Submission on Input Methodologies Review Invitation to Contribute to Problem Definition

Unison Networks Limited

24 August 2015

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1. INTRODUCTION AND EXECUTIVE SUMMARY

1.1 Opening comment

1. Unison welcomes the opportunity to submit on "problems" that may be addressed in the review of Input Methodologies ("IMs") in response to the Commission's consultation paper *Input Methodologies review: Invitation to contribute to problem definition*. Unison has contributed to the development of ENA's submission and agrees with its recommendations.

2. Overall, Unison submits that this new step in the Commission's process – to develop a problem definition – is a very positive one. We agree that the IM Review process should be narrowly focussed on features of the IMs that may be detracting from achievement of the Part 4 policy objectives, although this should not be to the exclusion of ensuring that errors or ambiguities in the initial IMs are addressed. Review processes to deal with policy issues separately from more administrative or clarity issues would be appropriate.

3. In this submission we restrict our comments to key matters of interest to Unison.

1.2 Executive Summary

4. Overall, Unison considers that the non-CPP IMs have generally worked well and provide a generally more certain environment for establishing the key elements of the building blocks that under-pin price-setting under DPPs and CPPs. The Orion CPP experience has provided valuable lessons that can be incorporated into IM amendments to make the CPP process more effective, and there seems to be significant common ground between the Commission and EDBs about the types of improvements that can be made.

5. It is clear that the existing IMs, particularly as they relate to the components of the building blocks model, have been suitable for an environment where EDBs are assumed to have an enduring monopoly, such that cost recovery can occur over the expected physical lifetimes of investments (often 40-plus years) and there is low risk associated with pushing cost recovery into the future through inflation indexation of the regulatory asset base ("RAB").

6. Although the IMs have generally worked well, nevertheless, Unison submits that in the context of emerging technologies, such as solar PV, consumer-side battery storage and ongoing developments in energy management and appliance energy efficiency, a key focus for the IM review should be to ensure that some of the key policy settings or assumptions underpinning current building blocks methods are reviewed to determine whether they remain fit-for-purpose. In particular, Unison submits that two key related areas require attention:

   a) The weighted average price cap approach in combination with the DPP approach to tariff structure changes makes it risky for EDBs to change their tariff structures. This is because any behavioural response by consumers to new structures which leads to lower revenues cannot be addressed within the regulatory period. Tariff reform is vital in the context of emerging technologies and is in the long-term interests of consumers, as there are currently excessive marginal price signals to invest in grid alternatives such as solar PV. Because high proportions of revenues are subject to volumetric charges, this leaves shareholders in the short term (where volumes fall short of DPP forecasts) and other

consumers in the long term (DPP resets recalibrate prices to lower volumes) to contribute more to funding the grid than those investing in alternatives. Unison does not have a strong view that revenue cap regulation is necessarily the right solution to this particular problem, but recommends that the Commission evaluate the pros and cons of different forms of control to determine an optimal approach to enabling tariff restructuring;

b) Notwithstanding the potential for tariff-reform to better signal the costs of network services and therefore improve consumers' potential evaluation of emerging technologies, Unison submits that there is high probability that battery storage, solar PV, appliance efficiency and energy management systems will make it economic for consumers to significantly reduce their demand on distribution networks within a 10 to 20 year window. By "economic" we mean that those technologies will be competitive with wholesale electricity costs, not just at "grid parity". While it is unlikely that many consumers would seek to go off-grid, given the substantial reliability benefits provided by grid-supplies, we expect distributors' commercial models to be severely challenged, particularly given the requirement for distributors to offer low fixed charge tariff options to domestic users, who make up a substantial proportion of the customer base.

Unison submits that the Commission needs to undertake research on the efficiency impacts of different revenue recovery (cashflow) profiles under credible scenarios of technology uptake. This research would determine whether it would be in consumers' long term interests to tilt the recovery of costs towards recovering more now and less later, when the derived demand curve facing EDBs is likely to become smaller and more elastic.

7. Unison also perceives the following "problems" that should be examined in the review:

a) The approach to revenue recovery following a catastrophic event does not meet the "expected NPV=0 principle". EDBs bear the risk of revenue losses until a CPP has been implemented, and potentially beyond if there is a substantial decline in the customer base. EDBs are unable to insure this risk, there have been no allowances in DPP demand forecasts (which are based on projecting historical trends, not expected demand allowing for the potential for catastrophes), and no allowance in setting the WACC. The Commission has mis-interpreted the role of investor diversification in discounting the need to compensate businesses for the risk of such events. We recommend that the Commission take further expert advice on this matter and develop an option that ensures the expected NPV=0 rule is met;

b) Absence of incentives for innovation and development of smart networks. Unison submits that there are likely to be significant long-term benefits to consumers from EDBs investing in smart grid technologies to increase asset utilisation, defer replacement investments and better manage growth-driven expenditure. Unison's experience is that there are significant up-front expenditure and investment requirements to enable smart-grid solutions, particularly in "back-office" systems and processes. Because the pay-offs from the development of smart-grid solutions will largely occur in future regulatory periods, EDBs are penalised from spending opex and capex above conventional spend requirements in the short-term and have no ability to recoup benefits of lower capex in future because prices track actual capex, not avoided capex. Unison submits that the Commission should consider further development of incentives, potentially under the IRIS umbrella or section

54Q type incentives that allow cost recovery for R&D and business development initiatives linked to development of smart grids;

c) Related to development of smart-grids, EDBs need to have incentives to make efficient opex and capex trade-offs. Unison submits that in the longer-term consumers are likely to be better off if emerging technologies can be well-integrated with grid solutions. There are likely to be significant option values associated with EDBs seeking to maintain their assets more intensively or in funding demand-side initiatives in preference to committing capital to new assets, whose capacity may not be required in the medium to longer term. The Commission should revisit its IRIS methodologies to ensure that there are not barriers to efficient capex-opex trade-offs.

8. In terms of process for the IM Review, the ENA has submitted[1]:

> *4 The ENA notes there is plenty of time available in this IM review process for detailed stakeholder engagement and we recommend the Commission uses this time to work with us to ensure the draft decisions are well developed.*
>
> *5 The best means of progressing through the next phase of the IM review will vary for each issue. Options include:*
>
> *a) Working groups of representatives or experts to carry out further analysis of potential problems and develop options and solutions on key topics*
>
> *b) Improving the use of experts by all parties, including making terms of reference for experts publicly available and establishing a process where the expert advisors of all parties, including the Commission, come together to identify areas of agreement and disagreement.*

9. Unison submits that issues arising from emerging technologies, including the form of control and research to establish whether it is in the long-term interests of consumers to alter cash-flow profiles would be amenable to a working-group type approach, supported by suitably qualified experts and involving consumer representatives.

1.3 Summary of recommendations

10. The following table summarises Unison's recommendations:

Issue / problem	Recommendations
Uneven access to emerging technologies will result in unit price increases for consumers who cannot access those technologies	Develop options for consideration that facilitate EDBs making price changes to better signal the value of alternatives. This would include consideration of different forms of control (e.g., revenue caps) or amendments to the DPP provisions relating to tariff restructures, which

[1] ENA (2015) *Response to the Commerce Commission's Input Methodologies review paper: Invitation to contribute to problem definition* paragraphs 4-5

Issue / problem	Recommendations
	immunise EDBs and their customers from revenue changes resulting from a tariff restructure.
The risk that emerging technologies will prevent EDBs from recovering the full value of their investments, leading to under-investment	Undertake research into the welfare/efficiency effects of increasing charges on consumers under credible scenarios of emerging technology uptake, under different scenarios of RAB recovery (e.g., faster depreciation, non-indexation of RAB).
EDBs may be discouraged from making optimal trade-offs between capex and opex under the IRIS mechanisms	Customer-side technologies (especially cost-efficient battery storage) potentially offer significant network benefits in the longer term. In the interim, EDBs should not face any undue incentives to incur higher levels of opex if this can avoid sunk asset investments that may not be required in the longer-term. The Commission should consider whether there are improvements to be made to the IRIS mechanisms or whether "totex" may be a more appropriate concept to apply in future.
The "expected NPV=0 rule" is not met under the Commission's approach to revenue losses following a catastrophic event	There is no *ex ante* or *ex post* compensation for revenue losses following an extreme event until a CPP application is approved (and potentially beyond). EDB's are unable to obtain insurance for business interruption insurance on their "transmission and distribution" assets (poles, wires, under-ground cables) so bear this risk without compensation. We recommend that the Commission take further expert advice on this matter and develop an option that ensures the expected NPV=0 rule is met.
There may not be sufficient incentives for EDBs to invest in new technology (smart grid) solutions that have pay-offs beyond the end of the regulatory period	The Commission develop approaches which incentivise EDBs to invest in R&D, systems and processes to enable smart-grid solutions to be deployed to reduce capital expenditure over the longer term by improving the ability to increase capacity utilisation or defer investment. An EDB would incur losses if they pre-emptively invest in the necessary systems and capability to deliver smart solutions that have pay-offs in future regulatory periods.
The treatment of disposals and forecasting approach in the DPP may not create the right incentives	The RAB IMs require assets to be removed from the RAB when no longer retained by the business. In the DPP forecasts, allowance is made for losses on disposals of assets which is based on historical levels of disposals. This was an expedient and practical approach to forecasting disposals, however, where a network

Issue / problem	Recommendations
	experiences a major disposal (e.g., associated with higher volumes of work, or replacement of a major item) the loss on disposal may exceed historical averages and therefore the expected NPV=0 approach would not be met. Although disposals are not highly material to the level of MAR, Unison submits the Commission should consider whether it may be preferable to retain disposed assets in the RAB until they become fully depreciated, or consider other approaches to ensure EDBs are able to realise the full value of their assets.
Consistency of related party transaction rules for commissioned assets and opex that are workable under different business structures	The related party transaction rules for valuing assets and services (opex) acquired from a related party are different between the IMs and ID. Some options are available under the IMs but not under ID and vice versa. The rules should ensure that a consistent approach can be applied across capex and opex and ensure that the rules are sufficiently flexible to recognise different business models (e.g., where a related party provides components of commissioned assets only, such as labour).

1.4 Structure of this submission

11. Unison's submission is set out as follows:

a) In section two we make brief comments on the framework for the review and the advice provided by Russell McVeagh, which accompanies the ENA submission;

b) In section three we address the challenges posed by emerging technologies to the existing IMs; and

c) In section four, we cover a small number of other issues with the existing IMs that we submit should be addressed in the review.

2. DECISION-MAKING FRAMEWORK

2.1 Role and importance of the existing input methodologies

12. As Unison has previously submitted[2], it is critical that there is a clear framework for the IM Review, so that stakeholders can understand the basis for making changes to the IMs over time. A clear framework would contribute to improved predictability of the regime and certainty over time.

13. Unison has read the advice from Russell McVeagh to ENA and New Zealand Airports Association and agrees with the approaches and recommendations outlined in the advice. In particular, we agree with the recommendations set out in paragraph 6:

> *6. In relation to the decision-making framework, our key recommendations are:*
>
> *(a) To further develop the principles to be applied before a current IM (the starting point) is changed. We agree with the Commission that the framework will necessarily be high level so it can be generally applied (that is, it cannot be formulaic or a "tick box" exercise). However, in order to be capable of meaningful application, the principles need to be sufficiently defined and understood.*
>
> *(b) We agree that the IMs should only be changed if it can be demonstrated that doing so would be better at meeting the relevant purpose statements. A key consideration will be the impact of change on the Part 4 purpose statements.*
>
> *(c) We agree that defining the policy intent underpinning the IMs should provide the starting point for review, where changes in reasoning and approach can undermine regulatory certainty and the Part 4 purposes.*
>
> *(d) At a minimum, we consider it would be helpful for the Commission to further develop the framework for assessing the impact of change against the Part 4 purposes as follows:*
>
> *(i) clearly define the "policy intent" underlying the IMs, as the core economic principles underlying the IMs when they were determined and the reasoning set out in applicable IM reasons papers;*
>
> *(ii) restate and set out (as the starting point for the consultation);*
>
> *(aa) the core economic principles that applied when the IMs were determined (representing the basis of the regulatory compact); and*
>
> *(bb) the key reasons underlying an IM that is a focus of the review (from the IM reasons paper / IM consultation process).*

14. Unison endorses the view that the existing IMs for EDBs and the associated reasons paper establish the regulatory compact between EDBs, the Commission and consumers. Decisions to change IMs need to be with reference to the existing IMs, so that confidence and certainty is promoted. From Unison's perspective, the key elements of the existing IMs are as follows:

[2] Unison (2015) *Unison Response To Open Letter On Scope, Timing, Focus Of Review Of Input Methodologies* 31 March 2015

a) Expected NPV=0 or, equivalently, EDBs should expect to make normal returns on their investments and recover their costs. This is a necessary condition to there are incentives for EDBs to invest;

b) To achieve a), investors are provided with a low rate of return, reflecting a low risk approach to rolling forward the regulatory asset base ("RAB"). This low risk approach includes;

i. Including new assets at cost in the RAB;

ii. No *ex post* efficiency or prudency test; and

iii. Stranded assets remain in the RAB.

c) Cost allocation rules that enable EDBs to achieve economies of scale and scope in other activities up to a level of materiality, before those economies must be shared with consumers.

d) *Ex post* recovery of costs of responding to catastrophic events that cause EDBs to incur additional costs beyond that allowed in a DPP.

15. Unison submits that the principles above provide an anchoring point for considering changes. If it was considered that changes to the IMs would be necessary to achieve the objectives of Part 4 regulation, then that change would need to be consistent with the expectations established under the policy settings above. To use a hypothetical example: suppose in the long-term it was considered appropriate to shift the balance of risk allocation so that stranding risk was to be borne by investors. Clearly this would require a lift in the WACC to compensate investors for such risk-bearing, but at the point of policy change any existing stranded assets would still need to be recovered from consumers to remain consistent with the expected NPV=0 principle. The Commission would not be free to require EDBs to bear the costs of existing stranded assets, as this would be inconsistent with past expectations.

3. EMERGING TECHNOLOGIES

3.1 Overview

16. As noted in Unison's presentation to the IM Review Problem Definition Forum, emerging technologies, particularly solar PV and battery storage, whilst generally[3] not economic now, have high probability of becoming economic within the expected lifetimes of distribution assets. Battery storage at the household level, in particular, is likely to significantly challenge EDBs' commercial models, because it will enable consumers to store energy in low-priced periods and consume it when prices are high. While battery storage is also likely to provide significant network benefits in the longer term if this capacity is "firm", i.e., always available for discharge during network peaks, it will still significantly challenge EDBs' commercial models in recovering the costs of sunk network capacity.

17. In light of emerging technologies, Unison submits that there are two related problems that the Commission needs to address in the IM Review:

a) The immediate priority is for EDBs to restructure existing tariffs to residential consumers, so they face better signals of the relative economic benefits of emerging technologies, particularly solar PV; and

b) But even with tariff restructuring, in the longer term there is a material risk that consumers will have economic opportunities to reduce their reliance on the grid. As a result, the Commission needs to determine whether it is in the long-term interests of consumers to tilt EDBs' cost recovery so that more revenues are recovered in the short term and less in the long-term (remaining consistent with the expected NPV=0 rule).

18. These issues are addressed in the following two sections.

3.2 Enabling EDBs to restructure their tariffs

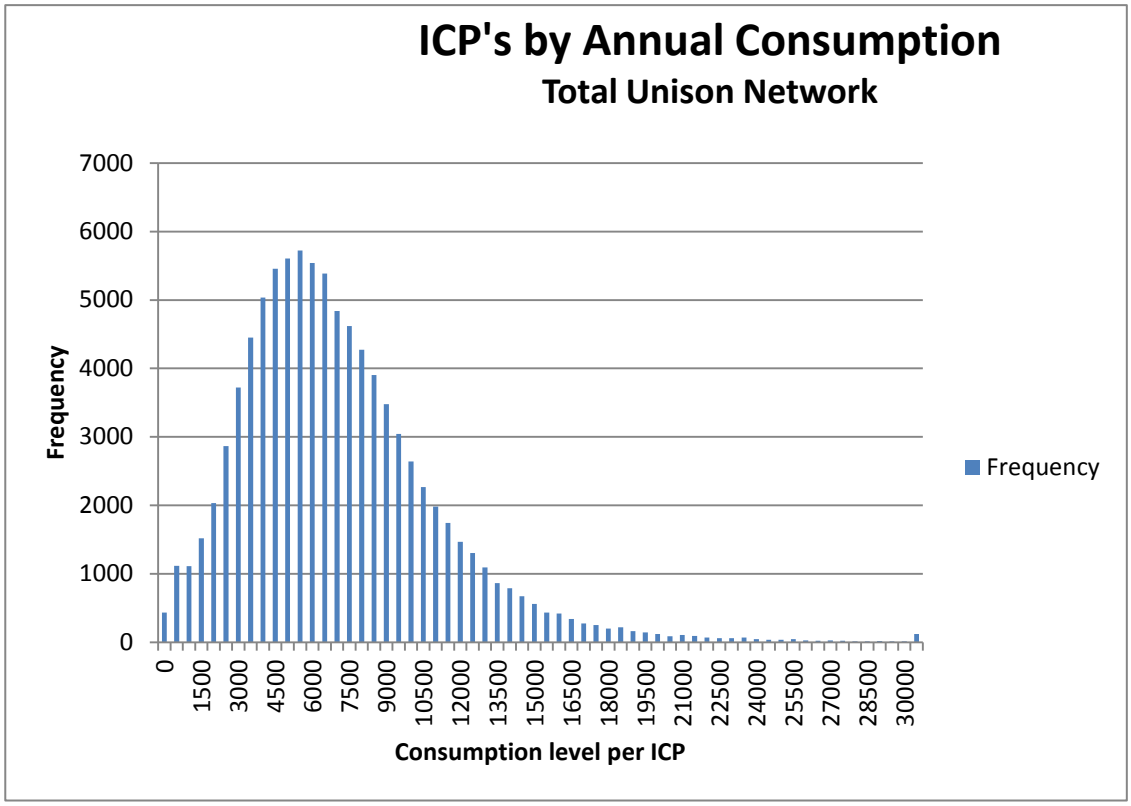
19. Like most New Zealand EDBs, Unison bases its charges on individual's consumption, using flat-rate tariff structures for residential and small commercial consumers. Historically, there has been little option but to use such approaches, as meter technologies did not provide information on time of consumption. However, smart meters have become more affordable and it is now possible to establish more cost-reflective tariff structures for smaller consumers.

20. A significant factor affecting all EDBs and retailers is the requirement[4] to offer a low fixed charge tariff (LFCT) option of no more than 15 c/day for EDBs and a further 15 c/day for retailers to domestic consumers at their primary place of residence. The remainder of the tariff must be variable. The LFCT option is applicable to a substantial proportion of Unison's customers (all those consuming less than 8,000 kWh per annum) as shown in the following figure:

[3] They may be economic in sparsely populated areas when network assets come to be renewed.

[4] Electricity (Low Fixed Charge Tariff Option for Domestic Consumers) Regulations 2004 ("LFCT Regulations")

Figure 1: Number of residential consumers per consumption band on Unison's networks



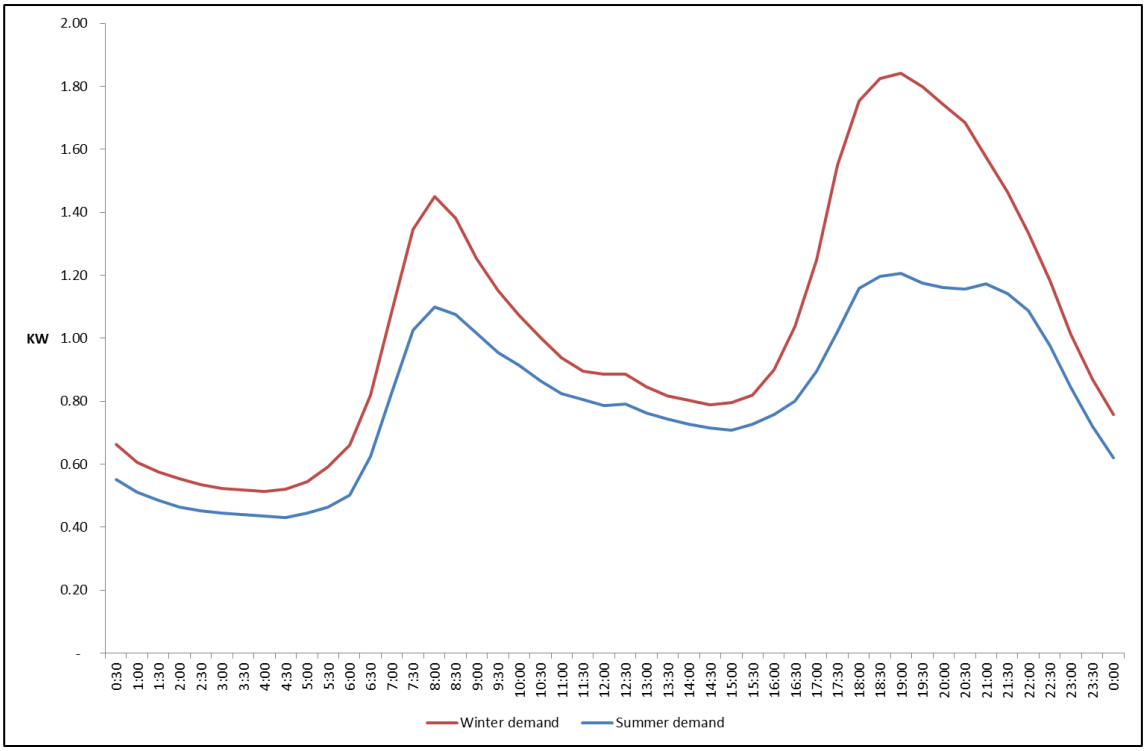
21. In consequence, in the Hawke's Bay region, on the cheapest plan that we have been able to observe a consumer currently faces a marginal price signal of 25.6 c/kWh[5]. This compares to average wholesale electricity prices of potentially around 8-10c/kWh, which represents something closer to the true marginal cost of producing and delivering an extra unit of electricity.

22. As a result of these high variable charges, consumers currently face excessive price signals to invest in alternatives. In recent times, solar PV has reduced significantly in price, and there are numerous installers indicating overall cost reductions if consumers install panels. At a variable price of 25.6 c/kWh, solar may well be privately profitable for an individual, but from an economic perspective, in most cases is net welfare reducing for New Zealand, because the consumer is largely avoiding contributions to fixed costs of EDBs and Transpower, in particular.

23. Given the constraint of the LFCT Regulations, which prevents the increasing of fixed charges, EDBs need to consider alternative options. These include setting "time-of-use tariffs" so that prices are high when the network is most heavily utilised (generally weekday mornings and evenings in winter), and low when the networks are lightly loaded (generally during the middle of the day and late-night/early morning in summer) as illustrated in the following chart:

[5] Sourced from powerswitch.co.nz on 21 August 2015.

Figure 2: Residential electricity use profile



24. EDBs are permitted to unilaterally restructure their tariffs under the IMs and other non-Part 4 regulatory arrangements, apart from adhering to the constraints of the LFCT Regulations. As noted above, some form of time of use tariff arrangement (whether based on through-put or demand and potentially seasonal) is likely to send a better signal of network costs, which are materially influenced by peak demand requirements in winter. This would reduce the strength of the price signal that consumers face to invest in solar PV, which generates most in summer and typically during off-peak periods. However, by strengthening peak price signals, consumers would then face incentives to move discretionary demand to off-peak periods or invest in other alternatives, such as gas for space heating and/or water heating.

25. Under weighted average price cap regulation which is required under the IMs, and under the tariff restructuring rules set in the 2015 DPP Determination[6], EDBs are not permitted to take into account behavioural responses when restructuring tariffs. As a result, if consumers change their behaviour in response to tariff changes, EDBs are unable to recoup any foregone revenues. This creates a barrier to restructuring, which is not likely to be in consumers' long-term interests.

26. Potential solutions to this problem are to develop a mechanism within the DPP to allow EDBs to take into account behavioural responses in restructuring tariffs, or to change the form of control to revenue cap regulation, which would eliminate EDBs concerns about undertaking tariff restructuring. Revenue cap regulation may have other advantages in eliminating the potential for volume forecast error in resetting DPPs.

6 Electricity Distribution Services Default Price-Quality Path Determination 2015, clauses 8.7-8.10

27. Unison submits that the Commission should accept as a "problem" for the IM Review, that the current weighted-average price cap regime, in combination with the DPP tariff restructuring rules creates a barrier for EDBs to restructure their tariffs. Unison recommends that the Commission investigate a range of potential solutions to effectively eliminate this barrier. It is in the long-term interests of consumers for EDBs to be able to set more cost-reflective tariffs.

3.3 Long-term impacts of emerging technologies

28. Given the global pressures to reduce carbon emissions, there is significant and ongoing research into developing cost effective renewable technologies. This research has seen the costs of solar PV plummet.[7] Similarly, battery storage, which is complementary to solar PV by allowing time-shifting of generation to match demand, has reduced substantially in cost and improved in efficacy. The risk to EDBs is that in the medium to long-term consumers have access to economically viable alternative technologies that enable significant proportions of consumers to reduce their reliance on networks and potentially to reduce their grid-related electricity costs.

29. Ideally, the "haves" (e.g., people with batteries and/or solar, or other alternatives to reduce their use of the grid) and the "have-nots" (those without due to locational or economic circumstances) would be treated equally in their contributions to the fixed and sunk costs of the grid. To achieve this outcome there would be reasonably high proportions of fixed charges with peak related price signals, where necessary, to signal capacity constraints.

30. However, such efficient price structures for electricity are politically unpopular. Despite widespread concern about the impacts of the LFCT Regulations we understand there is no political appetite to even analyse whether there is a problem with the Regulations, let alone consider solutions. As noted above, the LFCT Regulations force EDBs to use variable rates in some form to recover costs, and accordingly, residential consumers have incentives and increasing ability to respond, thereby shifting costs on to others.

31. Unison submits that the economic impact of uptake of alternative technologies in the long-term is potentially three-fold:

a) There is potential for excess network capacity in the longer-term as EDBs invest to meet short-to-medium term demands, before consumers start to invest in alternatives. Assets are not likely to be stranded in the sense that they are not used, but may exceed the longer-term capacity requirements of consumers. This was demonstrated in Orion's presentation to the Forum, where they illustrated that battery storage could reduce network capacity requirements by around 20% under one scenario of uptake;[8]

b) Rising unit prices and charges for those without access to grid alternatives because relatively fixed revenue requirements are spread over shrinking volumes (whether they be volumes through the network or demand/capacity requirements); and

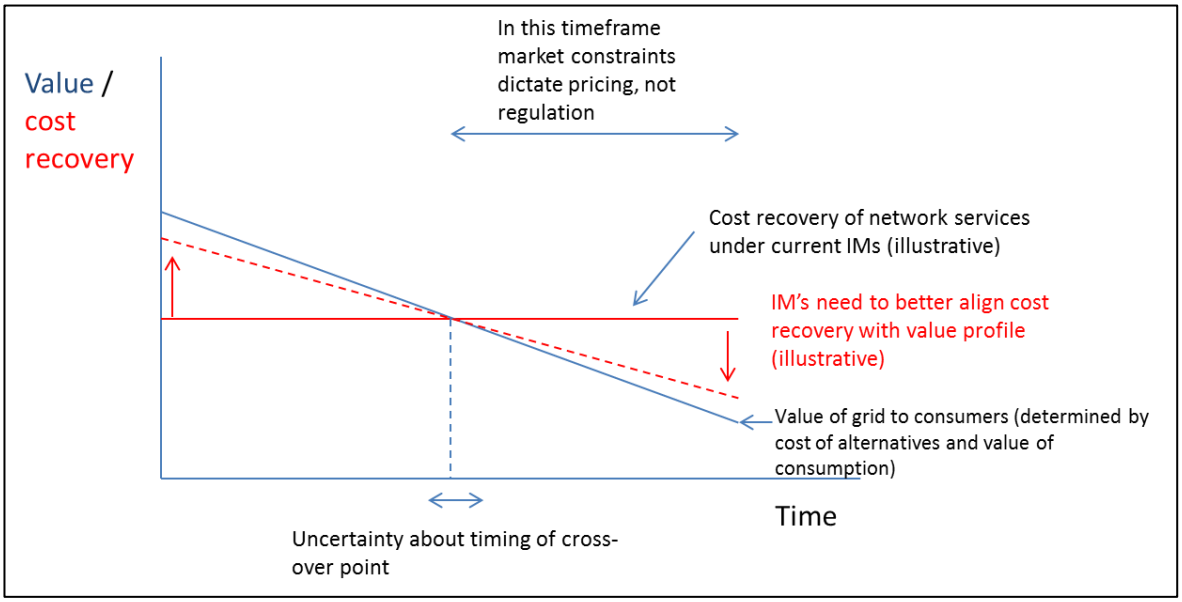
[7] See, for example, page 8 of Smart Grid Forum's presentation to the IM Problem Definition Forum. http://www.comcom.govt.nz/dmsdocument/13490

[8] See page 6 of Orion's presentation to the IM Problem Definition Forum, http://www.comcom.govt.nz/dmsdocument/13488

c) Reluctance of EDBs to invest in long-lived assets, even though they may be the most economic solutions to consumers' short-to-medium term capacity requirements and consumers would be willing to pay for those investments. Reluctance would result from lack of confidence that revenues would be sufficient over the longer term to cover the costs of new investments.

32. Unison's concern is that network tariffs will ultimately be constrained by market forces which do not allow for full RAB recovery, but in the interim returns/depreciation are constrained by regulation based on recovery rates linked to expected physical asset lives. This is illustrated in the following figure:

Figure 3: Cost recovery profiles need to align to customer value proposition



33. Unison submits that the Commission should undertake research/modelling work to ascertain whether it is in consumers' long term interests to bring forward recovery of the RAB starting in the 2020-2025 regulatory period, rather than wait for the regulatory period commencing in 2025, which is the earliest point that the next IM review would impact on revenues/prices.

34. Research would involve modelling revenue requirements, unit prices and the welfare effects over time of credible scenarios of consumers taking up alternative technologies. Modelling would need to track expenditure according to asset management plans as we note that there is already long-term price pressure resulting from flat or declining demands, but nominal investment requirements exceeding nominal depreciation of assets. For example, over the past five years capital expenditure has exceeded depreciation by a factor of 1.4:1, implying growing revenue requirements to fund growing RAB values.

35. In assessing welfare impacts, the Commission should also consider how incentives to invest may be affected if EDBs legitimately perceive a material risk that revenue recovery may be compromised in the longer-term. While Unison has not yet finalised strategy in light of the threats posed by emerging technology, options to manage the risk include:

a) Shifting investment requirements to new customers (e.g., higher capital contributions). This is not necessarily efficient if EDBs have lower cost of capital or better access to credit compared to consumers;

b) Use of exit fees, capacity downgrade fees or other compensation payments for customers if certain demand levels are not achieved or maintained;

c) Maintaining assets beyond the end of their economic lives to avoid making further sunk and potentially unrecoverable capital investment decisions, as opex is more likely to be recoverable in the short term;

d) Moratoria on new connections or capacity upgrades in areas where network security requirements would be exceeded by new connections' capacity requirements;

e) Reducing network security and reliability;

f) Shifting the cost recovery burden to customers with higher load-factors and less ability to use alternative technologies;

g) Requiring more customer types to enter into long-term contracts as a condition of connection; and/or

h) Procuring demand-response to avoid growth investments. While in many cases this may be efficient if the value of foregone or deferred consumption is less than the cost of additional network capacity, there is also a risk to consumers that the costs of demand-response could be excessive when it may be more cost-effective for investments to be made in network capacity.

36. Unison stresses that while we need to consider the merits of the options above to better manage emerging technology risks, none of these options are Unison policy.

37. Overall, Unison submits that the Commission needs to look at the long-term impacts of emerging technologies through two lenses:

a) Would aggregate consumer welfare be improved by adjusting the rate at which investment costs are recovered, due to Ramsey pricing type considerations applied over time?

b) What impact would there be on investment incentives and welfare if regulatory depreciation rates do not match investors' expectations?

Should the Commission wait to see what happens?

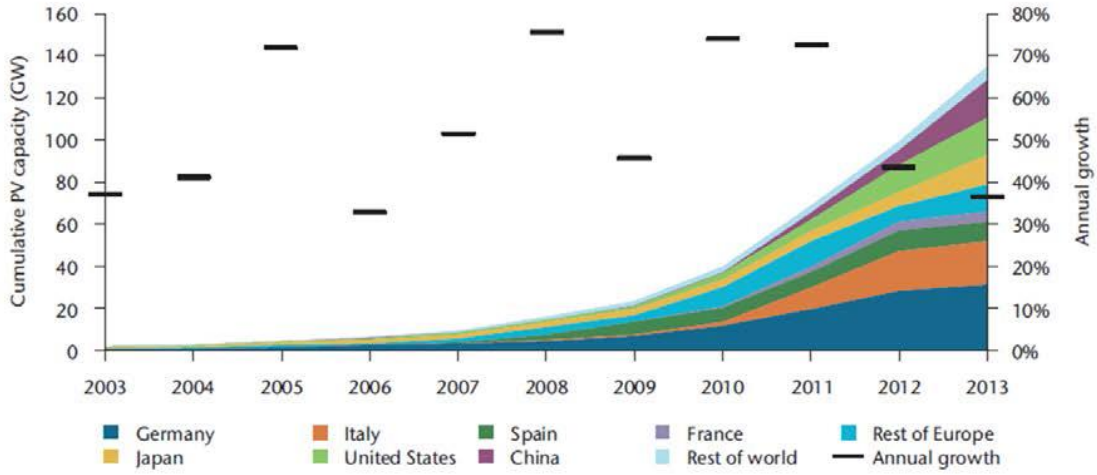
38. A likely consideration in whether to change the rate of cost recovery is to assess whether waiting to see how emerging technologies develop in price and efficacy would be the best approach? Unison submits that it is not possible for EDBs to wait, as we are required to make investment decisions now that will have implications for revenue requirements for 40-plus years. It would not be possible, for example, to tell consumers to wait 10 years for a connection until we find out whether solar and batteries would reduce investment

requirements. Accordingly, Unison submits that the concept of "waiting" to make a decision on the expected impacts of emerging technologies is illusory. In making a decision to wait, there is an implicit decision that there is zero risk that, by waiting, it will still be possible to react quickly enough in future to accelerate cost recovery to ensure the NPV=0 criterion is met. To the extent that there is mis-alignment between the IM approach to cost recovery and EDB's expectations, then inevitably there would be an impact on investment incentives.

39. In considering the risks of waiting to see what happens with emerging technologies, it is also relevant to note that the rate of technology uptake for technologies such as solar can be extremely rapid. The Australian experience was that the rate of investment in solar substantially exceeded expectations and that a $10 billion excessive investment in solar has now been booked with policy-settings only recently adjusting to diminish the effects of the substantial investments in solar on the "have-nots".[9] If the Commission does not act before the 2020 reset process begins, then it will be 2025 before any adjustment can flow through into regulated prices in the 2025 DPP reset.

40. The following figure highlights the substantial growth rates in solar PV capacity, to illustrate how quickly uptake can occur when consumers determine it is privately profitable to invest in solar.

Figure 4: Cumulative growth of solar PV capacity (source: International Energy Agency)



41. Unison also notes that any decision to alter cash-flow profiles would remain consistent with NPV=0. Even if a decision to tilt EDBs cash-flows turned out to be wrong, EDBs would not earn any additional revenues or profits over the life-time of the assets. Bringing forward cash-flows relative to the status quo approach, would however, counter-act EDBs perception of risk in making further network investments.

42. Unison also observes that Transpower by virtue of its guaranteed revenue recovery and non-indexed asset base already receives a relative cash-flow advantage compared to EDBs that presumably the Commission implicitly considers is in the long-term interests of consumers.

9 See Wood, T., Blowers, D., & Chisholm, C. (2015). *Sundown, sunrise: how Australia can finally get solar power right.* Grattan Institute. Retrieved from http://grattan.edu.au/wp-content/uploads/2015/05/822-sundown-sunrise5.pdf

We understand that non-indexation of Transpower's RAB was to assist its cash-flows during its large capex programme, however, this requirement has passed. If the same non-indexation regime applied to EDBs, Unison calculates that there would be an initial 13% improvement in cashflow in the first regulatory period following change relative to an indexed approach, which would reduce over time as a non-indexed RAB would grow at a slower rate.

43. It may be preferable to continue inflation indexation of the RAB, but bring forward cash-flows by increasing the rate of depreciation of assets. For illustrative purposes, we have calculated that to achieve the same 13% increase in cash-flow profile over the current regulatory period using a faster rate of depreciation on new and existing assets, Unison's existing assets would be depreciated over 15.7 years (down from 23.1 years average remaining life) and new assets would be depreciated over 30 years (down from 44 years). To provide further context, under current depreciation rates Unison's RAB is projected to grow to $661 million from $521 million at the start of the 2015 regulatory period, but under faster depreciation as set out above, the RAB would grow to $575 million in nominal terms, or effectively flat in real terms.

44. Unison submits that this analysis demonstrates some useful points:

a) Given capex to depreciation ratios, Unison (like most distributors) is facing the prospect of an increasing RAB. This is in spite of efforts to use smart grid technologies to reduce investment requirements. The increasing RAB is in part due to new assets being more expensive in nominal terms than the legacy assets. This implies increasing unit rates in future if demand stays relatively flat, or declines. We expect this is likely to be common to many EDBs. Changing depreciation rates can allow for price smoothing over time;

b) The increase in depreciation rates to generate equivalent cash-flow profiles as Transpower enjoys through non-indexation of the RAB leads to reasonable outcomes. Depreciating existing assets over 16 years instead of 23 and new assets over 30 years instead of 44 still spreads the recovery of asset costs over lengthy timeframes.

45. This analysis was conducted using the DPP reset model and only looked at simulated effects over the current regulatory period. Extending the model to examine outcomes over a longer timeframe, say to 2030, would allow further insights into the effect on BBAR/MAR and the RAB over time of faster depreciation or changes to the indexation approach.

What should be assumed about the external (non-Part 4) regulatory environment?

46. As noted above, the Commission needs to consider both the commercial/market environment as well as regulatory constraints on EDBs. The LFCT Regulations are the most constraining on EDBs' responses to emerging technologies, by limiting more efficient tariff structures. We also understand that MBIE has no mandate to review the Regulations and politically it is not seen as desirable to review them. While we think that the risks to consumers and EDBs posed by emerging technologies could be much better managed if it were permissible to set higher proportions of fixed charges, for the purposes of the IM Review Unison submits that the Commission is obliged to take into account prevailing Regulations and, only if there is a clear signalled intention for those Regulations to be changed, would it be reasonable to assume that there would likely be change.

47. Accordingly, Unison submits that the Commission would need to assess changes to the IM's, particularly in relation to the merits of bringing forward cash-flows relative to the status quo, based on current or clearly signalled Government policy.

Overall statement of problem definition regarding emerging technologies

48. The following paragraphs set out Unison's views on statements of problem definition with respect to emerging technologies.

a) Emerging technologies make it essential for EDBs to set more cost-reflective prices. While broad-based, flat-rate tariff structures have served the industry well in the past in efficiently recovering sunk costs, technologies such as solar PV, combined with battery storage will make such tariff structures ineffective in efficiently and equitably recovering costs. The **problem** with the existing IMs relating to the form of control (weighted average price cap) (and DPP approach to price structure changes) is that they do not promote tariff reform because of the downside revenue risks associated with behavioural responses to tariff structures changes. Unison **recommends** that the Commission examine the form of control to ensure there are no disincentives for tariff reform.[10]

b) Because of the requirement under the LFCT Regulations to variabilise high proportions of residential tariffs, regardless of tariff approach consumers will have increasing incentives and ability to reduce their charges. As a result, it will become increasingly difficult for EDBs and the Commission to accurately forecast future volumes, giving rise to potentially inaccurate price paths which may over or under-recover required revenues. The **problem** with the existing IMs is that the WAPC approach and lack of adjustment mechanism for forecast errors in the DPP may lead to under or over-recovery of BBAR. Unison **recommends** the Commission examine the form of control and other possible approaches to address potential for likely increases in forecasting inaccuracy.

c) Emerging technologies have potential to reduce consumers' willingness to pay for distribution services over the medium to long term. Efficient pricing considerations suggest that it would likely be in consumers long term interests to ensure that cost-recovery (i.e., cash-flow) profiles maximise consumer welfare by aligning cash-flows to willingness to pay. The demand curve for distribution services is likely to become smaller and more elastic. The potential **problem** with the IMs is that, through the combination of RAB indexation and using straight-line depreciation of assets over expected physical lifetimes, this assumes that consumers have the same willingness to pay for network services over time. Unison **recommends** that the Commission undertake empirical research to determine the optimal rate of cost recovery which maximises economic efficiency in light of credible scenarios of network revenue requirements, unit prices for network services and alternative and conventional technology uptake rates.

[10] Related to this, Unison also submits that as an independent regulator, the Commission should also consider using its "Summary and Analysis" role to explain the long-term benefits to consumers of tariff reform in ensuring that the existing sunk grid is utilised effectively in minimising New Zealand's total investment in achieving its energy needs.

49. For each of these problems Unison recommends that the Commission consider a working group approach with clear terms of reference and supported by experts, as a means of bringing industry practical knowledge together to establish robust and informed analysis to bear.

4. OTHER MATTERS

4.1 Treatment of reduced revenues following a catastrophic event

50. Unison submits that under the current DPP approach and CPP IMs, the expected NPV = 0 principle is not met because EDBs face the uncompensated risk of experiencing lower than forecast demand as a result of a catastrophic event. There is currently no compensation in the WACC IM or specific cash-flow allowances under DPPs for the risk of lower revenues following a catastrophic event up to the time a CPP is implemented.

51. The Commission's final decision on the WACC percentile for price-quality regulation rejected the proposition that an increment to the WACC should be applied in order to account for the risk associated with catastrophic events. The Commission concluded that catastrophic events and other asymmetric risks would be best dealt with through cash flows rather than making an additional allowance to the WACC. However, in establishing the 2015 DPP reset, no allowance was made for the risk of lower demand following a catastrophic event.

52. We understand the Commission's reasoning in respect of the residual demand risk that Orion was not able to recover, to be that consumers should not have to bear all of the risks associated with catastrophic events as investors are better able to diversify investments and manage demand risk. The Commission reasoned that the impact of the earthquakes would have only had a minor effect on a diversified investor.

53. Unison submits that the Commission has not correctly assessed the role of investor diversification in determining the current policy position. The discussion of asymmetric cash flow risks in the Commission's WACC percentile final decision did not address the fact that diversification does not make the costs to the business disappear. Unison submits that the contention that there would only be a minor impact on a diversified investor, and such an investor would require minimal or no compensation for bearing such risks is incorrect as a matter of finance theory. The Orion experience shows clearly that diversification will not make investors whole. The loss to Orion from the earthquake did not translate into equivalent gains by another distributor; instead there was a severe one-way impact on demand.

54. Accordingly, Unison submits that the Commission should obtain further expert advice on how investors can be kept whole in when exposed to demand risk events such as following a catastrophic event.

4.2 Incentives to invest in smart grid solutions

55. New technologies are not just assisting consumers reduce their costs. Smart grids offer EDBs the ability to reduce or defer capital expenditure by improving capacity utilisation and enabling EDBs to extend the lives of assets by making condition-based replacement decisions rather than age-based decisions.

56. Commencing in 2010, Unison embarked on a significant programme of business development and smart grid investment to improve investment efficiency. Relative to conventional asset investment approaches, Unison calculated an $80 million NPV benefit over thirty years. However, to develop a smart grid requires significant up-front investment in systems,

processes and network monitoring and communications technologies in order to realise benefits, which will occur over the long term and certainly outside of a single regulatory period. These upfront investments resulted in material costs, which have largely caused Unison to exceed the forecast opex allowances in the first DPP period.

57. Accordingly, Unison submits that under the current regulatory approach, which relies heavily on projections of what each EDB will spend in each regulatory period, based upon past trends and baselines, will generally discourage EDBs from investing in research and development and innovation. We note that Unison's investment in smart grid was in spite of regulation, not because of it. Community ownership was a large factor in Unison having the mandate to invest in more efficient approaches. But on purely commercial considerations it would not be warranted for EDBs to invest in smart grids under the current IMs, because additional expenditure on R&D and innovation above the DPP allowances will prevent EDBs from realising the regulatory WACC.

58. One option for EDBs wanting to invest in developing a smart grid is to apply for a CPP. However, as smart grids are an industry-wide opportunity, Unison submits that all EDBs need to be subject to a DPP regime which enables appropriate levels of R&D and innovation expenditure. Accordingly, Unison submits that the Commission accept as a problem under the existing IMs that:

a) There is no regulatory incentive to invest in research and development or innovation where the pay-offs occur outside a five-year regulatory period. The Commission should consider mechanisms whereby EDBs can be compensated for such investments.

4.3 Incentives to make efficient trade-offs between capex and opex

59. Under DPP regulation, expenditure allowances are based on separate forecasts of operating and capital expenditure. These are complemented by the IRIS mechanisms that seek to ensure time consistent incentives to realise capital and operating expenditure efficiencies. Additionally, where EDBs undertake energy efficiency or demand-side management activities, EDBs may seek the Commission's approval to recover foregone revenues.

60. Given the potential for consumers in the longer-term to reduce their reliance on the grid, especially once battery storage becomes economically viable, it will become increasingly important for EDBs to be able to consider efficient trade-offs between opex and capex. For example, it may well be worth procuring demand-response, or maintain assets more intensively in order to defer or avoid making long-term sunk investments in growth capex. If the DPP approach and IRIS mechanisms do not allow for opex and capex trade-offs, then EDBs may be discouraged from making efficient investment decisions.

61. It is also important to recognise that trade-offs need not be on a dollar-for-dollar basis. For example, an EDB might spend more on opex (demand-response) in the short-term than the annualised capital cost of additional capacity, in order to create a potentially valuable option to avoid further sunk investment or reduce the scale of the investment.

62. Unison submits that the Commission accept as a "problem" under the existing IMs that it is likely to become increasing important that EDBs face incentives to make efficient trade-offs

between capex and opex. Unison recommends that the Commission investigate whether the existing approach to forecasting capex and opex in resetting DPPs, and the associated IRIS mechanisms are effective in promoting efficient trade-offs, and if not, develop potential options to address this problem.

4.4 Treatment of asset disposals in the IMs

63. Under the RAB IMs, assets disposed of before the end of their physical lives are removed from the RAB, with gains or losses on disposals recorded against income. Under the DPP forecasting approach, the Commission forecast losses on disposals based on historical averages, effectively assuming that disposals are relatively constant over time.

64. However, this approach to disposals disadvantages EDBs facing significant one-off type disposals, with the extent of the disadvantage dependent on the timing of disposals and whether the forecasting approach remains constant from regulatory period to regulatory period. EDBs may be encouraged therefore not to dispose of assets, where possible, to ensure that they do not suffer losses beyond what was provided for in the DPP reset.

65. Unison submits that the Commission should examine whether there are alternative approaches to "truing up" for differences between actual and forecast disposals, in order to achieve the NPV=0 rule, or to reconsider the IMs relating to asset disposals, for example, by allowing for the retention of disposed assets in the RAB.

4.5 Related party transactions

66. Related party transaction rules apply under the Commissioned Asset IM for asset-related transactions and separately for opex under Information Disclosure Regulation. The following table highlights the inconsistency between the rules:

Approach	Capex work	Opex work
Arms-length equivalents		
Price is similar to substantially similar works in past three years adjusted for inflation	✓	✓
Competitively tendered	✓	✓
Market value	✓	×
Direct cost plus 17.2%	×	✓

Director certification that prices are as would be in arm's length transaction (as last resort)	✓	✓
Cost-based methods		
Inventory value	✓	×
Depreciated historic cost	✓	×
Direct cost (as if consolidated)	✓	✓
Nil value if no other option can be exercised	✓	✓

67. Unison notes that the ability to consolidate the overhead expenses of a related party contractor is not formally provided for in the Input Methodologies or ID Determination, but the Commission has provided guidance that consistency allows for complete consolidation of the contractor, not just the direct costs associated with operating and capital works.

68. Unison submits that the related party transaction rules need to be made consistent across capex and opex and ensure that they are practical to apply in a range of circumstances where related parties provide different types of services. For example, Unison's related party contracting business provides labour services only, with Unison supplying materials at free issue for installation. The market valuation rules permit only market valuation of the labour component, but it would be more practical and internally consistent to value the entire project.

69. Unison submits that a focussed working group with EDBs that currently apply the related party IM and ID rules may be the most effective way of identifying all the current problems with the rules and potential solutions.