

A few  
words.



**24 June 2016**

John Pierce  
Chairman  
Australian Energy Market Commission  
PO Box A2449  
SYDNEY SOUTH NSW 1235

Submitted online via [www.aemc.gov.au](http://www.aemc.gov.au)

Dear Mr Pierce

**Proposed rule change: NEM Wide Inertia Ancillary Service**

AGL is pleased to submit a rule change request to the Australian Energy Market Commission Consultation Paper on the introduction of a National Electricity Market (NEM) Inertia Ancillary Services market.

Inertia, as defined by the Australian Energy Market Operator, is 'produced by synchronous generators' which 'dampens the impact of changes in power system frequency'<sup>1</sup>. Inertia effectively stabilises power systems, allowing the system to cope with rapid changes in frequency due to significant changes in either supply or load, delivering a more stable system overall. As such, the real value of inertia is not what it is, but what it does, which is to assist in maintaining the overall reliability and security of electricity supply.

AGL has developed this rule change request in response to the ongoing shift towards renewable energy in the NEM, changes in consumer preferences and the corresponding reduction in the level of inertia as synchronous generation capacity in the NEM is either mothballed or retired.

The rule change proposal is at Attachment 1 for your consideration.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Simon Camroux'.

Simon Camroux  
**Manager Wholesale Markets Regulation**

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<sup>1</sup> Update to Renewable Energy Integration in South Australia: Joint AEMO and Electranet Report, Australian Energy Market Operator, February 2016.



## Attachment 1: National Electricity Market Inertia Ancillary Service

### Background

There presently exists three competing priorities in the supply of electricity in the NEM:

1. **Reliability and security** of electricity supply;
2. **Electricity prices** being kept as low as possible; and
3. Delivering on the **transformation** of the sector, through a lowering of emissions intensity as well as supporting the rise of the 'prosumer' (the producer-consumer). This includes the strategic withdrawal of incumbent, higher emissions, generation capacity to address capacity oversupply and allow for the entry of lower emissions capacity.

Increasingly the focus is on transformation and the NEM is definitively a market in transition. Historically a market with decentralised large scale generation assets, the NEM is now experiencing the withdrawal of such assets, the influx of large scale renewables (solar and wind) and significant investment in residential solar photovoltaics. Further, battery storage at scale is set to disrupt the status quo.

The NEM was framed on the basis of thermal capacity investments and in most cases, assumes that demand is relatively inelastic and that dispatchable thermal generation is able to meet demand. The optimal generation mixture therefore becomes the balance between the load duration curve and price duration curves. The shift to renewable energy is showing the limitations of the NEM's thermal centric design. In that both the load duration and price duration curves are shifting, diminishing the economic viability of incumbent large scale synchronous generation capacity.

Demand for energy services such as Frequency Control Ancillary Services (FCAS), reactive power and inertia can be expected to increase in the face of the changing generation mix – as the traditional suppliers of these services exit the market and generation shifts away from operator controlled power plants towards 'nature' controlled<sup>2</sup>. Additionally, AGL notes that wind and large scale solar generation cannot typically be used for Automatic Generation Control (AGC).

Given the potential detrimental impacts that could arise from maintaining the status quo, AGL considers that additional, complementary, measures are now required to ensure that the current NEM energy only market design delivers ongoing security and reliability of electricity supply as the sectoral transformation continues.

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<sup>2</sup> Produced by synchronous generators, inertia dampens the impact of changes in power system frequency, resulting in a more stable system. Power systems with low inertia experience faster changes in system frequency following a disturbance, such as the trip of a generator. Electrical inertia is measured in MW seconds (MWs). Source: Update to Renewable Energy Integration in South Australia: Joint AEMO and Electranet Report, Australian Energy Market Operator, February 2016.



Explained in another way, AGL considers that under current market and policy settings, the three competing priorities of the energy sector are not being effectively pursued in a coordinated or integrated way. AGL considers that in order for the three competing priorities to be optimally achieved they must be co-optimised.

Potentially, and this is the rationale behind AGL's rule change proposal, new markets need to be introduced in the NEM to effectively manage the transformation of the sector. The objective of such markets is to ensure that users appropriately value services that have previously been in surplus or provided for free (i.e. inertia) or have not previously been a priority (i.e. emissions reductions).

AGL therefore proposes the introduction of an inertia ancillary services market as one measure to better balance the pursuit of the identified competing priorities. The remaining priorities are beyond the scope of this rule change proposal.

AGL envisages that the inertia services procured would ensure system security and reliability and would apply only when the supply of inertia drops below a set threshold, which would be determined by the Australian Energy Market Operator (AEMO). For example, South Australia in particular is moving away from thermal fuel sources of generation capacity and has experienced a significant increase in the proportion of its energy being supplied by renewable, intermittent, generation sources.

AGL considers that contracting inertia services in such an environment would significantly help to address concerns with regards to security and reliability of electricity supply as the sectoral transformation continues.

### **Statement of Issues**

Inertia, as defined by the AEMO, is 'produced by synchronous generators' which 'dampens the impact of changes in power system frequency'<sup>3</sup>. Inertia effectively stabilises power systems, allowing the system to cope with rapid changes in frequency due to significant changes in either supply or load, delivering a more stable system overall. As such, the real value of inertia is not what it is, but what it does, which is to assist in maintaining the overall reliability and security of electricity supply.

The in situ technology mixture dictates the level of grid inertia that can be supplied for a given quantity of grid generation. Historically, inertia services have been provided by market participants for free. Given the changing mix of generation capacity in the NEM has led to the supply of inertia decreasing, its scarcity now requires a policy response. Specifically, it is important that inertia, as an increasingly scarce service, is appropriately valued in the market.

Fundamentally, AGL considers that the introduction of an inertia ancillary services market is an appropriate response to the declining supply of inertia.

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<sup>3</sup> Update to Renewable Energy Integration in South Australia: Joint AEMO and Electranet Report, Australian Energy Market Operator, February 2016.



It is arguable that current market issues associated with sectoral transformation may be transitory. In particular, the anticipated rise of the 'prosumer' may mitigate issues associated with reliability and security, as a result of the capability for consumers to manage their own electricity supply needs through generation and storage. However, there is significant uncertainty around when the actual evolution of the 'prosumer' and widespread adoption of battery technology will occur. As such, it is important to take proactive steps now to move away from the NEM's thermal centric market design and amend market settings to mitigate the potential adverse impacts of sectoral transformation.

### **Description of the proposed Rule**

AGL proposes the introduction, as soon as possible, of a NEM-wide Inertia Ancillary Services market.

AGL proposes that the inertia services would be procured on a competitive basis by AEMO, similar to System Restart Ancillary Service (SRAS). Specifically, AEMO would:

- administer the market and determine the quantity of capacity to be contracted;
- determine the time frame for the capacity to be procured (currently a three year time frame for SRAS);
- be the responsible entity to conduct the tender/auction process;
- set any relevant terms and conditions and or any other relevant requirements associated with procurement; and
- complete any other relevant functions as necessary to ensure that the service contracted is reliable, contracted efficiently and competitively.

AGL notes that in framing this new ancillary services market it may also be necessary to allow for the islanding of regions in the NEM - in order to account for this possibility in the contracting of the service. Specifically, AGL would consider it appropriate that the level of inertia be calculated in, for example, South Australia based on both lines of the Heywood Interconnector being out of service (currently not considered a credible contingency). Otherwise, the risk exists that in the event of interconnector failure, sufficient inertia services are not present within the region to meet system needs; ultimately negatively impacting system security and reliability.

AGL is proposing a regionalised cost recovery based on a 50/50 split between customers and incumbent generators.

### **The proposed Rule contributes to the National Electricity Objective**

The National Electricity Objective (NEO) is to promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to:

- a) price, quality, safety, reliability and security of supply of electricity; and
- b) the reliability, safety and security of the national electricity system.



The proposed Rule contributes to the NEO by supporting the reliability and security of the supply of electricity in the NEM, in light of sectoral transformation towards renewable energy and increasing numbers of 'prosumers'.

Considering the increasing scarcity of inertia ancillary services, designing a market for these services would increase allocative efficiency and encourage the efficient take up of such services.

### **Expected benefits and costs of the proposed rule**

AGL contends that if implemented, the inertia ancillary services market will lead to greater system security and therefore, reliability as the market transformation continues. There are clearly significant benefits to the market, notably end use customers, of delivering this outcome.

Recent issues in South Australia, in October-November 2015, have brought security and supply reliability to the fore – when supply was threatened as a result of the Heywood interconnector dual line outage and over 135,000 customers lost supply of electricity. AEMO took steps to manage potential system issues during the Heywood outage by enabling regulation FCAS. Issues associated with that action are still being resolved.

AGL envisages this proposed rule could form part of a package of solutions to mitigate potential supply security and reliability issues - alongside existing mechanisms such as FCAS and SRAS. In fact, AGL considers that the proposed rule goes towards future proofing the energy market for the inevitable withdrawal of high emissions generation and the shift towards smaller, non dispatchable generation.

There is little tolerance in the NEM of threats to the supply of electricity, and correspondingly, system reliability and security is highly valued. The key beneficiaries therefore of the proposed rule change are energy consumers, benefiting from improved system reliability, and providers of inertia services, benefiting from having the service they provide appropriately valued in the NEM.

The proposed rule will impose additional costs on the market as a result of the need to contract capacity on an ongoing basis to maintain system reliability – with some of this cost flowing to energy consumers (AGL's proposal is for incumbent generators and consumers to share the costs of this measure based on a 50/50 split). However, given the increasing scarcity of inertia and the value placed on system reliability, AGL considers it is not unreasonable for such costs to be imposed.



## Glossary

AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AGC	Automatic Generation Control
FCAS	Frequency Control Ancillary Services. FCAS are used by AEMO to maintain the frequency on the electrical system, at any point in time. <sup>4</sup>
Inertia	Produced by synchronous generators, inertia dampens the impact of changes in power system frequency, resulting in a more stable system. Power systems with low inertia experience faster changes in system frequency following a disturbance, such as the trip of a generator. Electrical inertia is measured in MW seconds (MWs). <sup>5</sup>
NEM	National Electricity Market
NEO	National Electricity Objective
SRAS	System Restart Ancillary Services. SRAS are reserved for contingency situations in which there has been a complete or partial system blackout and the electrical system must be restarted. <sup>6</sup>

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<sup>4</sup> AEMO, Guide to Ancillary Services in the National Electricity Market, April 2015.

<sup>5</sup> Update to Renewable Energy Integration in South Australia: Joint AEMO and Electranet Report, Australian Energy Market Operator, February 2016.

<sup>6</sup> AEMO, Guide to Ancillary Services in the National Electricity Market, April 2015.