27 October 2016

Mr John Pierce
Chairman
Australian Energy Market Commission
PO Box A2449
Sydney South NSW 1235

Submitted online: www.aemc.gov.au

REF: EPR0053

Dear Mr Pierce

SYSTEM SECURITY MARKET FRAMEWORKS REVIEW - CONSULTATION PAPER 2016

Origin Energy Limited (Origin) welcomes the opportunity to comment on the System Security Market Frameworks Review. The focus on power system security is timely not only due to the recent events in South Australia but also given the increasing entry of non-synchronous generation in the market and the expected continual decline in synchronous plant.

Managing power system frequency

A reduction in the stock of synchronous generation increases the difficulty of managing the power system. Synchronous generators are a vital source of inertia which helps to limit the rate of change of frequency (RoCoF) when there are significant deviations in supply and demand. Additionally, synchronous plant are the primary suppliers of ancillary services that help to address frequency imbalances in the aftermath of any disturbance (such as a contingency event). Given this, Origin's view is that a key focus of this review process should be to:

- Gain a better understanding of the minimum levels of synchronous generation that will be needed over time to maintain system security, and whether any additional incentives are required to ensure that this minimum level is maintained; and
- Explore options for the development of additional markets for ancillary services.

These issues are discussed further below.

Inertia

The policy framework is such that the primary sources of inertia are expected to decline over time in line with Australia's carbon abatement objectives. Currently synchronous generation provide inertia for free, but with the service set to become increasingly scarce, it is prudent that policy makers now consider whether incentives such as an explicit price signal is needed to ensure that sufficient levels are available to maintain system security. There are a number of factors that should be considered:

1. As a starting point it would be useful to determine what minimum level of synchronous generation is required for AEMO to effectively manage the power system. Table 2.1 in the Consultation Paper shows that in all jurisdictions (other than South Australia) the stock of synchronous generation as a proportion of total generation is still significant, at well over 80 percent. A clearer view of the anticipated rate of decline, and the minimum levels of synchronous generation needed for system stability would help guide decisions regarding the need for, and design of, any incentive mechanism. This is by no means a straightforward exercise with both the withdrawal of synchronous plant and the minimum level of inertia dependent on a number of factors where there

Origin Energy Limited ABN 30 000 051 696 • Level 45, Australia Square, 264-278 George Street, Sydney NSW 2000
GPO Box 5376, Sydney NSW 2001 • Telephone (02) 8345 5000 • Facsimile (02) 9252 9244 • www.originenergy.com.au

is still a great deal of uncertainty. These include emissions reductions policies and pathways; future uptake of non-synchronous generation; and the levels of interconnection in the NEM.

2. Where some minimum required level of inertia is established, under the current framework, AEMO could only ensure that this is met by directing synchronous generation to remain online. If the proportion of synchronous generation remains high (i.e. well above the required level) this approach could prove sufficient. However if the rate of withdrawal of these plant is such that the required minimum level is likely to be breached, then the establishment of long term incentives for the provision of inertia may be warranted.
3. The development of such incentives calls for careful consideration. Origin notes AGLs' rule change proposal for the establishment of an inertia market whereby a procurement mechanism would apply when inertia levels fall below some predetermined threshold. The effectiveness of an inertia market will be dependent on its ability to provide adequate incentives for the provision of the service. Given the broader policy framework, the economics of synchronous generation is likely to become more challenging over time with more of these plant expected to exit the market. Depending on the expected rate of withdrawal, to be successful, an inertia market would need to impact a generators close down decision such that where it is uneconomic to participate in the energy market, participation in the market for inertia would delay the retirement decision.
4. If this review process concludes that a long term incentive is now required then the design would be crucial. One option could be the implementation of a procurement process (as suggested by AGL) where AEMO would procure inertia (via tender over some determined time horizon), to be deployed if the level falls below the minimum threshold. Presumably, under this option the majority of synchronous generation will continue to provide inertia for free while the contracted services would get paid to do so. It is not clear what impact this will have on overall efficiency, particularly given the behaviour of the uncontracted generators impacts the need for the contracted services. An alternative approach is to price inertia more broadly where all synchronous generators are paid for providing the service. This could allow for a more dynamic efficient outcome where generators are not only paid for the energy they provide but also their positive impact on system stability. If incorporated in the dispatch process, payments under this approach could be made through the existing market settlements.

Frequency control ancillary services (FCAS)

Currently the market for contingency FCAS ranges from 6 seconds to 5 minutes. It is our understanding, however, that it might be possible for some generators in the market to provide even faster services (i.e. is less than 6 seconds). If this is the case this could enhance system security by arresting frequency deviations quickly and returning the frequency levels to within the operating range in conjunction with the other contingency and regulation services.

Over Frequency shedding schemes

Origin supports the development of an over frequency generation scheme (OFGS) that would be prescribed within the Rules. We note that AEMO and Electranet are currently considering the design of an OFGS for South Australia that would apply at times of high wind generation when the state is a net exporter of energy. We agree that such a scheme should prioritise the maintaining of synchronous generation and the shedding of low inertia plant to ensure the stability of the power system is restored in an expeditious manner.

Another element of the OFGS scheme is how generation is identified, grouped and shed in blocks. An OFGS scheme must equitably identify the priority order of generation to be tripped off in an over frequency event. Consultation should be undertaken with the owners of generators to determine the correct priority order, whether this is as a result of location, size, or type of generation to be shed first.

It is Origin's preference that the design of any OFGS scheme for synchronous generation preferences load be shed in blocks via a run back scheme, rather than a hard stop. By shedding load in blocks

through a run back scheme, a generator is able to continue to power auxiliary systems and in the case of coal fired power stations, maintain boiler heat and pressure. If a hard stop is experienced the generator will be out of service for a number of hours while systems are reset and the start up sequence is initiated.

Non-credible contingencies

Origin supports the establishment of a new category of contingency that would enhance AEMO's ability to safeguard the system where events currently categorised as being non-contingencies were to occur. Under the rules AEMO is only able to intervene in the central dispatch process to manage network limits when considering single credible contingency events. However if we take the case of South Australia, the State's separation from the rest of the NEM is classified as a non-credible contingency which means that AEMO cannot intervene to manage network limits or performance issues that would arise following separation.[1] Origin therefore supports the adoption of the proposed *protected event* which would allow for better management of reasonably low probability but high impact contingencies such as the islanding of South Australia.

The Reliability Panel could be charged with setting a definable standard which enables AEMO to manage the system if a protected event were to occur. In classifying non-credible events as protected the Panel could develop a probability matrix that analyses the likelihood of an event and its impact.

Origin looks forward to the draft report that will be presented to COAG in December 2016. Should you have any questions or wish to discuss this information further, please contact James Googan on james.googan@originenergy.com.au or (02) 9503 5061.

Yours sincerely,

Steve Reid
Manager, Wholesale Regulatory Policy

[1] AEMO 2014: Renewable Energy Integration in South Australia, pg 12