21 February 2020

Ms Audrey Zibelman
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Dear Ms Zibelman

Draft 2020 Integrated System Plan for the National Electricity Market

Energy Queensland Limited (Energy Queensland) welcomes the opportunity to provide comment to the Australian Energy Market Operator (AEMO) on the *Draft 2020 Integrated System Plan for the National Electricity Market*. AEMO has requested feedback on the content of the draft Integrated System Plan (ISP) prior to the final ISP being published in mid-2020.

Energy Queensland notes that, although the ISP is intended to be a transparent, whole of National Electricity Market (NEM) system exploration of the future power system needs to maximise net market benefits, energy distribution is out of scope of the draft ISP. While Energy Queensland recognises that there is significant complexity in including impacts originating from distribution networks in the ISP, we also note that the document places considerable emphasis on the impacts and changing dynamics of distributed energy resources (DER) connected at the distribution network level. As the manner in which DER is operated has a significant impact on local distribution networks, we expect that AEMO would coordinate an assessment of those impacts in collaboration with distribution network service providers and that the requirement for this assessment is included in the ISP's scope to ensure it covers the whole of market as intended.

Energy Queensland agrees with the assessment that in an increasingly decentralised energy market, the distribution businesses are likely to connect the largest share of NEM energy requirements, which will be of greater scope than just aggregated residential DER but will also include small-scale solar farms. This situation is already demonstrated in Energy Queensland's network businesses, Energex and Ergon Energy. Between them, Energex and Ergon Energy cover 1.7 million km^2 and supply 37,208 GWh of energy to 2.1 million homes and businesses and are supporting a country-leading rate of DER adoption, including:

- Connection of 1,177 medium- to large-scale DER (with 643 MW of total capacity), four committed projects in construction (with 205 MW of total capacity) and a further 91 projects in various stages of the application process (with a total of 3.95 GW estimated capacity); and

- Connection of more than 580,000 small-scale residential and commercial-sized DER (with a total capacity of around 2,600 MW).

While the ISP appropriately dedicates considerable content to the issues surrounding DER, it is important to consider that system investments by the market, AEMO, transmission network service providers and distribution network service providers should be coordinated in an open and transparent manner to ensure the achievement of the National Electricity Objective. This view is supported by section C1.2 of the ISP which acknowledges that changes in how DER are adopted and enabled to achieve their full potential will not happen automatically but will require the necessary regulations, standards, systems and distribution level investments to be in place. Energy Queensland agrees with this assessment and recommends that the ISP should therefore recognise the current research programs (largely led by distribution businesses) that are exploring DER connection and market opportunities, including:

- The proposed deployment by Energex and Ergon Energy over the 2020-2025 regulatory control period of commercial and industrial dynamic export management to allow 50 per cent of existing DER-enabled commercial and industrial customers and all new commercial and industrial customers to have the option of dynamic DER export. This initiative will maximise the size of the renewable connection while minimising localised distribution network investments.
- The Queensland Integrated Power Platform, a joint initiative between AEMO and Energy Queensland, which is designed to stay ahead of electricity market transformation to maximise the value and benefits for all Queensland customers (both those with and without DER) through improved integration of DER and load connected to low voltage networks.
- The Energex Home Energy Management System Pilot which explores the links between emerging aggregator and virtual power plant capabilities and our demand management programs. This pilot is seeking to understand customer and market readiness for a “set and forget” solution that provides our customers with additional value delivered through market aggregators, whilst helping the distributors to manage their networks. The trial is investigating the interrelationships between all parties, both commercially and technically.

These initiatives are just a small example of the projects that Energy Queensland’s businesses are participating in to enable customer choice as part of our commitment to the Customer Energy Charter.

As recognised frequently throughout the ISP, visibility of DER is a critical issue for the operation of distribution networks. Energy Queensland is undertaking a range of trials and research to improve local network visibility of DER. Joint activities, such as the DER register involving AEMO and industry participants, are good examples of early work already being undertaken to address these critical challenges. Further, Energy Queensland considers that the ISP should also highlight the research that is being undertaken by AEMO and other market bodies, such as the Distributed Energy Integration Program, Open Energy Networks and tariff reform, and how this research is being coordinated and shared across the market to complement the development of emerging markets to achieve positive customer outcomes.

Energy Queensland notes that the ISP calls out the need for greater levels of DER coordination and controllability, using the example of potential mandatory feed-in management capability in future DER fleets. However, it is important to recognise that any coordination or control of DER impacts our customers and that the benefit they receive from DER occurs at the distribution network level, with responsibility for local

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network security falling to the distribution network service provider or, in some instances, the owners and operators of embedded networks. Any coordination of DER should occur in a manner that maximises customer benefit and aligns with local network conditions and capacity. In this regard Energy Queensland also notes the mention of a "regulatory lever" to establish a "single interoperability platform" and requests that further clarification of this comment is provided. Managing conditions on distribution networks is inherently complex and interoperability or coordination of DER should therefore integrate effectively with distribution network operations and responsibilities.

Energy Queensland notes that many of the above-mentioned issues are being explored through the joint AEMO / Energy Networks Australia Open Energy Networks program. Close coordination and integration of DER across both distribution networks and the broader system is critical to achieving lowest cost integration in accordance with the ISP's overarching objectives. Energy Queensland therefore recommends that, in future, there should be closer coordination with distribution businesses in the development of the ISP in recognition of the fact that:

- in the long-term 13 to 22 per cent of energy consumption will be met by DER;
- distribution businesses are actively working on solutions to enable DER connections; and
- distribution businesses work closely with customers connecting DER on a daily basis.

This collaboration could be achieved through joint planning or other mechanisms to develop an ISP that considers the impacts on the entire system from the emerging market changes.

Energy Queensland's further specific comments on the draft ISP are as follows:

- As mentioned in the draft ISP, DER is expected to double or triple by 2040. As such, an examination of the impact of increased high temperatures on DER, and the ability of the grid to manage increasingly high penetrations of uncontrolled generation, should be explored (including the impact of high temperatures on energy efficiency).
- In section D5 of the draft ISP, visibility is highlighted as a key component of DER integration. However, there is a lack of detail surrounding the investments or requirements that might be required to achieve this objective. As highlighted earlier and as noted in the forming AEMO / Energy Networks Australia Open Energy Networks program, how AEMO level visibility of DER integrates with local distribution network visibility requires further attention.
- It is unclear in the draft ISP whether additional system strength mitigation, such as synchronous condensers, are also anticipated to be built as synchronous generation retires or whether it is intended to be technology-neutral. Further clarification is therefore required as to whether these system services will only be implemented in renewable energy zones or whether there may be a need for additional system strength mitigation throughout the network in addition to that already proposed.

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- While the future state scenarios model the potential differences in the pace of uptake of DER, the modelling also needs to consider scenarios where the uptake of different categories of DER diverges. There is significant potential for differences in the pace of uptake considering the different technologies, costs, resources and potential markets of the individual DER categories. In Energy Queensland's view, the current modelling potentially underestimates the energy, peak demand and minimum demand volatility as growth in the DER categories will have divergent and offsetting impacts on transmission and distribution networks.

- The ISP should model the possibility of a more significant structural change in the broader Queensland economy in the years up to 2040. While AEMO has mentioned the likely shift away from existing carbon intensive industries like coal (generation and export market) towards renewable generation and a potential hydrogen export market, the analysis is only focussed on the direct network impacts. This scenario is likely to be only a small part of the bigger picture which could also include impacts on the broader economy due to establishment of new renewables based industries and potential flow-on impacts on the density, growth and location of the state's population and electricity network infrastructure requirements.

Finally, Energy Queensland highlights that there are a substantial number of regulatory changes that are currently being progressed in the market by various bodies, including the Energy Security Board and the Australian Energy Market Commission as well as AEMO, and cautions that these changes should be complementary so as not to create a situation that results in perverse or inefficient outcomes for electricity customers. In particular, there are a range of activities that are likely to impact the future DER state, such as:

- Distribution access and charging frameworks;
- Common value of customer export methodology;
- Efficient DER expenditure;
- Smart meter roll outs; and
- Tariff reform,

all of which will need to be coordinated to ensure efficient outcomes.

Should AEMO require additional information or wish to discuss any aspect of this submission, please contact me on (07) 3851 6787 or Charmain Martin on (07) 3664 4105.

Yours sincerely

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