



Five minute settlement

Publication of final rule and final rule determination

The AEMC has made a 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 rule provides a transition period of three years and seven months.

The rule is in response to a request by Sun Metals Corporation Pty Ltd.

Background

A physical requirement of power systems is that demand and supply must always be in balance. A market where 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, five minute dispatch was considered the shortest operational timeframe practicable. However, different periods for dispatch and settlement were adopted based on limitations in metering and data processing in the 1990s. These limitations no longer exist today.

The NEM is undergoing a significant transition involving the adoption of wind, solar and energy storage technologies at the same time as the age-based retirement of existing thermal generation. There is also increasing consumer participation being enabled by the advanced metering, solar, battery and other technologies.

Given the change underway, it is increasingly important that the NEM market design provides efficient price signals for operation and investment decisions.

The rule change request

Sun Metals submitted that the mismatch between dispatch and settlement 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 solution proposed was aligning settlement and dispatch at five minutes.

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

Consultation

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

- Undertook three formal rounds of consultation, in the form of the consultation paper (May 2016), directions paper (April 2017) and draft determination (September 2017).
- Considered 112 submissions received during these formal consultation rounds.
- Held over 100 stakeholder meetings.
- Established a working group comprising of representatives from generators, retailers, large and small consumer groups, new technology companies, financial institutions, and market institutions, which met in September and December 2016.
- Held a public forum on the directions paper in May 2017.

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

Benefits of five minute settlement

Aligning dispatch and settlement at five minutes will 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.

Aligning financial incentives with physical operation 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 leads to generator and demand responses occurring up to 25 minutes after they are required by the power system.

There is increased evidence of the price distortion occurring across the NEM today, with the trend most pronounced in Queensland and South Australia. It is expected that in the absence of any change this distortion will get worse in the future.

Aligning dispatch and settlement will also provide an improved price signal for innovation and investment. Over time, this will promote a more efficient mix of generation assets and demand side technologies, leading to lower supply costs. Consumers will benefit 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 wholesale spot price exposure. 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 and secure finance, while also providing incentives for generators to be available to generate, contributing to reliable supply
- providing retailers with the wholesale purchase cost stability necessary to deliver price stability for consumers
- providing major energy users, such as large industry, with price stability and reliable supply.

Given the importance of liquidity in the contract market, the Commission has sought to minimise disruption to this market.

Concerns have been raised that five minute settlement could result in a reduction in the supply of 'cap' contracts. Caps are a risk management product used by retailers and large energy users as protection against high spot prices. They also underpin the finance of much of the existing fast response generation technology.

Stakeholders have indicated uncertainty as to whether gas peaking generators will offer the same volume of cap contracts currently supplied to the market. This could damage competition in the retail market and lead to higher prices for consumers.

While there are potential risks to the contract market, the Commission's analysis suggests that five minute settlement will still allow for hedging and risk management outcomes. This is because:

- generators will have strong incentives to continue selling the same, or similar, contracts to what they currently offer
- alternative risk management options could be developed given sufficient lead time. These options involve new and emerging storage and demand response technologies, utilised to achieve similar risk management outcomes. Other potential sellers of caps include new entrant thermal generators and financial intermediaries.

Effects of five minute settlement on system security and reliability

Some stakeholders raised concerns that the rule 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.

While there are potential risks to system security and reliability, the Commission is satisfied that there is no direct threat to system security or reliability from making this rule 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
- recent announcements and investment decisions relating to gas generation and energy storage highlight the rapid speed with which they can be implemented if there are any emerging supply shortfalls.

Implementation

The Commission considers that the five minute settlement benefits will be maximised by:

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

The key features of the rule are:

- It will commence on Thursday, 1 July 2021. The transitional provisions will commence on 19 December 2017. This is a transition period of three years and seven months.
- The definition of a trading interval is amended so that it is a five minute period. Bidding and offering into the NEM, the dispatch process, settlement, intervention pricing, the calculation of trading amounts, the calculation of the cumulative price threshold, and periodic energy metering will be done on a five minute basis.
- The spot price will be determined for each five minute trading interval. It 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 processes which should continue to operate on a 30 minute basis. For example, 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 provide five minute data from 1 July 2021.
- 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 provide five minute data from 1 July 2021.
- The rule does *not* require the provision of five minute data from all other type 4 meters,² type 5 meters and type 6 meters that are already installed. The data from these meters will be profiled to five minute intervals by AEMO.
- New or replaced type 4 meters² installed between 1 December 2018 and the commencement date will need to record and provide five minute data from 1 December 2022 at the latest.
- From 1 December 2018, all new or replaced type 4 meters will need to be capable of recording and providing five minute data. An extra year is provided for type 4A meters to be capable. These new or replaced types 4 and 4A meters will need to record and provide five minute data from 1 December 2022 at the latest.

An accompanying information sheet focuses on the implementation of five minute settlement.³ It provides high level information on what stakeholders need to do to prepare.

Costs and challenges of implementing five minute settlement

30 minute settlement has 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. The AEMC recognises that there will be practical challenges, disruption, and risks associated with implementing five minute settlement, and large one-off costs.

² Other than type 4 metering installations 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.

³ AEMC, *Information sheet: Implementation of five minute settlement*, November 2017, Sydney.

The three year and seven month transition period allows for implementation issues to be managed

Stakeholders have valid concerns about the magnitude of the costs and the time within which the required changes can be made. However, the Commission considers that the enduring benefits of five minute settlement will quickly outweigh the one-off and ongoing costs.

Given the size of NEM transactions in 2016/17 was \$16.6 billion, only a relatively small increase in the efficiency of operation and investment over time is required to outweigh the costs.

To address concerns raised about the implementation costs and risks, the final rule sets a transition period of three years and seven months. This reflects the shortest time that the Commission believes is possible to enable market participants and AEMO to manage the 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.

Next steps

The Commission acknowledges the breadth and depth of implementation required and therefore recommends that market participants begin transitioning to five minute settlement without delay in consultation with AEMO.

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