

COGENERATION AND TRIGENERATION IN NEW SOUTH WALES

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Date Received: 4/09/2013

4 September 2013

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Dear Mr O'Dea

Cogeneration and trigeneration in New South Wales - Submission

Thank you for your letter dated 29 July 2013, inviting AEMO to make a submission to the inquiry by the Public Accounts Committee into cogeneration and trigeneration in New South Wales.

Established in 2009, AEMO is an independent organisation working in the long-term interests of Australian energy consumers by operating and developing markets that underpin affordable, safe and reliable energy supplies. AEMO's operational roles include managing the operation and security of the interconnected eastern and southern Australian power system, operation of the National Electricity Market (NEM), and operation of wholesale gas markets across four Australian states. AEMO also has a number of key planning roles, including development and publication of the annual National Transmission Network Development Plan, and in the publication of independent, open and transparent electricity demand forecasts for the NEM.

AEMO understands that the inquiry will focus on the installation and use of cogeneration/trigeneration technology in New South Wales, as set out in the published terms of reference. The nature of cogeneration/trigeneration makes it most suitable as distributed generation, installed at a precinct, factory, building or residential level. Consequently cogeneration/trigeneration is commonly connected to the electricity and gas distribution networks.

It is important to note that AEMO does not have direct responsibility for distribution network operation or planning, however the installation and use of cogeneration/trigeneration is likely to interact with areas for which AEMO is responsible or involved, including:

- Power system planning and energy forecasting
- Power system security
- Generator registration and technical requirements
- Participation in the spot market
- Emergency management

AEMO's interest in each of these areas is discussed briefly in the sections below, with reference to the planning, development, installation and use of cogeneration/trigeneration in NSW.

Power system planning and energy forecasting

AEMO develops and publishes a range of power system planning and forecasting reports each year to inform industry stakeholders of future trends and investment opportunities.

Examples include:

- National Energy Forecasting Report¹ (NEFR) – AEMO published the second edition of the NEFR in June 2013, providing an independent electricity consumption forecast to industry and other stakeholders. The NEFR covers a 10-year period, and foreshadows a continued slowing of demand growth.
- Electricity Statement of Opportunities² (ESOO) – Most recently published in August 2013, the ESOO is a 10-year comparison between demand expectations and committed supply side investment initiatives. It is intended as an input to future generation investment decisions.
- Gas Statement of Opportunities³ (GSOO) – provides a 10-year supply and demand outlook to inform investments in gas infrastructure.
- National Transmission Network Development Plan⁴ (NTNDP) – a 20-year analysis of possible economic growth and investment scenarios for the power system, to inform electricity network expansion decisions.

To prepare these reports at a high quality, AEMO relies on gathering the best available information from network service providers, generation businesses, retailers, large customers and other businesses involved in energy production or consumption. The development of cogeneration/trigeneration is expected to involve coordination with distribution network service providers from an early stage, and access to such information is important to AEMO for preparation of the above planning reports.

Power system security

A key operational responsibility of AEMO is to ensure that the interconnected electricity transmission network remains secure at all times. This requires co-ordination of the dispatch of all major generation sources, to ensure that power flows remain within the technical capability of the main transmission system. The future connection of systemically large quantities of embedded cogeneration/trigeneration could have a material impact on power flows across the power system as whole, and AEMO will have an interest in preparing its processes to properly accommodate these developments.

Although it is unclear what specific areas of interest may require attention, some possibilities might include anticipating new requirements for voltage regulation, response of the power

¹ The NEFR can be found at: <http://www.aemo.com.au/Electricity/Planning/Forecasting/National-Electricity-Forecasting-Report-2013>

² The ESOO can be found at: <http://www.aemo.com.au/Electricity/Planning/Electricity-Statement-of-Opportunities>

³ The GSOO can be found at: <http://www.aemo.com.au/Gas/Planning/Gas-Statement-of-Opportunities>

⁴ The NTNDP can be found at: <http://www.aemo.com.au/Electricity/Planning/National-Transmission-Network-Development-Plan>

system to contingency events, and changes in transfer limits across the transmission network that might result from the new generation and load distribution.

Generator registration and technical requirements

AEMO is responsible for Registration under the National Electricity Rules, of generating plant that is connected to the electricity system. Performance standards for generating plant connected to the network are negotiated with the relevant network service provider (in NSW this is TransGrid, Ausgrid, Endeavour Energy and Essential Energy) to ensure the facility is unlikely to cause degradation in the quality of supply to other network users. However, where power system security might be affected, AEMO also has a role in this negotiation.

There are a number of different categories of generator registration available in the NEM, and one or more may be applicable to cogeneration/trigeneration plant, depending largely on its size. Cogeneration/trigeneration plant might also be exempt from registering depending on the circumstances. Full details of generation registration processes are available on AEMO's website⁵, and the following points are worthy of particular note:

- A standing exemption from technical requirements is provided for generators less than 5MW.
- Generating systems (including a group of generators connected at a common connection point) with a nameplate rating of 30MW or greater is generally required to be scheduled, and to participate in the central dispatch process.
- Despite the standing exemption, a generating unit must be registered in the market unless all its output is purchased at the connection point or by the local retailer.

AEMO usually encourages generation developers to engage with the AEMO registration process in the early stages of their decision-making, to ensure they are aware of all obligations, and to assist in the process of connection and registration.

Participation in the spot market

Over the last few years AEMO has been working with the industry on improving the arrangements for small generators (typically those that are less than 5MW), with the objective of minimising the barriers to cost-effective participation in the NEM spot market. Effective from January 2013, the energy market rule-maker (the Australian Energy Market Commission) established a new category of registration termed the "Small Generation Aggregator" (SGA)⁶. The SGA category of registration permits a stream-lined registration of generation plant, for cases where the plant meets the standing exemption from technical requirements, and has the necessary metering arrangements in place.

The SGA category is likely to provide benefit to factory and building level cogeneration/trigeneration, allowing improved commercial opportunities for electrical generation surplus to local requirements. However the SGA category may not be suitable for cogeneration at a residential level, as there is a requirement for remotely-read interval metering which could be uneconomic for small scale installations.

⁵ Registration information is available at: <http://www.aemo.com.au/Electricity/Registration/Participant-Categories/Generator>

⁶ Rule Change - Small Generation Aggregator Framework: <http://www.aemc.gov.au/electricity/rule-changes/completed/small-generation-aggregator-framework.html>

Although AEMO does not take a view on the economic viability of cogeneration/trigeneration, we note that the energy spot price in the National Electricity Market does have a significant variability across daily, weekly, and yearly time horizons. This pricing behaviour would be an important consideration for the planning and operation of a cogeneration/trigeneration facility, and AEMO makes this information publicly available through a variety of distribution mechanisms, including our website⁷.

Emergency management

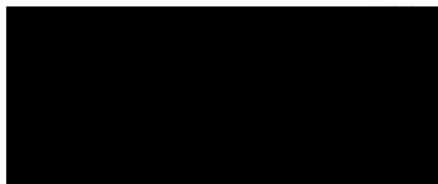
AEMO performs a co-ordinating role in the management of emergency conditions, such as an electricity supply shortage. This involves liaising with transmission and distribution network service providers, and regulators in each NEM jurisdiction (in New South Wales the Department of Trade and Investment, Regional Infrastructure and Services).

Depending on the detailed nature of a cogeneration/trigeneration development, collaboration may be required between TransGrid, the distribution network service provider and AEMO to review and if necessary amend the processes related to emergency management, including areas such as the following:

- Communication protocols during a widespread disruption
- Automatic under-frequency load shedding settings
- Local frequency control during a period where the cogeneration/trigeneration network is not connected to the grid (i.e. operating as an islanded power system)
- Co-ordination of load restoration, including the resynchronisation of the cogeneration/trigeneration network to the grid following a widespread disruption

AEMO would be happy to assist with the inquiry in any way possible. Should you have any enquiries regarding our submission, please contact Mr David Swift, Executive General Manager Corporate Development on [REDACTED]

Yours sincerely



Peter Geers
Acting Executive General Manager Corporate Development

⁷ Price information is available at: <http://www.aemo.com.au/Electricity/Data/Price-and-Demand>