The WACC uplift question

A brief review of the balance between intuition and evidence supporting the WACC uplift

NZIER report to MEUG

12 September 2014

Final

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1. WACC uplift

1. In July the Commerce Commission (Commission) released a paper[1] which proposes to change how it estimates the regulatory cost of capital (WACC) applied to energy businesses which are regulated under Part 4 of the Commerce Act. The Commission propose that the 67th percentile of their estimated distribution of WACC be used for setting the price-quality path, replacing the 75th percentile that has been used from 2011 up until now. The change would take place immediately and apply to the price-quality resets that are due to be implemented in 2015.
2. Submissions on the 22 July paper closed on 29 August following which 35 documents from interested parties and their advisors were posted on the Commission's website. NZIER provided MEUG with advice regarding the July submission, including some brief local evidence.
3. Amongst other matters, we also advised MEUG that the persistent assumption in submissions of an asymmetric loss from symmetric errors when estimating the WACC was not connected to evidence on how EDBs made investment decisions, on how investment affected reliability or on how consumers value marginal improvements in reliability. Overall the absence of evidence against uplift did not justify a presumption that uplift was consistent with the purposes of Part 4 of the Commerce Act.
4. In our view both the responses in submissions, and the information and reasons provided by the Commission in making its July proposal, has significantly undermined the case for any uplift to WACC. We repeat our view that this is a good thing, – we now better know what we don't know and importantly we are getting a much better picture of what matters to the process of deciding on WACC uplift.
5. We remain particularly sceptical of WACC uplift because it represents certain consumer cost for uncertain consumer benefit.
6. We would expect that regulators would have difficulty accepting the proposition that is inherent in many of the submissions - which is that it should 'trust' monopoly businesses to make reliability investments that are optimal for consumers, provided that the WACC is at what EDB's say is at, or is close to, the 'right level'.
7. From submissions we see the difficulty for the Commission as being how to shift the discussion of the WACC away from a 'beauty contest' between theoretical frameworks toward an evidence-based approach with testable results. The Oxera/Vogelsang advice was a step by the Commission in this direction.
8. The NZIER 29 August report suggests that the analysis and estimates prepared for the Commission by Oxera could have its theoretical based strengthened and its applicability to NZ markets materially improved by:

[1] "Proposed amendment to the WACC percentile for electricity line services and gas pipeline services" Commerce Commission 22 July 2014.

- leveraging the approaches to valuing investment in network reliability that have been tried and tested[2],
- applying these investments to information available on the causes of outages and value of lost load already available in New Zealand.

9. In this paper we consider both the general tone of the submissions by other expert advisors, the extent to which there is support in submissions for a New Zealand specific evidence based approach and we pick up on the suggestions for how it might be implemented.

[2] For example the approaches used in the USA cited later in this cross-submission.

2. Focusing on the evidence?

10. Our analysis of the advice taken by the Commission and the investigatory work from our 29 August report highlighted for us that the Commission is using a lot more intuition than was first implied by the High Court comments on the arguments presented in the merits review. Other submissions to the Commission reinforce our view – there is considerable critique in submissions of the various components of the evidence with most submissions urging the Commission to leave the 75th percentile in place or increase the uplift.

11. We do not attempt to cover all the material that has emerged from submissions but rather we provide comments on those matters that, in our view, emerged as tipping points for the Commission decision.

2.1. Some general observations

12. Most submissions seem to consider that a lower WACC appears inevitable and are positioning themselves to minimise potential losses. While there are plenty of arguments in submissions, little by way of empirical analysis or persuasive evidence is presented. The Commission is making an honest attempt to fix something that the High Court thought needed attention and has searched for evidence to inform their assessment and decision.

13. Most of the submitters argue that the evidence supporting the proposed 67th percentile is inadequate but there are several different views on what Commission should do and where the WACC should be set. Some lines companies and their advisors argue either that the WACC uplift should be increased while others argue it should be left unchanged.

14. There is still however an overwhelming weight in submissions towards the core assumptions that;

    - Networks will under invest if they perceive that the regulatory WACC is less than their real WACC
    - If they under invest, consumers will be adversely affected to a greater level than the adverse effects from high prices that result from WACC uplift
    - WACC uplift is the only mechanism to encourage efficient network investments
    - WACC uplift should apply to all categories of the RAB

15. Despite a lack of evidence to support these assumptions submissions seem unable to shake themselves free and take a fresh look at how to identify the most appropriate WACC percentile or take a wider perspective on how EDBs judge and make the level of investment required to deliver a given level of network reliability.

16. To their credit Transpower did engage Frontier Economics to travel the 'fresh look' path but they (Frontier) started with the Dobbs model and the

core assumptions that are its underpinnings. They found that the optimal percentile was;

> *considerably higher than the 75th percentile of the estimated WACC range. ….. This is because the welfare costs of under-investment accrue substantially more quickly than the welfare costs of over-investment* [3]

17. These assumptions are in many ways self-fulfilling and define WACC uplift from the beginning. We previously challenged this view and we still maintain that it is an unreasonable start point.

18. Amongst the many errors and issues that Vector see with the Commission proposal, they are adamant that other tools to incentivise network investment will not work and will, in fact, harm network companies;

> *The reliance on "other tools" to incentivise investment is inappropriate and unlikely to work:*
>
> - *Incentives such as quality standards and IRIS mechanisms are not normally applied to make up for shortcomings elsewhere in the regulatory scheme, such as a low WACC.* [4]

19. In their submission ENA come straight to the point on these assumptions being the starting point for any analysis.

> *It is common ground between most of the experts, the Commission and regulated businesses that selecting a WACC above the mid-point is necessary because the social costs of under-investment in essential infrastructure would out-weigh the impacts of higher prices.* [5]

20. NZIER, the Commission and other submissions question these assumptions. In his submission Dr Small – Covec, sets out the issue in a straightforward manner;

> *The question we addressed is the same question the Commission is addressing: whether symmetric errors have asymmetric effects and if so how the regulator should accommodate that* [6]

21. We believe that the Commission and submitters are looking for answers in the wrong places. Indeed, the 'cat is out of the bag' with respect to the inadequacy of both the evidence to support the proposed 67th percentile and the status quo. In many ways the High Court comments regarding the availability of evidence to support uplift have been confirmed by the

[3] piii Executive summary. Frontier submission

[4] p6 d) I Vector submission

[5] p1 ENA submission

[6] p2 Covec submission

conflict of arguments put forward by submitters on the back of the absence of real evidence.

2.2. A very flexible model

22. A common theme among the submissions is the ease with which they are representing the Oxera model results as the justification for a different WACC recommendation to that made by Oxera. The efforts to recast the Oxera model lead some of the submitters to cherry-pick general pieces of evidence or suggest that additional pieces of evidence are required.

23. For example Frontier Economics in their submission:

    - *alter the Dobbs loss function to make the analysis meaningful by assuming consumers have a 'maximum willingness to pay'*
    - *noted that:*

      higher maximum willingness to pay implies a higher total surplus and thus a larger welfare loss when investment is deferred. ….and

      The Electricity Authority's recent Value of Lost Load (VoLL) technical report found that the value of unserved energy tends to vary by duration of outage, location and type of customer…..
    - *compared various estimates of the maximum willingness to pay value of lost load in New Zealand and Australia and after noting the wide range settle on a point estimate of $10,000 per MWh* [7]

24. However the focus on maximum willingness to pay does not answer questions about either how willingness to pay varies across different consumers or what alternatives different consumer groups can use to mitigate the effects of outages (that is, aside from relying on EDB investment in the network). Two good next steps for the Commission in assessing Frontier and other evidence orientated submissions would be to consider how:

    - a more granular analysis of the difference in the estimated value of lost load for different consumer groups affects the estimated consumer loss. Our analysis of the work on the value of lost load suggests the average willingness to pay to avoid an outage is much lower than the maximum willingness to pay of $10,000 per MWh quoted by Frontier Economics.
    - well the Frontier Economics approach to calculating an 'optimal WACC' compares to the value of investment in reliability approach

[7] 'Application of a loss function simulation model to New Zealand A REPORT PREPARED FOR TRANSPOWER' by Frontier Economics, August 2014 p15

cited above, particularly credibly modelling how investment decisions are made.

25. Another example of critique of the Oxera model leading to a call for more evidence can be found in the HoustonKemp submission. The HoustonKemp critique of the Oxera model notes the following:

- in respect to valuing investment in reliability:

> *This is a relatively narrow approach to estimating the benefits of marginal investment projects. Network improvements address reliability concerns other than by reducing the risk of severe outages. [8] For example, the effect of investment decisions on such measures as the system average interruption duration index (SAIDI) or the system average interruption frequency index (SAIFI) may have provided more useful approaches ….* [9]

- in respect of modelling EDB response and consumer benefit from a WACC uplift:

> *However, other critical relationships in the model are subject to, what Oxera terms, 'fundamental uncertainty.' The underlying assumptions around these relationships are therefore based purely on Oxera's judgement. Such assumptions form the backbone of Oxera's analysis and relate to:*
>
> - *the sensitivity of investment decisions with respect to changes in the WACC;*
> - *the value of changes in reliability; and*
> - *the sensitivity of reliability to changes in investment.*[10]

26. To correct these issues HoustonKemp suggest that:

> *In order to move Oxera's analysis forward to the point the results will be informative for the Commission's purposes, it would be necessary to better specify the key relationships. To this end, it would be important to obtain information from network service providers that would enable the following questions to be addressed:*
>
> - *Which planned investment projects are likely to be dropped or delayed as a result of a WACC shortfall of, for example, the following amounts: 0.5, 1, 1.5 and 2 percentage points?*

[8] Op cit. p19

[9] Comment on the Commerce Commission's Proposed WACC Percentile Amendment, A Report for Powerco, 29 August 2014' by HoustonKemp Economists. p19 to p25

[10] Op cit p 22

- *What is the estimated cost of those investment projects?*
- *What would be the implications on system reliability of these investments being delayed or abandoned, both in the short-term and over time?*
- *Would these investments be expected to yield other benefits to consumers, which would be lost if the investments were not to proceed?* [11]

2.3. Investment and reliability

27. These particular submissions are on the right path in our view. There are other ways of developing empirical evidence to better inform the Commission's decision. For example, picking up on the HoustonKemp point regarding SAIDI and SAIFI and network investment, analysis down this path could proceed as follows.

28. To identify how additional investment could improve the reliability of the network, it is necessary to identify both the cause of the outage and the equipment affected. This information provides a starting point to consider whether additional EDB investment or other measures would be effective in improving network reliability.

29. The new format for the EDB Information Disclosure reports used by the Commerce Commission for the 2013 financial disclosures provides information on both the cause of disruption and the equipment involved. The disclosure reports the following data:

    - Classes of outage; for the purpose of this analysis we focus on Class C (unplanned interruptions on the network)
    - Measures of disruption;
        > system average interruption duration index (SAIDI)
        > system average interruption frequency index (SAIFI)
    - cause of class C outages measured by SAIDI and SAIFI
    - equipment involved in each outage measured by SAIDI and SAIFI
    - energy delivered (MWh) and the number of interconnection points (ICPs under each EDB pricing plan.

30. This data allows a more granular examination of how investment might improve network reliability and where this investment should occur. The following comments apply to 16 of the 17 EDBs 'price-path regulated' by the Commerce Commission.[12] We have aggregated the SAIDI and SAIFI information reported for each EDB into a total by using the following formula:

[11] Op cit p25

[12] The information was downloaded from http://www.comcom.govt.nz/regulated-industries/electricity/electricity-information-disclosure/electricity-information-disclosure-summary-and-analysis/information-disclosed-in-august-2013/. The files did not include information for Otago Net.

- Sum of the SAIDI/SAIFI data for each EDB multiplied by the number of ICPs to which the EDB supplied energy all divided by the total number of ICPs for the regulated EDBs.

31. The key insights from the data were:
    - of the total number of interruptions, 1,444 for 2013, only 801 (55 percent) of the interruptions were unplanned EDB network outages. Energy delivery was restored for 69 percent of the Class C interruptions within 3 hours
    - the duration of the average interruption for all customers in 2013 was 140 minutes of which 92 minutes (65 percent) was due to Class C interruptions
    - most of the causes of unplanned interruption to the network are due to events that it would be arguably difficult to either efficiently avoid or mitigate through additional network investment
    - distribution lines excluding low voltage lines are the equipment that is associated with the bulk of the Class C interruptions - 57 minutes (62 percent) of the average length of disruption as measured by SAIDI.
32. We have listed the information on the causes of failure and the equipment related to the failure in the network in the following table. We have also suggested a grouping of the causes and equipment according to whether it is likely to be easy or hard to avoid or mitigate these causes through investment. Our grouping is based on a qualitative judgement of whether the causes are predictable and concentrated on part of the network (easier to address efficiently with investment) or random and diffused across the network (harder to address efficiently with investment).

Table 1 Class C Cause of Outage

Duration of outage as measured by SAIDI

Harder to address through investment			
Cause of Outage	**Average duration (SAIDI)**	**Equipment Involved**	**Average duration (SAIDI)**
Lightning	1.5	Distribution lines	19.7
Vegetation	13.4	Distribution cables	2.3
Adverse weather	10.1	Distribution other	8.7
Adverse environment	0.5		
Third party interference	13.6		
Wildlife	3.6		
Human error	1.3		
Cause unknown	12.8		
Sub-total	**56.9**		**30.8**
Easier to address through investment			
Cause of Outage	**Average duration (SAIDI)**	**Equipment Involved**	**Average duration (SAIDI)**
Defective equipment	34.8	Sub-transmission lines	2.4
		Sub-transmission cables	0.0
		Sub-transmission other	0.2
Sub-total	**34.8**		**2.6**
Note: Distribution lines, cables and other all exclude "LV"			

Source: NZIER analysis of Commission data

33. Based on this grouping:
    - about 60 percent of the causes of Class C interruptions are not directly attributable to defective equipment and are therefore likely to be difficult to address efficiently through investment
    - distribution line failure is the main cause of the remaining 40 percent of Class C interruptions caused by defective equipment.
34. The data in Table 1 and our comments illustrate that the reliability problem that can be addressed efficiently by additional EDB investment (and therefore avoidance of consumer welfare loss from outages) is much more narrowly focused than the aggregate of all energy supply outages. This is important input to the assessment of those submissions that include analytics. Some of the data that is required to assess the difference that additional EDB investment could make to energy supply reliability is now publicly available and should be considered in the assessment of whether

WACC uplift is the most efficient means of encouraging EDBs to improve reliability.

35. One of the weaknesses of this data is that it relies on SAIDI, a measure that averages outages over all customers and therefore is not adjusted for the different effects of outages on different groups of consumers. We discuss this point in more detail in section 2.5.1

2.4. Criticisms of Oxera

36. Much submission attention has been directed at the Commission's use of the analytical work that Oxera provided to inform the Commission's choice of WACC percentile. The Commission rightly had the Oxera work reviewed by Ingo Vogelsang to determine if it addresses the High Court comments and if it applies a sound economic rationale. For us his main insights were;

> *While the costs to consumers form higher prices associated with a higher WACC turn out to be conceptually straightforward and measureable, the costs to consumers from a WACC below the true cost of capital are complex and, according to Oxera fraught with "fundamental" uncertainty leaving the ultimate assessment to the regulators judgement*[13]

37. This insight led him to express considerable concern about the relationships between WACC, investments, network reliability and consumer welfare;

> *While I agree that these relationships cannot (at this time) be estimated with any precision and that some judgement needs to be exercised with respect to them, one can probably come much closer by engaging the network providers in filling the gap* [14]

38. Vogelsang's views were echoed in a number of submissions. Powerco make mention of it;

> *(b) the Oxera framework leaves the fundamental relationships unquantified and the results no more than a weakly informed guess.* [15]

39. Powerco's adviser HoustonKemp was more articulate regarding the suitability of the Oxera analysis;

> *Further, Oxera's inability to provide any support for its assumptions around the fundamental relationships that it examines renders its analysis to be no better than a (weakly) informed guess. Those fundamental but unsupported relationships include:*
>
> - *The sensitivity of investment decision with respect to changes in the WACC*
> - *The value in changes to reliability, and*

[13] p1 at 4. Vogelsang

[14] P2 at 10.Vogelsang

[15] P3 at 7.8. Powerco

- *The sensitivities of reliability to changes in investment* [16]

40. In the same way as other advisors, HoustonKemp also duplicated the Oxera analysis finding only weak support a percentile range of 60th and 70th.

> *In sum, we find that Oxera's analysis is insufficiently developed to support any conclusion* [17]

2.5. Insights on the value of reliability

41. Debate about model assumptions and the use of US reference data contained in submissions is not helpful for an enduring solution – we believe that the debate has moved on from there. We now need a more evidence driven WACC IM determination, developed at a level of detail that captures the reality of the relationships between WACC – investment incentives – network reliability and consumer welfare in New Zealand.

42. The Commission's proposal is something of a game changer with respect to the 75th percentile – they have determined that the 75th is too high but the evidence they use to support their choice of the 67th percentile has been exposed as inadequate.

43. Again, picking up on the submissions like HoustonKemp and Frontier who suggested that it was the local metrics on the value of reliability that mattered, we suggest that the following could be a way forward.

44. The following figure 1 is helpful to understand how their suggestions could fit in the causal chain between WACC uplift and the impact on consumer welfare (delta W).

45. There are accepted approaches to estimating the value to consumers of supply interruptions[18,19,20,21] and by implication the 'value of reliability' investment to consumers.

[16] piii HoustonKemp

[17] piii HoustonKemp.

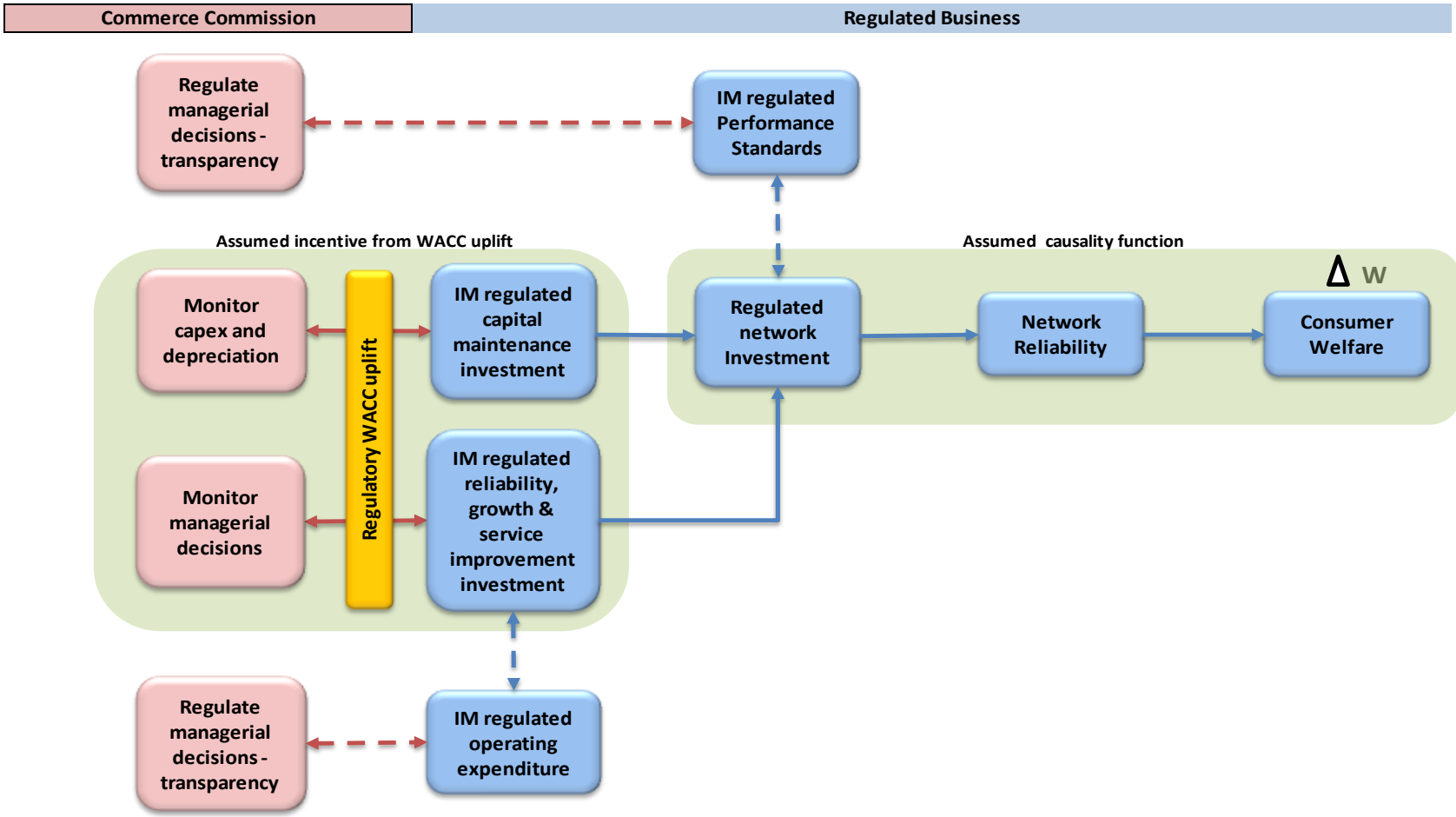
[18] See 'Estimated Value of Service Reliability for Electric Utility Customers in the United States' prepared for the Office of Electricity Delivery and Energy Reliability U.S. Department of Energy by Principle Authors Michael J. Sullivan, Ph.D., Matthew Mercurio, Ph.D., Josh Schellenberg, M.A Freeman, Sullivan & Co, dated June 2009 for a detailed study of the data bases available and the approach used in the USA.

[19] See 'The Development of Renewable Energies and Supply Security: A Trade-Off Analysis', Röpke, Luise (2013) : Ifo Working Paper, No. 151 for a simplified approach to the estimation of the value of lost load that uses SAIDI data similar to the data that is publicly available for the New Zealand market.

[20] See 'Cost of power interruption to electricity consumers in the US', LaCommare, Eto (2006) : prepared for the Assistant Secretary of Energy Efficiency and Renewable Energy. U.S. Department of Energy and published in Energy: The International Journal, and

[21] Refer http://web.stanford.edu/~ayurukog/main_infrastructure.pdf.

Figure 1 Where WACC uplift fits in the causal chain (Scope of the issue)



Source: NZIER

46. The 'Estimated Value of Service Reliability' paper prepared for the US Department of Energy:

    - notes that value based reliability planning has been used for more than 20 years to estimate multiple elements of investment in generation and distribution assets including assessing the benefits of:
    - transmission system reliability reinforcements
    - distribution system reinforcements
    - describes their work in combining the results of multiple cost of interruption surveys into a meta dataset on customer willingness to pay to avoid energy outages.
    - estimate customer 'damage' functions22 from these datasets, based on the following format :
    - interruption attributes such as duration, season, time of day and day of the week
    - customer characteristics such as type, size, business hours, sensitivity of business equipment to interruption and access to back-up equipment
    - environmental attributes such as temperature, humidity, frequency of adverse weather events etc.

47. The publicly available data for New Zealand EDBs aggregates data on the duration and customer group affected by outages into single measures such as SAIDI and SAIFI which are too general for us to adopt the approach used in the US DoE paper.

48. To illustrate how this analysis could proceed we have adopted a simple approach of combining Value of Lost Load data (VoLL), originally prepared by the Electricity Authority, with EDB disclosure data on SAIDI and SAIFI, numbers of connections and total energy supplied. This analysis illustrates an approach to estimating the value of reliability investment by New Zealand EDBs that uses data from the New Zealand market rather than relying on the extrapolation of the ballpark estimates of the total economic cost of catastrophic failure in the USA.

49. NZIER's recent update of this VoLL data for NZ[23], plus the Commission's own recent network data can be used in this manner in section 2.5.1 below to estimate the value that an interruption would have across different classes of consumers in aggregate and for a per minute of outage.[24]

[22] This is their version of a 'loss function'.

[23] Client report to Electricity Authority 2012 VoLL survey update. The EA have not published NZIER's report though they have published a detailed report, Investigation into the Value of Lost Load in New Zealand, Report on methodology and key findings, 23rd July 2013, refer http://www.ea.govt.nz/development/work-programme/transmission-distribution/investigation-of-the-value-of-lost-load/

[24] The survey traversed a wide content, including the extent to which the consumers relied on energy, their usage and the outage mitigation steps that they had in place. We think that, if there is a bias of error in the results of the survey, it would probably be toward overstatement of losses because some of the large users surveyed have in place mitigation measures which reduce the likelihood of loss to a level they probably already consider optimal.

2.5.1. An approach to valuing reliability

50. Table 2 below describes this approach. Class of customer is defined by the EDB disclosure data (connection point orientated rather than market defined) as is the number of customers, while the remaining inputs are as described by the output data from the NZIER 2012 VoLL survey update;

    - Load weighted average $ value of outage (we tested the max and min range as well)
    - SAIFI and SAIDI data from the survey that is best aligned to the network actual (survey SAIDI was 180 mins vs 140 mins actual for 2013)
    - Customer load at the time of the outage (MWh for larger businesses and average load per event for medium and small customers)

51. The remaining columns in table 2 are the calculated values of an outage by customer class and total overall ($279m), plus the value per minute of outage for individual customers.

Table 2 Valuing network outages

Class of customer	# of customers	Load weighted value of outage (mean)	Average outage, SAIDI & SAIFI	Total Value of outage	Value per minute per ICP
Largest 5 ICP's	5	$203,754 /MWh	180 mins/1.4	$19,866,015	$16,979
Large ICP's	28	$11,740 /MWh	180 mins/1.5	$7,396,200	$978
Medium conn' points	137,182	$98 /outage	60 mins/3.0	$215,100,889	$26.13
Small conn' points	1,506,974	$6.08 /outage	60 mins/3.0	$36,649,615	$0.41
Total	1,644,246			$279,012,720	$2.60

Source: Commission reliability data, NZIER Voll update.

52. As a reality check we compared these results with two of the studies that we referenced earlier and we are satisfied that this is a sensible approach. One of the US studies estimated a mean per-minute loss at USD$2.48 for a 30 minute outage in 2013 which compares well with our $2.60.[25]

53. This result is not to be directly compared to the Oxera 'damage to the economy' estimate because each is prepared from a different perspective and with a different purpose in mind.[26] We are at a more granular level using in-network New Zealand data and, as discussed, we are more

[25] There are well known difficulties with using VoLL data to derive point estimates as the range of responses to these surveys can be influenced by the questions posed. The spread of responses illustrates this point. Also these surveys nearly always deliver outliers which do not fit with models developed from weight-averaged point estimates and have to be handled in a manner that is appropriate to the purpose of the research.

[26] Despite saying this we are satisfied that the orders of magnitude of the welfare loss from outages is nowhere near the $1b+ estimate that Oxera extrapolated from major US network failure events.

interested in identifying the scale and scope of linkages in the causal chain to shed some light on whether WACC + uplift is an appropriate intervention to incentivise network reliability. We think not.

2.5.2. Analysis and sensitivity

54. Putting aside outliers for a moment this analysis is important because it illustrates the diversity in the value that is placed on lost load by consumer groups. For instance small connection points (pretty much residential) place a very low value on outages – 41 cents per minute of outage. There is of course a range around this mean that depends on the length of outage and obviously there is a range across all residential customers. The point here is that the loss values adopted for use in submissions are just not reflective of the real world New Zealand situation.

55. The small value for the largest group of customers makes for a challenging cost-benefit justification for network investment in reliability. However, we observe that given most outages occur in the distribution network that connects residences to the higher voltage sub-transmission network, it may be most efficient for networks business to continue to commit opex to outage recovery on an as-required basis in the low voltage network. Applying a general WACC uplift to all new capex and the existing assets in the RAB, justified on the basis of reliability improvements may leave residential consumers paying twice – once for the operational cost of outage recovery and a second time for a WACC uplift to all new and old capex that is of only a very small value to them.

56. At the other end of the scale large commercial and industrial consumers place a high value on outages and (generally but not always) have standby generation capability to cover the outage event. It may well also be that a portion of their high valuation is being subsidised by other consumer classes, however to avoid problems of free-riding and/or others paying too much, there is a need to extend this work to get a better understanding of the effects by consumer type, their geographic location and their approach to mitigating the effect of outages.

57. The data on the EDB network reliability published by the Commerce Commission and the value of lost load studies completed by the Electricity Authority suggest that the two key building blocks for an assessment of the 'business case' for additional reliability investment by way of an uplift in WACC in the New Zealand EDB networks are available to the Commission. The discussion in the papers we have cited 'Estimated Value of Service Reliability for Electric Utility Customers in the United States' and 'Cost of power interruption to electricity consumers in the US' outline a proven approach to assessing the case for reliability investment.

2.6. Choice of welfare standard

58. We note again the debate about the appropriate welfare standard against which to assess the cost-benefit analysis of the effects of WACC mis-

estimation. Our views were well expressed in our previous advice to MEUG and have been echoed by Dr Small of Covec in his advices to BARNZ.

59. In their submission Covec echo an important observation by Vogelsang who was circumspect;

> *in respect of the weights that apply to each of these (consumer welfare and total welfare) standards.* [27]

60. Covec agree with Vogelsang;

> *There are some obvious rationales for circumspection, such as the diversity of assets to which the WACC applies and the consequent barriers to accurate estimation of an optimal percentile*

61. Some submissions argued against the Commission's interpretation of the appropriate welfare standard and suggested that the Commission's sole focus should on the efficiency of the energy sector and that distributional matters should left to central government[28].

> *there is ultimately no way to distinguish between welfare impacts upon producers and consumers. In any event, there are more efficient vehicles to redistribute income than through regulatory policy, as the New Zealand Treasury has observed*

62. Dr Small had a different view on this matter;

> *Arguments in favour of a total surplus standard tend to talk in general terms about the "size of the pie" in order to avoid sharp questions over the division of the pie. In regulated sectors, inelastic demand dictates that there are strict limits on the size of the pie and forces one to focus on its division* [29]

63. We agree with Dr Small. Frontier Economics assessment and recommendations re WACC uplift (charge consumers because they have inelastic demand, that is, no-where else to go for electricity supply) are akin to Ramsey pricing which is not dissimilar to monopoly pricing – the very practice regulation is trying to moderate.[30]

2.7. The level of optimal investment matters

64. We agree with submissions that identified this as fundamental to the process of sorting out the relationships between investment incentives and consumer welfare over time that we referred to above.

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[27] See Covec p2.

[28] 'Economic Review of Draft Decision on the WACC Percentile, A REPORT FOR NZ AIRPORTS, August 2014' by Competition Economists GroupP21, paragraph 69

[29] P4 Covec.

[30] There are a significant number of consumers with an income constraint which, for them, renders the implied demand curve in the Frontier analysis impractical.

65. Our submission of 29 August[31] pointed the Commission to existing data and the makings of a process that could help them work through an assessment of this issue. As stated earlier in this submission, the data on the EDB network reliability published by the Commerce Commission and the value of lost studies completed by the Electricity Authority suggest that the two key building blocks for an assessment of the 'business case' for additional reliability investment by way of an uplift in WACC in the New Zealand EDB networks are available to the Commission.

[31] See 'Changing the WACC percentile' NZIER advice to MEUG 29 August 2014.

3. Summary

66. We repeat again one of the conclusions from our report to 29 August MEUG;

> *the fundamental point is that the Commission needs to adopt a more structured and disciplined way for thinking about its own rule-making under uncertainty. The current approach – to estimate WACC and add an adjuster motivated largely by intuition – is too ad- hoc to promote certainty.*

67. This brief cross-submission has served to confirm this conclusion - the debate about what constitutes evidence regarding WACC uplift, and the lack of empirical evidence to support uplift remains.

68. The attempts to develop analytical models that could inform the High Court concerns in the absence of evidence have also failed to provide support for WACC uplift.

69. This is a good thing in some ways and allows the Commission to start afresh with the WACC IM right now, but with the big advantage of knowing much more than it did in 2010 when the IM's were put in place.

70. Picking up on suggestions from submissions, we have put forward a structured approach that can be further developed to inform the fresh start and we believe that the Commission should be prepared to take a fresh look at where and how the WACC IM fits in the regulatory framework for the energy sector.

71. While they go about that work we remain unconvinced that a WACC at anything other than the mid-point is the way to go at this stage.