



Mr Ben Noone
Australian Energy Market Commission
Level 6, 201 Elizabeth Street
Sydney NSW 2000

Lodged via www.aemc.gov.au

Friday, 19 May 2017

Dear Mr Noone,

RE: Five-Minute Settlement Directions Paper (Ref: ERC0201)

ENGIE appreciates the opportunity to comment on the Australian Energy Market Commission (AEMC) directions paper regarding the proposed five-minute settlement rule change for the national electricity market (NEM).

In December 2015, Sun Metals Pty Ltd proposed changes to the national electricity rules (rules) to reduce the time interval for settlement in the NEM from 30 minutes to five minutes, whilst leaving the dispatch interval at the current value of five minutes.

In the rule change proposal, Sun Metals noted that the mismatch between dispatch and settlement leads to inefficiencies in the market where generators withdraw capacity to influence price outcomes and impedes some categories of participants from entering the market. The proposed solution was to move to five-minute settlement in the NEM.

Since Sun Metals lodged their rule change proposal in December 2015, the implementation of the 'bidding in good faith' rule change in July 2016 has changed the obligations on generators when rebidding close to actual dispatch time. This has led to a change in generator bidding behaviour as summarised in the following two graphs, which look at price spikes occurring in Queensland prior to the good faith bidding rule change, and after the rule change¹.

¹ Russ Skelton and associates; Presentation at AEMC public forum 4 May 2017

Figure 1 Queensland price spikes >\$300: FY 2013/14 to 2015/16

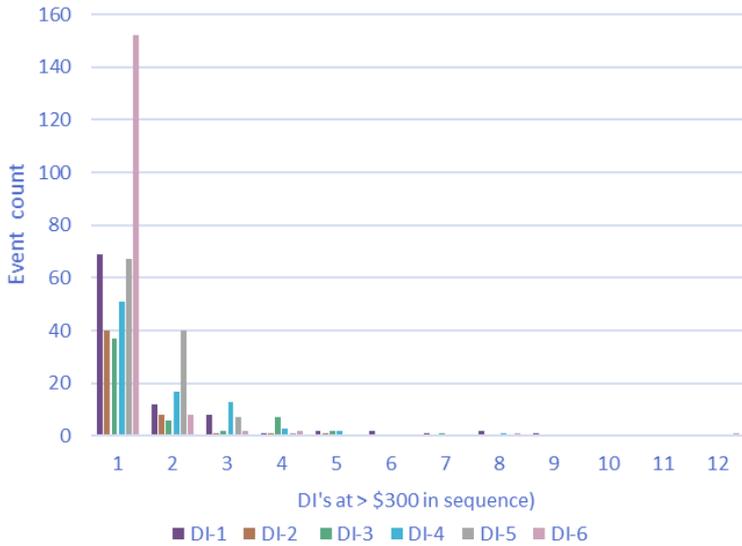
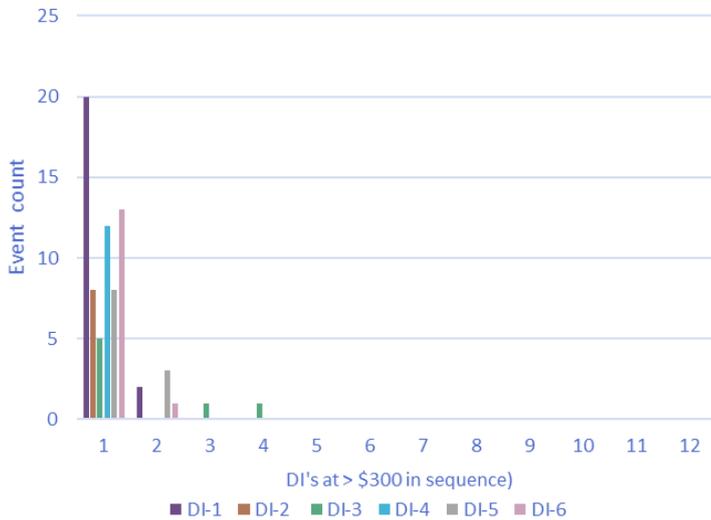


Figure 2 Queensland price spikes >\$300: July 2016 to Feb 2017



Looking at figure one, it is apparent that prior to the good faith bidding rule change, a high proportion of five-minute price spikes occurred in dispatch interval six, when compared to the other dispatch intervals. Figure two shows price spikes that have occurred since the good faith bidding rule change, highlighting that the instances of price spikes in dispatch interval six has fallen dramatically, relative to the other dispatch intervals.

This observed change in generator bidding behaviour has substantially eliminated the original drivers for the five-minute rule change identified by Sun Metals.



Despite the original problem identified by Sun Metals having now been largely resolved by the good faith bidding rule change, it appears that the AEMC have decided to identify a new problem for this rule change to solve – being that battery storage is not sufficiently incentivised to invest in the NEM under the current 30 minute settlement arrangements.

ENGIE is opposed to this rule change for the following reasons:

- It will impose **very high costs** on market participants with **unclear benefits**;
- It will lead to closure or **withdrawal of gas turbine generators** who can no longer defend cap contracts;
- The reduction in gas turbine capacity will decrease flexible generation, inertia and system strength resulting in **reduced levels of system security and reliability**;
- Departure of flexible gas turbines will be replaced by flexible coal generation leading to **increased carbon emissions**;
- Incentivising extreme ramping within a five minute interval **creates security concerns**;
- Majority of battery installations likely to be below 30 MW – therefore **not bound by this rule change**;
- **Battery investment is already happening** under current regime;
- **Interaction with other rule changes** for non-scheduled generation and load has not been discussed by AEMC;
- Encouraging more dynamic non-scheduled response exacerbates **AEMO problems** with non-scheduled plant;

For these reasons, ENGIE supports not making the proposed rule change and retaining the existing 30-minute settlement interval.

ENGIE has provided further discussion on each of these reasons in the following.

High costs – Unclear benefits

In order to introduce five-minute settlement it will be necessary to make significant changes to all market participant systems and processes for market trading, settlement, customer management and risk management. This is on top of the system and process changes that AEMO will also need to implement.

As well as the costs associated with changes to systems and processes, there will also be substantial costs associated with re-negotiation of financial hedging contracts, which are a critical element to ensuring reliable and cost effective electricity supplies to consumers.

The total present value of all of these costs is estimated to be \$250 million².

² Costs estimates determined by Russ Skelton and associates as outlined in AEMC Public Forum on 4 May 2017.



A further costs that was not included in the above estimate will arise out of the longer term power purchase agreements which have been used for a large proportion of the energy projects that underpin the renewable energy target. Since the renewable energy target extends out to the year 2030, the power purchase agreements that have been employed are long-term agreements, which would extend beyond the proposed three to five year transition period.

Whilst the costs as outlined above are clear and substantial, it is less clear that substantial benefits will arise out of the proposed rule change. The suggested benefit of encouraging investment in new technologies such as battery storage is not compelling given that there is already a steady flow of investment occurring in batteries.

Without detailed modelling it is difficult to estimate what benefits (if any) would emerge under five-minute settlement and which stakeholders would be considered most likely to benefit. ENGIE would therefore encourage the AEMC to proceed with caution given that there are clear and significant costs associated with his change, but the benefits have not been clearly stated or quantified.

The AEMC should therefore conduct a reasonable cost benefit exercise before proceeding any further with this rule change.

Fewer cap contracts

The AEMC has commissioned Energy Edge to examine the potential impact of five-minute settlement on the electricity financial markets. The Energy Edge analysis has concluded that the changed incentives and increased difficulty for fast start generators to respond to five-minute price signals will lead to a reduction in cap contracts of approximately 625 MW across the NEM. Energy Edge also note that this might be a conservative estimate, and the actual reduction in cap contracts could be higher³.

Such a reduction in financial cap contracts would mean that those parties that previously supplied cap products but were no longer able to, would need either to operate with increased exposure to the volatile spot price, or decide not to run at all. Neither of these options would be attractive, and it is therefore quite conceivable that the previous suppliers of these cap products will withdraw from the market altogether.

The reduction in cap products would have a negative impact on those parties that previously were cap purchasers as they would now either need to pay a higher price for the cap (due to greater scarcity), or decide to be more exposed to the volatile spot price. Neither outcome would be an attractive proposition.

Reduce power system security

A change to five-minute settlement would make it more difficult for gas turbine generators to defend a cap contract as noted in the previous section. Cap contracts provide the fundamental means by which gas turbine generators are able to achieve a level of revenue that can support the capital investment and operating costs of such peaking generation plant. If the market mechanisms that underpin these cap products are interfered with, it will become less

³ See Energy Edge paper: Effect of 5 Minute Settlement on the Financial Market, March 2017.



certain that gas turbines will be able to continue to operate successfully in the national - energy only - electricity market.

As stated previously, Energy Edge has estimated (conservatively) that 625 MW of cap contracts might be lost under the proposed five-minute settlement regime. Energy Edge also note that a generator would normally not sell cap contracts for more than 75% of its physical capacity. On this basis, a reduction in cap contracts of 625 MW is equivalent to a loss of 830 MW of generation capacity. Furthermore, the Energy Edge analysis notes that a relatively large proportion of this lost capacity is likely to occur in the South Australian region.

Under the current circumstances in the Australian electricity industry, with an urgent focus on ensuring the ongoing security and reliability of electricity supplies at low cost to consumers, introducing a market change that will cause such a dramatic deterioration in the security and reliability of the power system would be unwise.

Increase carbon emissions

Another implication of the reduction in the utilisation of gas turbine generators is that it will lead to an increase in the amount of energy delivered by coal-fired generation. This increase will arise since the lost flexible gas turbine generation will need to be replaced substantially by an increase in other flexible generation sources.

An increase in coal generation in the coming years will clearly have a detrimental impact on the government's objectives of reducing carbon emissions.

Create power system security concerns

It has been noted by a number of stakeholders that five-minute settlement creates an incentive for operators of inverter based technologies with extremely fast ramping capability to change output quickly in response to price and other signals. In fact, some commentators have suggested that one of the benefits of introducing five-minute settlement is that it will encourage a greater volume of extremely fast ramping capability, which it is suggested, will be beneficial to the operation of the power system.

As the aggregate amount of these new technologies continues to grow, the need to manage variations in its output / consumption becomes more and more important. Whereas the amount of variation in supply / demand within a five-minute dispatch interval is currently managed through utilisation of relatively modest amounts of frequency control ancillary service, if the amount of variation increases substantially, there will be an increased reliance on corrective services.

AEMO have identified this potential issue in their report to ESCOSA - Recommended Technical Standards for Generator Licensing in South Australia (31 March 2017), which notes that there may be a need to impose limits on rapid ramping of units. At a forum hosted by ESCOSA in Adelaide on the 16 May 2017, AEMO gave a presentation in which they indicated that they are considering seeking to impose ramping limitations on new generators to no more than 20% of the unit's capacity per minute. For example, under this arrangement a 50 MW battery would be required to limit its ramp rate to no more than 10 MW per minute.



These recent statements and proposed new limits from AEMO are important indicators that the AEMC should not simply assume that encouraging more very fast ramping capability will be beneficial to the power system. In fact, imposing such dramatic ramping capability will mean that the NEM will be increasingly subject to large variations in supply / demand balance, which up until recently, would only have been seen relatively rarely when large generators or interconnectors suddenly trip.

Advocate not bound by rule

ENGIE has noted that the majority of battery installations that have occurred to date have been 'behind the meter' small installations that are not subject to the NEM pricing and settlement rules. Whilst it is true that there are currently some new battery proposals under consideration that would be greater than 30 MW (and therefore, ENGIE assumes will be scheduled), it seems likely to ENGIE that the majority of non-subsidised battery investment will be small scale investments. Put another way, the ability for battery proponents to offer flexible services to retailers, networks and consumers directly are likely to best be served by providing their services close to the consumer, and not at grid scale.

The rule change is in large part being justified on the basis that it will provide an incentive to battery storage. However, since most battery installations are likely to be smaller than 30 MW and therefore not scheduled, they will not be subject to the NEM dispatch and pricing rules, drivers or incentives. It seems somewhat unfair that new rules and incentives are being proposed for the scheduled entities in the NEM so that the non-scheduled entities might enjoy a perceived benefit.

One of the principles that the AEMC often espouse when considering allocation of risks in the NEM is the importance that risks are allocated to the parties best able to manage them. It would seem in this particular rule change proposal that this principle may not be achieved.

What is the problem?

As noted a few times already, there is clear evidence that investment in batteries is already happening, and that the current 30 minute settlement period is not an impediment to such investment. For example, an article in the Australian Financial Review on 6 March 2017 included the following statement:

Dean Spaccavento said Reposit is adding more than a megawatt of battery capacity a month - equivalent to 200 batteries at an average 5 kW capacity - to its virtual power station or distributed energy network. He said big power companies could try to compete with Reposit's virtual power station by building a conventional generator at a fixed cost per megawatt hour "but it's competing against ours and it will lose".

Given this apparent rapid growth that is already occurring in battery storage, it is difficult to understand why there is a desire to introduce such a fundamental and costly change to the NEM rules.

To be clear, ENGIE is not seeking to impose unnecessary restrictions on the development of new technologies such as battery storage, and in fact, is seeking to invest in these technologies itself. Furthermore, ENGIE is not seeking to unnecessarily extend reliance on older technologies, and looks forward to the energy transition delivering cleaner sustainable forms of energy provision.



In successfully navigating the energy transformation however, ENGIE is mindful that a careful approach needs to be adopted as the industry and market rules adjust in response to new challenges, ensuring continued secure, reliable and affordable electricity supply.

Interaction with other rule changes

ENGIE is concerned that this rule change proposal seems to be under consideration by the AEMC in isolation from two other rule change proposals that have a very direct linkage to this one. The ENGIE proposal for changes to non-scheduled generation and the Snowy Hydro proposal for changes to dispatched loads will have a direct impact on the manner in which the five-minute settlement change plays out, should it be introduced.

ENGIE suggests that before the AEMC can take the five-minute rule change proposal forward, it needs to provide a clear statement of whether it intends to proceed with the other two rule changes. Only then can participants properly assess the potential impact of five-minute settlement on their business, and the industry in general.

Increase non-visible response

The growth in recent years in small scale solar generation and more recently, battery storage has caused AEMO to highlight the need for the market operator to have improved methods for monitoring and forecasting the amount of these sources, and how they are likely to respond to price and other signals. AEMO have identified this as one of the three priority issues within their Future Power System Security work program⁴.

ENGIE notes that increasing the amount of battery storage that is sensitive to a five-minute price signal will greatly increase the problem highlighted by AEMO, due to the increasing and significant variability in supply / demand balance that is not directly visible to the market operator.

Whilst ENGIE acknowledges that to a certain extent, AEMO and the industry are going to need to find a solution to this issue regardless of the five-minute settlement decision, ENGIE also contends that if the AEMC are minded to introduce five-minute settlement, then they need to give due consideration to the potential impact on this important issue.

⁴ See for example, AEMO document Visibility of Distributed Energy Resources, January 2017



ENGIE trusts that the comments provided in this response are of assistance to the AEMC in its deliberations. Should you wish to discuss any aspects of this submission, please do not hesitate to contact me on, telephone, 03 9617 8331.

Yours sincerely,

A handwritten signature in black ink, appearing to read "Chris Deague". The signature is fluid and cursive, with a prominent initial "C".

Chris Deague
Wholesale Regulations Manager

