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ESCOSA16/0085

20 July 2016

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Dear Mr Zema

Technical standards for grid connection of wind farms and inverter-connected generators

The Essential Services Commission of South Australia (**Commission**) is about to commence an inquiry into the regulatory, licensing and associated arrangements for grid-scale wind and other inverter-connected electricity generation plant and equipment.

The Commission has enjoyed a productive and reciprocal working relationship with the Australian Energy Market Operator Limited (**AEMO**), including its predecessor organisations (namely, the Electricity Supply Industry Planning Council (**Planning Council**) and the National Electricity Market Management Company Limited (**NEMMCO**)). This is particularly so in respect of the support and assistance provided to the Commission's earlier reviews of the licensing and technical requirements for connection of wind farms to the transmission network.

In undertaking this Inquiry, the Commission is seeking advice from AEMO in relation to two matters:

- ▶ the currency of the special licence conditions relating to technical standards for wind farms connecting to South Australia's electricity network, and
- ▶ whether there is merit in additional or amended technical requirements being imposed on other inverter-connected generator technologies (for example, solar).

These matters are addressed in greater detail below.

Technical standards for grid connection of wind farms

In 2005 and 2008, the Planning Council, now subsumed within AEMO, provided the Commission with advice on the likely impacts of increased wind generation capacity on the South Australian electricity network (a copy of the 2008 advice is attached). Taking into account that advice, the Commission developed and later refined a suite of licence conditions for wind generators.¹

¹ Refer: www.escosa.sa.gov.au/projects/15/2010-wind-generation-licensing.aspx

The level of wind generation in South Australia continues to grow. The Commission is aware through its licensing role, and more generally, that there remains strong interest in expanding existing wind farms and connecting new wind farms to the electricity network.

While the Commission is aware that the National Electricity Rules contain specific provisions in relation to wind (and other intermittent) generation, it remains unclear as to whether or not those measures are sufficient to address the unique issues facing South Australia in terms of the penetration of renewable generation relative to demand.

Given the growing penetration of renewable generation, the Commission considers it timely, once again, to review the special provisions attached to the licensing of wind generators. Obtaining the technical views of AEMO is integral to any review of this nature. Accordingly, the Commission would appreciate AEMO's considered advice of the following:

- ▶ whether the current licence conditions for the grid connection of wind generators be retained, removed or varied and, in each case, why and how should this be effected?
- ▶ whether the license conditions for existing wind generators currently connected to the grid be modified and why and how this should be effected?

Technical standards for grid connection of inverter-connected generators

The Commission regulates generation through its licensing role and the requirements of the Electricity Distribution Code (specifically Chapter 3 of the Code).² Generators, with a rated nameplate output of more than 100 kVA, and which supply electricity for reward by means of a transmission or distribution network, are required to hold a generation licence in accordance with the Electricity Act 1996. Further, all embedded generators (with the exception of those registered in the market under the National Electricity Rules) must comply with the technical standards contained in Chapter 3.

As with wind generation, the Commission notes the substantial uptake of inverter-connected solar photovoltaic generation in South Australia since receiving the Planning Council's advice in 2008. In addition, the commercial and technical viability of battery storage and the interest in micro-grid technology points towards a change in the electricity supply mix from traditional large scale generation to a distributed and disaggregated scale. Coupled with South Australia's large wind generation portfolio, the Commission is keen to ensure that technical conditions relating to inverter-connected generation are sufficient to maintain the integrity of the electricity network and the quality and reliability of energy to consumers.

Accordingly, the Commission deems it timely to review whether there is merit in introducing additional technical standards for (grid-scale) inverter-connected generators. In addition, the Commission notes that the Australian Energy Market Commission (**AEMC**), at AEMO's request, has recently implemented a rule change that amended the definition of a generating unit given the recent technological and market developments. Accordingly, the Commission seeks advice from AEMO on the following matters:

1. In light of the above developments in the industry, is AEMO able to advise the Commission of any additional or amended technical requirements that should be imposed on grid-scale inverter-connected generators?

The Commission notes that any review should include (but not be limited by):

- a) the number and scale of new and proposed inverter-connected generation projects that may be known to AEMO

² Refer: www.escosa.sa.gov.au/library/20141007-Elec-DistributionCodeEDC12.pdf

- b) the nature of the changes and other developments in generation technology and related technologies
 - c) the observed market behavior and operational experience of inverter-connected generation
 - d) whether any operational or technical limit on inverter-connected generation is likely to be reached (at any time now or in the future) in any specific location, or more generally, across the entire electricity network in South Australia, and
 - e) any other matter considered relevant by AEMO.
2. If AEMO considers that a review of the technical requirements is justified, would AEMO please provide to the Commission, detailed information including the reasoning underpinning its conclusions and the nature and scope of any proposed changes
 3. If AEMO considers that a review of the technical requirements is not justified, would AEMO please provide to the Commission, detailed information including the reasoning why it considers that the existing regulatory arrangements for the licensing of inverter-connected generation is appropriate and sufficiently robust to protect the long-term interests of South Australian consumers in light of the matters listed in item 1 above.
 4. Any other matters considered relevant by AEMO.

Next steps

The Commission's focus, in relation to its responsibilities in licensing and regulating generators, is to remove any unnecessary local requirements once it is satisfied that the National Electricity Rules deal adequately with power system integrity and reliability issues posed by intermittent generation in this State. The Commission notes, however, that complete removal of any local requirements may not be appropriate and that further modification of these local requirements may, in fact, be necessary to ensure that adequate safeguards remain in place, given the likelihood of a continuing increase in wind and inverter-connected generation developments in South Australia.

Of vital consideration is the Commission's primary objective under section 6 of the Essential Services Commission Act; to protect the long-term interests of South Australian consumers with respect to the price, quality and reliability of electricity supply. This objective should be considered in developing AEMO's advice for the Commission.

Given the current appetite of the market for new wind generation projects and the growth of inverter-connected generation, the provision of advice by AEMO is a matter of some urgency. That said, the Commission also understands the need for careful and robust deliberation of these matters and the necessity for sound and detailed reasoning to be provided to support any conclusions. The Commission is also aware that AEMO is continuing its work into the integration of renewable energy in the national electricity market. Accordingly, the Commission is seeking to work with AEMO to develop a mutually agreeable program of work within an appropriate timeframe.

For your information, an early draft of this letter was sent to Mr David Swift to provide AEMO with advance notice of the Commission's Inquiry. In addition, preliminary discussions were held with Mr Swift to assist with the Commission's planning. As a consequence of those discussions, Mr Swift indicated that any forthcoming advice from AEMO may need to be staged in two parts to allow consideration of the more complex aspects of this review and to facilitate early consultation with stakeholders.

In accordance with the Commission's Charter of Consultation and Regulatory Practice, the Commission will place this correspondence on its website so that stakeholders are aware of the nature of the advice being sought from AEMO. It should also be noted that, once received, AEMO's advice will also be available on the Commission's website.

Should you wish to discuss these matters further, please contact Con Carellas on (08) 8463 4867 or via email on con.carellas@escosa.sa.gov.au.

Yours sincerely



Adam Wilson
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