirely the profit component of economic welfare). … For this reason, I am not entirely sanguine with the idea of putting greater weight on CS [consumer surplus] as a 'mechanism' for generating a lower predicted AROR [allowed rate of return]" (Professor Ian Dobbs "Proposed amendment to the WACC percentile for the Allowed Rate of Return, Comments on the Application of the Dobbs [2011] model" (17 September 2014), paragraphs 20-21). As a result, Frontier Economics state that: "This strongly suggests it would be invalid to use Professor Dobbs' loss function model in conjunction with a consumer surplus criterion rather than a total surplus criterion" (Frontier Economics "A submission on Prof Ian Dobbs' comments on our implementation of his loss function model, a report prepared for Transpower New Zealand" (September 2014), paragraph 30). However, we do not consider Professor Dobbs' cautionary comments about the appropriate weight to be given to consumer surplus as being intended to provide a general principle—rather his comments simply reflect a number of shortcomings in the specific formulation of his model in the current context. Some of the shortcomings of the Dobbs model (and Frontier Economics' implementation of that model) in the context of determining the appropriate WACC percentile under Part 4, are discussed in Attachment B.

365 For example: see Frontier Economics' reference to a 'pure consumer surplus criterion' (Frontier Economics "A submission on Prof Ian Dobbs' comments on our implementation of his loss function model, a report prepared for Transpower New Zealand" (September 2014), Section 3); Webb Henderson "Commerce Commission reopening of WACC percentile estimate, Memorandum of advice to Transpower Limited" (30 September 2014), paragraph 29(d); Russell McVeagh "Review of Franks & Ogilvie advice dated 12 September 2014, to Electricity Networks Association and NZ Airports Association" (30 September 2014), paragraphs 17-18; and CEG "Economic Review of Draft Decision on the WACC Percentile, a Report for NZ Airports" (August 2014), paragraphs 71-72.

A33 These arguments do not support the use of a total welfare standard over a consumer welfare standard in loss analysis. Instead, they highlight potential limitations in the way consumer surplus might be quantified in such an analysis. In the current context, a more pertinent question is how well any loss analysis model using measures of consumer (and producer) surplus is able to appropriately inform the decision on the appropriate WACC percentile, in light of the overall purpose—ie, the long-term benefit of consumers of regulated services.

Our draft decision balanced the long-term interests of consumers due to under- or over-investment

A34 In our draft decision, we stated that we had adopted both consumer welfare and total welfare approaches. This means that in reaching our draft decision as to what would best promote the long-term benefit of consumers by promoting outcomes consistent with outcomes produced in competitive markets, we had regard to transfers from suppliers to consumers, but also had regard to aggregate efficiency considerations.[366]

A35 A number of submitters (on behalf of both regulated suppliers and consumers) criticised our draft decision as not explicitly identifying the relative weight we gave to consumer welfare or total welfare.[367] It was also emphasised that the relevant 'test' in s 52A applying to our decision is not explicitly expressed in terms of either consumer welfare/surplus or total welfare/surplus.[368]

A36 The approach taken in our draft decision involved exercising judgement in light of the s 52A purpose and the available evidence, rather than assigning some numerical weighting to the quantitative results of various economic models based on either consumer welfare, total welfare, or some mix of the two. The approach we took was to balance the interests of consumers in the long term due to under- or over-investment, consistent with the overriding purpose in s 52A.[369]

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366 Commerce Commission "Proposed amendment to the WACC percentile for electricity lines services and gas pipeline services" (22 July 2014), paragraph 2.17.

367 For example: Sapere "Proposed amendment to the WACC percentile – Commerce Commission's draft decision, Report prepared for Vector" (29 August 2014), page 5; NZ Airports Association "Submission on Commerce Commission's proposed amendment to the WACC percentile for electricity lines services and gas pipeline services" (29 August 2014), paragraph 43; and Covec "WACC Percentile Issues, Prepared for BARNZ" (28 August 2014), page 2. Vector submitted that, although we claimed to have considered a balance of consumer and welfare approaches, in its view we in fact applied only a consumer welfare approach (Vector "Submission on Draft Determination to amend the WACC percentile" (29 August 2014), page 4).

368 For example: Sapere "Proposed amendment to the WACC percentile – Commerce Commission's draft decision, Report prepared for Vector" (29 August 2014), section 4.

369 Commerce Commission "Proposed amendment to the WACC percentile for electricity lines services and gas pipeline services" (22 July 2014), paragraph 6.42.

A37 The way our view on consumer welfare and total welfare influenced our draft decision was in concluding that:

A37.1 quantitative estimates of the appropriate WACC percentile based solely on a total welfare approach would likely be too high;[370]

A37.2 the fundamental uncertainty regarding the link between the WACC we apply in setting price-quality paths, the level of investment by regulated suppliers, how this affects quality of service, and the resulting impact on economic welfare, mean it is not possible to define a specific WACC percentile based purely on empirical evidence—rather, judgement is required when determining the appropriate WACC percentile;[371] and

A37.3 some conservatism in selecting the percentile (ie, erring on the high side) remains appropriate, particularly given that there is fundamental uncertainty regarding the appropriate WACC percentile, and the long-term costs to consumers of under- and over-estimating WACC are asymmetric (so erring on the higher side is likely to be in consumers' interests).[372]

Our final decision also balances the long-term interests of consumers due to under- or over-investment

The s 52A purpose does not require a total welfare standard

A38 We agree with those submitters that have highlighted our decision on the appropriate WACC percentile must be made in light of s 52A, and requires balancing s 52A(1)(a) and (d) in the context of the long-term benefit of consumers.

A39 Throughout the consultation process, some submitters (on behalf of regulated suppliers) have stated or implied that we should only use a total welfare standard when undertaking any loss analysis.[373] That means we should take no account of the

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370 Commerce Commission "Proposed amendment to the WACC percentile for electricity lines services and gas pipeline services" (22 July 2014), paragraph 6.13.

371 Commerce Commission "Proposed amendment to the WACC percentile for electricity lines services and gas pipeline services" (22 July 2014), paragraph 6.41.

372 Commerce Commission "Proposed amendment to the WACC percentile for electricity lines services and gas pipeline services" (22 July 2014), paragraph 6.44.

373 For example: Incenta Economic Consulting "Rationale for setting the regulatory WACC above the midpoint value, report prepared for Electricity Networks Association" (May 2014), page 12. Incenta goes as far as saying that "when the Commission is instructed to promote the outcome of competitive markets, it is simply being instructed to promote economic efficiency and not make distributional judgements, and so wealth transfers must be ignored" (Incenta Economic Consulting "Rationale for setting the regulatory WACC above the midpoint value – Response to Draft Decision, Electricity Networks Association" (August 2014), pages 1-2). We note, however, that a number of the legal submissions on behalf of regulated suppliers acknowledge that consumer welfare is not an irrelevant consideration (ie, Webb Henderson "Commerce Commission reopening of WACC percentile estimate, Memorandum of advice to Transpower Limited" (30 September 2014), paragraph 5(a); and Russell McVeagh "Review of Franks & Ogilvie advice

benefits to consumers from limiting future wealth transfers from consumers to suppliers (that would result from suppliers setting higher prices).[374]

A40 On the other hand, a number of submitters (on behalf of consumers of regulated services) have argued that a total welfare standard is inconsistent with the s 52A purpose.[375]

A41 In our draft decision, we explained that we considered benefits to consumers from wealth transfers due to lower prices are relevant to our analysis (meaning, as is expressed above, avoiding future wealth transfers from consumers to suppliers due to higher prices). We did not accept that the Part 4 framework suggests that wealth transfers should not be taken into account at all. Our view at that stage, which we continue to hold for this final decision, is consistent with:

A41.1 the High Court's analysis of the Part 4 purpose statement in the merits appeal judgment (already expanded in more detail above);[376]

A41.2 the relevant Parliamentary materials prior to the Commerce Amendment Bill being passed;[377] and

A41.3 the mandatory analysis required before recommending that any additional services be regulated under Part 4.[378] It is not logical in our view for the standard for imposing regulation on suppliers to be more concerned with wealth transfers between consumers and suppliers than the regulatory controls that are actually imposed.

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dated 12 September 2014, to Electricity Networks Association and NZ Airports Association" (30 September 2014), paragraph 17).

374 Regulation is intended to limit the future exercise of monopoly market power that would otherwise result in a transfer of wealth from consumers to suppliers, while at the same time maintaining incentives for suppliers to invest and operate efficiently (Commerce Commission "Regulatory Provisions of the Commerce Act 1986, Discussion Paper" (19 December 2008), paragraph 59).

375 For example, BARNZ "Submission on proposed amendment to the WACC percentile for energy businesses" (29 August 2014), pages 8-10. Franks and Ogilvie, acting for MEUG, go one step further and argue that the "Commission would err in law were it to apply a total welfare standard, as it would fail to take proper account of welfare transfers between suppliers and users of the regulated services" (Franks and Ogilvie "Commerce Commission Review of WACC percentile – Specific Legal Issues Arising from Submission" (1 September 2014), paragraph 2(a)).

376 *Wellington International Airport Ltd & Ors v Commerce Commission* [2013] NZHC [December 2013], paragraphs [660] – [666].

377 See for example the discussion about the various options for the Part 4 purpose statement in the Explanatory Note to the Commerce Amendment Bill 2008, pages 17 and 19-20.

378 See Commerce Act 1986, s52I(3), where the Commission must not only quantify material effects on allocative, productive and dynamic efficiency, but material distributional and welfare consequences on suppliers and consumers as well.

A42 One argument raised is that the reference to 'workably competitive market outcomes' in s 52A "would direct an economist to a total welfare standard, not a consumer welfare standard", because the rivalry that occurs in workably competitive markets maximises total surplus not consumer surplus.[379] A similar argument is that: "To an economist, the notion of promoting outcomes that are consistent with competitive markets is a synonym for promoting economic efficiency."[380] Also, one of our expert advisors, Dr Lally, advised that "WACC uncertainty implies a WACC margin may be necessary to encourage socially desirable investment, and the usual meaning of 'socially desirable' is positive total surplus".[381]

A43 As noted in the IM reasons paper, in determining *which* outcomes consistent with workably competitive markets should be promoted under Part 4, we are guided by s 52A(1)(a)-(d), and the central purpose of promoting the long-term benefit of consumers.[382] Under a total welfare approach, only the efficiency effects of any excessive profits are taken into account, and not the financial costs the associated higher prices would impose on consumers. As is noted above (paragraph A10.3), workably competitive markets serve to ensure prices are lower than they otherwise would be (ie, if there were unconstrained monopoly market power). Therefore, workably competitive markets not only provide efficiency benefits to consumers—they result in distributional benefits to consumers as well.

A44 As the High Court observed, s 52A puts "consumers' interests front and centre", with that "reference now coming before the reference to the (socially desirable) outcomes associated with workably competitive markets."[383] Therefore, the s 52A purpose does not require us to apply a total welfare/surplus approach in any loss analysis that informs our decision, or to apply a total welfare standard more generally.

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379 CEG "Economic Review of Covec Report, A Report for the NZ Airports Association and the Electricity Networks Association" (June 2014), paragraphs 17 and 20.

380 Incenta Economic Consulting "Rationale for setting the regulatory WACC above the midpoint value – Response to Draft Decision, Electricity Networks Association" (August 2014), page 1.

381 Lally, M., "The Appropriate Percentile for the WACC Estimate" (19 June 2014), page 21.

382 Commerce Commission "Input methodologies (Electricity Distribution and Gas Pipeline Services): Reasons Paper" (December 2010) paragraph 2.6.3. Paragraph A10 above describes a number of the benefits to consumers that are reflected in s 52A(1)(a) to (d).

383 *Wellington International Airport Ltd & Ors v Commerce Commission* [2013] NZHC [December 2013], paragraph [665]. The Court also observed that: "the *tendencies* in workably competitive markets are towards [normal] returns and prices [that reflect such normal rates of return, after covering the firms' efficient costs]. By themselves, these tendencies will also lead toward incentives for efficient investment (investment that is reasonably expected to earn at least a normal rate of return) and innovation. That is to say, the prices that tend to be generated in workably competitive markets will provide incentives for efficient investment and for innovation" (*Wellington International Airport Ltd & Ors v Commerce Commission* [2013] NZHC [December 2013], paragraphs [18] and [20]).

A consumer welfare approach is more consistent with the s 52A purpose

A45 Other submitters (on behalf of consumers) have consistently argued that s 52A implies or requires a consumer welfare standard.[384] One of our expert advisors, Oxera, stated that a consumer welfare approach "would be most consistent with the outcomes of workably competitive markets", and that it is the only appropriate assumption to take in its loss analysis.[385] Another of our experts, Professor Vogelsang, observed that, in his view, the High Court's interpretation of the s 52A purpose statement lends itself to a consumer welfare approach.

> In my reading the High Court seems to lean more towards a consumer welfare interpretation by emphasizing that "the outcome of providing regulated suppliers with incentives to invest and innovate … is to be decided within the context of what best promotes the long-term benefit of consumers, the overriding purpose of Part 4."[386]

A46 Having considered the submissions on our draft decision, we agree that, on the face of it, the s 52A purpose is more consistent with a consumer welfare approach than a total welfare approach.

Producer surplus may provide a proxy for consumer benefits in the absence of better information

A47 Even though the s 52A purpose is more consistent with a consumer *welfare* standard, there are limitations to the extent to which any analytical model of static consumer *surplus* can adequately take into account all the relevant benefits to consumers over the long term (paragraphs A29 to A33 above). Therefore, to the extent that consumer surplus is not defined, represented or quantified in economic models (such as a loss analysis) in a way that adequately takes into account consumer benefits over the long term, it may be appropriate to give some weight to producer surplus. This will only be appropriate to the extent producer surplus provides an appropriate proxy for some otherwise unquantified (or unquantifiable) long-term (net) benefit to consumers.[387] In the current context, the effect of giving

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384 For example: Covec "Estimating WACC for Airports in New Zealand, Report prepared for Board of Airline Representatives New Zealand Inc" (30 April 2014), page 2.

385 Oxera "Review of expert submissions of the input methodologies" (27 October 2014), section 3.4. Despite its views on the appropriateness of a consumer welfare approach, Oxera also noted that it "may also be appropriate, where the Commission sees fit, for an upwards adjustment to be made to the WACC percentile to take account of the value of producer surplus."

386 Professor Ingo Vogelsang "Review of New Zealand Commerce Commission 'Proposed amendment to the WACC percentile for electricity lines services and gas pipeline services', paper published on July 22, 2014" (31 July 2014), footnote 3.

387 For instance, NZIER, for MEUG, explains that: "producer surplus matters in the long run because we need investment in network industries, but is subordinated to consumer interests" (NZIER "No case for WACC uplift, A brief review of the 17 September Dobbs paper in the context of the WACC uplift question, NZIER report to MEUG" (30 September 2014), paragraph 43).

some weight to producer surplus would be a higher WACC percentile than would otherwise be the case.

A48 Putting some weight on producer surplus might imply that benefits to regulated suppliers are being taken into account rather than the consumer benefits referred to in s 52A. However, the reason some weight might be given to producer surplus is to mitigate the risk that the WACC is set 'too low', which could result in consumers of regulated services suffering significant losses due to under-investment. Consequently, the net effect on consumer benefits over the long term is expected to be positive.

Our final decision balances s 52A(1)(a) and (d) in the context of the long-term benefit to consumers

A49 In practice however, our final decision on the appropriate WACC percentile does not rely on giving some numeric weight to quantitative estimates of producer surplus and consumer surplus that are produced by one or more (imperfect) economic models. Seeking to specify such a weighting would give an appearance of false precision at best.

A50 Rather, our decision on the appropriate WACC percentile involves the exercise of judgement in light of the s 52A purpose and the evidence available to us. As for our original decision in 2010 on the appropriate WACC percentile, in exercising our judgement, we consider some conservatism in selecting the percentile (ie, erring on the high side) remains appropriate. Doing so recognises there is fundamental uncertainty regarding the appropriate WACC percentile, and that the long-term costs to consumers of under- and over-estimating the WACC are asymmetric. Therefore, erring on the high side is likely to be in consumers' interests. Doing so reflects otherwise unquantified (or unquantifiable) factors that are likely to result in greater benefits to consumers in the long term, in terms of efficient investment and innovation that meets current and future consumers' demand at the quality that they want.

Attachment B: The Dobbs model and applications

Purpose

B1 The purpose of this attachment is to:

B1.1 discuss the ways in which Professor Dobbs model helped inform the review; and

B1.2 explain why we are placing limited weight on the quantitative results from models based on Professor Dobbs' framework when considering the appropriate WACC percentile for price-quality regulation.

Key findings

B2 Professor Dobbs' model, and the extended version submitted by Frontier Economics, provide some interesting insights regarding the WACC percentile. In particular, exploring these models in the context of this review has helped shed light on a number of complex issues, including:

B2.1 how consumer and producer surplus relate to the long-term benefits of consumers;

B2.2 how different options to defer investment can affect the preferred WACC uplift; and

B2.3 the role a WACC uplift might play in providing incentives to meet new demand that is independent of existing demand, where there is an option to delay that investment and a WACC uplift is the only available regulatory tool to provide such incentives.

B3 We do not consider the Dobbs model a 'good fit' for determining an appropriate WACC percentile for price-quality regulation, in light of the s 52A purpose.

B3.1 The Dobbs model does not address the risk of misestimating the WACC. It addresses the risk created by fixing the allowed WACC over the regulatory period.

B3.2 The Dobbs model does not model investments to maintain the existing network. Instead it focuses on investments in new innovative services.

B4 We also note that currently the Dobbs model cannot robustly take into account wealth transfers and therefore does not adequately accommodate our 'long-term interests of consumers' objective. The Dobbs model also assumes optional and deferrable investment decisions depend only on the allowed WACC. By ignoring other influences, the model is likely to overstate the relative influence of the WACC uplift.

B5 We are also concerned that the model's output is highly sensitive to input parameters.

B6 In light of our view that the Dobbs model is not a good fit for our current purpose, and our concerns with the sensitivity of the model to changes in input parameters, we have decided to not rely on the Dobbs model in setting the WACC percentile.

Background

Overview of the Dobbs model

B7 In this section we provide a high level overview of the Dobbs model. For a more comprehensive description of the model, refer to Dobbs 2011 article.[388]

B8 The Dobbs model was designed to investigate whether an uplift to the WACC could improve economic total welfare by incentivising investment in new innovative services in the telecommunications sector.[389]

B9 The model defines three categories of investment:

B9.1 Category 1: existing network (ie, sunk investment). The model assumes that service quality standards will ensure that the existing network is maintained regardless of the allowed WACC.

B9.2 Category 2: new optional and non-deferrable investment.

B9.3 Category 3: new optional and deferrable investment.

B10 Category 1 are required non-deferrable investments that are assumed to take place independent of the allowed WACC. Category 2 requires a 'now or never' decision that is moderately sensitive to the allowed WACC. Category 3 involves a 'real option' to delay investment which is highly sensitive to the allowed WACC.

B11 The model assumes that the regulated utility's actual WACC distribution is known and can be estimated accurately at the beginning of a regulatory period. However, because the allowed WACC is set for the duration of the regulatory period (typically five years), there is a chance that the utility's actual WACC will deviate either above or below the allowed WACC during the period. Within the model this risk may incentivise utilities to delay investment. The model examines how an increase to the allowed WACC would reduce the risk that the actual WACC will exceed the allowed WACC during the regulatory period and thereby reduce the incentive to delay investment. The model then uses Monte Carlo analysis to find the WACC percentile that maximises total economic welfare as defined in the model.[390]

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388 Dobbs, I., 2011 "Modelling Welfare Loss Asymmetries Arising from Uncertainty in the Regulatory Cost of Finance", Journal of Regulatory Finance 39(1), pp1-28.

389 See Dobbs "Comments on the Application of the Dobbs [2011] model" (17 September 2014).

390 The model also calculates three separate WACC percentiles over each of the three categories of investment.

How has the Dobbs model been used in this review?

B12 We first discussed Professor Dobbs' 2011 article in our February 2014 'invitation to have your say' information paper.[391] Our treatment of this article was limited to noting that it included arguments in favour of a split cost of capital approach to setting the allowed WACC.

B13 In May 2014, NZIER (on behalf of MEUG) submitted the results from their analysis using the Dobbs model.[392] NZIER found that the Dobbs model suggested a discontinuous relationship between welfare and WACC percentiles. NZIER concluded that this discontinuous relationship warrants caution and industry-specific analysis before selecting a WACC percentile.

B14 In June 2014, we published an expert report from Dr Lally which explored a number of features of the Dobbs model.[393] Dr Lally's report notes that Dobbs' 2011 article provides the best available analysis on the issue of setting a WACC percentile. Dr Lally noted several limitations of the Dobbs model and suggested that these limitations made it difficult to be definite about the appropriate WACC margin.[394]

B15 In our July 2014 draft decision, we referred to Dobbs 2011 article as a relevant piece of academic literature which formed part of the evidence base that informed our decision.[395]

B16 In response to our draft decision, Transpower engaged Frontier Economics to replicate and apply the Dobbs model to the New Zealand electricity sector.[396] Frontier reported that its application of the Dobbs model supported a WACC percentile significantly greater than the 75th. This was because, based on Frontier's assumptions, the total welfare loss from the WACC uplift was "very small" compared to the welfare loss that would occur in the event of under-investment.

B17 We considered the work of Frontier Economics important within this review given it is an attempt to quantify an optimal WACC percentile using a loss analysis framework (albeit one that assumes optional and deferrable investment decisions depend on one regulatory lever, the allowed WACC). Consequently we engaged

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391 Commerce Commission "Invitation to have your say on whether the Commerce Commission should review or amend the cost of capital input methodologies" (20 February 2014).

392 NZIER "Review of evidence in support of an appropriate WACC percentile: Response to Commission invitation on 31 March 2014" (NZIER advice to MEUG, May 2014).

393 Martin Lally "The appropriate percentile for the WACC estimate" (19 June 2014).

394 We note Dr Lally's final conclusion that the 75th percentile was likely to be too low.

395 Commerce Commission "Proposed amendment to the WACC percentile for electricity lines services and gas pipeline services" (22 July 2014).

396 Frontier Economics "Application of a loss function simulation model to New Zealand" (Report prepared for Transpower, August 2014).

Professor Dobbs to review Frontier's application of his model.[397] Dobb's review noted that the "model appears to be soundly constructed, and the adjustments to take account of pass through, fixed and variable cost proportions, and elasticity of demand seem reasonable."[398]

B18 There was general support from stakeholders on our decision to engage Professor Dobbs to review the application of his model.[399]

B19 Dobbs' response did raise questions about the relevance of his model to the NZ electricity sector, concerns about specific assumptions used by Frontier and cautioned against over-reliance on the quantitative output of the model. We discuss Dobbs' responses in detail in the analysis section below.

B20 On 30 September 2014, Frontier submitted revised modelling in response to Dobbs' feedback.[400] We discuss this further in the analysis section below.

What insights have we gained from the Dobbs model?

B21 The Dobbs model helped us explore the relationship between static consumer and producer surplus and how trade-offs between these two affect our objective of promoting the long-term benefits of consumers of regulated services.

B22 The Dobbs model prompted us to more fully explore the relationship between the allowed WACC and investment levels. We found that different types of investment are likely to respond differently to changes in the WACC. This also included wider analysis which considered other mechanisms that influence investment decision such as general quality standards and more targeted incentive schemes.

B23 The Dobbs model also helped us consider whether the role of the WACC uplift should be expanded to play a wider role beyond its current role of mitigating the risk of deterioration in network quality resulting from under-investment. We consider that network quality is the most likely area where consumers may suffer higher costs in the future due to under-investment (with the most significant costs resulting from major supply outages). We are therefore of the view that it is appropriate to restrict

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397 Ian Dobbs "Comments on the Application of the Dobbs [2011] model" (17 September 2014).

398 Ian Dobbs "Comments on the Application of the Dobbs [2011] model" (17 September 2014), paragraph 1.

399 For example, Covec commented that "we consider it very useful for the Commission to have asked Professor Dobbs for comment directly" (Covec "Cross submission on Dobbs and NZIER", 30 September 2014) and Houston Kemp commented that "Professor Dobbs' report offers a balanced review of Frontier Economics' implementation of the Dobbs (2011) model (Houston Kemp "Analysis of further evidence in the Commerce Commission's review of the WACC percentile", 30 September 2014).

400 Frontier Economics "A submission on Prof Ian Dobbs' comments on our implementation of his loss function model" (report prepared for Transpower New Zealand, September 2014).

the role of a WACC above the mid-point estimate to mitigating the risk of under-investment in network quality.

What is the purpose of the WACC uplift?

B24 Before considering whether the Dobbs model is a good fit for our purpose, we consider it useful to reiterate what we consider is the purpose of the WACC uplift.

B25 Our problem is that the real WACC is unobservable. We are only able to estimate it. Estimation inherently involves a degree of measurement error. Therefore we cannot be sure that our best estimate of WACC (ie, the mid-point) is in line with the real WACC.

B26 Based on the view that the potential cost of misestimating the WACC is asymmetric[401], the purpose of the WACC uplift is to reduce the risk of setting the WACC 'too low' and thereby reduce the potential cost to consumers from under-investment.

Is the Dobbs model fit for our purpose?

B27 In this section we consider features of the Dobbs model that suggest it is not a good fit for our purpose. The main reasons why we consider the Dobbs model is not suitable to be applied in our context is:

B27.1 The Dobbs model is addressing a different problem than the mis-estimation of the WACC.

B27.2 The Dobbs model is focused on a different type of investment not occurring than the reliability investment we are primarily concerned with.

B27.3 The Dobbs model does not adequately accommodate our 'long-term interests of consumers of regulated services' objective.

Is the Dobbs model addressing a different problem?

B28 The Dobbs model is built around the idea that once the allowed WACC is set at the beginning of a regulatory period, financial conditions can change leading to a divergence between the allowed WACC and a regulated utility's actual WACC.

B29 This uncertainty, together with Dobbs simplifying assumption that investment decisions can only be made at the beginning of each regulatory period, means that utilities may decide to either not invest or to delay investment until a future regulatory period.

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401 That is, the cost of overestimating the WACC (higher prices and potentially over investment) is less than the cost of underestimating the WACC (underinvestment leading to more frequent and costly outages).

B30 The Dobbs model focuses on the value of the option to delay investment which is available to monopoly suppliers. The Dobbs model suggests that by setting an allowed WACC well above the actual WACC at the beginning of the regulatory period, this will reduce the value of the option to delay and the likelihood of under-investment will diminish.

B31 Dobbs notes that if the regulator were to index the allowed WACC, the rationale for the WACC uplift would disappear. [402]

What type of investment is the Dobb's model focused on?

B32 The Dobbs model was designed with investment in new innovative services in the telecommunications sector in mind.[403]

B33 NZIER submitted that innovation makes up a very minor share of investment in electricity and gas distribution sectors.[404] As discussed in Chapter 5, we have concluded that the appropriate role of a WACC uplift is to mitigate significant risks to consumers that could result from under-investment in network quality.

B34 Professor Dobbs has expressed caution about the 'goodness of fit' of his model's assumptions with the energy sectors under consideration in our review. Dobbs notes that "the Dobbs [2001] model actually assumes that there is a service obligation on the supplier, such that investment to maintain adequate capacity is not optional; the model does not in any way model reliability…".[405]

B35 As noted by Dobbs, his model does not in any way model reliability investments. The Dobbs model assumes that these investments will occur regardless of the allowed WACC. However, reliability investments are the focus of our rationale for a WACC uplift. [406] Dobbs discussion on the cross elasticity between existing and new

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402 As Professor Dobbs notes, "if the regulator indexed the allowed rate of return to account for changes in financing conditions through time, the rationale for the uplift would disappear", Dobbs "Comments on the Application of the Dobbs [2011] model", 17 September 2014, para 23.

403 Dobbs "Comments on the Application of the Dobbs [2011] model", 17 September 2014, para 8.

404 NZIER "Changing the WACC percentile" (29 August 2014, pp31-32).

405 Dobbs "Comments on the Application of the Dobbs [2011] model", 17 September 2014, para 27.

406 We note that EDBs are subject to a continuance of supply obligation (under the Electricity Industry Act 2010). However, this obligation only applies to connections existing on 1 April 1993, and not to connections made since then. The EDB may not cease supply to an electricity consumer that was supplied on that date without the consent of that consumer (or the Minister of Energy). The EDB must continue to supply the consumer from its network, or the EDB may propose an alternative source of supply. If the EDB proposes to supply electricity from an alternative (and presumably cheaper) source, it must consult with the affected consumer and have regard to any comments made, but it does not require the consumer's consent. Because EDBs are subject to a weighted average price cap, there is no constraint on the specific price an EDB may charge a consumer covered by a continuance of supply obligation that appears 'uneconomic' to the EDB. That price could potentially be sufficiently high to incentivise the consumer to find its own alternative source of supply.

investment underlines the potential complexities of adapting the model to cope with investments concerning reliability of the network.[407] We consider a cost-benefit analysis approach, such as the analysis undertaken by Oxera, has the flexibility to directly consider reliability investments and is therefore better suited to our purpose.

Can the Dobbs model accommodate our 'long-term interests of consumers' objective?

B36 The Dobbs model was designed to maximise a total economic welfare objective.[408] That is, it was designed to maximise the sum of consumer surplus and producer profits in the context of new investments that may or may not occur. This total welfare objective does not consider the distribution of welfare between consumers and producers and therefore does not consider wealth transfers generated when prices are lifted above the efficient market level.

B37 As discussed in Attachment A, we do not consider a total welfare standard is consistent with the purpose statement of Part 4.

B38 The Dobbs model can be modified to use a consumer welfare standard by placing zero weight on the profit component in the economic welfare objective statement. Professor Dobbs points out that this modification is ill-advised because it can easily result in wealth transfers in the opposite direction.[409] That is, under the model's consumer welfare standard where producer profits carry no weight, the Dobbs model can support an allowed WACC significantly below the mid-point and thereby exploit existing investments in a manner inconsistent with the principle of ex ante FCM (refer Attachment A). Doing so would be inconsistent with promoting the long-term benefit of consumers.

B39 An alternative would be to overlay a wealth transfer constraint on the Dobbs model. This would effectively pull the model's results back towards the mid-point.

B40 We consider a cost-benefit analysis approach, such as that undertaken by Oxera, is much better suited to weighing up the long-term costs and benefits of the WACC uplift to consumers of the regulated services.

Dobbs assumes that the WACC is the only mechanism that incentivises investment

B41 The Dobbs model assumes that optional and deferrable investment decisions depend on one regulatory lever, the allowed WACC.

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407 Dobbs "Comments on the Application of the Dobbs [2011] model", 17 September 2014, para 15 and 16.

408 Dobbs, I., 2011 "Modelling Welfare Loss Asymmetries Arising from Uncertainty in the Regulatory Cost of Finance", Journal of Regulatory Finance 39(1), pp1-28.

409 Dobbs "Comments on the Application of the Dobbs [2011] model", 17 September 2014, para 20.

B42 In practice however, we note that there are a range of factors that influence regulated utilities' investment decisions. As we discuss in Chapter 5, the WACC percentile is not the only tool to address the risk of under-investment. For example, service quality standards help ensure utilities maintain the quality of their services. In order to do this, utilities must invest to maintain their infrastructure. The Dobbs model does not address this.

B43 We consider that investment decisions are influenced by a range of factors, one of which is likely to be the allowed WACC.[410] By focusing on the allowed WACC, we consider the Dobbs model over emphasises the influence of the allowed WACC on investment decisions and consequently overstates the role of the WACC uplift.

Dobbs assumes all Investments is economic

B44 The Dobbs model does not consider the risk that setting an allowed WACC above the real WACC may incentivise uneconomic investment.

B45 We note advice from Oxera that this risk is low and can be mitigated by appropriate regulatory oversight as long as the WACC uplift is not too large.[411]

Should the Dobbs model be used as a quantitative guide at all?

B46 Several stakeholder submissions have cautioned us against over-reliance on the quantitative results of the Dobbs model.[412]

B47 We note Professor Dobbs advice that "this kind of model articulates why a significant uplift is warranted, but in my opinion, it is unclear how much quantitative significance should be placed on the model predictions."[413]

B48 We understand this was meant as a general caution to use the Dobbs model as an illustrative guide only and not to place significant weight on its quantitative output.

Frontier Economics' application of the Dobbs model

B49 Following our draft decision, Transpower engaged Frontier to apply the Dobbs model to the NZ electricity sector.[414] This has the advantage of being an attempt to quantify

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410 Dobbs notes that evidence of myopic investment perspectives and the use of artificially high hurdle rates when considering whether or not to invest suggest that business decision makers may not be particularly responsive to the incentives created by a WACC uplift. Dobbs "Comments on the Application of the Dobbs [2011] model", 17 September 2014, footnote 14.

411 Oxera "Review of expert submissions of the input methodologies" (27 October 2014), p 10.

412 For example, Frontier submitted that "we think the model should be used to inform, but not to dictate, the Commission's choice of the optimal WACC percentile". Frontier Economics "A submission on Prof Ian Dobbs' comments on our implementation of his loss function model" (September 2014), p 5.

413 Dobbs "Comments on the Application of the Dobbs [2011] model", 17 September 2014, para 4.

the optimal percentile for the WACC. As we stated earlier Dobbs noted this was a soundly constructed model.

B50 Frontier selected a range of input assumptions to reflect the situation in New Zealand's electricity sector. The following table lists four of the key assumptions used in Frontier's base case.[415]

Table B1: Summary of Frontier Assumptions

Assumption	Selected	Note
Maximum willingness to pay	$20,000	Based on the estimated value of lost load (VoLL).
Price elasticity of existing and new investment	- 0.3	That is, when price increases by 1%, demand is expected to fall by 0.3%.
Shape of demand curve	Constant-elasticity	That is, a convex curve that does not intersect with the vertical or horizontal axis.
Scale of new service	389 GWh	That is, 1% of current annual consumption.

B51 Frontier's application of the Dobbs model recommended the 99th WACC percentile. Frontier undertook sensitivity testing of input assumptions and reported:

B51.1 Under a consumer surplus objective (all else equal), the model recommends the 87th WACC percentile.

B51.2 Under "extremely conservative" assumptions, the model recommends WACC percentiles between the 50th to 70th percentiles.

B52 Frontier concluded that the WACC percentile should be increased above the 75th percentile.

B53 While we recognise the Dobbs model has limitations in answering our questions and therefore has limited evidentiary value in determining the appropriate uplift to the WACC, in the following section we lay out the main assumptions underlying the model and the sensitivity analysis carried out.

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414 Frontier Economics "Application of a loss function simulation model to New Zealand" (Report prepared for Transpower, August 2014).

415 Note that Frontier conducted sensitivity analysis by varying each input assumption and reporting the results.

Shape of the demand curve

B54 Dobbs noted that in the case of a constant-elasticity (ie, convex) demand curve, assuming demand is inelastic will result in unbounded (infinite) consumer surplus. Dobbs notes that in order to resolve this problem, Frontier was required to impose a 'choke price' (ie, maximum wiliness to pay) in order to quantify consumer surplus within the model.

Maximum willingness to pay

B55 Frontier assumed a maximum willingness to pay of $20,000 per Megawatt hour (MWh) based on an estimate of the value of lost load (VoLL).

B55.1 The VoLL is an estimate of the economic value of electricity not delivered to consumers over a specific duration because of a planned or unplanned outage.

B55.2 Frontier notes that the Electricity Authority's review of VoLL in New Zealand found that the value of unserved energy fell dramatically as outage duration increases from 10 minutes to 8 hours. [416]

B56 Dobbs along with other stakeholders expressed concern with this assumption. Dobbs noted that assuming a maximum willingness to pay of $20,000 MWh when demand is assumed inelastic was "likely to significantly exaggerate the loss of welfare that arises when new investment does not occur… as a consequence this may exaggerate the extent of uplift predicted by the model".[417]

Scale of the new service

B57 Frontier assumes the new service is equivalent to 1% of annual electricity consumption. Based on Frontier's total consumption estimate of 38.9 TWh, the new service represents 389,000 MWh of electricity.

B58 As noted by Dobbs, this quantity together with Frontier's demand assumptions implies an estimated consumer surplus at risk of $2.6bn.[418]

B59 We note that the total sum of interruptions in Transpower's network in 2012/2013 was 7.6 system minutes.[419] This equates to about 823 MWh, or just 0.2% of Frontier's assumed 389,000 MWh.

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416 Electricity Authority "Investigation into the value of lost load in New Zealand: Report on methodology and key findings" (23 July 2013).

417 Dobbs "Comments on the Application of the Dobbs [2011] model", 17 September 2014, para 2.

418 Dobbs "Comments on the Application of the Dobbs [2011] model", 17 September 2014, para 63.

419 That is, the total sum of electricity lost through outages during the year was equivalent to the amount that would be lost if the entire network was offline for 7.6 minutes during the peak demand. Transpower

Rate of cost pass through

B60 Dobbs pointed out that there are different views on the extent to which costs are passed through to retail tariffs. [420] For example, Dobbs notes that "it could also be argued that in the long run, all costs must eventually be reflected in prices".[421] Dobbs suggests sensitivity testing on the assumed proportions of fixed and variable costs (which in the model determine the extent of cost pass through).

Differences in price elasticity of demand for existing and new services

B61 Dobbs notes that Frontier assumes the same price elasticity of demand for both existing and new services commenting "one might expect the demand associated with new investment to be more elastic and possibly, much more elastic". [422]

Cross elasticity of demand between existing and new services

B62 Dobbs points out a major limitation of his model is that it assumes zero cross elasticity between existing and new services. Dobbs notes that in practice the launch of a new service can have big impacts on the level of demand for existing services.[423]

B63 We note that this is a conceptually complex issue which would be difficult to model. Frontier did not respond to this issue.

Frontier response to Dobbs' critique

B64 In response to Dobb's critique, Frontier submitted sensitivity analysis of key assumptions discussed by Dobbs.[424] Frontier notes Dobbs' caution regarding the use of a consumer surplus objective and maintains a total welfare objective throughout these sensitivity tests.

B64.1 Specifying a linear demand curve in place of the original constant-elasticity (convex) demand curve.

B64.1.1 This allowed Frontier to avoid having to select a maximum willingness to pay cut-off and had the effect of significantly reducing the implied amount of consumer surplus at risk from under-investment.

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reports that system maximum demand was 6,494 MW. Therefore the volume of electricity lost through interruptions was approximately 6,494 x (7.6/60) = 823 MWh. Transpower "Quality performance report 2012/13".

420 Dobbs "Comments on the Application of the Dobbs [2011] model", 17 September 2014, paras 40-43.

421 Dobbs "Comments on the Application of the Dobbs [2011] model", 17 September 2014, para 42.

422 Dobbs "Comments on the Application of the Dobbs [2011] model", 17 September 2014, para 47.

423 Dobbs "Comments on the Application of the Dobbs [2011] model", 17 September 2014, para 15.

424 Frontier "A submission on Prof Ian Dobbs' comments on our implementation of his loss function model: A report prepared for Transpower New Zealand" (30 September 2014).

B64.1.2 Moving from a constant-elasticity demand curve with maximum willingness to pay of $20,000 MWh to a linear demand curve that intersects the vertical axis at around $800 MWh had the effect of lowering the recommended WACC uplift from the 99th percentile to the 93rd percentile.

B64.2 Allowing price elasticity of demand to vary for different types of investment.

B64.2.1 For this sensitivity analysis, Frontier assumed linear demand and held the assumed demand elasticity for existing services constant at -0.3.

B64.2.2 By increasing demand elasticity for new services to -0.7, the recommended WACC uplift fell from the 93rd to the 87th percentile.

B64.2.3 By increasing demand elasticity for new services to -1.5, the recommended WACC uplift fell from the 93rd to the 83rd percentile.

B64.3 Varying the extent to which network costs are passed through to retail tariffs.

B64.3.1 For this sensitivity analysis, Frontier assumed linear demand and demand elasticity for both existing and new services at -0.3.

B64.3.2 By decreasing the portion of fixed costs in the network business from 70% to 65%, the recommended WACC uplift increased from the 93rd to the 96th percentile.

B64.3.3 By increasing the portion of fixed costs in the network business from 70% to 75%, the recommended WACC uplift fell from the 93rd to the 91st percentile.

B65 Frontier concluded from its sensitivity analysis that although adjusting these assumptions resulted in a lower recommended WACC uplift, their analysis still supported an increase in the WACC uplift above the 75th percentile.

B66 We consider that there is still considerable uncertainty regarding key assumptions that drive the results of the Dobbs model. Frontier's sensitivity analysis demonstrates that the model is sensitive to input assumptions even under a total welfare objective that disregards wealth transfers.

Attachment C: Analysis of RAB multiples

Purpose of this attachment

C1 This attachment:

C1.1 presents our key findings and conclusions from our analysis of RAB multiples;

C1.2 provides background information on RAB multiples including a review of their use in other jurisdictions;

C1.3 defines the objective of our RAB multiples analysis and sets out our methodology; and

C1.4 summarises our analysis of the RAB multiples evidence including our responses to stakeholder submissions.

What has changed since our Draft Decision?

C2 We have made improvements to our RAB multiples analysis since the Draft Report. These improvements have strengthened our view that the existing WACC uplift is likely to be more than sufficient to meet our objective. The main changes since the draft decision include:

C2.1 We have included two new transactions, The Lines Company and OtagoNet, to our evidence base.

C2.2 We have calculated both 'standard' and 'adjusted' RAB multiples. The later include other financial obligations in the estimate of enterprise value.[425]

C2.3 We have subtracted the value of capital works in progress from enterprise values because capital works in progress are not included in the RAB. This has resulted in small reductions in the 'standard' RAB multiples for Vector and Powerco compared to those reported in the draft decision.

What are our key findings and conclusions?

C3 The following table summarises our RAB multiples analysis.[426]

[425] We agree with IWA which submitted that other financial obligations ought to be included in the estimated enterprise value of a utility.

[426] We have excluded Horizon from our RAB multiples evidence base because of concerns that its share price does not accurately reflect the underlying value of the business.

Table C1: Summary of observed RAB multiples

Name of EDB	Date of transaction	RAB multiple (standard)	RAB multiple (adjusted)
Vector	June 2013	1.14	1.36
Powerco	July 2013	1.30	1.48
The Lines Company	December 2013	0.77	1.03
OtagoNet	September 2014	1.89	1.91
Average (simple)		**1.28**	**1.45**
Average (weighted)	**-**	**1.20**	**1.40**

Note: the weighted average RAB multiples are weighted using 2013 RAB values.
Source: publically available information and Commerce Commission analysis.

C4 RAB multiples can be expected to be greater than 1.0 if either:

C4.1 the expected cash flows available to investors are greater than those assumed by the regulator; and/or

C4.2 investors' required rates of return are less than the rate of return allowed by the regulator.

C5 We note that the observed RAB multiples:

C5.1 can differ significantly depending on the utility and the situation;

C5.2 are on average significantly greater than 1.0; and

C5.3 range on average from 1.2 to 1.4 depending on whether 'other financial obligations' are included in the estimate of enterprise value;

C6 Our RAB multiples analysis suggests the following:

C6.1 There is evidence of excess returns available to investors in regulated utilities. This suggests that the risk of not attracting investment is low.

C6.2 The observed RAB multiples do not identify the drivers of excess returns. This is not an issue given that we are not using these indicators to assess the reasonableness of the WACC parameters or the WACC mid-point.

C6.3 We are assessing whether the current WACC uplift is too generous which does not require us to pinpoint the specific drivers of the excess returns.

C6.4 Given the evidence of excess returns, we consider the current WACC uplift may be too generous.

C6.5 We have estimated that reducing the WACC uplift from the 75^{th} to the 67^{th} percentile would have a relatively small impact on observed RAB multiples.

We would expect a RAB multiple of 1.20 to fall to approximately 1.16 following a reduction in the WACC uplift from the 75th to the 67th percentile.

C7 Based on our analysis of RAB multiples, we conclude that:

C7.1 The allowed WACC should be no greater than the current 75th percentile.

C7.2 The allowed WACC could be reduced from the current 75th percentile.

What are RAB multiples?

C8 A utility's enterprise value is the market value of the utility's equity, net debt and other financial obligations.

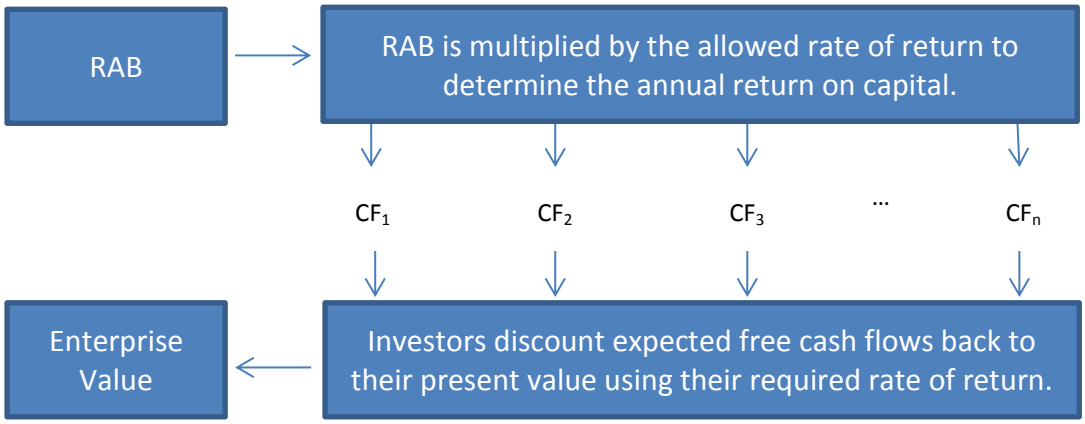
C9 The RAB is set by the regulator and is the value of capital on which a regulated utility earns a return.

C10 A 'RAB multiple' refers to the ratio of a regulated utility's enterprise value to its RAB. The general formula for calculating a RAB multiple is:

$$\text{RAB multiple} = \frac{\text{Enterprise value of regulated entity}}{\text{Regulated asset base of regulated entity}}$$

C11 The ratio tells us the market value of each dollar of the utility's RAB. For example, a ratio of 1.2 tells us that each $1.00 of RAB is currently valued by the market to be worth $1.20.

C12 The following diagram illustrates the underlying relationship between RAB, the allowed rate of return, the actual cost of capital and enterprise value. The diagram assumes that there are no other sources of free cash-flow such as expected efficiency savings or growth opportunities which would result in larger expected free cash flows and therefore a larger estimate of enterprise value.



C13 In the illustrative example above, if the allowed rate of return is equal to the actual required rate of return, the enterprise value would be expected to equal RAB (ie, the expected RAB multiple would be 1.0).

C14 In incentive-based regulatory regimes, the RAB multiple will not only reflect the relationship between the regulatory allowed rate of return and the market WACC, but also the market's expectations of the company to over or under-perform the regulator's cash-flow and other model assumptions. On this basis, a RAB multiple of greater than 1.0 could imply either the regulatory allowed rate of return was too high or the market expected the company to outperform cash-flow or other model assumptions used in their regulatory determination (or a combination of both).

Are RAB multiples used in other jurisdictions?

C15 In response to our draft decision, NZ Airports Association submitted that "the Commission has provided no evidence that its application of this (RAB multiples) concept is consistent with common regulatory practice."[427] CEG submitted that the Australian Energy Regulator (AER) had "expressed considerable caution about the use of RAB multiples in regulatory decision making".[428]

C16 Regulators commonly assess market data and 'other' sources of information to help inform their decisions on the allowed rate of return.

C16.1 The AER consults a wide range of additional sources of information including financial market data, valuation reports and analysts' estimates of market returns to inform their decisions on WACC parameters.[429]

C16.2 The Independent Pricing and Regulatory Tribunal of NSW (IPART) currently publishes a bi-annual WACC update which includes analysis of additional sources of financial market and WACC parameter information that may be considered by the Tribunal when setting the WACC.[430]

C17 We note that RAB multiples are used in other jurisdictions by regulators and investors to inform their decisions.

C17.1 The Chairman of Ofwat has referred to high RAB multiples for UK water utilities as evidence that the regulator's allowed WACC is too high noting that "the continuing trend for water companies to be sold for prices around 130% of RAV (regulated asset value) only suggests that the regulator's adopted cost of capital is too high and the premia reflect excess demand for these assets".[431]

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427 NZ Airports Association "Submission on Draft Energy WACC Decision" (29 August 2014).

428 CEG "Economic Review of Draft Decision on the WACC Percentile" (Report for NZ Airports, August 2014).

429 AER "Rate of Return Guideline" (December 2013).

430 IPART "Fact Sheet – WACC Update" (August 2014).

431 Jonson Cox "Observations on the regulation of the water sector" (5 March 2013), page 9.

C17.2 In its February 2014 report on the split cost of capital, the Queensland Competition Authority referred to UK and Australian RAB multiples as evidence of above-normal returns.[432]

C17.3 While the AER decided not to use RAB multiples to assess the reasonableness of its WACC parameters, the AER does monitor RAB multiples as part of a set of indicators to help inform it of potential areas of inquiry and research.[433]

C17.4 In its 2013 advice to the UK Office of Water (Ofwat) on the approach to reviewing the appropriate returns for water companies, PwC noted that "the expectation for out-performance on regulatory assumptions can be gauged by looking at the market-to-asset ratio (MAR) of water industry companies…".[434] PwC reports an average MAR in the UK water sector of 1.23 and concludes that "the relatively high MARs suggest that there have been consistent expectations of higher returns…". PwC lists three potential drivers of these expectations:

C17.4.1 outperformance that is attributable to unregulated business units which PwC comments is generally small;

C17.4.2 synergies available to the new entity that are not allowed for by the regulator; and

C17.4.3 allowed revenues being set at levels higher than finance providers require "suggesting operational targets were easy to outperform, and/or the WACC was set too high relative to the actual costs of financing".

C17.5 In 2014, Grant Samuel prepared an independent expert's report relating to APA Group's proposal to acquire the Australian gas distribution company Envestra. In this report, Grant Samuel commented that:[435]

C17.5.1 "A common rule of thumb parameter used in the valuation of energy infrastructure assets is RAB multiples";

C17.5.2 "Theoretically, listed infrastructure entities should trade at, and assets should be acquired at, 1.0 times RAB. However, that does

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[432] Queensland Competition Authority "The Split Cost of Capital Concept: Information Paper" (February 2014), section 3.3, pp 11 – 15.

[433] AER "Rate of Return Guidelines: Explanatory Statement" (December 2013).

[434] PwC "Cost of capital for PR14: Methodological considerations" (July 2013).

[435] Grant Samuel "Financial Services Guide and Independent Expert's Report to the Independent Board Sub-committee in relation to the Proposal by APA Group" (3 March 2014).

not occur and, in fact, most assets generally trade at a premium to RAB"; and

C17.5.3 "The precise reasons for this are uncertain but contributing factors probably include: expectations of volume growth above the levels used by regulators…; expectations of savings relative to the operating and capital costs assumed by regulators…; a cost of capital less than that assumed by the regulators…; growth options…; and profit streams from other businesses".

C17.6 In 2013, PwC published a report on regulated airports in the UK noting that "regulated airports are allowed to earn a return on their regulatory asset base (RAB). RAB is therefore a key valuation metric, and the market places significant emphasis on enterprise value to RAB multiples in assessing the value of regulated airports."[436]

C17.7 In 2011, Deloitte published a paper in which it explored a number of valuation issues concerning regulated infrastructure assets.[437] When describing factors that had led to Australian utilities trading at a premium to their RAB, Deloitte said: "the effective cost of capital borne by the asset owner may be lower than that assumed by the regulator due to either a cheaper cost of capital and/or greater leverage."

What is the purpose of our RAB multiples analysis?

C18 AMP submitted that the AER had considered using RAB multiples in its rate of return guidelines but had decided not to because "RAB multiples were influenced by a range of factors, and could not be attributable to any one factor".[438]

C19 We agree with the AER's position. RAB multiples indicate whether there is a source of excess returns relative to the regulator's assumptions. They do not however indicate what the source is.

C20 Consistent with the AER's approach, we are not using RAB multiples to assess the reasonableness of the individual WACC parameters used to estimate the WACC mid-point.

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436 PwC "Has the trend line shifted? The impact on airport valuations" (2013).

437 Deloitte "Regulated assets: trends and investment opportunities" (part of Deloitte's Infrastructure Series, July 2011). http://www.deloitte.com/assets/Dcom-Australia/Local%20Assets/Documents/Industries/Government%20Services/Public%20Sector/Deloitte_regulated_assets.pdf

438 AMP Capital "Submission to commerce commission on proposed amendment to the WACC percentile for electricity lines services and gas pipeline services" (26 August 2014).

C21 Our focus is not on isolating the individual sources of excess returns. Rather our objective is to assess whether the existing WACC uplift is too generous. As pointed out by Covec, "irrespective of the cause of a high RAB multiple, the existence of such multiples is strong evidence that the WACC is not too low".[439]

What is our methodology?

C22 Typically, the objective of valuing a utility is to estimate the fair value of its equity. An analyst would typically begin by estimating the enterprise value of the utility based on discounted cash flow and/or earnings multiples approaches. From this estimate of enterprise value, the analyst would subtract the market value of net debt (borrowings less cash) and any other material obligations (such as pension and tax liabilities) in order to arrive at an estimate of the equity value of the utility. This estimate would then inform investors on how much they should be willing to pay to purchase equity in the utility.

C23 We, on the other hand, are focused on inferring the enterprise value of a utility based on an observed market price for the utility's equity. Therefore, we need to effectively work in reverse by adding back the value of the company's net debt and other obligations in order to estimate the total enterprise value of the company.

C24 In response to a submission from IWA[440] which extended the RAB multiples analysis presented in the Draft Decision, we have updated our approach to include both a standard RAB multiple and an adjusted RAB multiple.

C24.1 Both the standard and adjusted calculations estimate enterprise value by including the implied market value of equity and net debt, exclude the estimated value of unregulated businesses and exclude the estimated value of capital works in progress.

C24.2 The difference is that the adjusted calculation also includes the value of other net financial obligations, such as deferred taxes, which should be included in enterprise value (using fair values where available).

C24.3 Given that some of these other financial obligations are recorded at book value and may not materialise until sometime in the future, it is likely that their book value will overstate their fair value. However we do not have sufficient information to make adjustments to these book values. Therefore we consider the actual RAB multiple is likely to lie somewhere between our standard and adjusted estimates.

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439 Covec "WACC percentile issues" (Report for BARNZ, 28 August 2014, p7).

440 Ireland, Wallace & Associates Limited (IWA) "Commerce Commission's proposed amendment to the WACC percentile for electricity lines services and gas pipeline services dated 22 July 2014" (29 August 2014).

C25 Given that RAB values do not include capital work in progress (ie, assets are only included in RAB once they are commissioned), we have adjusted enterprise value estimates to remove the value of any capital works in progress. This has resulted in some small reductions to the standard RAB multiple calculations that were presented in the Draft Report.

C26 A key assumption in this analysis is that the market price of a utility is an accurate measure of its value to investors. That is, what somebody is willing to pay is a good proxy for what it is actually worth. While we consider the market price is often the best available measure of value, we note that it may not always fairly reflect value. This is an important consideration to make when considering RAB multiples evidence.

C27 We have identified a general caution to be aware of when considering the RAB multiples evidence. Calculating RAB multiples requires gathering data from multiple sources. There are unavoidable timing mismatches between when the RAB is set, when financial statements are prepared and when equity transactions take place. Although these timing mismatches may result in over or under estimates of RAB multiples, we do not expect there to be a consistent bias in either direction.

What is our evidence base?

C28 Our RAB multiples analysis in the draft decision relied primarily on two pieces of evidence – RAB multiples based on Vector's share price and the Powerco transaction.

C29 Following our draft decision, PwC informed us of another transaction in which the minority interest in The Lines Company (TLC) was sold to the incumbent majority shareholder.[441]

C30 Following our draft decision, another transaction took place involving the sale of the majority interest in OtagoNet to the incumbent minority shareholders.

C31 We released a consultation paper seeking stakeholder feedback on these new pieces of evidence.[442] The stakeholder feedback is discussed in the analysis section below.

C32 We consider the TLC and OtagoNet transactions are valuable additions to our evidence base. They are particularly informative because each transaction took place under very different circumstances. We consider that these transactions provide a useful guide to the potential range (ie, minimum and maximum) of RAB multiples that might be observed in the market.

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441 PwC "Rationale for transaction premiums to RAB value" (26 August 2014).

442 Commerce Commission "Further work on cost of capital input methodologies: invitation for submissions on further evidence" (19 September 2014).

Can RAB multiples inform decisions relating to the WACC?

C33 In response to our draft decision, MEUG and IWA (on behalf of MEUG) expressed support for the use of RAB multiples and for the conclusions that the Commission had drawn from this evidence.[443] MEUG and IWA go further by suggesting that the RAB multiples evidence suggests there should be no uplift to the WACC mid-point.

C34 IWA submitted that the use of share prices that represent minority interests in businesses do not accurately measure the true market value of the entire business and that RAB multiples based on these share prices understate the true value of the business.[444] We consider the extent of control premium is heavily dependent on the specific circumstances surrounding each transaction. We do not consider it appropriate to assume a generic control premium would apply across all businesses.

C35 In response to our draft decision, Incenta on behalf of ENA presented RAB multiples for gas utilities in Victoria Australia and what Incenta described as 'RAB multiples' for a sample of utilities in the US. [445]

C36 Regarding the RAB multiples for Australian gas utilities:

C36.1 We referred to the source document in which the AER explains that the high RAB multiples for the Victorian gas utilities are explained in large part by significant under-estimation of revenue (ie, demand) and significant under spending on allowed operating expenses.[446]

C36.2 Incenta does not demonstrate how this evidence is relevant to Powerco and Vector. That is, we have seen no evidence that Powerco or Vector are achieving significantly higher than forecast revenues or are achieving significant cost savings relative to their allowed operating expenses.

C37 Incenta also presented analysis which showed an average 'RAB multiple' of 1.2 for a sample of US utilities. Incenta argued that this demonstrated that the observed RAB multiples for Powerco and Vector are not out of line with RAB multiples observed in the US.

C37.1 In Appendix A to its submission, Incenta discloses that in its calculations it used utilities' book values as a proxy for their RAB. In the US the 'rate base'

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443 MEUG "Submission on proposed amendment to WACC percentile" (19 August 2014) and IWA "Commerce Commission's Proposed Amendment to the WACC Percentile for Electricity Lines Services and Gas Pipeline Services dated 22 July 2014" (Report for MEUG 29 August 2014).

444 IWA "Commerce Commission's Proposed Amendment to the WACC Percentile for Electricity Lines Services and Gas Pipeline Services dated 22 July 2014" (Report for MEUG 29 August 2014).

445 Incenta "Rationale for setting the regulatory WACC above the midpoint value – Response to Draft Decision" (Report prepared on behalf of the Electricity Networks Association, August 2014).

446 AER "Victorian electricity distribution businesses – Comparative performance report 2010" (8 May 2012).

is typically based on either the fair value, book value or replacement cost of assets.[447] Under US accounting rules, businesses are permitted to hold assets on their balance sheets at historic cost / purchase price less depreciation. For this reason, price to book ratios in the US are typically greater than 1.0. For example, the current price to book ratio for the S&P500 as a whole is 2.6.[448] Price to book ratios for individual utilities may be very different than RAB (or 'rate base') multiples if the rate base is calculated based on either the fair value or replacement cost of assets.

C37.2 Incenta use earnings multiples to estimate the fair value of the unregulated business units. They then subtract these values from the utility's overall book value to arrive at the estimated book value of the regulated business. In the event that Incenta's earnings multiples result in fair values in excess of book values, their approach will have the effect of under-estimating the book value attributed the regulated business. This will in effect overstate the price to book ratio calculated for the regulated business.

C37.3 In addition, by removing the estimated fair value from both the price (numerator) and book value (denominator) Incenta assumes the unregulated business has a price to book ratio of 1.0. In cases where the overall price to book ratio is greater than 1.0, reducing both the numerator and denominator by the same amount has the effect of inflating the price to book ratio attributed to the regulated business.

C38 PwC submit that international investors may pay premiums when investing in New Zealand and refers to:[449]

C38.1 the ability to borrow more cheaply internationally than our IM assumes; and

C38.2 tax structuring opportunities, such as the double deduction of interest.

C39 In respect of the relative cost of raising debt internationally, we note:

C39.1 some regulated suppliers do access international debt markets, and the cost of debt advantage available overseas;[450]

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447 See paper by Jamison, M. A., "Rate of Return: Regulation" (http://warrington.ufl.edu/centers/purc/purcdocs/papers/0528_Jamison_Rate_of_Return.pdf)

448 Based on share prices as of 14 October 2014 and company book values reported in December 2013 (http://www.multpl.com/s-p-500-price-to-book). The price to book ratio for the S&P500 has fluctuated between 1.78 (March 2009) and 5.06 (March 2000).

449 PricewaterhouseCoopers "Rationale for transaction premiums to RAB value" (report prepared for Vector Limited, 28 March 2014), pages 3-4 (point I and ii).

450 See our discussion on suppliers raising debt offshore in our IM Reasons paper, at paragraphs H5.102-H5.108.

C39.2 raising debt in offshore markets, if not hedged to NZD, creates an exposure to exchange rate risks since the RAB and maximum prices are stated in New Zealand dollars; and

C39.3 if capital can be raised internationally at less cost than our IM assumes, then this could reduce the extent of the uplift above our mid-point WACC that is required to ensure investment occurs. (Ie, part of the buffer to ensure the WACC is high enough to attract investment is provided indirectly through lower cost offshore borrowing, so less needs to be provided through an explicit uplift above the mid-point WACC).

C40 In respect of the potential double claiming of interest, we note:

C40.1 our IM assumes interest expense can be deducted only once;

C40.2 if some investors are double-deducting interest, then investment in New Zealand's regulated suppliers may appear relatively attractive to such investors, regardless of any uplift to our mid-point WACC;

C40.3 if some investors are double-deducting interest, the need for an uplift to the WACC is reduced, at least in respect of international investors.

C41 We discussed the cost of capital for international investors in our IMs reasons paper in 2010, where we observed that:[451]

C41.1 our IM uses the simplified Brennan-Lally CAPM which is a domestic CAPM that does not consider the perspective of international investors;

C41.2 the use of a domestic CAPM may over-estimate the cost of capital for international investors;[452]

C41.3 international investors can be viewed as the key marginal investors; and

C41.4 these were relevant considerations in choosing the appropriate WACC percentile to use when setting price-quality paths.

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451 Commerce Commission, "Input Methodologies (Electricity Distribution and Gas Pipeline Services), Reasons Paper", (Dec 2010), paragraph H11.54.

452 Note that if a mid-point estimate of WACC from the point of view of an international investor is lower than our IM estimate of mid-point WACC, then any (positive) uplift to our estimate of WACC will still result in over-estimates of the cost of capital from the point of view of international investors.

C42 In addition, PwC submits that historic returns in another market or jurisdiction could lead investors to perceive that similar returns could be achieved in NZ regulated sectors.[453] We note:

C42.1 PwC provided no evidence that the impact of any such perceptions would be material; and

C42.2 perceptions based on international precedent seem to be much less relevant or significant when the local regulator has established clear precedents on, among other things, how WACC will be set, how assets will be valued, and how prices will be set, for that sector.

C43 PwC submits that investors seeking to balance their portfolios could lead to asset purchases occurring at a premium.[454] Conversely, portfolio balancing is equally likely to lead to asset purchases occurring at a discount. PwC did not provide evidence to support the relevance of this observation to the specific transactions under consideration.

Vector

C44 In response to our draft decision, Vector and CEG claimed that our analysis of Vector's RAB multiple was based on an incorrect share price.[455] We confirmed that our data was consistent with that reported by Bloomberg, Yahoo and NZX. We followed up with Vector to resolve this issue. We have since received a letter from Vector acknowledging their error and confirming that our analysis in our draft decision is based on the correct share price.[456] We have also received a corrected version of CEG's submission.

C45 The following table summarises our RAB multiples calculations for Vector.

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453 PricewaterhouseCoopers "Rationale for transaction premiums to RAB value" (report prepared for Vector Limited, 28 March 2014), page 5 (point vi).

454 PricewaterhouseCoopers "Rationale for transaction premiums to RAB value" (report prepared for Vector Limited, 28 March 2014), page 4 (point iv).

455 Vector "Submission on Draft Determination to amend the WACC percentile" (29 August 2014) and CEG "Economic review of Draft Decision on the WACC percentile" (August 2014).

456 Vector "WACC percentile consultation: further information and correction to submission" (7 October 2014).

Table C2: Vector RAB multiple

	Measurement date	RAB multiple (standard)	RAB multiple (adjusted)
Enterprise value of regulated utility ($m)			
- Equity value	June 2013	2,768	2,768
- Plus net debt	June 2013	2,364	2,364
- Plus other net obligations	June 2013	-	784
- Less unregulated businesses	June 2013	1,047	1,047
- Less capital work in progress	Mar/Jun 2013	60	60
- Total		4,025	4,809
RAB ($m)	Mar/Jun 2013	3,533	3,533
EV / RAB		**1.14**	**1.36**

Source: publically available information and Commerce Commission analysis.

C46 Analysis of the RAB multiple for Vector is complicated by its ownership of significant non-regulated businesses. Vector's unregulated businesses accounted for 36% of its total revenues in 2013/14.[457]

C47 We have attributed values for the unregulated businesses based on a sum-of-the-parts valuation of Vector's businesses, published by Deutsche Bank in February 2014.[458] Deutsche Bank valued Vector's business units as follows:[459]

C47.1 electricity lines business at $2,886 million;

C47.2 "gas transmission" business (which includes gas distribution) at $1,113 million;

C47.3 gas trading business at $515 million, and

C47.4 technology and other business at $532 million.

C48 Estimates of Vector's net debt and other net financial obligations are available as at June 2013.

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457 Vector annual report 2013, page 22; EDB Information Disclosure Requirements Information Templates (2013), Schedule 3; GDB Information Disclosure Requirements Information Templates (2013), Schedule 3; GTB Information Disclosure Requirements Information Templates (2013), Schedule 3.

458 Deutsche Bank, "Vector - Cuts being Treated" (21 Feb 2014), page 6.

459 Submissions from Vector and Sapere commented that this analysis relied too heavily on a single source of information (ie, Deutsche Banks' report). We are not aware of any alternative publically available valuations of Vector's individual business units and none were provided by submitters.

C49 The value of Vector's RAB was:

C49.1 $2,536 million for electricity distribution as at March 2013;

C49.2 $468 million for gas distribution as at June 2013; and

C49.3 $498 million for gas transmission as at June 2013.

C50 Since Vector's RAB is growing, we have allowed for forecast growth in the RAB to reflect forecast capex and historic depreciation based on disclosed regulatory statements. This has the effect of making our RAB multiple calculations more conservative.

C51 This analysis shows Vector trading at a multiple of between 1.14 and 1.36 its RAB.[460] This is less than the multiple for Powerco (see below), but is still a reasonably large premium to RAB.[461] As noted above, regardless of the sources of the excess return, their existence is evidence that the existing WACC uplift may be too generous. We consider this is strong evidence particularly given the current EDB price-quality path, which has over 70% of Vector's aggregate RAB, will be reset from April 2015.[462]

C52 We have focused on Vector's RAB multiple as of June 2013 because this achieves the closest possible timing match between Vector's share price, annual report information and RAB valuation.

C53 In the draft decision we estimated Vector's RAB multiple using share price data from June 2013 and December 2013.[463] CEG and Vector submitted that those periods may not have been representative of Vector's share price, and we should use broader time periods. Accordingly, in the figure below shows Vector's standard RAB multiple

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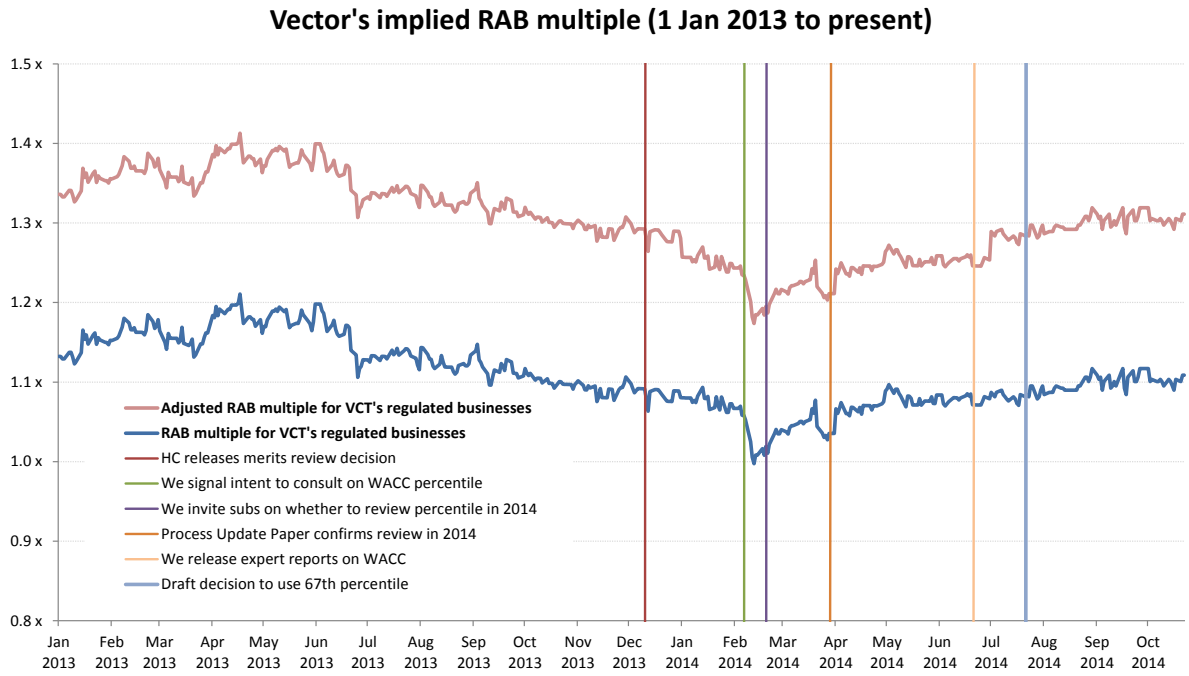
460 In his 31 July 2014 review of our Draft Decision (where we presented a RAB multiple estimate for Vector of 1.09 to 1.16), Professor Vogelsang noted that potential valuation errors together with the relatively low RAB multiple estimate called into question whether Vector's RAB multiple was statistically different from zero. He noted that on the other hand, Vector's actual RAB multiple may be much closer to Powerco's. Our adjusted RAB multiple for Vector suggests that Professor Vogelsang's latter observation is more likely to be correct.

461 The reasons for the difference in premiums between Vector and Powerco are not readily apparent, but could relate to tax structuring. The potential for tax structuring to impact on the premium is noted by PwC for Vector (PricewaterhouseCoopers "Rationale for transaction premiums to RAB value" (report prepared for Vector Limited, 28 March 2014)).

462 When a price-quality path is re-set it will reflect achieved efficiency gains, so achieved gains will accrue to consumers in future regulatory periods (subject to the impact of IRIS). However, to the extent that investors expect a supplier to make further efficiency gains in future pricing periods, they may be prepared to pay a larger premium to RAB.

463 Submissions from CEG and Vector claimed we had used incorrect share price data for Vector during these months in our draft decision. We can confirm that the share price data used in the draft decision is consistent with data reported by YahooFinance, Bloomberg, and the NZX. We have received correspondence confirming this from both submitters.

from 1 Jan 2013 until 22 October 2014, and identifies key dates relevant to this consultation.



C54 This shows Vector's standard RAB multiple was above 1.1 for the first half of 2013. It then declined towards 1.1 in the second half of 2013. The multiple continued to decline after the release of the merits review judgment (December 2013), and it declined further and more significantly, after we signalled that we may re-open the WACC percentile (February 2014). Since then, Vector's RAB multiple has gradually risen during 2014, and is now back around 1.1, and close to the levels it was during the second half of 2013. This analysis, using data from a longer time period, supports our view that Vector trades at a premium to RAB, and is likely to do continue to do so if the 67th percentile is adopted (consistent with our draft decision in July 2014).

Powerco

C55 In our draft decision we reported an estimate RAB multiple of Powerco of 1.33. AMP Capital responded that based on the purchase price, it assessed the RAB multiple to be 1.26 but did not provide any supporting details on how this was calculated.[464] We also received email correspondence from Powerco on 12 July 2013 which provided details and calculations arriving at a RAB multiple of 1.32.

C56 The following table summarises our RAB multiples calculations for Powerco.

464 AMP Capital "Submission to Commerce Commission on proposed amendment to the WACC percentile for electricity lines services and gas pipeline services" (26 August 2014).

Table C3: Powerco RAB multiple

	Measurement date	RAB multiple (standard)	RAB multiple (adjusted)
Enterprise value of regulated utility ($m)			
- Equity value	July 2013	1,250	1,250
- Plus net debt	March 2013	1,078	1,078
- Plus other net obligations	March 2013	-	316
- Less unregulated businesses	March 2013	0	0
- Less capital work in progress	Mar/Sep 2013	54	54
- Total		2,274	2,591
RAB ($m)	Mar/Sep 2013	1,755	1,755
EV / RAB		**1.30**	**1.48**

Source: publically available information and Commerce Commission analysis.

C57 In July 2013 AMP Capital Investors announced the acquisition of a 42% stake in Powerco Ltd for $525 million.

C58 The price paid by AMP for its 42% equity stake in Powerco implies a value of $1,250 million for 100% of Powerco's equity. Powerco had net debt of $1,078 million as at March 2013.[465] This implies a standard enterprise value of $2,274 million. Powerco also had other net financial obligations of $316m, implying an adjusted enterprise value of $2,591m.

C59 As of March 2013, Powerco had a RAB of $1,408 million for its electricity distribution business, and $347 million for its gas pipeline business.

C60 This implies a RAB multiple for Powerco of 1.30 (standard) and 1.48 (adjusted). That is, Powerco is estimated to be valued by the market at a premium of 30% - 48% over its RAB.[466]

C61 In our view this premium to Powerco's RAB is significant because:

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[465] Net debt calculated as total debt (short and long term) less cash. Data was sourced from Powerco Annual report 2013, page 31.

[466] In his 31 July 2014 review of our Draft Decision, Professor Vogelsang commented that the only question is whether AMP paid a premium to acquire the 42% share of Powerco. Professor Vogelsang argued that acquiring a 42% share of a company on the open market would most certainly push the share price up. On the other hand, Professor Vogelsang noted that selling a 42% share of a company on the open market would push the share price down. Professor Vogelsang concluded that these forces would offset each other and that, in the absence of information to the contrary, the observed sale price for 42% of Powerco could reasonably be judged to represent the "true" market price.

C61.1 AMP Capital Investors acquired only a minority stake in Powerco (of 42%; QIC holds 58%), and thus the pricing is unlikely to be significantly affected by assumed synergies or control premiums;

C61.2 AMP Capital Investors is a relatively passive investor, without other operations in this sector in New Zealand, limiting potential synergies; and

C61.3 expert advice to a UK regulator suggested it was highly unlikely outperformance on incentives and cost would contribute any more than 10% of a premium to RAB, and that a larger premium indicated a mispricing of the regulated rate of return.[467]

C62 PwC (on behalf of Vector) and Frontier (on behalf of Transpower) identified a number of reasons why premiums to RAB may exist.[468] These submissions do not attempt to quantify these factors or demonstrate that the factors they identify have a material impact on the RAB multiple for Powerco. More fundamentally, these submissions do not explain why evidence of excess returns cannot be interpreted to mean there is low risk of under-investment.

C63 We accept there are a number of factors which can in theory explain why a regulated supplier may be at valued at a premium to RAB. This does not affect our reasoning that large RAB multiples indicate that excess returns are available which brings into question the necessity of setting the WACC uplift at the 75th percentile.

C64 PwC and Frontier submit that the premium could be attributable to the value and growth potential of Powerco's unregulated businesses, or to intangible assets.[469] As an example, Frontier refers to Powerco Transmission Services. However:

C64.1 neither of those submissions offer any evidence on the value of Powerco's unregulated businesses and their growth prospects, nor on whether these could explain the high RAB multiple implied by AMP's investment;

C64.2 no evidence has been offered on the significance or value of any intangible assets owned by Powerco. We are not aware that the value is material, based on publicly-available information;

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467 Cambridge Economic Policy Associates (2013), "ORR - Advice on Estimating Network Rail's Cost of Capital", Final Report, June 2013.

468 PricewaterhouseCoopers "Rationale for transaction premiums to RAB value" (report prepared for Vector Limited, 28 March 2014). Frontier Economics Pty Ltd "Evidence on the WACC percentile: A Report prepared for Transpower in response to the Commerce Commission consultation" (report prepared for Transpower New Zealand Ltd, May 2014).

469 Frontier Economics Pty Ltd "Evidence on the WACC percentile: A Report prepared for Transpower in response to the Commerce Commission consultation" (report prepared for Transpower New Zealand Ltd, May 2014), page 10, second and third bullet points. PwC, Rationale for transaction premiums to RAB value, 28 March 2014, page 5 (point vii).

C64.3 as discussed above, based on Powerco's annual accounts, Powerco Transmission Services is a relatively small business, and therefore would seem to have only limited value;

C64.4 Powerco's revenue from segments other than electricity, gas and transmission were 0.5% ($2.2 million) of its total revenue in the year to March 2014.[470] The value of any intangible assets which are primarily generating unregulated revenues would seem to be immaterial.

C65 PwC and Frontier submit that the large premium paid for Powerco could be evidence of the "winner's curse", or an "investment imperative".[471] However, no evidence has been offered that other bidders submitted materially lower bids for the stake in Powerco such that, if another bidder had been successful, the price paid relative to RAB would have been materially different. Further, as the "investment imperative" described by PwC is generic in nature, rather than being specific to the investor in Powerco, it could be a factor in other transactions also.

C66 PwC submits that the premium may be due to AMP seeing Powerco as a beachhead for expansion into the electricity lines / gas pipelines sectors in New Zealand.[472] We are aware that AMP has stated it would like Powerco to grow its business including through acquiring other utilities.[473] However we are not convinced that growth opportunities are so large or that potential acquisition targets are so undervalued as to justify an acquisition price that implies a 30%+ premium to RAB.

C67 Frontier submits that:[474]

C67.1 Powerco has gas pipeline businesses as well as an electricity lines business, and that the GPB may have higher risk, and a higher WACC, than the GPB; and

C67.2 as a result, a diversified business like Powerco may have a higher than a pure-play EDB.

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470 Powerco, Annual Report, 2014, note 23, page 65.

471 See PricewaterhouseCoopers “Rationale for transaction premiums to RAB value” (report prepared for Vector Limited, 28 March 2014), page 11.

472 See PricewaterhouseCoopers “Rationale for transaction premiums to RAB value” (report prepared for Vector Limited, 28 March 2014), page 4 (point v).

473 Acquisition International, "Power Grab - AMP Capital’s Acquisition of Powerco Stake", (October 2013), at page 9.

474 Frontier Economics Pty Ltd “Evidence on the WACC percentile: A Report prepared for Transpower in response to the Commerce Commission consultation” (report prepared for Transpower New Zealand Ltd, May 2014), page 10-11, fourth bullet point.

C68 We note that if the regulator did not allow a higher return for the gas business, (ie, it allowed the same WACC for both businesses, based on the risks of the EDB), then this would suggest that the consolidated business should trade at a discount to RAB, not a premium. In practice, we do recognise the greater risks of supplying gas, and allow a higher WACC for supplying gas than for electricity.[475] However, the size of the premium over RAB for Powerco implies that one or both of these allowed WACCs is relatively generous.

C69 Frontier Economics submits that the acquirer may have expected Powerco to generate greater efficiencies than we assume in setting the price path, and reference our assumption of an assumed rate of change in partial productivity of zero in the 2012 DPP reset. [476] In response we note that since prices are reset every five years, any such gains are retained for a maximum of five years.[477] Frontier Economics does not identify whether Powerco is achieving greater efficiency than assumed it its price path or, more fundamentally, how large expected efficiency gains would need to be in order to play a significant role in the 30%+ premium to RAB.

C70 In summary, it is our view that the strongest and clearest conclusion from the RAB multiple observed for Powerco is that our use of the 75th percentile estimate of WACC to set price-quality paths is overly generous and is producing estimates of the cost of capital that are greater than necessary to attract capital.

The Lines Company

C71 The following table summarises our RAB multiples calculations for TLC.

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475 This occurs as we specify both a higher asset beta for gas pipeline businesses, and a higher standard error of the asset beta. Commerce Commission "Input methodologies (Electricity Distribution and Gas Pipeline Services): Reasons Paper" (December 2010), paragraphs H8.167-H8.182, and H8.206. The resulting mid-point WACC for gas pipeline businesses is 0.71% higher than the mid-point for an EDB given the same assumptions about the risk-free rate and debt premium.

476 Frontier Economics Pty Ltd "Evidence on the WACC percentile: A Report prepared for Transpower in response to the Commerce Commission consultation" (report prepared for Transpower New Zealand Ltd, May 2014).

477 We acknowledge that the price investors pay may reflect the expectation that a supplier can make efficiency gains in future regulatory periods.

Table C4: TLC RAB multiple

	Measurement date	RAB multiple (standard)	RAB multiple (adjusted)
Enterprise value of regulated utility ($m)			
- Equity value	Dec 2013	135	135
- Plus net debt	March 2013	42	42
- Plus other net obligations	March 2013		45
- Less unregulated businesses	March 2013	43	43
- Less capital work in progress	March 2013	1	1
- Total		134	179
RAB ($m)	March 2013	173	173
EV / RAB		**0.77**	**1.03**

Source: publically available information and Commerce Commission analysis.

C72 In December 2013 the King Country Electric Power Trust (KCEPT) agreed to sell its 10% share in TLC to the majority shareholder the Waitomo Energy Services Customer Trust (WESCT).

C73 In its submission on behalf of Vector, PwC disclosed that it acted as an advisor to KCEPT in the TLC transaction. PwC reported that "the amount of the transaction is confidential". PwC also commented that "these assets were transacted at a substantial discount to RAB".[478]

C74 TLC's 2014 Annual Report discloses a loan of $13.5m from TLC to an entity that is controlled by WESCT to purchase the 10% share in TLC.[479] This implies a total value of TLC's equity of $135m. We note that submissions did not object to this inference.

C75 We have calculated RAB multiples of 0.77 (standard) and 1.03 (adjusted) based on the inferred value of TLC's equity. These multiples suggest that TLC may have sold at a discount to RAB.

C76 There appear to be a number of factors that help explain why the minority shareholding in TLC sold at a discount to its RAB.

C77 In its submission, IWA presented evidence that TLC had been under recovering its allowable revenue. This has in effect locked in an actual rate of return (3.4% in 2013)

478 PwC "Submission to the Commerce Commission on proposed amendment to the WACC percentile for electricity lines services and gas pipeline services" (29 August 2014), paragraph 74.

479 The Lines Company Annual Report (2014).

below the allowed post-tax rate of return at the 75th WACC percentile (6.6% in 2013).[480]

C77.1 In its 2014 Annual Report, TLC acknowledged that its forecast prices were substantially below the forward price path allowed under the Commerce Commission's Default Price Path methodology. Beginning with the 2014/15 pricing year, the TLC board has resolved to reduce this gap over the next three to four years through price increases.[481]

C78 In 2012, PwC undertook a review to inform KCEPT on decisions regarding its shareholdings in two EDBs (King Country Energy and TLC).[482] This report included advice to KCEPT on options to increase/decrease its shareholdings in the two EDBs.

C78.1 PwC found that TLC's lines business had performed well but that its centralised costs were growing at twice the rate of revenue.

C78.2 PwC's report highlighted KCEPT Trustees' frustration at having little influence over the operation of TLC and concerns that some decisions may be destroying the value of KCEPT's shareholding in TLC.

C78.3 PwC concluded that the benefits to KCEPT of ownership in TLC were 'marginal'. PwC also discussed KCEPT's intention of increasing its shareholding in the other EDB, King Country Energy, for strategic reasons.

C79 In its 2013 Annual Report, KCEPT made the following comments regarding its shareholding in TLC:[483]

C79.1 "Most alarming is the continued growth in corporate service costs up to $4.51 million from $3.05 million in 2012, a 48% increase."

C79.2 "The venture in to non-regulated business in the hope of increasing profitability beyond regulatory constraints has been disappointing, it has destroyed shareholder value and had a negative impact on profitability, the reverse of what was intended."

C80 In its 2014 Annual Report, KCEPT reported that following PwC's ownership review it had:

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480 IWA "Report to Major Electricity User's Group for submission on "further evidence"" (30 September 2014) page 6.

481 The Lines Company 2014 Annual Report.

482 PwC "King Country Electric Power Trust: Ownership Review" (November 2012).

483 King Country Electric Power Trust Annual Report (2013).

C80.1 sold its shareholding in TLC, commenting that its "shareholding became regarded as a non-strategic investment"; and

C80.2 increased its stake in King Country Energy and increased liquid cash investments to provide "flexibility for investment opportunities as they arise".

OtagoNet

C81 The following table summarises our RAB multiples calculations for OtagoNet.

Table C5: OtagoNet RAB multiples

	Measurement date	RAB multiple (standard)	RAB multiple (adjusted)
Enterprise value of regulated utility ($m)			
- Equity value	Sep 2014	300	300
- Plus net debt	Sep 2014	0	0
- Plus other net obligations	March 2014		3
- Less unregulated businesses	March 2014	15	15
- Less capital work in progress	March 2014	6	6
- Total		279	282
RAB ($m)	March 2014	147	147
EV / RAB		**1.89**	**1.91**

Source: publically available information and Commerce Commission analysis.

C82 In September 2014, 51% of OtagoNet's equity was sold by Marlborough Lines to the existing minority shareholders Electricity Invercargill and the Power Company Limited. It is important to note that PCL (through its subsidiary PowerNet) also holds the contract to manage the OtagoNet distribution network.

C83 It was reported in several publications that this consolidation of ownership had directly resulted from a stalemate in which the majority shareholder was at odds with both the minority shareholders regarding the operation of the distribution network.[484]

C84 The reported sale price was $152.82m. This implies a total value of OtagoNet's equity of $300m.

[484] Louise Berwick "Council bid wins control of OtagoNet" (published in the Southland times on 2 September 2014) and Cathie Bell "Safety cited in sale of lines firm" (published in the Marlborough Express on 3 September 2014).

C85 We have calculated RAB multiples of 1.89 (standard) and 1.91 (adjusted). This suggests the majority shareholding in OtagoNet sold for a significant premium to its RAB.

C86 Empirical evidence suggests that premiums are often paid to gain control of companies.[485] Given PCL's vested interest as both an owner and, through its subsidiary PowerNet, the network operator, it is reasonable to consider that PCL would see strategic value in acquiring control of OtagoNet.

Transpower

C87 Transpower is not traded so it is not possible to calculate a RAB multiple for it. We have however found evidence to suggest that Transpower's required rate of return could be less than its current allowed rate of return.

C88 In its valuation of Transpower for the Crown, Northington Partners (Northington) noted that Transpower was valued at a premium to its book value and that this was higher than most of the comparator evidence. Northington stated that "…is a direct consequence of our assumption regarding the relativities between the regulated WACC and current required returns".[486] Northington's required rate of return estimate was lower than the current regulatory WACC for RCP1 and its estimate of the regulatory WACC for RCP2.[487]

C89 In response to our draft decision, IWA submitted a copy of a 2010 report by Cameron Partners to Transpower. This report benchmarked Transpower's earnings to Vector's earnings. Then, using Vector's share price, the author estimated an implied enterprise value for Transpower of $3.2 billion to $3.8 billion and a corresponding RAB multiple range of between 1.20 and 1.35.[488]

C90 Given that this analysis essentially piggybacks off of Vector's share price which is already included in our evidence, we are not placing significant weight on this evidence.

Horizon

C91 In the draft decision, we noted that Horizon was trading at an implied discount to its RAB. On the basis that the market for Horizon's shares is illiquid we concluded that we could not rely on Horizon's share price information and therefore that we had placed little weight on this evidence.

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485 For example, Dyck and Zingales (2004) analysed corporate takeovers across several countries over the period 1990-2000 and found that estimated control premiums averaged about 14% (range -4% to +65%).

486 Northington Partners, "Transpower New Zealand Limited Valuation Assessment", 15 Nov 2013, page 6.

487 Northington Partners, "Transpower New Zealand Limited Valuation Assessment", 15 Nov 2013, page 5.

488 Cameron Partners "Report to Transpower New Zealand Limited: Relating to a market based rate of return assessment" (16 August 2010).

C92 In his review of our draft decision, Professor Volgelsang commented that our decision to give less weight to Horizon's implied RAB multiple was "less innocent" than our decision to give less weight to Transpower's implied RAB multiple.[489]

C93 In response to our draft decision, AMP Capital, Houston Kemp, PwC, Sapere and Vector submitted that our concern regarding the illiquidity of Horizon's share price was not a sufficient reason to discount Horizon's implied RAB multiple.

C94 We note that our concerns about the illiquidity of Horizon's share price are shared by Horizon's major shareholders.

C94.1 The Eastern Bay Energy Trust's (EBET) 2014 Annual Report includes the following quote from the Chairman regarding Horizon's share price, "the trustees believe the trading price does not reflect the true value of the company. This is because, with EBET owning 77.29% of Horizon and Marlborough Lines Limited owning 13.8%, there is a lack of liquidity in the remaining stock that is trading on the NZX."

C94.2 In its role as auditor for Marlborough Lines Ltd, PwC undertook an independent valuation of Marlborough Lines Ltd's 13.89% shareholding in Horizon.[490] In the notes to the financial statements, Marlborough states that "PricewaterhouseCoopers has applied a combination of valuation techniques, rather than the quoted price of (Horizon) shares since the trading in (Horizon) shares is very light and there is a very small percentage free-float."[491]

C95 We maintain that the lack of liquidity in Horizon's share price raises significant doubt about the information it contains. We therefore continue to place low weight on this evidence.

Sensitivity of RAB multiples to a reduction in the WACC uplift

C96 In order to better understand the relationship between the WACC uplift and RAB multiples, we built a simplified discounted cash flow model that estimates enterprise value based on any differences between:

C96.1 the allowed WACC and the actual required rate of return; and

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489 Professor Ingo Vogelsang "Review of Commerce Commission "Proposed amendment to the WACC percentile for electricity lines services and gas pipeline services", paper published on July 22, 2014." (July 31, 2014).

490 Marlborough Lines Limited Annual Report 2014.

491 PwC's valuation of Marlborough's shareholding in Horizon was to test whether a book value of $4.17 per share had been impaired. PwC concluded that the book value of $4.17 had not been impaired as of 29 May 2014. This value represents a 32% premium over Horizon's share price of $3.15 on 29 May 2014.

C96.2 the allowance for operating expenses and actual operating expenses.

C97 When the allowed WACC equals the required rate of return and when the regulator's allowed operating cash flows are in line with expected actual cash flows, the model calculates a RAB multiple of 1.0.

C98 We populated the model with the RAB and forecast operating expenses for the five largest EDB's in New Zealand.[492] We then constructed a RAB multiple of 1.20 where the estimated enterprise value can be broken down into:

C98.1 the underlying value of the RAB (1.0);

C98.2 the value created by the regulator setting WACC at the 75th percentile rather than at the mid-point (0.11); and

C98.3 the value created from the expectation that the utility will underspend its operating expense allowance by more than 10% p.a. into perpetuity (0.09).

C99 In this scenario, the enterprise value of the utility represents a 20% premium over its RAB. Of this premium, 11% relates to the 75th percentile WACC uplift and 9% relates to an expectation the utility will continually achieve operating efficiency savings of more than 10% p.a.

C100 We have estimated that, in this hypothetical scenario, reducing the WACC uplift from the 75th to the 67th percentile, all else equal, would be expected to reduce the RAB multiple from 1.20 to 1.16.

[492] EDB ID Schedule 1(iv) (March 2014).

Attachment D: Reasonableness tests

Purpose of reasonableness tests

D1 In our February 2014 consultation paper we indicated we would undertake reasonableness tests on our estimates of the cost of capital.[493] We also undertook reasonableness tests when we finalised the cost of capital IM in 2010.[494]

D2 The purpose of the 2010 reasonableness tests was to check that application of the overall IMs produced commercially realistic estimates of the cost of capital. The reasonableness testing had the potential to identify any oddity in the Commission's estimates requiring us to modify our IMs.[495]

D3 The purpose of the reasonableness tests in the current context is similar, but the scope now is more limited. We use the reasonableness tests to ensure that adopting the 67th percentile will not move our overall WACC estimate (which will be used for setting price-quality paths), outside of the realistic range of estimates of the cost of capital for businesses of comparable risk.

Comparative information considered when conducting reasonableness tests

D4 The comparative information we have considered is very similar to that used in 2010, and comprises updated publicly-available information on:

D4.1 yields on five-year Government stock and BBB+ corporate debt;[496]

D4.2 estimates of the long-run historical returns earned by New Zealand investors on investments of average risk (over the period 1900-2012);[497]

D4.3 estimates of future returns expected by New Zealand investors on investments of average risk;[498] and

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493 Commerce Commission "Invitation to have your say on whether the Commerce Commission should review or amend the cost of capital input methodologies" (20 February 2014), page 13, paragraph 36.

494 Commerce Commission "Input Methodologies (Electricity Distribution and Gas Pipeline Services) Reasons Paper" (December 2010), Attachment H13.

495 Commerce Commission "Input Methodologies (Electricity Distribution and Gas Pipeline Services) Reasons Paper" (December 2010), paragraph H13.1.

496 *Cost of capital determination for information disclosure year 2015 for specified airport services (March year-end) and electricity distribution services* [2014] NZCC 10, page 5.

497 Credit Suisse Global Investment Returns Sourcebook (2013), page 135.

498 Ie, using our Cost of Capital IM (Electricity Distribution Services Input Methodologies Determination 2012) and assuming an asset beta of one.

D4.4 independent estimates of the post-tax WACC for New Zealand electricity lines businesses from:

D4.4.1 Forsyth Barr;[499]

D4.4.2 First NZ Capital;[500]

D4.4.3 Northington Partners;[501]

D4.4.4 PwC;[502] and

D4.4.5 research analysts employed by major investment banks. [503]

D5 In all cases we compare our post-tax WACC estimate with independent estimates, as the comparative information is generally only available on a post-tax basis only. All references to WACC in this attachment should be read as references to post-tax WACC.

D6 In a letter dated 10 October 2014 Powerco provided us with factual information on its risk management strategy that hedges its interest cost of debt exposure against the forthcoming regulatory control period. Powerco describes the information as highly confidential and commercially sensitive. Accordingly, and as this was factual information, received close to the end of this decision process, we have decided not to consult on the information.

D7 The information primarily relates to the cost of debt parameters in the IM, which is outside the scope of the current consultation. Our reading of the letter has identified a number of issues and questions for follow-up with Powerco, and we will seek further information in due course. While the letter is welcome as market-derived evidence on the cost to regulated suppliers of raising debt, some of which is relevant to assessing reasonableness of the cost of debt IM, it does not at this late point, as a reasonableness check, cause us to reconsider our decision on the appropriate WACC percentile uplift, which primarily relates to uncertainty in estimating the cost of equity.[504]

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499 Forsyth Barr “Transpower - Capex Coming to Fruition" (8 November 2011).

500 First NZ Capital "Transpower - A Valuation Perspective" (31 October 2011).

501 Northington Partners "Transpower New Zealand Limited Valuation Assessment" (15 November 2013).

502 PwC "Appreciating Value", 5th Edition, (June 2014), page 21.

503 Goldman Sachs JBWere, Deutsche Bank, Forsyth Barr, First NZ Capital, UBS were all contacted by phone in mid-June 2014 and surveyed as to their WACC estimates for Vector, and the risk-free rates that were used in their analysis.

504 See paragraph 4.24.3.1 above.

Standardisation of estimates to a single risk-free rate

D8 The IMs use estimates of the risk-free rate and debt premium prevailing at the time the WACC is being estimated. On the other hand, some analysts use (differing) long-run average estimates for these parameters.[505]

D9 As a result, our WACC estimate will be more volatile than some analysts' estimates, and lower (higher) those other estimates depending on whether the prevailing spot risk-free rate and debt premia, is below (above) the long-term average. Over time, these differences would be expected to offset somewhat: sometimes we would use estimates that are below the long-term average, and sometimes above it.[506]

D10 To standardise for the difference between spot risk-free rates and long-term averages of the risk-free rate we have adjusted comparator WACC estimates to reflect the risk-free rate used in our WACC estimate.[507] This recognises that the purpose of the reasonableness tests is to assess our decision to move from use of the 75th percentile to the 67th percentile of the WACC distribution, and is not to highlight differences in the risk-free rates which are used by different analysts. The approach to estimating the risk-free rate is outside the scope of this decision.

D11 Specifically, our standardisation adjusts independent WACC estimates for the difference between the risk-free rate we use, and the risk-free rate used by independent analysts (less the impact of tax). We have used data from March 2014, corresponding with our WACC estimate for the EDBs as at 1 April 2014.[508] The effect of this standardisation is illustrated in Table D1 below.

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505 We also allow for the greater debt premium (and related costs) of issuing debt with a term greater than five years, through the Term Credit Spread Differential as an addition to cash flows for qualifying suppliers.

506 Some analysts use averages of the 10 year risk-free rate, where we use the 5 year risk-free rate. This difference in term may lead to differences, over time, between our estimates and long-term averages. Our reasons for preferring a 5 year term (to match the regulatory period) were explained in the IM reasons paper, and are beyond the scope of the current consultation.

507 We have not standardised the estimates of WACC for differences in the debt premium. The amounts involved are significantly smaller and have a limited effect on the analysis.

508 *Cost of capital determination for information disclosure year 2015 for specified airport services (March year-end) and electricity distribution services* [2014] NZCC 10. This was our most recently available WACC estimate for electricity lines businesses at the time of the draft decision.

Table D1: The impact of standardising for differences in risk-free rates

Analyst	Original WACC estimate	Risk-free rate used	Standardisation adjustment	Standardised WACC estimate
Northington Partners (Transpower)	7.00%	4.75%	-0.39%	6.61%
Forsyth Barr (Transpower)	7.24%	6.00%	-1.29%	5.95%
First NZ Capital (Transpower)	7.60%	5.20%	-0.71%	6.89%
PwC (Vector)	6.60%	5.00%	-0.57%	6.03%
PwC (Horizon)	6.90%	5.00%	-0.57%	6.33%
Broker estimates (Vector)	7.0% to 8.1%	4.5% to 6.0%	-0.2% to -1.3%	6.4% to 7.2%

D12 Forsyth Barr disagreed with the adjustments made in our draft decision to standardise its WACC estimates for Transpower for differences in the risk-free rate.[509] Forsyth Barr submitted that its approach is to update the market risk premium for changes in the risk-free rate.[510] After doing so, Forsyth Barr offered a standardised WACC of approximately 6.6% for Transpower. We have also used this benchmark when assessing the reasonableness of our WACC estimate.

D13 Vector, and its advisor Sapere, also disagreed with the adjustments we made to independent WACC estimates for variations in the risk-free rate. Vector submitted that the WACC estimates from each independent analyst should be treated as a package (ie, individual components of their estimates should not be adjusted in isolation from other components).

D14 Our standardisation of the independent estimates of WACC for variations in risk-free rates was done to ensure the reasonableness tests did not simply highlight differences in the risk-free rates which are used by different analysts.[511] In our view, it is appropriate to adjust for differences in the risk-free rate as:

D14.1 differences in the risk-free rate used by different analysts can be material;

509 Forsyth Barr "Submission on draft decision relating to WACC percentile for electricity lines and gas pipeline services" (25 August 2014).

510 Our IM specifies the TAMRP as a fixed parameter (with a value of 7%), and does not require the updating of estimates of TAMRP for changes in the risk-free rate.

511 Commerce Commission "Proposed amendment to the WACC percentile for electricity lines services and gas pipeline services" (22 July 2014), paragraph B8.

D14.2 the current decision is concerned with the premium above the risk-free rate (more specifically, the premium above the mid-point WACC required when setting price-quality paths);

D14.3 we are not consulting on, or reviewing, our methodology for determining the risk-free rate at this time; and

D14.4 removing the impact of variations in the risk-free rate enables more useful comparisons of the premium required for bearing risk.

D15 In response to the submissions from Sapere and Vector[512], we note that an alternate approach to standardisation would have been to amend our WACC estimates to reflect the risk-free rate used by each independent estimate (rather than adjusting the estimate provided by the independent analyst). Adopting this alternative approach would avoid the criticisms from Forsyth Barr, Sapere and Vector as the independent estimates would have been reported unchanged, and the observed difference between our and the independent analysts' estimates would illustrate the impact of factors excluding differences in the risk-free rate.

D16 We note that adopting this alternative approach would result in the same differential between our estimate and the independent estimates shown in Figure D1. However, it would also make it harder to easily compare between the various independent estimates (since they used different risk-free rates estimated at different times). For that reason, we have not adopted this alternative approach.

Interpretation of the comparative information

D17 In considering the comparative information on WACC, it is our view that greatest weight should be given to New Zealand sourced estimates and to estimates relating to businesses which are closest to pure-play providers of regulated services (particularly Transpower, as this is the closest comparator to a pure-play regulated electricity lines business).[513]

D18 As before, the yields on BBB+ corporate debt is used as the extreme lower end, and the expected and historic returns to New Zealand investors as the extreme upper end, of the plausible range of the cost of capital for a provider of electricity lines services.

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512 Vector, Submission on Draft Determination to amend the WACC percentile, 29 August 2014, para 73-76. Sapere, Proposed amendment to the WACC percentile – Commerce Commission's draft decision, 29 August 2014, p.40-42.

513 Other (unregulated) businesses are likely to have a higher cost of capital than regulated services. We recognise that Transpower has unregulated business, but these are relatively smaller proportionally than for other comparators (such as Vector and Horizon).

Assessment of reasonableness of the mid-point WACC

D19 Using the standardised risk-free rates, our estimate of the mid-point WACC for an EDB of 6.10% is within the range of the independent broker WACC estimates for Transpower and EDBs:

D19.1 PwC use 6.03% for Vector and 6.33% for Horizon (6.33%);[514]

D19.2 Forsyth Barr use 5.95% for Transpower (or 6.6% after standardising for variations in the risk-free rate);

D19.3 Northington Partners use 6.61% for Transpower (including a 15% premium on the cost of equity which has no counterpart in other independent analysts' estimates); and

D19.4 First NZ Capital use 6.89% for Transpower.

D20 These comparators support the reasonableness of the mid-point estimate of WACC.

Assessment of reasonableness of the 67th percentile WACC estimate for EDBs

D21 After standardising for risk-free rates, our 67th percentile estimate of WACC is within the range of the independent estimates of WACC for Transpower. Specifically:

D21.1 our 67th percentile estimate is 6.57%; and

D21.2 the independent broker estimates for Transpower range from 5.95% to 6.89% (using our methodology as detailed above).

D22 Our 67th percentile estimate is also virtually identical to the 6.6% WACC identified by Forsyth Barr as its estimate after standardising for variations in the risk-free rate using its methodology.[515]

D23 After standardising for risk-free rates, our 67th percentile estimate of WACC is within the range of the independent estimates of WACC for Vector and Horizon. Specifically, it is:

D23.1 above the WACC estimates PwC has published for Vector and Horizon;

D23.2 within the range of estimates of Vector's WACC made by research analysts employed by NZ investment banks. These estimates range from 6.4% to 7.2%; and

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514 PwC "Appreciating Value" 5th Edition (June 2014), page 21.

515 Forsyth Barr “Submission on draft decision relating to WACC percentile for electricity lines and gas pipeline services” (25 August 2014).

D23.3 very close to the average of broker WACC estimates for Vector of 6.7%.

D24 As we explained in our 2010 IM reasons paper we would expect estimates of Vector's WACC to be above the IM estimate of WACC for an EDB.[516] In particular, the estimates of Vector's post-tax WACC cover all of Vector's businesses (including gas, electricity, telecoms, gas wholesaling, and metering), whereas the IM focuses solely on regulated services (electricity distribution and gas pipeline services). The post-tax WACC for electricity distribution services (in particular) would be expected to be lower than for the other services provided by Vector and lower than for the overall company.[517] We also allow a higher WACC for GPBs.

D25 The difference between our 67th and 75th percentile WACC estimates for an EDB is 0.25% per annum. A change of this size is less than the divergence in view (ie, the range) between the WACC estimates made for Transpower and Vector by independent broker analysts:

D25.1 there is a 0.94% difference between Forsyth Barr and First NZ Capital's estimates of WACC for Transpower (this reduces to 0.29% when using the standardised WACC provided by Forsyth Barr); and

D25.2 there is a 0.77% range of WACC estimates for Vector (after standardising for the risk-free rate) and 1.13% (without standardising).

D26 In our view, the comparator information supports that moving from the 75th to the 67th percentile WACC estimate, to reflect the new information now available to us, will continue to result in a WACC for price-quality paths that is in line with independent WACC estimates for electricity lines services in New Zealand.

D27 Figure D1 below shows the comparator information, and our mid-point, 67th and 75th percentile WACC estimates. It shows that the 67th percentile WACC estimate for EDBs is closer to, but slightly above, the mid-point of the distribution of estimates for Transpower.

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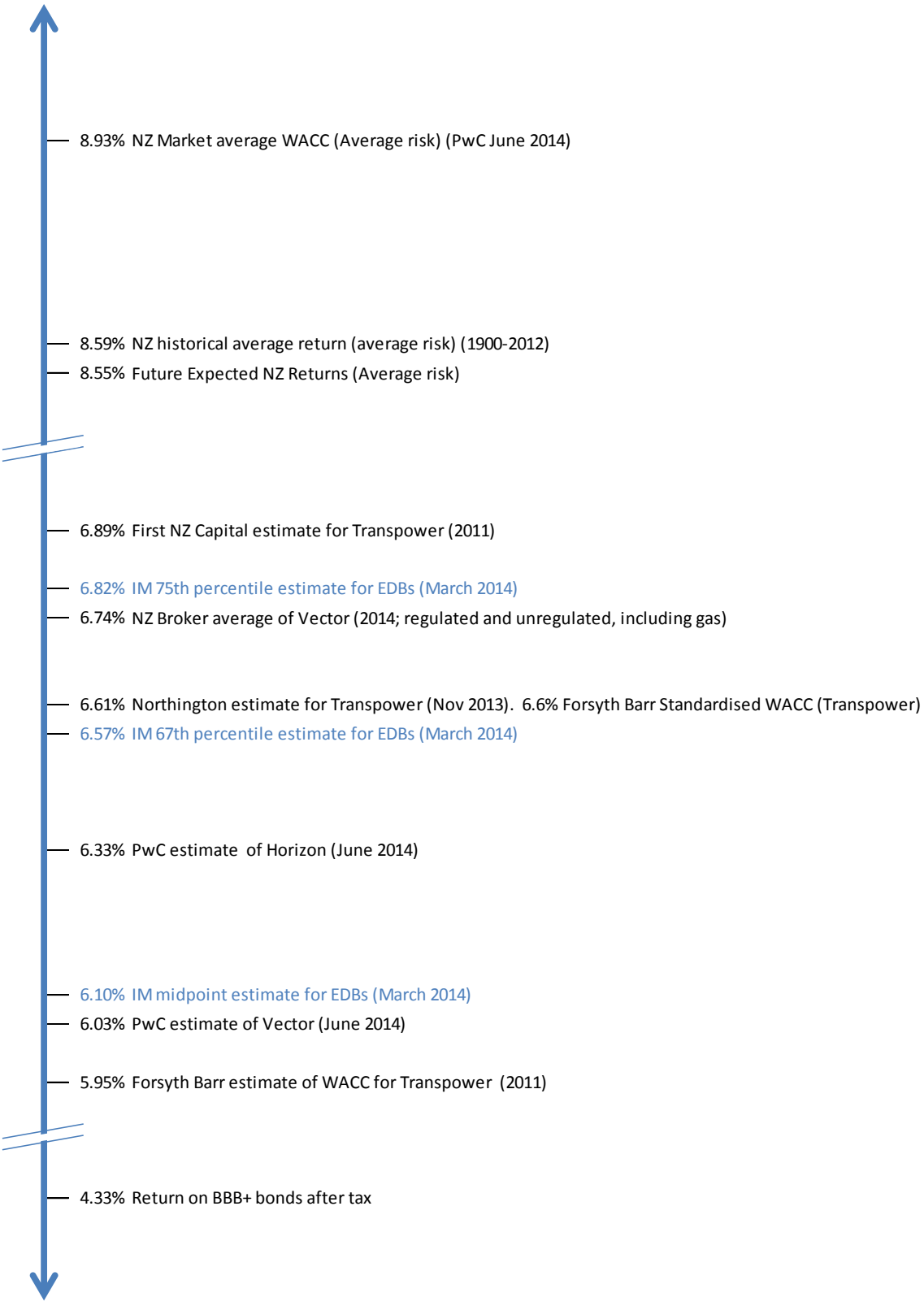
516 Commerce Commission "Input methodologies (Electricity Distribution and Gas Pipeline Services): Reasons Paper" (December 2010), paragraph H13.54.

517 This view is supported by estimates from the brokers. For example, we understand Forsyth Barr and First NZ Capital have estimates of WACC for Vector's other businesses that are higher than that applied to Vector's electricity distribution activities.

Figure D1: Summary of comparator information and our estimates of WACC (using standardised risk-free rates)



Assessment of reasonableness of the 67th percentile WACC estimate for GPBs

D28 As in 2010, there is little information for assessing the reasonableness of the 67th percentile WACC estimate for GPBs. However, we note that the 67th percentile WACC estimate for GPBs (which is 7.34% using the risk-free rate and debt premium as at 1 April 2014) is:

D28.1 0.28% less than the estimate produced using the 75th percentile for a GPB but still 0.77% above the 67th percentile estimate of WACC for an electricity lines business;

D28.2 above all the estimates for Transpower, and 0.60% above the average broker WACC estimate for Vector;[518] and

D28.3 similar to Forsyth Barr's WACC estimate for Vector's gas pipeline business (7.29%, using standardised risk-free rates).

D29 Based on the available evidence, we conclude that moving from the 75th to the 67th percentile estimate of WACC for GPBs will still result in a commercially realistic WACC estimate for a GPB.

Is our risk premia above the government bond rate inadequate?

D30 CEG (for Wellington Electricity) submitted that the Commission should not consider removing the 75th percentile uplift without also revisiting the IM mid-point WACC.[519] Its submission was based on a comparison of:

D30.1 the implied premium in our WACC above the NZ Government bond rate; relative to

D30.2 the implied premium above the government bond rate implied in regulatory decisions for EDBs in Australia, the UK and the United States of America.

D31 CEG's analysis did not persuade us that we should revisit our mid-point estimate of WACC.

D31.1 CEG's analysis essentially compares WACC estimates which incorporate long-term averages of the risk-free rate, with our estimate of the WACC which uses a spot rate for the risk-free rate. When interest rates are below

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518 For the reasons in paragraph D24 we would expect it to be above an estimate for all of Vector, due to the size of Vector's electricity lines business which we consider has lower risk.

519 Competition Economists Group "International precedent relevant to the 75th percentile" (report prepared for Wellington Electricity Lines Limited, April 2014).

long-term averages, as they currently are, it is unsurprising that our implied premia appears relatively small.[520]

D31.2 CEG's analysis makes no allowance for differences in tax treatment between jurisdictions. In particular, our estimate of WACC is after allowing for taxes payable by investors, whereas the UK and US estimates are before investor taxes.[521]

D31.3 CEG's analysis does not discuss why, if the NZ risk premia is unattractive relative to that allowed by regulators overseas, the stake in Powerco still attracted strong buyer interest (including from international investors) and was transacted at a significant premium to Powerco's RAB, the high price relative to RAB paid for OtagoNet, and why Vector too trades at an implied premium to its RAB on a standard and especially an adjusted RAB multiple.

D32 In the graph below we compare our allowed premia over the government bond rate with the independent estimates of the WACC for NZ regulated businesses (that is, the PwC and broker estimates for Transpower, Horizon, and Vector reported above). We note these estimates are free from the methodological issues in CEG's analysis that we noted in paragraphs D31.1 and D31.2).

D33 Figure D2 below shows that our mid-point WACC for electricity lines businesses allows a premia over the five-year risk-free rate that is in line with the premia for risk assumed by New Zealand analysts for companies of comparable risk (ie, Transpower, and Horizon). The premia in the 67th percentile WACC estimate is generally above that implied in the independent analysis. The implied premium for Vector includes all of its business units, most of which have higher risk (and therefore a higher premia) than an EDB.[522]

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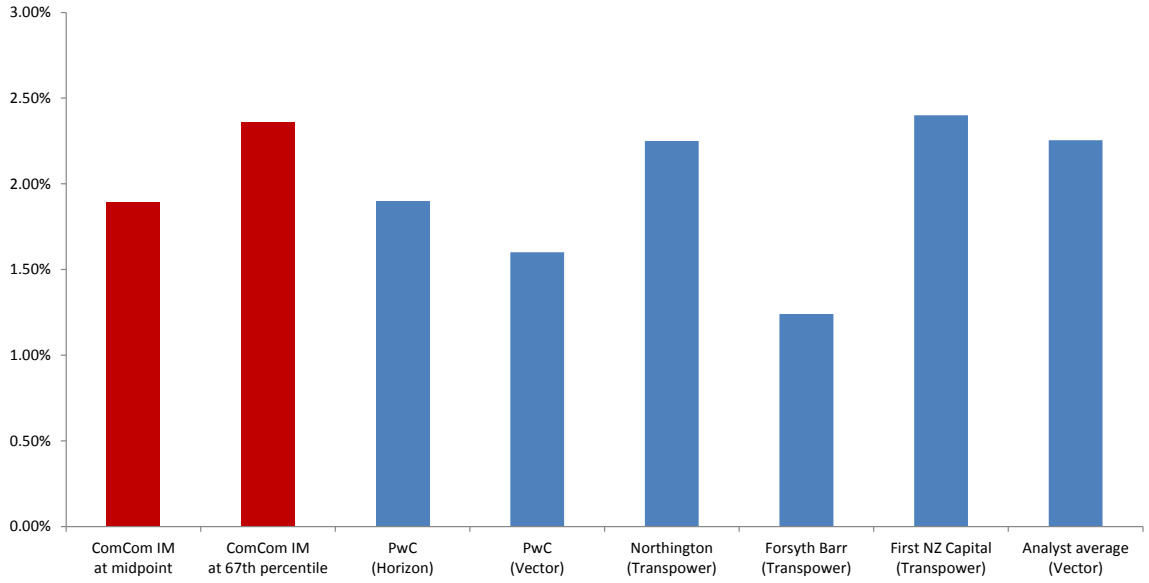
520 Contrary to CEG's submission on our draft decision, our analysis does not assume we are correct in using spot rates, while others are incorrect for using long-term averages (CEG "International Precedent and Selection of a WACC Percentile" (August 2014), paras 19-31). In our view, both are defensible options. Our point is that as the methodologies for estimating the risk-free rate are different this needs to be considering when comparing the risk premia used by offshore regulators with our estimates.

521 In its submission on our draft decision, CEG appears to misunderstand this point (CEG for Wellington Electricity Lines "International Precedent and Selection of a WACC Percentile" (August 2014), paras 32-36). The NZ WACC is a post-investor tax return as it is stated after (substantially) all taxes to local investors have been considered, whereas returns in other jurisdictions are before the taxes payable by local investors on equity returns. That is, equity returns to New Zealand investors are largely shielded from further tax by imputation credits, but there is no counterpart for this in, for example, the US and UK.

522 Accordingly, we allow a higher WACC (and a higher risk premia) for gas pipeline businesses. The implied premia for GPBs is 3.13%, which is a higher premia than any other reported in Figure D2.

Figure D2: WACC premia allowed by New Zealand analysts



Attachment E: Transpower's incentives to invest

Purpose of this attachment

E1 This attachment sets out our response to a number of key points raised in submissions, relating specifically to Transpower's investment and incentives to invest.

Key points from submissions

E2 There are a number of points that were raised in submissions about Transpower's incentives to invest. The points are themed as follows:

E2.1 The level of economic investment is material when compared with reliability investments, and that this needs to be specifically incorporated into the decision on the appropriate size of the WACC uplift.[523]

E2.2 Other drivers of investment, such as reputation, should not be relied upon to ensure adequate investment.[524]

E2.3 The risk of Transpower over-investing is low, and therefore submitters argue we should not be concerned with setting a higher WACC.[525]

E3 The remainder of this attachment provides our response to these points. First we discuss the drivers of reliability investment. The following section discusses the drivers and amount of economic investment, and last, we consider the risks of over-investment. Descriptions of the regulatory framework and incentives that apply to Transpower are publically available. However, we have included some explanation of this context as it applies to Transpower, in response to submissions, to assist in explaining our final decision.[526]

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523 For example, Transpower "Cross-submission: Proposed amendment to the WACC percentile" (12 September 2014) p.11 (Appendix A); NZ Airports Association "Submission on Commerce Commission's proposed WACC percentile for electricity lines services and gas pipeline services" (29 August 2014), p.3; Castalia report to Transpower, "Response to proposed WACC percentile amendment" (29 August 2014), p.1.

524 For example: Transpower "Cross-submission: Proposed amendment to the WACC percentile" (12 September 2014), p.3.

525 For example: HoustonKemp "A report for Powerco, Comment on the Commerce Commission's Proposed WACC Percentile Amendment" (29 August 2014), p.13; Frontier Economics, Report prepared for Transpower New Zealand "Evidence in support of setting allowed rates of return above the midpoint of the WACC range" (March 2014), p.17.

526 For example: Electricity Industry Participation Code 2010; and, Commerce Commission "Transpower capital expenditure input methodology, Reasons Paper" (31 January 2012).

Drivers of reliability investment

E4 This section discusses the drivers that influence investment in grid reliability.

E5 Transpower's reliability investments are those where the purpose is to maintain the reliability of supply. One of the primary purposes of reliability investments is to reduce the risk of unserved energy. Reliability investments are generally driven by an increase in peak demand or driven by the age or the condition of the assets. For Transpower, investing is either:

E5.1 compulsory on the Core Grid, as defined in the Electricity Industry Participation Code, where investment is driven by the need to meet security of supply standards. In these cases, Transpower is required to ensure that the capacity and reliability of the grid meets the Grid Reliability Standards set out in the Electricity Industry Participation Code; or

E5.2 discretionary, where the performance of the asset does not affect the N-1 security standards of the Core Grid, but is likely to effect the reliability (quality of supply) of the Non-Core Grid.

Reliability investments driven by the need to meet the security standards

E6 According to rules set out in the Electricity Industry Participation Code, when Transpower reasonably expects that an existing connection or interconnection asset is unlikely to meet the Grid Reliability Standards at the relevant grid exit point over the next five years, it must enter a process for upgrade of assets or amendment to transmission agreements or service levels in the interconnection rules.

E7 If a connection asset is found to not meet the Grid Reliability Standards, the process generally includes a requirement to develop proposals for investment in the grid to ensure that the connection asset meets the Grid Reliability Standards.[527]

E8 Where reliability issues are due to an interconnection asset not meeting the Grid Reliability Standards, and Transpower considers that an investment is necessary, the Electricity Industry Participation Code makes it compulsory (clause 12.114(1)) for Transpower to submit an investment proposal to the Commerce Commission in sufficient time to avoid a breach of the Grid Reliability Standards.[528]

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527 Electricity Industry Participation Code, Clause 12.40.

528 The transmission grid is a collection of connection and transmission nodes and the transmission links between them. Transmission or connection nodes that are connected to two or more other nodes in the grid are defined as Interconnection nodes and the links between them as interconnection links. Interconnection assets are the assets that form the Interconnection nodes and links. The nodes and links in the transmission grid that are not interconnection nodes and links are defined as connection nodes and loops. Connection assets are the assets that form the Connection nodes and links. 'N-1' means the ability of the transmission system to lose the single largest generator or transmission link without causing

E9 As such, and particularly for interconnection reliability issues (ie where the Grid Reliability Standards could not reasonably be expected to be met), it would be difficult for Transpower to justify not undertaking investments.

Reliability investments due to the age or the condition of the assets

E10 Where the driver is age or condition, investments are generally replacements or refurbishments. While replacements are made with the modern equivalent asset, these investments do not materially enhance the service potential of the asset (other than that attributable to using the modern equivalent asset). The main reason for these investments is to reduce the risk of interruptions to supply through failure of assets.

E11 On top of these requirements and incentives for Transpower to invest, additional reliability incentives are applied under the individual price-quality path. A range of new quality standards and performance measures now apply in RCP2, with a number of these incentives being linked to revenue.[529]

WACC is not the foremost determinant of reliability investments

E12 In line with this, Castalia states that "…WACC cannot be evaluated in isolation from other components of the regulatory regime".[530] In addition, it is well-recognised that Transpower has additional investment drivers to those that apply to EDBs and GPBs.[531]

E13 Castalia also notes that "Transpower needs to invest to meet regulatory standards, and has limited ability or incentive to avoid investment if doing so would directly compromise regulated reliability standards"[532] and "…Transpower has limited ability to defer or avoid investment required to meet the Grid Reliability Standards (GRS)".[533]

E14 Castalia's submission attempts to distinguish between Transpower's mandatory and discretionary investments. The implication by Castalia is that the economic-driven

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interruption to supply, instability of the power system, or overloading of the remaining transmission assets.

529 Commerce Commission "Setting Transpower's individual price-quality path for 2015—2020" NZCC 23, 29 (August 2014), Chapter 4.

530 Castalia "The rational response of a regulated transmission company to a low WACC" 1 May 2014, page ii

531 For example: Castalia "The rational response of a regulated transmission company to a low WACC" (1 May 2014), p.11; and HoustonKemp "A report for Powerco, Comment on the Commerce Commission's Proposed WACC Percentile Amendment" (29 August 2014), p.14.

532 Castalia "The rational response of a regulated transmission company to a low WACC" (1 May 2014), page i.

533 Castalia "The rational response of a regulated transmission company to a low WACC" (1 May 2014), page 9.

investments are more likely to be discretionary than the reliability-driven portion of investments. While this distinction is correct, it is also important to recognise that reliability investments also have a mix of discretionary and mandatory drivers.

E15 Given the range of investment drivers and obligations that apply to Transpower, we consider it less likely that a WACC uplift is needed to mitigate the risk of under-investment in relation to reliability investments to meet the Grid Reliability Standards compared to other regulated suppliers to which this range of obligations and incentives to invest is does not exist.

Levels of economic investment

E16 Transpower's economic investments are investments in the grid whose primary purpose is anything other than to reduce expected unserved energy. A project, with even a small portion of enhancement as a driver (i.e. materially enhance the service potential of the asset) may change classification from 'reliability' to 'economic'.[534]

E17 The drivers for economic investments are similar, irrespective of whether the investment is categorised as major capex or base capex. The difference between base and major capex is the dollar value of the project and level of scrutiny applied by the Commission in approving that project.[535]

E18 While both economic and reliability investments can be undertaken to increase capacity, economic investments are investments to remove generation constraints or facilitate new generation (examples mentioned by Castalia include the Wairakei ring project and the Kawerau generation export enhancement project) or investments to provide access to existing generation capacity (eg HVDC pole 3 upgrade and Clutha Upper Waitaki lines programme).

E19 Castalia states that "the present value of net benefits of this sample of commissioned and planned economic investments is $2.5 billion".[536] The sample used by Castalia is problematic, however, as a large portion of examples relate to either historical expenditure or expenditure that will be commissioned during RCP1.

E20 We note that, at an appearance before the Commerce Select Committee earlier this year, Transpower stated: "We anticipate that with low to flat demand growth, going forward, our capex should stabilise around the $300 million to $400 million level

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534 An example of this is the Bunnythorpe Haywards A and B Lines conductor replacement major capex investment.

535 To be classified as a major capex, the capital expenditure must be greater than $20 million, and must be either to meet the Grid Reliability Standards or provide a net electricity market benefit (see Capex IM determination 2012, p.12, for full definition).

536 Castalia "Response to proposed WACC percentile amendment" (29 August 2014), p.5.

going forward for the next few years, and probably the majority of that capex is actually around refurbishment, replacement, and repairs".[537]

E21 The level of economic investment that Transpower intends to carry out during RCP2 is significantly less than in RCP1. The total approved 'economic' investment for RCP2 is as follows:

E21.1	Major capex	$161m	Bunnythorpe/Haywards.
E21.2	Major capex	$142m	Clutha Upper Waitaki lines programme.
E21.3	Base capex	$6.1m	The total amount of base capex approved for RCP2 was $1.175 billion, of which we estimate $6.1m was for economic investments.[538]

E22 Furthermore, it is important to note that many economic investments include a mix of economic and reliability drivers. A good example of a project with a mix of drivers, is the Bunnythorpe-Haywards project – one of the only two currently approved major capex projects for RCP2:

E22.1 Bunnythorpe-Haywards total approved cost is $161 million.

E22.2 The total calculated net benefit of this project was $850 million.

E22.3 Only 3% out of the $850 million net benefit related to enhancement of the existing line (economic component of net benefit was $24 million: actual planned spend on that economic component is $10 million).

E22.4 97% of the net benefit (out of $850m) related to retaining the existing service at the existing capacity.[539]

E23 The Bunnythorpe-Haywards project is cited by Castalia as an economic project. [540] This is correct, as the case for having this line is that it provides an economic benefit. However, Transpower undertook this project because the asset's condition was

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537 House of Representatives, Report of the Commerce Committee, 2012/13 Financial review of Transpower New Zealand Limited, and Report from the Controller and Auditor-General on Transpower New Zealand Limited: Managing risks to transmission assets, 2012/13, p.7.

538 Base capex includes a category of investment called Enhancement and Development. The drivers for these are a mix of Economic and Reliability. While this number is not intended to be an exact amount, it is a useful guide as to the approximate materiality of the Economic type of investments. Refer Commerce Commission "Setting Transpower's individual price quality path 2015 -2020 final reasons and decision paper" (24 August 2014) p. 76.

539 Commerce Commission "Bunnythorpe/Haywards decision paper" (9 May 2014), paragraph 3.10.

540 Castalia "Response to proposed WACC percentile amendment" (29 August 2014), p.5.

resulting in the failure of the conductors, and safety concerns. Doing nothing was not really an option, so the primary drivers for replacing these existing lines were reliability and safety. So while the need for the line makes it an economic project, the driver for the conductor replacement project was reliability.

E24 Keeping this line was justified on an economic basis, despite reliability of performance being the driver for the current line replacements. In this instance Transpower could, at least theoretically, also have chosen to dismantle the line, as an option, rather than undertaking the project. Transpower presented dismantling the line as an option when consulting on the project.[541] However, given the negative benefit this would have produced, this option could not have been approved under the Capex IM. In instances like this, we consider that there are other very strong drivers of investment that would influence Transpower's decision, such as the views of government and industry participants, and therefore we do not consider dismantling the line to have been a credible option.

E25 There are a number of key points about the overall level of economic investments:

E25.1 First, the net benefit of the economic component of the two currently approved major capex investments for RCP2 is $328 million. This demonstrates that the economic component of capex for RCP2 is not as material as in RCP1 as submitters have implied (ie it is not in the order of $2.5 billion).[542]

E25.2 Transpower had the discretion not to include the 3% economic component in the Bunnythorpe/Haywards project. Instead, Transpower chose to take advantage of the need to replace the conductors to also increase the capacity of the transmission lines. While dismantling the line was a theoretical option, we do not consider it a real option.

E25.3 The economic component for approved base capex investments during RCP2, is not as material as submitters have implied. The approved amount of 'enhancement and development' economically driven projects is a total of $6.1 million out of a total approved base capex of $1.17 billion. Furthermore, as demonstrated by the Bunnythorpe/Haywards project, for those that do fall into the category of 'economic', there can potentially be a mix of drivers for any given project. In RCP2 only one project under the base capex meets the definition of economic investments.[543]

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541 Transpower "Bunnythorpe–Haywards A and B lines Conductor Replacement Major Capex Proposal" (November 2013), p.13.

542 Refer to footnote 523.

543 Transpower "Expenditure proposal: Regulatory control period 2, PD31 Relieve Generation Constraints" (November 2013), p.67.

E25.4 We consider that taking into account the expected level of future investments (ie RCP2) is more relevant than using historical levels of investments (ie the level of investment during RCP1) when considering an appropriate WACC. This is consistent with Incenta, who state that "the WACC provides an incentive for businesses to make the necessary investments that are required for the future when they are required to be made".[544] According to Transpower's Integrated Transmission Plan, it plans to develop only one economically driven major capex proposal in RCP2 (Pakuranga-Whakamaru series compensation).[545]

E26 Castalia notes that "Transpower has a regulatory obligation to identify economic investment opportunities under the Code. However, unlike reliability investments, there are no consequences for failing to make an investment that would have provided economic benefits".[546] This point is also noted by Frontier Economics.[547]

E27 We do agree with Castalia that arguably these economic investments are more discretionary investments for Transpower. We also note that Transpower has discretion about how to respond to some reliability investments. However, it would quickly become difficult to justify not undertaking many of its investments where there was a demand from stakeholders, as well as a clear net benefit. This is because consumers would suffer, or the beneficiary of the project would suffer. Beneficiaries do have some countervailing power, and there are requirements for Transpower to consult and make transparent the whole process. There would likely be negative reputation consequences for Transpower for not 'doing the right thing'.

E28 This does not mean that we consider reputational effects are intended to compensate for a WACC that is consistently set too low. Rather, as discussed in Chapter 3, our decision on the appropriate WACC percentile is intended to strike the right balance between s 52A(1)(a) and (d). We do this recognising there are other financial, as well as non-financial factors from a range of sources which influence the investment decisions of regulated suppliers.

E29 Finally, if there were evidence during RCP2 that all of the combination of incentives still failed to encourage Transpower to invest, it may be more appropriate to consider introducing incentives that specifically target the economic investments. This could be given effect through changes to the Capex IM prior to RCP3.

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544 Incenta "Report to ENA, Rationale for setting the regulatory WACC above the midpoint value – Response to Draft Decision" (29 August 2014), p.13.

545 Transpower "Expenditure proposal: Regulatory control period 2, November 2013, RT06-Integrated Transmission Plan", (spreadsheet).

546 Transpower "Report from Castalia, The rational response of a regulated transmission company to a low WACC" (1 May 2014), p.14

547 Frontier Economics "A report prepared for Transpower New Zealand, A submission on Prof Ian Dobbs' comments on our implementation of his loss function model" (September 2014), pp 12-14.

Risks of over-investment

E30 Although we consider the costs to consumers of setting the WACC 'too low' are greater than the costs of setting it 'too high', we are mindful that setting the WACC too high could potentially create risks of over-investment. Oxera, in its report for us, concluded that the impact of the risk of over-investment due to a higher WACC was not material due to the range of tools available to the Commission to exclude excess capex from the RAB.[548] Frontier argue similarly, suggesting that the level of ex ante checks on Transpower's major transmission investments reduces the risk of over-investment, and therefore is a case for a higher WACC.[549] HoustonKemp suggests that the WACC percentile decision should be delayed until the full suite of regulatory features can be taken into account, including an assessment of the mechanisms that limit over-investment.[550]

E31 While Oxera and Frontier are correct to a certain extent, we consider that despite the level of capex scrutiny to which Transpower's investments are subject, there remains a risk of over-investment should the WACC be set too high. We explore this further below.

E32 We have established a number of incentive mechanisms which help to minimise the risk of over-investment. One such mechanism is the ex-ante scrutiny applied by the Commission to all Transpower's proposed capex expenditure. The Commission is required to individually review all major capex proposals, and can only approve those that pass the investment test set out in the Capex IM. For base capex, prior to the start of each regulatory period, the Commission reviews Transpower's five-year forecast, and approves a level of expenditure for that regulatory control period.

E33 With major capex, projects are often approved at above the P50 level (the P50 being the expected final cost of the project). Setting the approval at, for example, the P90 level takes into account identified risks and uncertainty associated with the project.[551] It also recognises that not all detailed investigations have been undertaken at the time of approval. This means that costs incurred over the P50 are not necessarily inefficient. However, Transpower could inefficiently incur costs over-and-above the P50, up to the approved P-value (ie, P90 if that is what was set), without recourse. Because recovery is based on actual costs, unless Transpower exceeds the approved project value, no capex would be excluded from the RAB.

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548 Oxera "Review of expert submissions of the input methodologies" (27 October 2014), p.32.

549 Frontier Economics "Report prepared for Transpower New Zealand, Evidence in support of setting allowed rates of return above the midpoint of the WACC range" (March 2014), p.17.

550 HoustonKemp "A report for Powerco, Comment on the Commerce Commission's Proposed WACC Percentile Amendment" (29 August 2014), p.14.

551 P90 is where there is a 90% probability of project costs being lower than the specified value.

E34 With base capex, once the level of base capex is approved and set, Transpower is able to manage its expenditure and priorities within the envelope approved. While there are various mechanisms to encourage Transpower to ensure base capex is efficient, and to encourage Transpower to find ways to deliver the agreed outputs at lower cost Transpower can still change its programme of works, and spend up to the maximum approved level without recourse. [552]

E35 Transpower is required to deliver service performance (outputs) at the level agreed at the start of each regulatory control period. Incentives have been provided by specifically linking some of these performance measures to revenue. Likewise, the base capex expenditure adjustment is a mechanism that provides incentives for Transpower to not undertake expenditure over-and-above the level required. It should also help to make Transpower indifferent to whether it spends opex or capex, and encourage Transpower to select the lowest lifetime cost, rather than making expenditure trade-off decisions based on the regulatory mechanisms in place at the time.[553]

E36 Finally, applying from RCP2, an ex post review of whether base capex was sufficiently subjected to Transpower's internal policies and processes, may occur at the end of RCP2. Where, for example, those processes were not followed, or for projects over $20 million that did not in all material respects meet the requirement to undertake a cost-benefit analysis and consultation consistent with the Capex IM, ex post adjustments may be made.

E37 While we consider that the suite of incentives encourages Transpower to target efficient costs, we still recognise that Transpower has discretion over how it responds to the base capex mechanisms, and there remains some level of risk that Transpower over-invests in the grid. However, for the reasons above, we consider over-investment to be less of an issue for Transpower than for EDBs.

Key conclusions

E38 There are financial, as well as non-financial (eg reputation) factors from a range of sources which influence the investment decisions of Transpower.

E39 The vast majority of capex in RCP2 relates to reliability investments. In many cases, such as where it is required to meet the deterministic limb of the Grid Reliability Standards, Transpower has little discretion not to undertake investment, and in some cases, investment is compulsory. In these situations, WACC is unlikely to be the foremost determinant of whether investment will occur.

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552 Commerce Commission "Transpower capital expenditure input methodology, Reasons Paper" (31 January 2012), p.46.

553 Commerce Commission "Capex IM Reasons Paper" (31 January 2012), p. 37.

E40 On the other hand, Transpower has the most discretion around economic investments. However, we consider it may be difficult for Transpower to avoid economic investments where there is a clear demand and also a positive net benefit produced. We also consider that the materiality of this category of investment is relatively small.

E41 We consider the risk of Transpower over-investing to be less than EDBs. However, despite the level of ex ante scrutiny, transparency through consultation, and ex post incentives to ensure that an efficient level of investment is maintained, there is still potentially some scope for over-investment.