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Dr Alan Finkel AO
Chief Scientist
Chair of the Expert Panel
Department of the Environment and Energy
NEMSecurityReview@environment.gov.au

3 March 2017

Dear Dr Finkel,

Beyond Zero Emissions welcomes the Department of the Environment and Energy's invitation to make comments on the Independent Review of the National Electricity Market.

Beyond Zero Emissions submits that the Council of Australian Governments commits to securing Australia's electricity through a National Electricity Market powered by 100% renewables.

Energy security cannot be considered separately to the other core objectives of the electricity system – affordability and emissions reduction. We need to rapidly secure an energy supply that supports a thriving Australian economy while meeting our international commitment to limit warming to well below 2°C.

1. Using 100% renewables to secure the Australian grid is technically and commercially possible

In 2010 Beyond Zero Emissions, in collaboration with the University of Melbourne's Energy Research Institute, released the *Stationary Energy Plan* - a comprehensive research plan setting out how the stationary energy sector could achieve zero emissions in ten years using proven, commercially available and costed technologies. This integrated plan accounted for a projected increase in electricity consumption due to population growth, a growing economy, and a move to electrification of transport and heating.

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At the time of its release there was virtually no discussion of rapid decarbonisation, zero emissions or 100% renewables in Australia.

The plan was endorsed by many as a visionary, and yet achievable roadmap for deploying renewables, including the Hon Malcolm Turnbull MP who stated:

> "…I believe our long-term global goal is to very substantially reduce our emissions…the (*Stationary Energy Plan)* provides the most comprehensive technical blueprint yet for what our engineers, our scientists, can begin to do tomorrow."[i]

The *Stationary Energy Plan* influenced the commissioning of subsequent studies that also demonstrate a 100% renewable energy supply is possible. These studies include:

- 100% Renewable Study – Modelling Outcomes (AEMO, 2013) (This study was commissioned as a direct result of the *Stationary Energy Plan*)
- Pathways to Deep Decarbonisation in 2050: How Australia can Prosper in a Low Carbon World (ClimateWorks Australia, 2014)
- The Homegrown Power Plan (Get Up!, SolarCitizens, 2016)
- 100% Renewable Energy for Australia – Decarbonising Australia's Energy Sector in One Generation (Institute for Sustainable Futures, 2016)
- Electricity Transformation Roadmap: Key Concepts Report (Energy Networks Australia and CSIRO, 2016)
- 100% Renewable Electricity in Australia (Australia National University, 2017).

The Panel (in its preliminary report and in subsequent conversations with stakeholders and media) has described achieving policies that simultaneously provide high levels of energy security and supply, universal and affordable energy and reduced emissions as a 'trilemma', and has implied that security must take precedence in such a trade-off.

Beyond Zero Emissions disagrees with this assessment. An integrated policy framework that achieves all three outcomes is critical and must be achieved, and the studies cited above show that this is possible.

In its *Stationary Energy Plan* Beyond Zero Emissions modelled a transition to 100% renewable energy generation over ten years using a mix of 60% Concentrated Solar Thermal Power, 40% wind power and a 2% back up from biomass and hydroelectricity. Beyond Zero Emissions has also modelled a pathway to investing in renewable energy in Port Augusta, using again a mix of Concentrated Solar Thermal and wind.[ii]

Technical and commercial developments since the 2010 *Stationary Energy Plan* mean that 100% renewable electricity is now even more affordable. The studies highlighted above include a range of technologies that are commercially available and can be used to secure a 100% renewable electricity supply that is reliable, secure and affordable, while managing frequency and peak demand.

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Beyond Zero Emissions submits that the design of the reformed National Electricity Market puts in place the right conditions for rapid industry innovation and investment in clean, zero emissions technology, including:

- clear, long term energy policy outcomes that have bi-partisan support. We note that the Victorian Government's new *Climate Change Bill 2016* provides one such model for the policy certainty that is required
- a systems approach to energy reform, ensuring that policy outcomes, policy tools, the regulatory regime, governance and investment programs are integrated
- policy tools that reduce market barriers and incentivise investment, aligned to overarching energy policy outcomes
- a transparent and accessible regime that can be understood by all market participants.

BZE recommendation:

That the Independent Panel:

- include the *Stationary Energy Plan* and other 100% renewable studies -listed above - as part of their principal evidence base in developing recommendations for COAG
- agrees that security cannot be considered separately to the other core objectives of the electricity system – affordability and emissions reduction
- recommends to COAG that it:
    - revises the National Electricity Objective to include an emissions reduction objective to achieve zero emissions for the electricity sector in ten years, whilst maintaining current levels of system reliability, stability and cost.
    - establishes a national 100% Renewable Energy target with interim targets (commensurate with the revised National Electricity Objective)
    - puts in place a policy framework to create and support the right conditions for industry innovation and investment in clean, zero emissions technology.

2. Gas is unnecessary and fails to deliver emissions reductions

The Panel's Preliminary Report - and subsequent media and consultation conversations with Panel members - makes clear the Panel's view that gas is an essential part of transitioning to a low carbon National Electricity Market.

Natural gas is largely composed of methane, which has a global warming potential of 28-34 times that of carbon dioxide.[iii] At a leakage rate of just 3.2%, gas becomes worse for the climate that coal.[iv]

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Gas leakage is increasing as conventional gas reserves are depleted and unconventional forms of extraction such as coal-seam and shale gas are brought into production. Emissions from ageing conventional reserves are increasing because:

- reserves now need to be actively compressed. Previously, gas came out under its own pressure
- additional processing of the gas stream is now required, as progressively lower-quality reserves are tapped and contaminants such as CO2 are vented to the atmosphere.

In Australia the amount of methane escaping from unconventional production is not known, as the latest technologies to measure it have not been employed here. That said, in the United States new technologies, including satellite and aircraft-based systems, have been used to quantify methane emissions from unconventional gas developments. Emissions ranging from 2 to 17% of production have been reported.[v] This is 10-25 times higher than the Australian government reports to the UNFCCC, and up to 170 times those claimed by the gas industry.

If Australian unconventional gas production expands to twice its present size, a methane-emission rate of 6% would be equivalent to approximately half of Australia's total nation-wide greenhouse-gas emissions currently reported across all sectors.

Beyond Zero Emissions also brings to the Panel's attention the significant environmental and health risks arising from CSG, including water contamination, waste storage, salts, erosion, air pollution, land clearing and fire risk.

Beyond Zero Emissions considers investing in new gas infrastructure will ultimately result in a massive sunk cost and will further delay our transition to zero emissions.

Beyond Zero Emissions does not support gas – it delays what is inevitable and necessary: a secure, national electricity market that is powered by 100% renewables.

BZE recommendation:

That the Panel:

- quantifies the range of likely emissions and other adverse environmental and health impacts from natural gas and Coal Seam Gas
- not include gas as part of the transition energy plan, and instead recommends to COAG a direct transition to 100% renewable energy through facilitating investment in proven, commercially available technologies.

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3. Rapid transition can position Australia as a Renewable Energy Superpower

Moving to 100% renewable energy early will allow Australia to capitalise on the economic opportunities that renewable resources offers. Beyond Zero Emission's *Renewable Energy Superpower* report shows that the economic renewable energy resource potential of Australia is greater than its coal, gas, petroleum and uranium resources combined.

The global market for renewable energy and efficiency solutions has been estimated to be US$390 billion in 2013, and is expected to grow to US$2.3 trillion per year by 2035 to limit global warming to 2°C.[vi]

To be a renewable energy superpower, the time for electricity reform is now. The costs of renewable energy are up front and are locked-in from the time of investment. Every uncoordinated development adds costs to the electricity system and undermines Australia's renewable energy advantage.

BZE Recommendation:

That the Panel recommend to COAG that it commits to securing Australia's electricity through a National Electricity Market powered by 100% renewables, and deploys an investment and policy program that realises this vision in ten years.

4. About Beyond Zero Emissions

Beyond Zero Emissions is an Australian research and education organisation. Since 2006 we've helped governments, businesses and individuals address one fundamental question: How can Australia rapidly transition to a zero carbon-emissions economy?

Our work is carried out by a small staff of experts, with the help of academic institutions and a large network of volunteer scientists, engineers and economists. We are funded by private foundations and concerned individuals.

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In 2017 Beyond Zero Emissions' work was recognised by The Lauder Institute's Think Tanks and Civil Societies Program with a global think tank ranking of 52nd for the category "Best Independent Think Tanks."

Yours sincerely,

Vanessa Petrie

Chief Executive Officer

Beyond Zero Emissions

[i] Stationary Energy Plan, inset cover, Beyond Zero Emissions, 2010

[ii] Repowering Port Augusta: A blueprint to replace Northern and Playford B coal power stations with renewable energy, Beyond Zero Emissions, 2012.

[iii] IPCC, 2013: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

[iv] Alvarez, R. A., S. W. Pacala, J. J. Winebrake, W. L. Chameides and S. P. Hamburg (2012). "Greater focus needed on methane leakage from natural gas infrastructure." Proceedings of the National Academy of Sciences 109(17): 6435-6440.

[v] A review of current and future methane emissions from Australian unconventional oil and gas production, Melbourne Energy Institute, October 2016

[vi] Renewable Energy Superpower, Beyond Zero Emissions, 2015