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Keeping the energy flowing

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Ministry of Business, Innovation & Employment
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WELLINGTON

Submission on draft Electricity Demand and Generation Scenarios

This document comprises our submission on the draft Electricity Demand and Generation Scenarios (EDGS) published by the Ministry of Business, Innovation & Employment (MBIE) and dated 2 April 2015.

We appreciate the opportunity to comment. The EDGS effectively replace the Electricity Commission's Statement of Opportunities (SoO), which was last published in 2010. The SoO scenarios are now quite dated so we appreciate MBIE's work in developing new scenarios in this area.

Our responses to your specific questions are attached as Appendix 1. However, we take the opportunity in this letter to comment more generally on the draft EDGS.

As pointed out in the draft document, the EDGS are produced for the primary purpose of evaluating new transmission investment. The fact that some parties may use the scenarios for other purposes, it should not divert emphasis away from the primary purpose of the EDGS. As you note, we are required, under the Commerce Commission's (Commission) Capex IM, to base our investment analysis on the EDGS. We may vary the EDGS if we consider they are unsuitable for a particular investment or purpose, but are required to justify such variations to the Commission. The Commission may reject our investment proposals if they do not agree that our EDGS variations are justified.

Our experience with the SoO has led to some important observations that should be accounted for in the development of the EDGS:

Scenarios should reflect variability – no-one can predict the future, so the scenarios should not attempt to be forecasts. Rather they should represent relatively different possible futures which can be used to "stress test" the need for new transmission investment. Where information is available that suggests one or other scenario is more likely than another, the scenario weightings can be used to represent that likelihood.

The SoO scenarios dated quickly – demand forecasts in the published SoOs were valid for 12 months at most. New demand information is available each year and it is important to incorporate that information into the current forecasts. The generation build forecasts also dated quickly, as generation companies changed their investment plans.

Generation build forecasts were balanced nationally but not regionally – the Electricity Commission developed and used the Generation Expansion Model (GEM) for deriving generation build schedules. This model does a good job of ensuring that new generation is balanced on a national basis, but it does not concern itself with new generation on a regional basis. Many of our transmission investment analyses are concerned with a particular region of New Zealand (e.g. Bay of Plenty) and the scenarios need to reflect a range of possible generation futures for that region.

These observations led us to promote a format for the SoO replacement whereby the scenarios included the GEM inputs (list of potential new generation projects, gas prices, carbon prices, etc), but did not go as far as including GEM outputs (new generation build schedules). These inputs could be used, along with the most current information in regard to new short term generation changes, demand, etc to develop a set of specific scenarios relevant to the investment being considered.

The draft EDGS do not reflect those views and hence we will need to review and revise the scenarios whenever they are used. MBIE has gone to a lot of trouble to publish a set of scenarios and explain how they compare to one another, but the outputs will need to be reviewed for each and every major capex investigation.

High and low demand and the early exit of Tiwai are better treated as sensitivities – we agree that it is important that demand uncertainties are considered in making investment decisions. However, the mechanism through which we do this already exists. In applying the Investment Test, within the Capex IM, we are required to demonstrate that the investment results are robust to changes in levels of forecast demand. In the past we have done this by considering varying levels of demand across multiple scenarios. This provides a clear basis for assessing the influence of varying levels of demand growth on the results of the Investment Test.

At present the high and low demand scenarios presented in the draft EDGS are based on only the mixed renewables scenario. Hence, their inclusion tends to weight the assumptions associated with the mixed renewables scenario higher than other scenarios, and the weighted result is limited in its consideration of demand uncertainty.

With regard to Tiwai we note that there is currently a high level of uncertainty about the future level of production, and particularly the timing around any decision to reduce or shut down production. At present the scenarios reflect a 12.5% chance that it will shut down from 2017, a 25% chance it will operate at 400 MW from 2017, and a 62.5% chance that it will continue in perpetuity. We do not understand how this view was formed but consider, given the significance of Tiwai, that it should be explained in greater detail.

Our view is that major demand uncertainty, at least the early shut down or reduced demand from Tiwai, is better treated as a sensitivity, so as not to potentially trigger early investment. There is also some latitude to consider that Tiwai will not operate in perpetuity in other scenarios.

Technology is changing quickly – during the time that MBIE have been developing the draft EDGS, there have been significant developments in some technologies that will undoubtedly affect the future need for transmission services, but that are not well reflected in the draft EDGS. For example, the costs of solar photo voltaic panels (PVs) are reducing rapidly and research into electric vehicles means that battery

(electricity storage) costs are also reducing rapidly. Almost every day there is a new report, or media release, about the potential for solar PV and storage to significantly affect the industry.

The draft EDGS appear to reflect conservative (low) estimates for solar PV/storage uptake. We believe the draft EDGS view is somewhat dated and should reflect more recent estimates of such uptake.

We note that the Smart Grid Forum (SGF) has developed a "disruptive technology" scenario for its own work which is more aligned with mainstream thinking. We suggest that this should be included as an EDGS scenario. Without it, we will have difficulty (without extensively modifying all EDGS scenarios) justifying any transmission investment required in order to enable such a future. If, as the future unfolds, the likelihood of such a scenario changes, we can control how influential it is in our analyses by varying the scenario weightings, i.e. apply a higher weighting if it looks likely, or a lower weighting if it appears unlikely.

The discussion above includes a mixture of changes to the EDGS. Some could be incorporated in the EDGS before they are finalised, whilst some are changes that should be considered for the next version of EDGS.

For clarity, we summarise our recommended changes as follows:

Proposed change	Proposed timeframe
Change EDGS to be tables of GEM drivers only	Next version of EDGS
Publish scenarios which are more "stress tests" than forecasts	Next version of EDGS
Remove demand scenarios	Final version of this EDGS
Remove Tiwai scenarios	Final version of this EDGS
Include SGF "disruptive technology" scenario	Final version of this EDGS

We would be happy to discuss any aspect of this submission with MBIE staff and once again, we appreciate the opportunity to comment.

Yours sincerely

Stephen Jay
General Manager Grid Development

Appendix 1 – Responses to MBIE's specific questions

Organisation name	Transpower New Zealand Limited
Submitter name (on behalf):	Stephen Jay
Date	15th May 2015

#	Question	Response
1	Do you agree with this description of the purpose of the EDGS, including the material in the appendix?	The document conveys some confusion about the role of the EDGS. The EDGS are for Transpower and the Commerce Commission, for investment planning purposes and should be constructed to meet those requirements. Other parties may have an interest in the EDGS, but their requirements should not carry any weight in putting the EDGS together.
2	In the absence of regional and prudent peak demand projections being a part of the EDGS, the Ministry would like to ask for your feedback on the best way to independently verify regional and prudent peak demand projections.	We support the view that we produce peak demand forecasts avoiding the need for unnecessary duplication. We consider that MBIE could take on an audit role of our peak demand forecasts focusing on the "reasonableness" of our forecasts and approach. We note that the growth rates associated with our national expected peak demand forecast is similar to MBIE's national energy growth rates associated with the mixed renewables scenario. We believe this is suggestive that our forecasts are within a reasonable range, and goes some way to validating our approach. It is worth pointing out that at the start of each major investment investigation we release a consultation paper that sets out the assumptions we intend to use for an investment. This includes the peak demand forecast. A recent example, associated with our Central Park to Wilton B line, can be found here: https://www.transpower.co.nz/sites/default/files/uncontrolled_docs/CPK-WILlonglistandRFIconsultationFINAL.pdf We encourage interested parties to submit on the assumptions we intend to use to ensure we have gathered all relevant information. This process allows interested parties an opportunity to comment on our demand forecasts in the context of the investment need, as does the Commerce Commission's consultation processes. Our forecasting methodology is publically available and we welcome comments on our approach: https://www.transpower.co.nz/sites/default/files/plain-page/attachments/Transpower%20National-Regional%20Peak%20Demand%20Forecasts%20Feb-2015%20Information%20Document.pdf We reiterate our support of the use of demand sensitivities within the

		investment decision making process of a major capex project as a means of testing our investment decisions in the midst of uncertainty about future levels of demand growth. We update our forecasts annually. We anticipate producing new forecasts later this year once the winter peak period has passed.
3	Do you agree that the key uncertainties identified in this section, and the proposed eight equally weighted scenarios, sufficiently represent overall uncertainty for the purpose of the EDGS?	Overall, the scenarios appear to represent a relatively narrow range of possible future outcomes. As noted above, we would prefer that scenarios 5 to 8 are considered as sensitivities. The proposed eight, equally-weighted scenarios, put too much emphasis on the mixed renewables generation mix.
4	Do you have any specific feedback on the proposed EDGS capital cost assumptions which are sourced primarily from the PB generation data update 2011?	The PB report is now four years old. Are there any plans to update capital cost assumptions in the future? For well-established technologies the difference may be small but for those that are earlier in the learning cost-curve the difference could be quite significant. The consultation guide states that solar PV uptake is modelled outside GEM but it is unclear if this is a cost-driven model or not. If the model is cost-driven, could MBIE provide the cost forecast for solar PV?
5	Is the variation in key assumptions consistent with the scenario design and future	As outlined above, we believe that scenarios should reflect a broader range of possible futures to stress-test the need for new transmission investment. The variation in key assumptions is only partly consistent with future uncertainty. In particular, we think the following drivers could have a broader range: • Base demand growth – whether treated as sensitivities or scenarios • Uptake of solar PV – see response to question 7

	uncertainty?	• Uptake of electric vehicles – see response to question 7 • Huntly units retirement dates – see response to question 9 • Uptake of battery storage
6	Given the current flat demand environment, should we put more weighting on low demand growth scenarios?	There is a considerable amount of uncertainty in demand growth at the moment. This emphasises the need to undertake sensitivity analysis using a range of demand growth assumptions that is broad enough to capture the range of uncertainty.
7	Does the high uptake of electric vehicles (and Solar PV) that are used in our Global Low Carbon Emissions scenario adequately reflect future uncertainty?	**Electric vehicles** We consider that there is more uncertainty than currently reflected in the draft EDGS. Most of the scenarios (7 of the 8) assume that just 4.9% of the light fleet new vehicle entrants will be electric in 2040. While this is significant in relation to the 2014 share of electric vehicles of about 0.2% of new light fleet entrants, it is very conservative in comparison to more "extreme" opinions. Tony Seba[1] suggests that virtually all new light vehicles will be electric by 2030. Even MBIE's high uptake assumption of 43.8% of the new fleet entrants being electric by 2040 looks relatively conservative in relation to more extreme views. We consider there is room to vary these assumptions more significantly to better take into account uncertainties about the future uptake of electric vehicles. **Solar PV** Again we consider there is more uncertainty than currently reflected in the draft EDGS. We note that 6 of the 8 scenarios assume medium distributed solar uptake. This sees 248 MW of solar being installed by 2050. One scenario assumes low uptake of just 124 MW and one high uptake of 1200 MW. The possible range of solar uptake is much wider. For example, account should be taken of the work undertaken by the Smart Grid Forum that models in its "High Uptake of New Technology" scenario that 2000+ MW of solar PV is installed by 2050.

[1] http://www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=11294060

8	Should we put more weighting on the low gas availability option given the current level of oil prices?	This is not clear. We note that higher levels of solar and electric vehicle uptake could place sustained downwards pressure on oil prices. However, what weighting is appropriate will depend on the investment being analysed and the relevant regional generation options.
9	Does the range of retirement for the Huntly units across the scenarios adequately reflect the associated uncertainty?	We cannot comment on the commercial decisions of Genesis Energy over the retirement of Huntly. However, we note that the range from 2017-2021 for the remaining coal units over all scenarios appears relatively compressed. From a transmission investment perspective, the location of Huntly – or baseload generation built to replace it – can be very significant to flows on the core gird in the upper North Island. Therefore, it is important that MBIE capture the full range of retirement scenarios in the EDGS.
10	Are there any comments on the build schedules or other key results published in this document and the accompanying excel files?	Future uptake of electricity storage (i.e. batteries) is of key interest to us. We note very little is said about this within the draft EDGS. To interpret and apply the EDGS we require knowledge of where new generation is built. While it is clear where generation is being built within GEM it is not clear where a few hundred MW of embedded generation, particularly geothermal, wind and hydro, is built outside GEM. We note that Nova's Junction Road plant does not appear to have been included in the build schedules. We also note Mighty River Power's recent announcement regarding Southdown is not reflected in the build schedules http://www.mightyriver.co.nz/Media-Centre/Latest-News/Renewables-growth-behind-closure-of-Southdown-ther.aspx

If you wish to make any further comments or suggestions please include them below:

We would be interested to hear of MBIE's view regarding the review and update of the EDGS. As noted above, our experience is that the scenarios and assumptions could date relatively quickly. Therefore, a periodic update will be required.