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Submission No: 64

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Committee Secretary
Standing Committee on Industry and Resources
House of Representatives
PO Box 6021
Parliament House
CANBERRA ACT 2600

Dear Sir/Madam,

RE: CASE STUDY INTO SELECTED RENEWABLE ENEGRY SECTORS

NEMMCO operates the National Electricity Market (NEM). The NEM consists of the transmission-level interconnected power system encompassing Queensland, New South Wales, Victoria, South Australia, Tasmania and the ACT. Peak demand in the NEM is over 30,000MW.

Of the various renewable energy sectors being examined by the Committee, wind generation has the greatest presence in the NEM. At time of writing, registered wind generation capacity is about 830MW, or roughly 2% of around 40,000MW total generating capacity in the NEM. The majority of this wind generation is located in South Australia, with most of the remainder installed in Tasmania. None of the other renewable energy sectors being examined by the Committee – solar, wave, tidal, geothermal and hydrogen – have a significant presence in the NEM. The greatest amount of renewable energy in the NEM is actually sourced from hydro generation, while there is also some biomass-fuelled generation registered in the NEM. However, these technologies do not appear to be being examined by the Committee.

NEMMCO understands that wave, tidal, geothermal and hydrogen-based renewable technologies are still relatively undeveloped, and generally at the testing or prototype stage of development. Consequently, it is not surprising that they do not have a commercial presence in the NEM. Furthermore, one of the reasons that these technologies have not been commercially developed up till now is that they have been relatively expensive sources of electricity. The NEM dispatches generation on the basis of lowest-priced offers to sell electricity, and generating technologies with lower production costs are better able to make cheaper offers while still remaining profitable.

Generally speaking, wind power is more expensive than coal-fired power, and solar generation – a more established technology than tidal, geothermal or hydrogen-based power – is significantly more expensive than wind power. It is difficult for the less commercialised forms of renewable generation to compete in the NEM with these relativities in production costs, but they can still fill niches in electricity supply, possibly in places that are not connected to an established electricity network, or alternatively at the level of individual households or businesses who are willing to pay a premium for electricity from a renewable generation source.

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However, there are two important factors to consider when making generalisations about production costs.

- Firstly, the cost of power from newer technologies tends to reduce as the technologies mature. Thus gas turbines, which were once extremely expensive sources of power, are now commonplace. The cost of wind turbines – which is the major capital cost associated with wind generation – has also fallen significantly as more wind generation capacity has been installed. And it is probable that the costs of solar power – and any other renewable technologies – would also decrease if they moved from niche markets into large-scale production and installation.

- Secondly, the cost of power from non-renewable technologies tends to vary with fuel costs. For example, the cost of gas-fired generation fluctuates with gas prices. This has particularly been the case overseas where gas prices have arguably been more volatile because of the size and liquidity of the local gas markets. Furthermore, an emissions trading scheme or carbon tax would effectively increase the fuel costs of gas- and coal-fired generation, thereby changing the relativities between the production costs of these and other generating technologies. Recently the cost of power from established technologies has also risen markedly due to the effects of the drought being experienced by Australia at present. Admittedly, water is not a fuel in the conventional sense, since it is used primarily for cooling except in the case of hydro generation, and the effects of the drought may be transient rather than enduring. However, this does provide another example of the pitfalls of making generalisations about production costs for particular technologies.

The main reasons for the prevalence of wind generation in the NEM relative to the other technologies being examined by the Committee are:

- Wind energy is a more commercially proven and developed renewable technology than solar, wave, tidal, geothermal and hydrogen-based generation because of its generally lower production costs; and

- The Federal Government's Mandatory Renewable Energy Target (MRET) scheme made wind energy competitive with more established coal, gas and hydro generation in the NEM.

The mandatory nature of the MRET scheme coupled with the limited timeframe over which it applies meant there was a strong commercial incentive to build renewable generation as early in the scheme as practicable. Wind energy was more commercially proven than solar, wave, tidal, geothermal or hydrogen-based generation at the start of the MRET scheme, and the scheme penalties of $40/MWh made wind generation competitive with coal, gas and hydro generation. This meant that most of the renewable generation installed in the NEM as a result of the MRET scheme was wind energy. Consequently, the amount of wind generation increased from near zero several years ago to over 800MW now.

The rapid increase in wind generation created some operational issues for the power system. In particular:

- Wind turbines are frequently located in relatively remote sites, where the electricity distribution or transmission network – if it already existed – was not necessarily

designed to cope with the volumes of power that wind farms are capable of producing.

- The output from wind farms depends on the prevailing wind, which is uncontrollable. This complicates short-term dispatch and longer term reliability planning because wind generation cannot be controlled in the conventional sense, and needs to be forecast instead.

While wind generation cannot be controlled in the way that coal, gas or hydro generation can be controlled, it can be limited at times when the wind farm output risks overloading the local electrical network. NEMMCO has developed a process termed "semi-dispatch" to cope with this possibility. The semi-dispatch process relies on forecasts of wind generation. NEMMCO has already implemented an interim wind forecasting system. NEMMCO has also overseen the planning and development of a more advanced forecasting system, paid for by the Commonwealth Government, and known as the Australian Wind Energy Forecasting System (AWEFS). AWEFS will be a state-of-the-art forecasting facility and is scheduled to be operational within the next 18 months. Although AWEF's initial focus will be on forecasting wind generation, the system can be expanded to forecast other forms of renewable energy.

The fact that wind energy cannot always be relied upon to deliver power when needed is also reflected in forecasts of the supply-demand balance over the next ten years. NEMMCO publishes these 10-year forecasts annually in the Statement of Opportunities (SOO). The SOO is designed to inform interested parties of the future need for electricity supply capacity, demand side management, and transmission network augmentation in the NEM. The SOO includes forecasts of non-scheduled generation such as wind energy. In the case of wind energy, only 8% of wind generation capacity installed in South Australia is assumed to be always capable of producing electricity at times of peak demand. In Tasmania, the analogous figure is 5%.

Overall, the way in which significant amounts of wind generation have been successfully integrated into the NEM provides some confidence that other forms of renewable generation could also be equally successfully integrated into the NEM with suitable operational modifications as required.

NEMMCO would be happy to provide more information to the Committee if requested.

Yours sincerely,

LESLIE V HOSKING
Managing Director and
Chief Executive Officer