Submission to the
Australian Energy Market Operator
for the Integrated System Plan Consultation of Dec. 2017

Submission prepared by Climate Rescue of Wagga Inc., 1 February 2018

We applaud the forward thinking of AEMO's Integrated System Plan Consultation (ISP) paper. We thank AEMO for its determination to facilitate the transformation of the energy landscape in the highest interest of Australian consumers, with recognition of the rapid rise of renewable generation, storage technologies, demand management and distributed energy resources.

The ISP paper invites submissions on several questions, which include (1.2):

- "Recognising the time limitations to produce the first ISP in mid-2018, are these suitable scenarios to address at a high level?"
- "Should these be expanded in more detailed analysis following the first high level ISP?"

This submission from Climate Rescue of Wagga Wagga Inc. is to address the above questions.

The AEMO ISP paper includes three scenarios. Two of these scenarios apply a proportionate share for the National Electricity Market (NEM) of the current governmental target of reducing emissions by 28% from 2005 levels by 2030. The other scenario ('Fast change') is built on the recognition that for the broader Australian energy sector to meet the 28% emission reduction target, and to aim to limit temperature rise to 2°C above pre-industrial levels, electricity emissions will have to reduce much more sharply; the scenario targets NEM emission reductions from 2005 levels of 52% by 2030 and 90% by 2050.

We encourage AEMO to include a scenario that models more ambition, aiming toward limiting temperature rise to 1.5°C as per the Paris Agreement signatories' commitment to "pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels". Such a scenario may:

- assist in the recognition of different approaches that may prove advantageous in terms of economics and reliability as well as climate change mitigation
- prepare the nation for a possible increase in international and national ambition in the face of accelerated renewable technology cost reductions and possible public reactions to increasingly obvious climate change effects.

A number of credible reports provide evidence of the economic benefits of a 1.5°C trajectory. Among these are the CSIRO Electricity Network Transformation Roadmap (2017), which indicates that a scenario in which the "electricity sector achieves zero net emissions by 2050"[1], with a focus on distributed energy resources, is likely to save hundreds of dollars per family per annum compared to less ambitious scenarios. In addition the "100% Renewable for Australia" report (2016) from the Institute for Sustainable Futures at UTS concludes that the "transition to a 100% renewable energy system by 2050 is both technically possible and economically viable in the long term."[2] The ANU report "100% renewable electricity in Australia" finds that the levelised cost of electricity for a 100%

[1] CSIRO and Energy Networks Australia (2017), Electricity Network Transformation Roadmap: Final Report, p. iv, http://www.energynetworks.com.au/sites/default/files/entr_final_report_web.pdf

[2] Teske, S., Dominish, E., Ison, N. and Maras, K. (2016), 100% Renewable Energy for Australia – Decarbonising Australia's Energy Sector within one Generation. Report prepared by ISF for GetUp! and Solar Citizens, March 2016.

renewable system, including costs for balancing of intermittency, to be AU$75/MWh[3], which is below the average wholesale price for electricity in 2017.[4]

A scenario aligning the reduction of all Australian emissions to the Paris Agreement commitment to limiting temperature rise to 1.5°C would involve the electrification of a higher proportion of the energy needs of Australia and turning to renewable sources for thermal processes in industry, including renewably generated hydrogen. Beyond Zero Emissions suggests that an Australian very low emission scenario would result in an increase in electricity demand of over 40% (even with energy efficiency measures), due to the "electrification of transport as well as residential, commercial, and industrial heating."[5]

The ISP Fast Change scenario does anticipate an increase in electricity demand over the long term due to some electrification of other heating and industrial processes and increased numbers of electric vehicles. This is reflected in the growth of demand in one scenario in Figure 26 of Appendix A of the ISP. However, the growth in electricity demand suggested by the Beyond Zero Emissions report appears to be nearly double the percentage of the demand increase anticipated in the ISP modelling for the Fast Change scenario.

An underestimate of future electricity demand could mean that the capacity of transmission developed from the ISP Renewable Energy Zones to metropolitan areas is not as high as needed for the growth in demand. Hence the most economical development opportunity for transmission could be missed. On p. 15 the ISP paper asks "What are the least-regret generation and transmission developments which are most robust to different futures?" We believe that insufficient anticipation of increased demand due to the electrification of transport and heating poses a risk for the planning of the least regret generation and transmission developments.

As the AEMO consultation paper notes (p. 14), the ISP will provide analysis "of how capturing diverse renewable generation profiles across the NEM may reduce the need for other types of development, thereby minimising the overall cost of the system for consumers." The 'generation' or incentivised discharge patterns of electric vehicles, and other changes consistent with the Paris commitment to limit to 1.5°C, may be just such factors that reduce the need for other development. Plans based on scenarios that do not include a rapid uptake in electric vehicles (due to increased climate ambition and lowering technology costs) or other trends reflecting the Paris 1.5° scenario may lead to the development of generation, transmission or storage infrastructure that proves to be redundant or inadequate and so imposes a higher cost on consumers.

AEMO work on a 1.5°C scenario might, for example, model incentives or contracts needed to integrate electric vehicles into the grid in a way that reduces needed investment in peak generation, stationary storage and transmission infrastructure. While the take up of electric vehicles in Australia, due to its lack of planning of incentives, has been negligible, in the time frames of the ISP the cost reductions that the global market will achieve are likely to mean that electric vehicles will become cheaper than internal combustion vehicles by 2025-2030[6]. With such competitive prices, and the longer range and faster recharging times that technology advance will likely also bring by that time, substantial percentages of Australian consumers particularly fleet and commercial operators, will likely purchase electric vehicles. Anticipating other trends that are similarly aligned to the 1.5°C

[3] Blakers, A., Lu, B., & Stocks, M. (2017), 100% renewable electricity in Australia: ANU. http://energy.anu.edu.au/files/renewable%20electricity%20in%20Australia.pdf
[4] https://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Data-dashboard#average-price-table
[5] Wright, M., & Hearps, P. (2010), Zero Carbon Australia stationary energy plan. Carlton, VIC: Beyond Zero Emissions, p. 14, http://bze.org.au/stationary-energy-plan/
[6] BNEF 2017, Electric Vehicle Outlook (2017), https://about.bnef.com/electric-vehicle-outlook/

scenario, such as improvements to the cost and upscaling of the renewable generation of hydrogen and the use of fuel cells, could also prove important to the least cost development of infrastructure for reliable electricity supply.

Given the tight timelines for AEMO to produce the first Integrated System Plan by mid-2018, we understand that it may be impractical to consider an additional scenario for the initial plan. If so, we ask that AEMO include the 1.5°C scenario in future years as it develops its modelling capacity and builds on the achievement of the first Integrated System Plan. Doing so should not only prepare the nation for higher ambition consistent with the 1.5°C commitment of the Paris Agreement, it will also guide us to lowest cost reliable energy supply.

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