



16 June 2016

Ben Noone
Adviser
Australian Energy Market Commission
PO Box A2449
Sydney South NSW 1235

Dear Mr Noone

RE: Five Minute Settlement (ERC 0201)

ERM Power Limited (ERM Power) welcomes the opportunity to respond to the Australian Energy Market Commission's (the Commission) Consultation Paper on five minute settlement.

About ERM Power Limited

ERM Power is an Australian energy company that operates electricity generation and electricity sales businesses. Trading as ERM Business Energy and founded in 1980, we have grown to become the fourth largest electricity retailer in Australia, with operations in every state and the Australian Capital Territory. We are also licensed to sell electricity in several markets in the United States. We have equity interests in 497 megawatts of low emission, gas-fired peaking power stations in Western Australia and Queensland, both of which we operate.

General comments

A shift to five minute settlement would represent a significant change to the operations of the National Electricity Market (NEM). It would require drastic changes to bidding, settlement, contracting and possibly metering arrangements for all participants in the market. As such, the threshold for this change should be set relatively high. ERM Power believes that the risks and costs of five minute settlement will likely outweigh any benefits and we therefore oppose the rule change.

Sun Metals argues that there are distortions created by the difference between settlement and dispatch intervals when a price spike occurs late in the last five minutes of a dispatch interval. The Commission's Bidding in Good Faith rule change made in December 2015 aimed to address these price spikes. ERM Power considers that it is premature to consider new rule changes to address this issue considering the Bidding in Good Faith rule change will take effect on 1 July 2016. Furthermore, current arrangements enable generators to respond to high prices early in a dispatch interval which, by increasing supply, can help reduce prices over the full settlement interval. The rule change would prevent this price relief. Sun Metals' rule change proposal effectively turns every dispatch interval into the last five minutes, and only increases the risks that this brings.

ERM Power also believes that the Demand Side Obligations to Bid into Central Dispatch rule change currently under consideration by the Commission provides superior outcomes to the five minute settlement proposal from an overall market efficiency perspective.

Currently when the National Electricity Market Dispatch Engine (NEMDE) calculates the Regional Reference Prices (RRP) for the next dispatch interval it does this on the basis of a non-price responsive load forecast. Load withdrawing from the market to benefit from the five minute settlement proposal would in effect result in the dispatch interval being incorrectly priced. Had the NEMDE been aware of this price responsive load withdrawal during its calculations, a lower RRP for that dispatch interval would have been calculated. Having price responsive load bid into the market to withdraw at a known price would lead to far more efficient market outcomes than if a price responsive load is withdrawn after the price calculation process.

Sun Metals proposal also introduces asymmetry to the market by advocating for generation to be settled on a five minute basis while load would remain on 30 minute settlement, with the option of changing to five minute settlement. ERM Power believes that it is important for the market to operate equally on both the supply and demand sides as this will produce a more efficient market.

We disagree with Sun Metals' assertion that moving to five minute settlement would incentivise more fast-start generation to enter the market. In fact, the opposite is more likely. Many of the fast-start generators currently operating in or likely to enter the market require at least five minutes to synchronise from rest and then at least an additional five minutes to achieve stable loadings before being able to routinely dispatch into the market. Under a five minute settlement regime, it would be impossible to synchronise with the market in time to respond to one-off price spikes. This could result in fast-start generators withdrawing from the supply of financial risk management products. Alternatively, it could force generators who continue to offer financial products to remain online at low loading levels for long periods to avoid missing out on the high price periods that are necessary for peaking generators to operate economically. Operating at low loading levels is costly and inefficient, leading to higher costs which in turn would result in higher prices being passed through to consumers than under current arrangements.

In the submission that follows, we expand on these points and respond to the consultation questions where we have particular views.

Please contact me if you would like to discuss this submission further.

Yours sincerely,

[signed]

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To what extent does the mismatch between the dispatch and settlement intervals create risks for market participants? What is the materiality of these risks and under what circumstances are they most acute?

The fact that the NEM is dispatched and settled on different timeframes means that there are clear but manageable risks to market participants. One of the key risks is that because prices for the settlement period is the average of the six dispatch intervals, a price spike in one dispatch interval of a settlement period, increases the price for the full half-hour settlement period. This is well understood and is outlined both in the Commission's consultation paper and its analysis as part of the Bidding in Good Faith rule change which was finalised in 2015.

When these price spikes occur at the end of a trading interval, the higher price results in an increased price for any generation and consumption earlier in the trading interval. It also removes the opportunity for users to initiate demand response or for more off-line generation to come on line to help bring down prices.

As highlighted by the Commission in its Bidding in Good Faith final determination, a price spike in the final five minutes of a trading interval limits the ability of fast-start generators "to offer price-reflective hedge products to the market".¹

In ERM Power's view, the ultimate result of Sun Metals' proposed rule change would be that every five minute period would act like the final five minutes of existing trading intervals. That is, it would become much harder to dispatch demand response and fast-start generators would be unable to synchronise with the grid in sufficient time to start exporting energy into the grid. The Commission described the impact of late rebids in the final five minutes of a trading interval in the Bidding in Good Faith final determination:

*"Under this scenario, market efficiency is likely to be reduced, increasing the costs of hedging to market participants, which may again result in higher pass-through costs to customers."*²

We consider that this statement holds true and is magnified under the proposals outlined in the rule change request.

What types of supply and demand side participants are capable of responding within a five minute period? Under what circumstances can these responses occur?

Most fast-start generation is unable to respond within a five minute period if operating from rest. Even very fast start generation, able to synchronise within five minutes, may not be able to adequately respond when ramping requirements are taken into consideration. A change to five minute settlement would therefore make it far more difficult for fast-start generators to respond.

Under current arrangements, fast-start generators can generally respond to price spikes early in the trading interval as they are able to synchronise and start to dispatch energy before the end of the half-hour trading period. This situation changes dramatically under a five minute settlement scenario. In fact the risks relating to the Bidding in Good Faith rule change described above would be exacerbated for generators under five minute settlement. Fast-start generators are unlikely to be dispatched in the event of a five minute price spike as they require at least five minutes to synchronise with the grid.

¹ AEMC (2015), Bidding in Good Faith Rule Change – Final Determination, p 21

² Ibid.

There is also a risk that five minute settlement may prolong any high priced event given that each dispatch interval will be settled individually. In this case, a fast-start generator unsure of recovering its start costs from a single dispatch interval may delay synchronising and additional high priced events may result.

Consequently, in order to manage the risk of price spikes under five minute settlement arrangements, fast-start generators would potentially need to remain synchronised with the grid at low loading levels to allow them to dispatch in the event of price spikes. This is an inefficient and costly way to operate such generators and would act as a barrier to the entry of new fast-start generators and increase costs for existing plant. Higher costs are likely to flow through to consumers as a result.

Battery storage with advanced control systems could theoretically dispatch to the market almost instantaneously but this is at present a niche product in the market, operating at a small scale. It is uncertain when battery storage will be able to operate instantaneously on a large enough scale to respond to price spikes, and how the potential variability of dispatch may affect the reliability and performance of battery storage systems. It is also unclear whether the price of battery systems will decline to a point where they will be economically efficient compared to other peaking generators such as open cycle gas turbines.

On the demand side of the market, ERM Power's experience as a provider of significant volumes of demand response in the market gives us the insight to observe that there are barriers to demand response occurring efficiently within a five minute period. Typically, demand response takes some time to be dispatched, so retailers and large load may not be able to initiate demand response immediately. It often requires a manual response which means that it may take several minutes for load reductions to occur. This limits the amount of demand response that could practically occur within a five minute period.

For these reasons, ERM Power does not consider that there are sufficient demand and supply side options in the market at the present time to respond to five minute settlement arrangements.

Would the wholesale market operate more or less efficiently if supply side participants were settled on a five minute basis?

Theoretically, as dispatch and settlement timing approaches becoming instantaneous, the NEM would become increasingly efficient as supply matches demand in close to real time. Supply would be rewarded for meeting the demand which actually occurs at all times. However, there are technical, physical and economic costs to achieving this. As such, these costs are balanced against the benefits of a more dynamic and efficient market.

Given the current technology mix in the NEM, settlement on a five minute basis would result in less productive efficiency in the market. Over time, new technologies may enter the market resulting in prices that more accurately reflect the interaction of supply and demand. In the short to medium term, ERM Power believes that changing to five minute settlement will result in higher prices and greater volatility in the spot market. The market will therefore operate less efficiently as a result.

ERM Power believes that from an overall perspective market efficiency would increase if price responsive load was bid into the market and allowed the NEMDE to include this in the price calculation process.

Compared to the current arrangements, would settlement on a five minute basis be more conducive to demand side participation? How would demand side participants respond and what impact would this have on market efficiency?

ERM Power's retail business (ERM Business Energy) is currently the fourth largest retailer in Australia, and retails only to business customers. We have what is arguably the largest and most successful demand response program in the NEM, spread across all interconnected states and territories. This puts ERM Power in a strong position to provide commentary on how changes to market arrangements are likely to influence demand side participation.

Based on our experience, a shift to five minute settlement will be less conducive to demand side participation in the market. As discussed earlier in this submission, there are few loads that are able to respond to five minute price spikes immediately and for such short periods. In our experience, customers prefer to receive clear information about the expected duration, timing and frequency of demand response events. A shift to five minute settlement would make demand response harder to dispatch as it would be unclear when price spikes may occur and how long a high price event will last.

Customers may not wish to initiate several demand response events within a day, or to engage in demand response for several consecutive days due to factors such as fuel constraints, staffing levels or production requirements.

ERM Power considers that five minute settlement would make demand response less likely and as such is likely to reduce efficiency in the market.

Is using SCADA measurements a viable alternative to replacing existing metering equipment in order to implement five minute settlement?

Under the rule change proposal, metering and SCADA data measured over a half hour period would be compared and where required, adjusted and averaged to provide a settlement value for each five minute period. This process will not accurately represent the true consumption and generation patterns over each five minute dispatch interval. While overall 30 minute metering and SCADA data can be aligned, for each five minute dispatch interval the calculation would represent only the averaged error between the two over the 30 minute period.

SCADA measurements are taken by measuring instantaneous power every four seconds compared to revenue meters which measure energy over a specific timeframe. Compared to revenue meters, SCADA data is less accurate and less reliable and there is uncertainty derived from the different measurement locations of SCADA systems. This makes using SCADA data more error prone than using revenue meters. Under Sun Metals' proposal SCADA data also require modification to enable it to be translated into usable energy data over a five minute period. This goes outside the scope of AEMO's remit as the market operator.

Using SCADA data would keep the implementation costs of five minute settlement down. However in ERM Power's view this does not outweigh the risks attached to using less accurate and less reliable metering arrangements. Although Sun Metals does argue that generators could choose to install five minute metering should they wish to, this creates too much optionality in the market, which adds to the complexity. It would be entirely possible for the market to contain two classes of generators – those with five minute metering and those using SCADA data – alongside two classes of load – five minute settlement and 30 minute settlement, which again could be using either five or 30 minute

metering. This is entirely unnecessary and goes against the operations of a national and efficient market.

What changes would be required to metering infrastructure so that five minute metering data could be used in the proposed five minute settlement regime?

What changes to participants' systems would be required to accommodate a five minute data format?

Could five minute settlement be implemented without changing the existing data format?

Are there any other data sources, such as dispatch targets, that would be preferable to SCADA profiling or five minute metering?

ERM Power considers that there would be substantial changes required to metering infrastructure and systems in order to use five minute metering data. While some participants may already have the appropriate metering in place for a five minute settlement regime, others would not and would need to upgrade their meters. Furthermore, participants will need to adjust their internal systems in order to manage the six-fold increase in settlement periods were this rule change to come into effect.

There will also be flow-on effects as participants adapt bidding strategies and plant operations to factor in the effects of a five-minute settlement regime. Overall, the changes required to implement five minute settlement will add costs to the system for little clear gain.

The monetary value of energy at stake over the course of a year and the high market price cap mean that the cumulative impact of errors in measurement can be material. For this reason proper technical measurement devices must be used rather than alternatives such as SCADA profiling or dispatch targets.

Should the full value of the settlement residue be recovered from demand side participants remaining on 30 minute settlement?

Should five minute settlement instead be compulsory for all demand side participants? If so, what threshold would be appropriate for compulsory demand side participation?

Notwithstanding the fact that we do not support the rule change, any change to such a fundamental aspect of market design as five minute settlement should be applied to all participants in the market. It is neither efficient nor appropriate for the NEM to operate in a manner that allows participants to pick and choose the aspects of market design that best suits their interests.

Inefficiencies would arise through several means including the need to reconcile the difference in payments received by generators operating under five minute settlement arrangements and that paid by retailers and load on a 30 minute settlement. The difference in settlement arrangements would also provide slightly different incentives to the supply and demand side of the market which could distort outcomes.

In suggesting that settlement residue be recovered from demand side participants remaining on 30 minute settlement, Sun Metals' proposal adds costs to those unable or unwilling to participate in five minute settlement, while leaving those best placed to benefit relatively free from costs. It is logical to assume that parties who would benefit from five minute settlement would choose this option allowing them to accrue benefits while passing on the costs to those who would not benefit.

We have previously discussed in this submission how the change in settlement arrangements would increase risks for both generation and demand response resulting in a less efficient market. Maintaining two separate settlement arrangements would only add to this. ERM Power contends that it would therefore be far more efficient for both supply and demand side participants to be settled on the same basis.

How would the proposed move to five minute settlement affect existing contractual arrangements?

There is a possibility that the proposed move to five minute settlement would be a disruption event for over-the-counter (OTC) contracts. This would void all OTC contracts and result in new contracts needing to be struck. The costs of this would need to be considered against the benefits of shifting to five minute settlement.

Even in the event that it is not a disruption event for contracts, the proposal to have generators settled on a five minute basis and load on a 30 minute basis could create contractual problems for generators. This arises due to the mismatch between payments received from AEMO and payments made under contracts for difference if a generator's output isn't consistent over a half hour period.

Would the proposed optionality for demand side participants affect the ability of participants to contract with each other? Would a generator settled on a five minute basis be able to contract with a consumer settled on a 30 minute basis?

By virtue of the increase in volatility in the market, it is likely that under five minute settlement arrangements it will be far more costly and difficult to enter into cap contracts. Cap contracts are used to limit the exposure of retailers or load to high pool prices (usually greater than \$300/MWh). The cost of these contracts is largely based on the availability of providers and the probability of high price events occurring. Peaking generators generally provide cap contracts as they tend to be dispatched during high price periods. The impact of having dispatch intervals averaged out over the 30 minute trading interval means that in the event of a price spike early in the trading interval, fast-start generators can respond in time to meet their contracts. Under five minute settlement, this dynamic changes substantially as even very fast-start generators are unlikely to be able to be sufficiently dispatched for prices spikes lasting just five minutes if they have been operating from rest. This reduces the ability of generators to offer cap contracts, which is likely to result in higher prices for cap contracts if generators choose to still offer them.

ERM Power considers having customers settled on a different basis to generators would not necessarily be a barrier to contracting between the two parties. Contract markets will find a solution to any problems. It should be noted though that this difference in settlement arrangements presents an increased risk to the transaction which will result in higher costs.

What impact would a move to five minute settlement have on contract market liquidity?

We also consider that a change to five minute settlement is highly likely to reduce the liquidity of the contract market, though the extent of this is difficult to quantify. As discussed, the cost of cap contracts will rise sharply as a result of less availability and greater risks. Similarly, there will be challenges in hedging for five minute settlement periods. For instance, five minute settlement would create large risks for all generators, including baseload, in the event of a generator trip or transmission congestion event. These increased risks caused by five minute settlement will impact hedging levels and price offers.