



Five minute settlement

Draft determination released for consultation

Sun Metals Corporation Pty Ltd submitted a rule change request to reduce the time interval for settlement in the wholesale electricity market from 30 minutes to five minutes.

The AEMC has made a draft rule, which is a more preferable rule, to align operational dispatch and financial settlement at five minutes. This will reduce the time interval for financial settlement in the national electricity market from 30 minutes to five minutes. The draft rule provides a transition period of three years and seven months.

Background

A physical requirement of power systems is that demand and supply must always be balanced. A market where the price signals provide incentives to respond to supply and demand changes over the shortest timeframe practicable, will provide more efficient wholesale market outcomes.

At the inception of the national electricity market (NEM) in the 1990s the five minute dispatch price was considered to be the shortest timeframe practicable. However, the decision was made to adopt different periods for dispatch and settlement based on limitations in metering and data processing in the 1990s. These limitations no longer exist today.

The NEM is currently undergoing a significant transition involving the adoption of lower emissions generation such as wind and solar at the same time as the age-based retirement of existing thermal generation. There is also increasing demand side participation by consumers, which at the commercial and residential level is being enabled by the adoption of solar, battery and other technologies.

The generation mix will change further as technology advancements improve the economics of faster and more flexible demand and supply solutions. Wholesale prices directly influence the type, scale and location of technology installed, in response to changing power system conditions. They also provide a signal for the efficient consumption of electricity and efficient investment in generation and demand side technologies. Given the change underway, it is increasingly important that the NEM market design provides efficient price signals for operation and investment decisions.

Consultation to date

This rule change has far-reaching consequences to the operation of the physical electricity market and the supporting financial contract markets. It has attracted a high level of interest from a diverse mix of stakeholders. To inform its decision on the rule change, the AEMC:

- released an initial consultation paper in May 2016
- established a working group comprising of generators, retailers, industrial and residential consumers, new technology companies, financial institutions, a community group and market institutions, which met in September and December 2016
- engaged a number of technical consultants to inform its view of the change
- held over 80 bilateral discussions with stakeholders
- released a directions paper in April 2017
- held a public forum on the directions paper in May 2017
- considered 43 submissions to the directions paper, around half of which were submitted late, some only being submitted in mid-June.

Aligning dispatch and settlement at five minutes would have significant enduring benefits relative to the current arrangements.

The rule change request

Sun Metals proposed that the time interval for financial settlement in the NEM be reduced to five minutes so as to align financial settlement with operational dispatch. Sun Metals submitted that the mismatch between the dispatch and settlement intervals leads to inefficiencies in the operation and generation mix of the market. Specifically, it:

- accentuates strategic late rebidding, where generators have been observed to withdraw generation capacity in order to influence price outcomes
- impedes market entry for fast response generation and demand side response.

The accompanying fact sheet explains how the electricity spot market works.¹ It includes description of the current dispatch and settlement processes.

The benefits of five minute settlement

Aligning dispatch and settlement at five minutes would have the following significant enduring benefits relative to the current arrangements:

- improved price signals for more efficient generation and use of electricity
- improved price signals for more efficient investment in capacity and demand response technologies to balance supply and demand
- improved bidding incentives.

By aligning the financial incentives for participants with the physical operation of the market, five minute settlement will more accurately reward those who can deliver supply or demand side responses when they are needed by the power system. In contrast, 30 minute settlement provides an incentive to respond to expected 30 minute prices, rather than the five minute dispatch price. This pricing distortion leads to generator and demand responses that can occur up to 25 minutes after they are required by the power system.

Aligning dispatch and settlement at five minutes and creating an improved price signal also provides the right incentives for innovation and investment. The expected result over time is a more efficient mix of generation assets and demand response technologies leading to lower supply costs. This will benefit consumers as reduced wholesale electricity costs flow through to lower retail prices.

Effects of five minute settlement on hedging and risk management

Market participants and intermediaries enter into contracts external to the NEM physical market to manage the risks associated with volatile demand and supply conditions and hence wholesale spot prices. The contract market plays a crucial role in reducing price uncertainty for generators, retailers, major industry and consumers of electricity, by:

- allowing generators to manage risk, secure finance and provides signals for on-going investment in generation capacity
- enabling generators to receive payments for having capacity available, even when they are not providing energy to the market
- providing retailers with the stability in their wholesale purchase costs necessary to deliver price stability for consumers
- allowing retailers to secure financing for their own operations
- providing major energy users, such as large industry, with security of supply and price stability.

Given the importance of liquidity in the contract market, it is vital that disruption to this market is minimised.

Concerns have been raised that five minute settlement would potentially result in a reduction in the supply of 'cap' contracts, a risk management product that retailers and large energy users use as protection against high spot prices and to underpin the finance of much of the existing fast response generation technology. Stakeholders have indicated uncertainty as to whether gas peaking generators will be able to defend the contracts and offer the same volume to the market. This could damage competition in the retail market and lead to higher prices for consumers.

There are potentially risks to the contract market associated with moving to five minute settlement. However, analysis done suggests that five minute settlement will still allow for hedging and risk management outcomes. This is because:

¹ AEMC, *Fact sheet: how the spot market works*, September 2017, Sydney.

The risks of five minute settlement to the contracts market and to system security and reliability are manageable.

- generators will have strong incentives to continue selling the same, or similar, contracts to what they currently offer
- there appear to be a range of alternatives risk management options available that could be developed given sufficient lead time. These include applications involving new and emerging storage and demand response technologies that can be utilised to achieve similar risk management outcomes. Other potential sellers of cap contracts include thermal generators and financial intermediaries.

Effects of five minute settlement on system security and reliability

Some stakeholders raised concerns that the rule, if made, would:

- encourage greater volumes of fast ramping capability (e.g. batteries) that is invisible to the Australian Energy Market Operator (AEMO), making it harder for AEMO to manage system security
- impact the ability of gas peaking generators to offer caps and remain financially viable, causing them to exit the market, reducing both system security and reliability.

There are potential risks to system security and reliability with the introduction of five minute settlement. However, the Commission is satisfied that there is no direct threat to system security or reliability from making the rule change because:

- work is underway to promote the effective and efficient integration of fast frequency response technologies into the NEM
- peaking generators are likely to continue selling cap contracts under five minute settlement
- the creation of a market for the supply of inertia services is being considered – this may in future offer additional revenue streams to support existing synchronous generation
- recent gas generation and storage commitments and investment decisions highlight the speed with which new technologies can be implemented in the face of emerging supply shortfalls.

Implementation

The benefits of five minute settlement will be maximised by:

- having mandatory five minute settlement for all wholesale market participants, rather than optional demand-side participation in five minute settlement on a permanent basis
- using revenue metering data, rather than supervisory control and data acquisition (SCADA) data, which while involving lower implementation costs, are less accurate and not widely available for all market participants.

The draft rule reflects this position and its key features are as follows:

- If the Commission makes a final rule that reflects the draft rule, it will commence on Thursday, 1 July 2021. This would be a transition period of three years and seven months.
- Five minute settlement is implemented in the NEM by amending the definition of a trading interval from a 30 minute period to a five minute period. Bidding and offering into the NEM, the online dispatch process, settlement, intervention pricing, the calculation of trading amounts, the calculation of the cumulative price threshold, and periodic energy metering are done on a five minute trading interval basis.
- The spot price is now determined for each five minute trading interval. The spot price is no longer the time-weighted averaging of dispatch prices across a 30 minute timeframe.
- A new definition of 30 minute period is created to apply to provisions in the national electricity rules (NER) which should continue to operate on a 30 minute basis. For example, in relation to the projected assessment of system adequacy (PASA) processes. AEMO is also required to calculate and publish 30 minute spot prices (calculated in the same way that the current spot price is calculated).
- Types 1, 2 and 3 meters will need to record and store five minute data from the commencement date of the rule.
- *Type 4* meters at a transmission network connection point or distribution network connection point where the relevant financially responsible market participant is a *Market Generator* or *Small Generation Aggregator* will need to record and store five minute data from the commencement date of the rule.

The enduring benefits of five minute settlement will quickly outweigh the one-off costs and any ongoing costs.

- The draft rule does **not** require all other types 4, 5 and 6 meters that are already installed to provide five minute data at the commencement date. The data from these meters will be profiled to five minute trading intervals by AEMO using net system load profiles.
- From 1 December 2018, all *new and replacement* type 4, 5 and 6 metering installations will need to record and store five minute data.
- Existing meters that generate five minute data are prevented from being replaced with a meter of a lower functionality.
- AEMO can exempt a *Metering Provider* from complying with the data storage requirements for types 1, 2, 3, and 4 metering installations installed prior to 1 July 2021 where it is reasonably satisfied that the *Metering Provider* will be able to otherwise meet the requirements of the NER.

Costs and challenges of implementing five minute settlement

The 30 minute settlement arrangements have been in place for nearly two decades. All existing IT systems, metering infrastructure, and financial contracts have been designed with reference to 30 minute settlement. Consequently, there will be significant practical challenges and risks associated with implementing five minute settlement, and non-trivial one-off costs.

Stakeholders have valid concerns about the magnitude of the costs and the timeliness within which the required changes to support the implementation of five minute settlement can be made. These arise from the upgrades required to IT systems and metering, and the disruption to current contract arrangements.

However, the Commission considers that the enduring benefits of five minute settlement will quickly outweigh the one-off costs and any ongoing costs. It will therefore promote the efficient operation and use of, and investment in electricity services for the long-term interests of consumers.

To address concerns raised about the costs and risks of implementation, the draft rule has set a transition period of three years and seven months (with a proposed start date of Thursday, 1 July 2021). This reflects the shortest time that the Commission believes is possible to enable market participants and AEMO to manage the significant implementation issues, such as the large IT system changes.

The transition period also provides a timeframe within which new generation could be built if required, and solutions to system security and reliability issues are likely to be developed.

If the Commission makes a final rule that reflects the draft rule, it is recommended that market participants begin implementation as soon as possible.

Consultation and next steps

The Commission welcomes submissions on this draft determination and the more preferable draft rule by **17 October 2017**. There will be limited capacity to accommodate late submissions.

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