Major Energy Users Inc.

Australian Energy Markets Commission

National Electricity Amendment (Five Minute Settlement) Rule 2016

ERC 0201

DIRECTIONS PAPER

Submission by

The Major Energy Users Inc

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The content and conclusions reached in this submission are entirely the work of the MEU and its consultants.

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1. Introduction

The Major Energy Users Inc (MEU) welcomes the opportunity to provide its views on the AEMC Directions Paper addressing a proposed rule change from Sun Metals Corporation P/L which seeks to have aligned dispatch and settlement (trading) periods of five minutes in the National Electricity Market (NEM).

The MEU has already provided its initial views on the Sun Metals proposal in its response to AEMC Consultation Paper, forwarded in June 2016. These views have been augmented and modified by the MEU active involvement in the workshops and forums the AEMC implemented to discuss the issue further.

The MEU also notes that the AEMC is concurrently assessing two other rule change proposals (from Snowy Hydro and Engie) which would also be impacted by the five minute settlement rule change. What concerns the MEU is that the AEMC initial position is that it views the 5 minute settlement proposal favourably yet this view has been derived without any detailed assessment of the impacts on the market, consumers and generators if these other rule changes were to be implemented. While the AEMC asserts that the cost of metering for such additional generators and loads might be modest[1], the MEU points out that it is not just the cost of metering that will be incurred by including these additional loads and generators in the market activities, but there will be significant operational and capital costs involved as well, further adding to the costs of the proposed 5 minute settlement rule change.

While the MEU can see there are benefits from aligning the dispatch and settlement periods, it is concerned that the AEMC has focused purely on just changing the settlement period to 5 minutes. While accepting that this was the basis of the rule change proposal, a number of responders to the review process have also suggested that the dispatch period could also be changed so that aligned dispatch and settlement periods might be longer than 5 minutes, to 15 minutes for example. That the AEMC has not even contemplated such a change has introduced significant disquiet amongst stakeholders, especially those consumers which are currently active in providing demand responses in the NEM but would be unable to provide such demand side responses should 5 minute settlement be introduced. The MEU considers this oversight needs to be addressed

1.1 About the MEU

The Major Energy Users Inc (MEU) represents the interests of large energy consumers operating in the NEM and in other jurisdictions. The MEU comprises

[1] Directions Paper page 95

some 30 major energy using companies in NSW, Victoria, SA, WA, NT, Tasmania and Queensland.

Of particular note, the MEU members include end users that have provided demand side responses to the market signals by operating with spot market exposure and load shedding when electricity prices are high. Additionally, MEU members have implemented their own generation as part of their operations to better manage their energy costs and provide demand side responses. These features provide the MEU with intimate knowledge of the reasons behind decisions to be exposed to the spot market, provide demand responses to the market signals and implement self generation – this knowledge also includes a sound understanding of the costs to implement these decisions.

MEU members are very concerned about the cost, reliability, quality and long term security of their energy supplies and therefore the MEU comments in this submission are made in full knowledge of the need for managing the tensions between these separate aspects of energy supplies.

1.2 The rationale behind the proposed change

The AEMC Directions paper comments that electricity systems are balanced in real time and this means that a market where

> "...the price provides signals and incentives for supply to be responsive to demand over the shortest timeframe practicable, will drive more efficient wholesale market outcomes [and a] more efficiently functioning wholesale market will in turn provides the benefits of lower supply costs and lower retail prices for consumers." (Directions Paper page ii)

The AEMC also notes that the practicality of responding to the shortest time frame is dependent on aspects such as IT capability, data processing, metering and the physical ability of energy producing and consuming assets to respond to the market. The MEU agrees that these market limitations due to practicality are a core issue and the MEU contends that while the AEMC has to some extent assessed the issues of IT, data processing and metering, it has not fully assessed the abilities of consumers' physical plant to respond in the shorter time frame in terms of providing demand responsiveness. Specifically, the MEU is very concerned that imposing a shorter limitation on the time generators and consumers have to respond to price signals will result in a reduction in competition in each 5 minute dispatch/settlement period.

The question then arises – is the transition to a 5 minute settlement going to deliver more benefits than the costs to make the change? As has been rightly pointed out by stakeholders in the debate so far, the costs of change are more readily identified than benefits. But so far, other than theoretical assertion that

aligning the settlement period with a 5 minute dispatch period would provide a benefit, there has been little to support the contention that there will be benefits sufficient to exceed the costs.

The Directions paper makes the observation that (page ii)

> "Aligning dispatch and settlement intervals at five minutes means that financial incentives for participants are matched to the physical operation of the market [which] provides an improved signal for the efficient use and investment in generation and demand side technologies [as] it signals the physical value of when a demand or supply response is needed by the power system, and rewards more accurately those who can deliver that response."

Overall, the AEMC asserts the proposed change will provide a market which is more responsive to the changing technologies now being introduced in to the electricity market as it will provide a price signal that can more accurately signal where more flexible technologies are required.

However, what is not addressed within the Directions paper is any assessment of the impact of the change on the level of competition that will result. The MEU points out that the concept of maximising competition (through ensuring there are sufficient supply side entities competing and where demand side entities can enhance competition through their actions) is intrinsic to the electricity market as it is competition that will drive prices to the efficient level. If this proposed change is made to the rules and it results in a reduction in competition, then this is a major concern and should not proceed.

Of equal concern, is that while the AEMC approach identifies the detriments of the change (eg potential reductions of cap contracts causing higher prices for consumers and the costs of implementing the change), it contends that these issues can be addressed through a staged transition without addressing the fundamentals of the impacts on price that consumers will face in the short and medium terms. While the National Electricity Objective is written with the focus of the long term interests of consumers, this does not mean that the interests of current consumers should be disregarded, as the actions of current consumers will impact on the interests of future consumers.

The MEU is very concerned that the Directions paper is very "heavy" on an assumption in the ability of new technologies to solve the problems being seen in the electricity market and that 5 minute settlement will incentivise investment in these new technologies. But the question still remains, will the change result in greater competition in the market.

1.3 The NEM "workable" as it currently is

While the AEMC has, in previous rule change proposal discussions, provided a view that it considers that the market as it is currently structured provides "workable" competition. The concept of workable competition recognises that there may be times when the market exhibits elements of anti-competitive behaviour where generators use the freedoms in the market to the detriment of consumers[2]. The AEMC has previously stated that the opportunity for generators to use these freedoms is limited because there is adequate competition most of the time and reflects the reality of the physical nature of an electricity supply system. The AEMC has averred that the use of these freedoms has had a limited negative impact on consumers and that changes to further limit their ability to use these freedoms for anti-competitive behaviour would be counter-productive as the further restrictions might lead to a loss of needed investment in the future.

Effectively, the AEMC approach has been to ensure that a rule change must not constrain potential future investment which is needed by the market as it is investment that occurs as needed, which provides for the competition which underpins benefits to consumers over the long term.

The MEU acknowledges that alignment of the dispatch and settlement periods has an economic purity which should result in a more efficient market but the electricity market is not merely about economics – it must also address the realities of physics and the ability of machines to provide responses to market signals. If market signals can only be addressed by a limited number of respondents, then competition will be less and the long term interests of consumers will not be provided.

The MEU points out the current market structure already delivers signals for the new technologies to be introduced as and when needed. For example, storage options (batteries, pumped storage, etc) have already been implemented in the market, as have improved techniques for combining the output of multiple small storage assets. At the same time, large wind farms and the ability to harvest solar generation have also been widely introduced, and more is forecast to occur. This reinforces the point that the current market structure already provides for the introduction of new technologies and so any change will provide a marginal increase in incentives for these new technologies. But if this change in incentive results a loss of other investments, then care is needed to ensure the change does not result in an overall detriment for consumers.

The Directions paper clearly states that the proposed change will provide better incentives for these new technologies and implicit in the paper is that other technologies will be less able (if at all) to participate in the market. If the current

[2] Such as economic withdrawal of capacity, bidding/rebidding ramp rates to maximise generator revenue, etc

market structure provides adequate incentives for both the new technologies and the existing technologies, then it must be assumed that the current market is "workable" and does not need change.

The issue that was the focus of the Sun Metals rule change proposal was the frequency at which dispatch periods 5 and 6 in the settlement period were high priced and thereby imposed costs on consumers after they had used the electricity. The "good faith rebidding" rule change introduced in July 2016 was intended to address this aspect of the market. The question then arises – has the change to the "good faith rebidding" rule delivered to address the specific concern that triggered the 5 minute settlement rule change proposal?

A review of the market since the rule was introduced shows that this specific concern would appear to have been addressed as in the time since its introduction, there is clear evidence that high prices now occur must less frequently in these later dispatch intervals. The Directions paper reinforces this observation with its comment (page 18)

> "...the Bidding in Good Faith rule change introduced in 1 July 2016, was designed to curb this incentive to create late spikes through rebidding behaviour. Initial analysis suggests that since the rule change was made, this behaviour has declined."

The Directions paper then observes that the incidence of price spikes has moved to dispatch intervals earlier in the settlement period and the 5 minute settlement rule is needed to address this change in market bidding.

The MEU questions whether this reason is sufficient to warrant the changes when the market is seen to be "workable" as it currently operates.

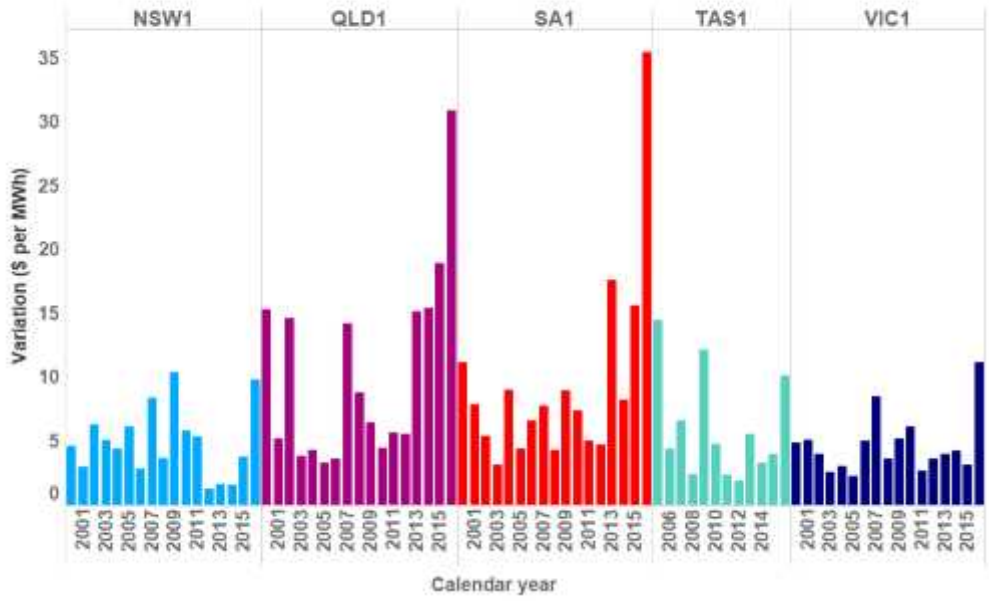
1.4 The counterfactual

To demonstrate the materiality of the problem of non-aligned dispatch and settlement periods, the Directions paper devotes considerable effort to explaining there are significant divergences between the peak price seen in a settlement period and the average price of all 6 dispatch interval prices.

It needs to be recognised that a high price in any of the dispatch intervals will still be a high price for all consumers, however it is caused. A shortcoming in the Directions paper is that there is no assessment which looks at whether the rule change will change the dynamic which sees the high price in one dispatch interval and, if the same conditions continue, for the high price to continue into subsequent dispatch intervals.

The analysis that is undertaken highlights that in Queensland and SA regions particularly, there appears to be significant divergences between the highest dispatch price and the settlement period price and the Directions paper asserts that this needs to be addressed. The extent of this differential is shown in the Directions Paper figure 3.2.

Figure 3.2 Average annual variation by region (2009 to 2016)



The Directions paper points out that a low divergence indicates that the 30 minute settlement period is providing an acceptable outcome. The AEMC comments (page 24)

> "...the difference provides an indication of whether at any point in time the five minute dispatch price is a reasonable reflection of what participants will pay or are being paid. A smaller difference suggests that the 30 minute trading price is providing a good incentive for participants to respond to what is required in the power system on a five minute basis. Alternatively, a larger difference signals that the trading price associated with the 30 minute settlement outcome no longer provides a good signal of what is required on a five minute basis. That is, the 30 minute settlement is distorting the price signal for the efficient operation, use and investment in generation and demand response technologies in the NEM."

The Directions paper observes that there are regional divergences but what is not addressed is whether the causes of the divergence in SA and Qld regions might be caused or amplified by factors other than 5 minute settlement. For example, the high divergences are just as likely to be caused by issues such as the low generator competition that exists in the SA region and the significant

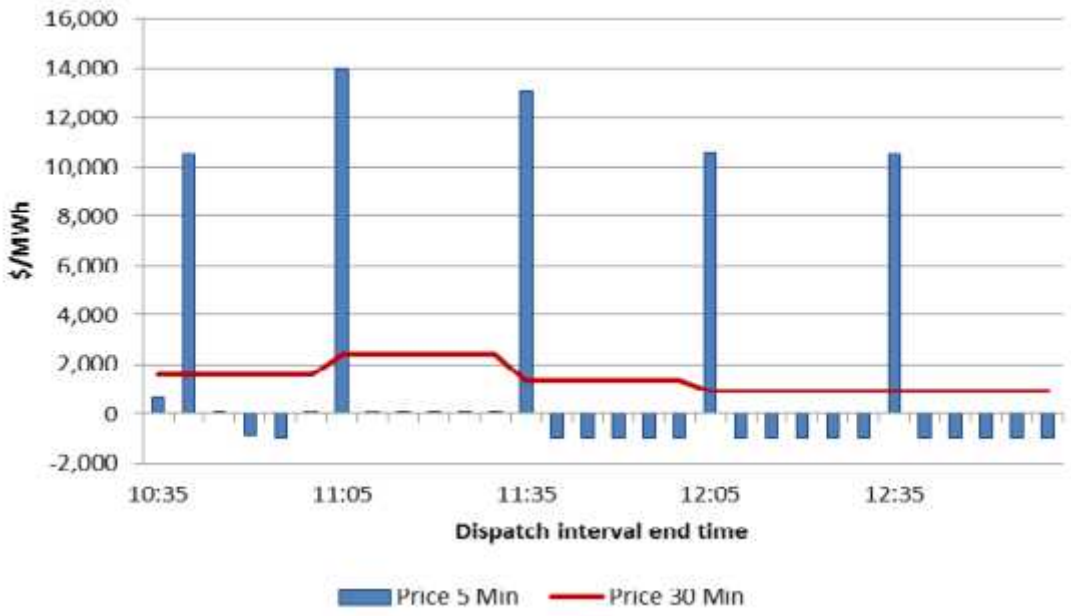
transmission constraints frequently seen in the Qld region. While the Directions paper asserts they reflect the misalignment between dispatch and settlement, they are just as likely to be caused for other reasons.

What is concerning about the AEMC assessment is that there is no attempt to explain why there is such divergence in two of the regions (SA and Qld) compared to the other regions which also operate under 30 minute settlement. If the issue relates to a market design issue, there is an expectation that all regions would show similar outcomes but this is not the case. If there are other causes of the divergence, the AEMC should be looking to address these rather than impose considerable costs on those regions where the market is demonstrably workable and the move to 5 minute settlement will not result in significant benefit.

The Directions paper also comments that across the NEM the trend exhibits and increase over the past 4 years. While this is true for SA and Qld, the MEU disagrees that the trend is increasing as the chart clearly shows that, in other regions, the divergence in the earlier years of the NEM was just as high as it is now. This reinforces the view that there are other causes to the divergences than the misalignment.

The Directions Paper carries out deeper analysis for SA region where there has frequently been observed a high price in the first and second dispatch periods which does not carry on to subsequent dispatch intervals. The Directions paper points to responses where there is “piling in” of generators in later periods in order to benefit from the earlier high price. This is shown in figure 3.4 of the Directions paper.

Figure 3.4 21 March 2017 South Australia prices



The Direction paper asserts that (page 26).

> "...this bidding behaviour has the potential to significantly distort operational, usage and investment incentives, creating productive, allocative, and investment inefficiency."

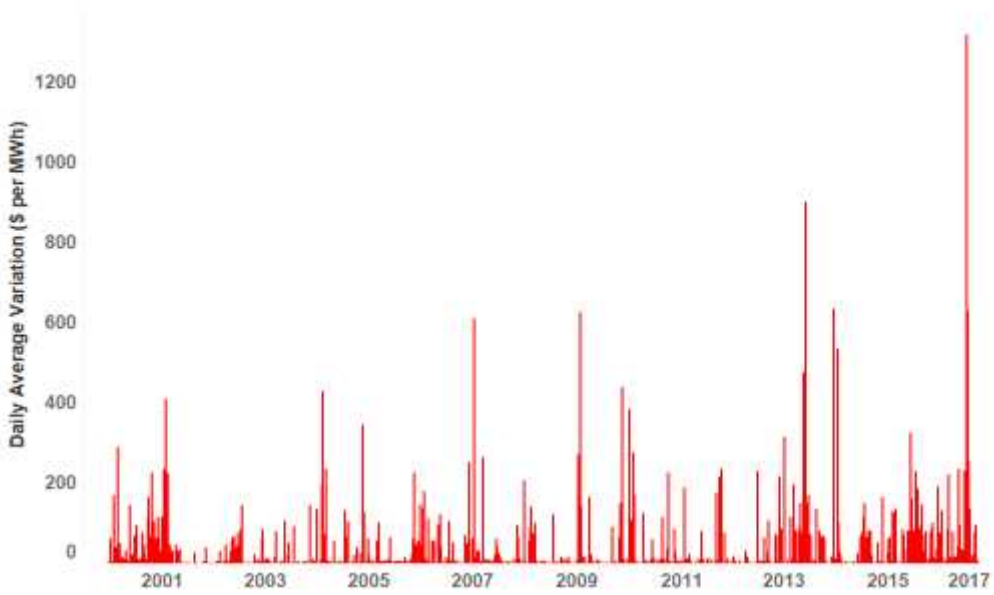
While the bidding behaviour might have the potential to distort the economic purity of the outcome, the MEU contends that the outcome is a result of greater competition which occurred to deliver lower prices to consumers.

What the Directions paper fails to do is assess is, in the absence of the "piling in" by generators and demand side responses to the high price seen in the early dispatch intervals, whether the same high price would have continued for subsequent dispatch intervals if this action by generators and consumers had not occurred. The MEU does not consider that the "piling in" by generators and consumers is inefficient but is a market response leading to increased competition and a reduction in the price to consumers.

For example, an alternative to the "piling in" after the high priced dispatch interval would be that there is no response from faster start generators and demand side responses occurring. Without this "piling in", this would mean that as well as paying the high price for the first dispatch interval, consumers could well be paying the same price for the subsequent dispatch intervals because there was no increase in competition. So rather than consumers paying for a high price for just one dispatch interval, they end up paying multiples of the same high price for subsequent dispatch intervals as well. So in the same 30 minute period, the average price will be higher as a result of the loss of the "piling in" approach currently seen.

The Directions paper uses a chart of the daily average variation in prices in the SA region to support its contention that a better outcome would be 5 minute settlement.

Figure 3.3 Daily average variation (SA, 2000 to 2016)



The AEMC asserts that this chart supports its view that there is an increase in inefficiency as it exemplifies the "piling in" problem. The MEU disagrees. In fact the chart shows the impacts of the low competition that has been a feature of the SA region since the NEM commenced, particularly in terms of the low volumes of base load generation capacity the region has had in the past and which is even now worse with the closures of both coal fired power stations (Playford and Northern).

The MEU points to the high differentials in 2000 and 2001 were a direct result of low competition that was (at least in part) addressed by the government decision to incentivise the building of Pelican Point CCGT plant. Subsequently the problem reappears in more recent times, coincident with the closures of Playford power station and an even stronger response after the closure of Northern power station.

The trend identified by the AEMC could well be attributed to causes other than not having 5 minute settlement. This assessment is supported by the observation that base load generation competition was and still is consistently stronger in Victorian and NSW regions than in the SA region and the same problem (or divergence) is not exhibited in those other regions.

In particular, the MEU points out that in the SA region, there is little capability on the demand side to provide demand reduction within a 5 minute period[3]. What

[3] Typically, there is a dearth of fast response demand side plant such as aluminium smelters and electrolytic processes in SA but which are a significant part of the demand mix in Victoria, NSW and Tasmania.

typically happens in SA region is that the demand side needs more time than five minutes to load shed safely, but what does occur is that the load shedding is in response to the high demand that caused the price spike. What is often overlooked is that demand needs a strong incentive to shed load as load shedding operations incur significant shut down and start up costs and these costs need to be recovered. With a move to 5 minute settlement, the bulk of demand side load shedding will not occur because there will be no certainty of recovery of at least some of the costs of load shedding.

What is particularly important to note is that the SA regional outcome is not a feature of bidding that is observed in other regions, especially Victoria, NSW and Tasmania. The MEU considers that the outcomes observed in the SA region are a result of:

- the very low competition existing in the SA regional market
- the extreme peakiness[4] in demand that SA region experiences
- a feature of the physical constraints inherent in the generation mix
- a market which exhibits considerable volatility in demand frequently caused by weather changes,
- relatively low base load generation relative to the average demand,
- a large fleet of OCGT peaking generation in relation to average demand, and
- consumer assets which can only provide demand side responses over a time period greater than 5 minutes

The MEU considers that the outcomes observed in SA and Qld regions need to be examined in much more detail than the limited oversight provided which is predicated on the assumption that 5 minute settlement will address the much wider problems that exist in the NEM, especially in the SA and Qld regions.

1.5 Materiality of the issue

The focus of the assessment of materiality detailed in the Directions paper is that there are significant differences between prices seen in one dispatch interval and average price for the 6 consecutive dispatch intervals that make up the settlement period. The MEU points out that this is not an issue of materiality when considered in context of what consumers see.

If there is a spike in any of the dispatch interval in a settlement period, and the prices for all other dispatch periods are much lower, the cost to consumers is the same regardless as to whether there is 5 minute settlement or 30 minute settlement when the prices for six consecutive dispatch intervals are summed for an average 30 minute price.

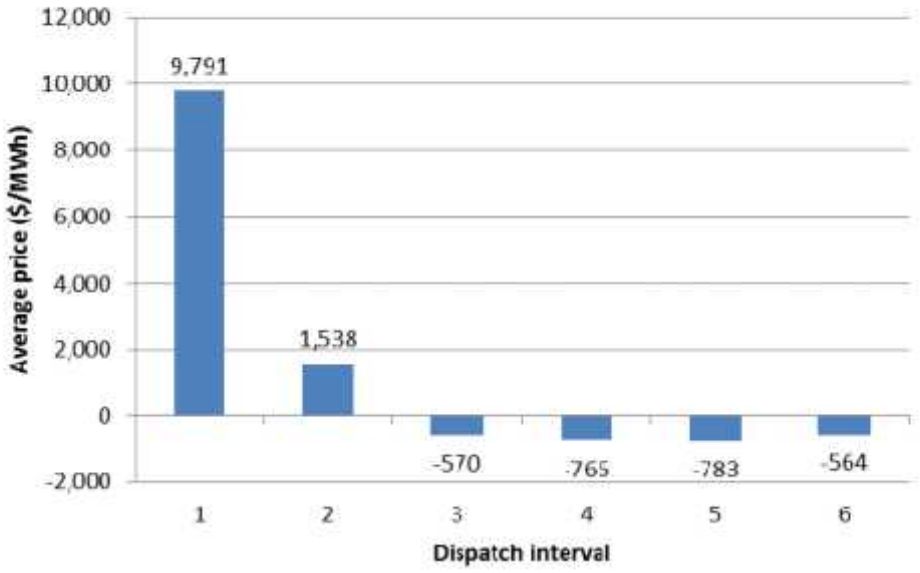
[4] The relative few very high peaks in demand relative to the average demand in the region

What is important to consumers is whether the high price in one dispatch interval continues into subsequent dispatch intervals. Under the current 30 minute settlement, competition in subsequent dispatch intervals is incentivised thereby reducing prices in these subsequent dispatch intervals. In turn, the outcome of this increased competition in the subsequent dispatch intervals increases the size of the initial high price relative to the settlement price. Effectively, the high differential that the analysis by the AEMC is based on actually reflects the **benefit** that the 30 settlement period process provides to consumers rather than a need to reduce settlement periods to 5 minutes.

If increased competition in subsequent DIs does not occur, then there is a much stronger expectation that the same high price will continue in subsequent dispatch intervals. This will occur because under the 5 minute settlement approach there is no incentive for increasing competition in subsequent dispatch intervals. This means that the high price could well continue for multiple dispatch intervals because of reduced competition able or willing to be dispatched. While a continuing high price would result in a lesser differential when measured over the 6 consecutive dispatch intervals that is the settlement period, the price impact on consumers would be significantly higher but the differential lower. The MEU considers that the analysis undertaken by the AEMC does not reflect the impacts on consumers.

In contrast, the materiality of the issue (or rather the lack of it) would be better served by analysis of the frequency that high prices move from one dispatch interval to the next. This is typified in figure 3.5 from the Directions paper

Figure 3.5 21 March 2017 South Australia average dispatch interval prices



While the Directions paper points to this chart showing the problem that 5 minute settlement would solve, the MEU considers that it really shows that the increase in competition in subsequent dispatch intervals after there has been a price spike, and this results in a considerable benefit to consumers as the increased competition drove prices lower in the subsequent dispatch intervals.

If there had been 5 minute settlement, the question then becomes one of whether there would have been lower prices in the subsequent dispatch intervals. If there is reduced competition in the subsequent dispatch intervals, it is more likely that the high price will continue. In contrast, as there is an inherent incentive for generators to offer capacity and consumers to reduce demand subsequent to a high priced dispatch interval early in a 30 minute settlement period, this leads to overall lower prices for consumers over 6 consecutive dispatch intervals that comprise the 30 minute settlement period. 5 minute settlement would remove this incentive and thereby reduce competition.

The MEU notes that the later in the 30 minute settlement period this incentive reduces for responses that require more than 5 minutes to respond. But under 5 minute settlement there is even less incentive for responses that require more than 5 minute response time.

From a consumer point of view, the fact that there is little carryover of the high price in one dispatch interval to the next shows the benefit to consumers of the 30 minute settlement rather than the reverse.

1.6 It is all about competition

The MEU considers that the move to 5 minute settlement will result in a loss of competition in each dispatch interval.

While the theory of the market is that as demand increases, each generator will be dispatched in the merit order of each generator's short run marginal cost of production and so the price for each dispatch interval will increase with increasing demand. In practice, dispatch does not occur in line with merit order of short run marginal costs and high prices can be seen even when demand is low. This means that forecasts of demand are not necessarily the main driver of the price that will be seen in each dispatch interval.

A high price in a dispatch interval is a response to the inability of the generation dispatched for a specific dispatch period to meet the forecast demand, resulting in a small amount of additional but high priced generation being needed to match the actual demand. While 5 minute settlement might incentivise faster start generation to be available within a dispatch interval (and so lead to a lower price in that dispatch interval) the capital and operating costs of such plant (eg a

battery) indicate that high prices will still occur in the initial dispatch interval[5]. The MEU is concerned that a move to 5 minute settlement will result in lower competition in dispatch intervals subsequent to the high priced interval because 30 minute settlement provides an incentive for generators and load to offer supply and/or load reduction in response to a high price signal in a previous dispatch interval.

The MEU points out that the 30 minute settlement actually does reduce the prices in dispatch intervals subsequent to a high price dispatch interval and this is shown in Directions paper figure 3.5 (shown in section 1.4 above).

The 2016 Electricity Statement of Opportunities (ESoO) published by AEMO shows the following mix of existing generation across the NEM reflects the following basic mix. Of the 48.7 GW of currently installed generation in the NEM, 51% is coal fired, 23% is gas fired (with 13% being fast start open cycle gas turbine generators), 0.5% is solar driven, 8% is wind driven, 16% is hydro, 1% is biomass and 0.5% is other.

This analysis of the existing mix of generation in the NEM shows that a move from 30 minute settlement to 5 minute settlement will significantly reduce the amount of generation that can respond within a 5 minute settlement period. While the AEMC identifies that there is plant that can synchronise and provide load very quickly, the introduction of such plant into the generation mix is expensive and will have to be added to the fleet. A direct outcome of adding to the fleet of generation will be for existing plant to become redundant, resulting in higher costs for consumers[6].

Particularly, it is the open cycle gas turbine and hydro generators that provide fast responses to increases in demand that cannot be managed by those generators already dispatched. The MEU notes that between 90% and 100% of all generation in the NEM, and which can be dispatched at call, cannot be safely and consistently dispatched to provide firm competition within a 5 minute dispatch interval[7].

When there is a high priced dispatch interval, this is a result of low competition within that dispatch interval as the high price is not reflective of the short run marginal cost of generation. The prime risk to consumers is if this condition of low competition continues into subsequent dispatch intervals. The AEMC

[5] For example, the capital cost for a battery based on current costs implies that a battery will require in excess of $1000/MWh/day in addition to the cost of the electricity it buys for charging up the battery

[6] Noting that consumers effectively underwrite the addition of new plant, pay for the costs of existing plant and will have to pay for the book value of generators with remanning lives which are made redundant

[7] Generally, these fast start types of plant cannot be dispatched safely from cold to provide significant output within a 5 minute window

asserts that this lack of competition can be addressed by the introduction of very fast start plant[8] that can be called for within each dispatch interval.

However, the MEU points out that currently the market has little of these plant types in the NEM. The import of this observation has two facets – that of the cost to consumers that underwrite the investment in this new type of plant, and the impacts on prices until there are sufficient of such plant in the NEM to make a difference. This means that consumers will face significant increases in prices due to the lack of competition in each 5 minute dispatch interval for some period of time after the rule change is implemented.

Further, while the AEMC highlights that batteries and other common storage technologies can provide fast responses because they can discharge within short time frames, what this observation fails to recognise is that rechargeable technology[9] faces a significant cycling problem[10] and that this cycling will have an impact on the life of the equipment and its ability to provide required responses to the market. This full cycle duration and expected number of cycles of the equipment are critical elements as to the usefulness of the technology and the physical quantities of such plant that will be needed to replace the plant already operating in the market.

Offers from batteries and those demand side users able to provide the benefits of thermal inertia (such as shopping centres and cool stores) are limited in how long they can provide support to the market. Once discharged, batteries have to recharge before they can be used again and if they recharge at times of high demand (and potentially high price) this increases the problem of high prices; thermal inertia has a limited life before the load has to return, potentially further exacerbating the need to continue a high price for subsequent dispatch intervals.

For example, consider a battery that is used to provide competition and there is no competition from an open cycle gas turbine generator in the subsequent dispatch intervals. If the high priced interval is DI-1, then the battery will be used in DI-1 and be discharged. In DI-2, the general demand remains the same except for the increase to recharge the battery. The price in DI-2 will not affected by other generators “piling in” because there is no certainty that they will recover the costs from being dispatched but the price could increase because of the additional load from the battery recharging. The price in DI-3 is set by the recharged battery which has to sell its electricity at the price of DI-2 plus its capital recovery, which means that DI-3 has a higher price than DI-2. The outcome of this cycling is that the battery would perpetuate the high prices seen in DI-1 across the market.

[8] Such as batteries, fast start diesels, extra fast start gas turbines, pumped hydro
[9] For example, batteries and pumped hydro
[10] That is the period between being fully charged, discharging and returning to full charge

In practice, the MEU does not consider that this battery discharge/recharge sequence would occur, but to avoid it, there would be needed multiples of batteries each of the same size as the generators currently "piling in". This means that the total cost of replacing the OCGT generator made redundant by the rule change would be many times the cost of the OCGT generator[11].

In addition to the loss of supply side competition in subsequent dispatch intervals, there will be a loss of competition from the demand side of the market. As the Directions paper points out (page 49), consumers do provide a response to market signals (high priced dispatch intervals). The analysis by Oakley Greenwood for the AEMC points out that there is already an estimated 2500 MW of demand side responsiveness to the market, of which only 10% could respond within a 5 minute dispatch interval, although 70% can respond within the 30 minute settlement period. The MEU agrees that little demand side plant has the ramp rates to provide a response within 5 minutes.

The CoAG Energy Council, the AEMC, the AER and AEMO have all devoted considerable resources to providing incentives for the demand side to respond to market signals and thereby provide a counter to the dominance of the supply side in the electricity market. What 5 minute settlement does is to massively reduce the numbers of demand side entities to respond to market signals.

The MEU is aware of the key properties that the demand side entities would need to be able to safely respond to 5 minute settlement. Thermal inertia (as available to aluminium smelting, air conditioning and cool stores) and electrolytic processes are typical of such properties. What needs to be recognised that these properties suffer from cycling issues too where the time available to provide a response is limited (eg a shopping centre could only reduce demand for a short period of time before having to restart with a higher load than before it cycled down). The MEU is also aware of the potential for aggregating multiple distributed batteries using new IT technologies but such technologies rely on the considerable investment to provide the multiples of batteries.

To provide a demand side response is not costless and this cost has to be recovered from the electricity market in some fashion otherwise the demand side response will not be made available. The 30 minute settlement provides such an incentive but there would be little incentive to the majority of end users to provide a demand side response under a 5 minute settlement period due to the uncertainty of there being sufficient reward in subsequent dispatch intervals.

The MEU is very concerned that the Directions paper provides little analysis as to the impact of the proposed change on demand side responsiveness to the

[11] While pumped storage might address some of the issues that batteries present, there are limited sites for large pumped storage on most regions. To rely on pumped storage from locations where it is possible, will require significant investments in transmission capacity.

market, especially as there has been so much attention given to encouraging this since the introduction of the Power of Choice program in 2012. What is further necessary is to assess the impact of this loss of demand side responsiveness in terms of what additional investment would be needed on the supply side to offset the impact of the loss of demand side responses.

To provide the competition necessary to limit the loss of competition in dispatch intervals subsequent to a high priced dispatch interval, there will have to be massive investment in new equipment to offset this loss

This raises the question – will 5 minute dispatch provide a greater incentive to invest in all aspects of the supply side and demand side? The MEU considers that there will only be an incentive to invest in plant that can be dispatched within 5 minutes and plant requiring longer time to provide a response will be disincentivised. Just as importantly, the move will result in less demand side responsiveness in the market.

1.7 A change to 5 minute settlement is not technology neutral

The AEMC highlights that their decisions should be technology neutral as this is a design principle inherent in the National Electricity Rules. The Directions paper asserts that (page ii)

> "Five minute settlement provides an improved price signal that would be technology neutral."

The MEU does not agree.

In its final decision on the rule change proposed by the AER regarding ramp rates of generators (ERC 0165) the AEMC highlighted that increasing a ramp rate requirement discriminated against some generators and therefore the increased ramp rate was not technology neutral. In that decision the AEMC commented (footnote 10 of the final decision):

> "In this context, technology neutrality means that, to the greatest extent possible, the NER should not advantage one technology type over another. As set out in section 3.1.4(3) of the NER, one of the market design principles of the NEM includes "the avoidance of any special treatment in respect of different technologies used by market participants"."

The Directions paper quite clearly sets out that it recognises that 5 minute settlement will prevent existing OCGT generators from being able to bid within a 5 minute period due to the time needed for them to synchronise and then ramp up. Further, although some existing plant might be able to be dispatched safely within a 5 minute window, it needs to be noted that such a fast start places

significant stresses on most plant and the more frequently such high ramp rates are imposed on equipment, the faster the plant wears out and requires more frequent and intensive maintenance.

The Directions paper points out that fast start diesel and the very latest of gas turbine generators might be able to provide some output within 5 minutes and that batteries will be able to deliver well within a 5 minute window. While some hydro generators might be able to be dispatched within a 5 minute window not all will be able to respond this quickly, especially from a shut start. Certainly the bulk of demand side users will not be able to load shed safely within a 5 minute window.

Changing the rules on the assumption that 5 minute settlement is more efficient provides battery providers an advantage that enhances their investment and detracts from the investments made in fast start plant which cannot comply with 5 minute settlement. If the rule change provides an active incentive for one technology to be more dominant in the market and for another to be actively prevented from participating in an efficient manner, the MEU questions how such a change can be classed as technology neutral.

In practice under 30 minute settlement we are seeing the introduction of new technology (eg batteries and better coordination of distributed small plant) and this is increasing competition.

As this introduction of new technology is already occurring under the 30 minute settlement arrangement but under 5 minute settlement we see increased incentives for new technology but the loss of other conventional generation as a result, the MEU does not agree with the AEMC that the move to 5 minute settlement is technology neutral but in fact provides a clear benefit to new technology options

1.8 The costs will be greater than implied in the Directions paper

The Directions paper implies that the costs involved for the change will be mainly in terms of the IT and metering requirements (page ii).

> "The reasons for adopting the different periods of five minutes for dispatch and 30 minutes for settlement at the inception of the NEM were limitations in metering and data processing in the 1990s."

This might be partly true but the MEU suspects that the actual practice of the NEM operations would probably show that there are significant other benefits from 30 minute settlement that have emerged over time. While new data processing technology has improved remarkably in past years, the need for 30 minute settlement is also a function of physics and the ability of generation

technology and consumer demand response to provide a response to price signals.

The 2016 ESoO identifies that there is already some 6400 MW of open cycle gas turbine generators operating in the NEM along with some 4 GW of hydro generation. Because of the ramp up times for this generation, it is probable that much of this plant will not be able to provide the fast start generation needed in a 5 minute settlement period and the Directions paper concedes this. Further, with the lack of any reward to be dispatched in subsequent dispatch intervals, it is probable that this plant will not respond to high price signals in a dispatch period and so limit competition in subsequent dispatch intervals. The Directions paper considers that the only reason that generators “pile in” after a high priced dispatch interval is because there is an incentive to o so. With the loss of this incentive, the Directions paper implies that these generators will not continue the practice of “piling in” as there would be no reward to offset the costs involved in being dispatched

In other words, this means that, unless they are already dispatched, a move to 5 minute settlement will remove the incentive for the 6.4 GW of OCGT generation and a significant proportion of 4 GW of hydro generation from participating in the market in the most effective manner their operation allows.

To provide sufficient competition within each 5 minute settlement period, 8-10 GW of this fast start plant will have to be replaced with the new super fast start sources of power to provide the needed competition in each dispatch interval to reduce the numbers of high priced dispatch intervals and to prevent a flow on from one high priced dispatch interval into subsequent intervals.

New faster start generators (such as fast start diesel engine driven and super fast gas turbine generators referred to in the Directions paper) might well be able to deliver some of the needed generation into the market within a 5 minute window but at the same time will increase the total cost of the generation fleet in the NEM. Additionally, they will also face higher operating costs as faster cycle times and ramp rates increases the stresses on the plant and therefore lead to reduced lives and increased maintenance costs.

The addition of this super fast plant will require a considerable investment to replace the many OCGT generators that are already installed in the market but which will be made basically redundant by the change as they cannot operate effectively within the 5 minute window.

The cost to replace 6.5 GW of OCGT generators and perhaps a similar amount of hydro generators will impose a considerable impost on the NEM. For example, these new diesel and super fast OCGT generator sets will cost at least $1m per MW in capital cost, implying that the market will have to fund maybe $10 Bn of new generation capability (along with significant associated

network costs for their connection) if the existing OCGT and some hydro generators are made redundant due to the proposed rule change. While it might be argued that these costs will be borne by the providers of this new plant, in reality the cost will be underwritten by and recovered from consumers. While the AEMC comments that the existing fleet of generators is aging, it is primarily base load generation that will need replacement in the near to medium term, and this new super fast start plant will replace the existing fast start plant which is much younger and still have significant economic life left.

An alternative to this replacement would be for a significant part of the OCGT and hydro generator fleet to be operating continuously on line, even if they are not generating. The cost to the market for this what is essentially standby will be significant and will have to be recovered from consumers in the event that they do get called so increasing the prices they have to offer.

It is also important to note that should the existing fleet of fast start plant made redundant by the new technology, then the undepreciated capital costs will have to be recovered from somewhere. As most OCGTs are held by the main retailers operating in the market, they will be able to recover this cost from consumers.

It is also important to note that rechargeable technology operates on an arbitrage basis in that it buys electricity at one price and will deliver probably less than this amount back to the market at a later stage[12]. In an energy only market, this means that the rechargeable technology plant has to recover its capital cost as part of the price of the electricity it subsequently sells. This means that the prices offered must include the cost of the electricity it purchases plus the cost of capital plus the cost of the loss of efficiency in conversion. As noted is section 1.6 above, this means that once the plant is discharged, it either cannot provide electricity in subsequent dispatch intervals or has to recharge by buying in subsequent periods. This means that it **increases** demand in subsequent periods thereby adding to the price pressures in subsequent dispatch periods or it is not available to address any price issues in the subsequent dispatch intervals.

Batteries only arbitrage electricity prices. So in addition to a capital recovery cost, their price offers are based on the cost of the electricity they buy when recharging. In a volatile market, recharging times prevent batteries from being consistent players and if they recharge when prices are high, they will have to sell their output at even higher prices to recover their capital cost. The effectiveness of the full cycle periods and the number of cycles they can undergo before replacement also need to be assessed as part of the life time cost of the equipment and the impacts they make on the market.

[12] For example, pumped storage is only 60-70% efficient, although batteries are more efficient

As is noted in the Directions paper, one facet of the new information technology that is seen as part of the solution to increased volatility in the market, is the ability to combine many diversely located batteries installed by residential users to back up their rooftop PV. What is important to note that this investment has already increased costs to other end users in the market through the transfer of costs from those keen and able to address high prices to those that cannot invest through either lack of resources or other circumstance. This raises the question as to whether such investment is efficient when seen across the market rather than from the viewpoint of a specific user[13]. Either way, the cost to the market as a whole is increased.

So at a very high level, consumers will have to fund the new technologies such as batteries and fund the plant that is made redundant. This is already being seen where consumers are funding the renewable generators which is displacing lower cost coal fired generators which are being shut early (eg SA region Northern station) or because of age (eg Victoria's Hazelwood).

Investors providing the new technology will not provide the new super fast plant until they can be certain they will recover the value if the investment. The outcome of this observation is there will be period of time when the rule change is in operation but the new super fast plant that is the enable the change to operate efficiently will not be available. The MEU is concerned that the investment in the new technology will occur over the medium term and in the intervening period, consumers will be faced with a market that does not allow the existing generation fleet to operate efficiently or for the demand side to participate, resulting in significantly higher prices for an extended period. This will impose a considerable cost on consumers as they wait for the new plant to be installed to moderate prices.

The Directions paper points out that in the short term there will be an increase in prices, particularly from the significant reduction in the availability of price cap offers which will reduce liquidity in the supply of these caps but will also increase their price. This is another cost that has to be included in the cost benefit analysis that AEMC should undertake when assessing the benefit of the proposed rule change.

The Directions paper comments that alignment of dispatch and settlement will be (page ii)

[13] The capital cost of the PV and battery is incurred by householders who justify the PV/battery investment on the delivered cost of electricity which includes the cost of networks as they currently pay only on energy delivered. The MEU considers that once residential owners are charged appropriately for the networks they use (even if only occasionally), the cost of distributed PV and batteries will become less attractive.

> "...technology neutral [promoting] productive, allocative and dynamically efficient outcomes by encouraging efficient operation in generation, use of energy services, and innovation and investment in an appropriate amount of flexible generation and demand response technologies [resulting in] efficient mix of generation assets and demand response technologies over time leading to lower supply costs, [benefitting] consumers as reduced wholesale electricity costs flow through to retail prices."

While the MEU does not necessarily support this contention, it does raise an essential question – but at what cost? The MEU considers there are many cost elements that the rule change will impose on consumers than that of changing data processing and metering that the Directions paper focuses on.

1.9 Metering and profiling

The stated purpose for reducing the settlement period from 30 minutes to 5 minutes is to implement better signalling for the market so that it operates more efficiently. However, for the demand side to use the signals efficiently they have to see what changes they make in their usage patterns will provide a benefit to them by making the change in usage.

While larger users tend to have meters that can be read every 30 minutes (ie the settlement period), the vast majority of end users use small amounts of electricity and have type 6 meters that are read every 3 months and record the volume of electricity used between meter reads. All consumers in Victoria and some small end users in other regions do have type 5 meters which can be read more frequently.

30 minute settlement is essentially a compromise outcome to balance between the 5 minute dispatch and a need to send some price signals to consumers that might not otherwise see these signals for up to 3 months. The MEU also notes that even though there are price signals provided in the electricity market, research by Energy Consumers Australia, QCoSS and Business SA[14] implies that potentially up to 65% of residential and small business consumers[15] are either electing not to respond to price signals or unable to implement **all** of the various options to respond to market signals to reduce their costs with a lower proportion unable to implement **any** of the options perceived to be available.

If such a large proportion of consumers are unable or unwilling to utilise the signals provided by the market, for whatever reason, the value of such

[14] Reported by ECA, QCoSS and Business SA at the ECA Foresighting Forum 2017 (20/21 February 2017).
[15] Such cohorts would include the aged, technology challenged, those on low incomes, renters (both residential and business), those with little available cash to invest in solar, batteries, etc

signalling must be assessed in more depth, as it is an assumption by the AEMC that signals are the driver for its view on this rule change proposal.

This is particularly important as it is the large number of small users that provide the bulk of volatility in the NEM[16] as those small users have a usage pattern that is quite weather dependent. To address the long periods between meter reads and the current 30 minute settlement period (and a lack of appropriate metering) the usage of these many small consumers is profiled back to 30 minute periods. While this profiling can be extrapolated to 5 minute settlement, it is still an approximation of the usage each small end user actually incurs.

As the purpose of 5 minute settlement is to be more efficient, the assumption is being made that small consumers will respond to the more accurate price signals provided. Yet the many small consumers never see the relationship between their actual usage and the price signals generated on a 5 minute basis, yet it is these consumers that must change their usage pattern to address the weather dependent variances in the NEM demand. If these consumers never see the 5 minute dispatch price or the new 5 minute settlement price, where is the value to them of moving to 5 minute settlement as an incentive to respond to the more "efficient" price signal?

Further, while those small consumers with type 5 metering could potentially gain a benefit from responding to 5 minute settlement prices, it is obvious that even under 30 minute settlement there are not clear benefits from responding to price signals as the offerings from retailers to residential consumers rarely (if ever) reflect the usage pattern that each residence has[17].

If there are no benefits available to residential or small business users from responding to price signals where is the value of more efficient price signals to those consumers that have such a big impact of the NEM?

1.10 Summary

The initiation of the rule change arose from a concern expressed by an end user at the way some generators were using the dispatch process to spike dispatch prices at the end of a settlement period. While this issue appears to have been resolved by the introduction of tighter controls on the "bidding in good faith" provisions, the AEMC then widened the scope of the rule change proposal to examine high priced spikes at other times within a settlement

[16] It has been consistently stated that the prime cause of volatility in the NEM is driven by the ever increasing numbers of residential air conditioning units in the NEM to address high temperatures on the mainland and low temperatures in Tasmania. The MEU also notes that the increasing penetration of residential rooftop solar PV is also a contributor to NEM demand volatility.

[17] For example, see the energymadeeasy government website for details of retail tariff offerings

period. The AEMC asserts this analysis shows that the outcomes of the mismatch are material and need to be addressed. In contrast, the MEU analysis of the same data is that the issue is less material than the AEMC asserts.

The Directions paper asserts that (pages 16 and 17)

> "Aligning dispatch and settlement intervals at five minutes means that financial incentives for participants are matched to the physical operation of the market, over the shortest practicable timeframe. This provides for an improved price signal for the efficient, operation, use of and investment in generation and demand-side technologies. Importantly, by rewarding those that can deliver a response within the dispatch period, it also signals the physical value of when a demand or supply response is needed by the power system. This enables the market to deliver enough generating plant or demand response to meet the demand and supply balance."

The MEU recognises that there are inefficiencies in the NEM (including the lack of alignment between dispatch and settlement but it has been accepted that inefficiencies are tolerated because the cost of removing the inefficiencies is too great compared to the benefit the improved efficiency might provide. Many of the inefficiencies in the NEM reflect physical constraints (such as ramp rates) of equipment that is used to deliver electricity to consumers at the overall lowest cost. The MEU considers that the inefficiency inherent in 5 minute dispatch and 30 minute settlement is one such inefficiency.

The MEU notes that the Directions paper devotes considerable effort into explaining how new technologies can provide an option to allow the market to operate within 5 minute settlement yet the assumptions made to support this contention do not examine the way such plant will have to operate. Observation by the MEU on the operations by the new technology highlights that higher costs than those implied by the AEMC will be seen in the market.

In contrast the AEMC devotes considerable attention to the inability of existing plant to be able to operate efficiently with 5 minute settlement and that the way it currently does is inefficient. The MEU provides a view that this supposed inefficiency actually does provide a clear benefit to consumers through increasing competition in dispatch intervals subsequent to a high priced dispatch interval causing much lower average prices than might otherwise have occurred.

There will be increased costs through less efficient operations of existing plant for it to operate in a 5 minute settlement regime, and from the actual processes needed for the new super fast plant to provide responses and to cover for the loss of demand side participation.

The MEU particularly draws attention to the reality that moving to 5 minute settlement will reduce the ability of the demand side to participate in the market as the vast majority of consumers will not be able to safely provide a response within 5 minutes. So not only will there be reduced competition amongst the supply side entities in each 5 minute settlement period but this will be amplified by the loss of demand side responses. This loss of competition will increase prices in the market.

At a high level, investment in the electricity market imposes a cost on consumers. If new investment matches the rate of depreciation of existing plant, assuming static demand, then this new investment does not impose a cost to consumers. If the new investment is faster than the depreciation of existing plant (again assuming static demand), consumers will see increased costs in the market. The move to 5 minute settlement will require significant new investment despite there being no growth in demand. This will result in an overall cost to consumers to fund this new investment. The costs to consumers will be further increased as plant owners will seek to recover the "book" value of the plant that is effectively made redundant through early retirement.

The NEM is structured so that it provides incentives to maximise competition and so drive prices to the efficient level. The AEMC points out that 5 minute settlement will provide an incentive for new technology plant to enter the market and but what is also implicit in the paper is that other technologies (generation plant already in the market and demand side responses) will be less able (if at all) to participate in the restructured market. This change will lead to higher prices inherent in the way these new technologies will have to operate

The fact that the new technologies have already entered the market (even with 30 minute settlement) it is clear that the current market structure already provides adequate signals for the entry of these new technologies to operate and provide their unique services. This means that the impact of the change will be marginal rather than absolute. To show that the change will deliver a net benefit to consumers, this marginal improvement derived from new technology must be demonstrated that it offsets the detriment of the loss of competition provided by existing fast start generators and demand side participation.

As the new technologies are entering the market along with the fact that there is demand side participation operating along with the existing technologies, then it must be assumed that the current market is sufficiently "workable" and does not need change. The proposed change will change this balance.

In addition to the cost increase for consumers from the absolute increase in capital investment in generation in the NEM to be able to respond to 5 minute settlement (a cost that is not even addressed in the Directions paper), the Directions paper points out there will be short term cost increases resulting from the change and specifically highlights the cost and availability of cap contracts.

The Directions paper implies that there will arise a change in the market to accommodate this loss, but the shape and cost of these new arrangements is not assessed. What is sure is that the loss of the cap contracts will introduce a significant price rise in the short term and must therefore be included in the costs.

The new investment in the super fast generating plant will not occur until investors can see that they will be able to recover their investment costs and this means that sufficient of the new technology will not be available for a significant period of time. In this intervening period, consumers will face considerable higher costs as the generation fleet will not match the needs of the market. While the MEU sees that there will be considerable capital costs as the new technology is added to the generation fleet, it sees that the change to 5 minute settlement, at least in the short to medium term, will lead to increased prices

While the MEU accepts that there is an economic “purity” in aligning dispatch and settlement periods, it also recognises that physics and the physical limitations of most technologies impose constraints on achieving this economic purity. The MEU is concerned that the proposal will result in accelerating an already declining level of competition in the electricity market and this will not be in the long term interests of consumers.

Further, the significant costs that will have to be incurred in order to make the change possible will be much more than the impact of lower economic efficiency that results from the mismatch; this issue of lower economic efficiency in place of economic purity has been used by the AEMC in many other of its decisions and should be again.

2. Responses to AEMC questions

The MEU provides the following responses to the specific questions raised in the Consultation Paper. The MEU has endeavoured to keep its answers as concise as possible and refers to the commentary in the preceding sections to amplify its reasoning.

	Description	MEU observations
1	**(a) How suitable is the proposed assessment framework for this rule change request?**	The MEU is concerned that the assessment framework focuses too much on the price signals that the market changes might deliver, but insufficiently on • whether the rule change will eliminate a significant proportion of existing generation plant and require new and major investments of in order to provide the security of supply. This capital cost for new plant and batteries will have to be recovered from consumers increasing electricity prices. • the physical attributes of the electricity supply system (including the constraints in the transmission networks that limit the maximisation of competition), • the operational limitation of the new technologies so they can deliver sufficient competition (rather than just provide a response in the shorter settlement period) which is the fundamental key attribute that delivers the most efficient outcomes for consumers • the ability of consumers to respond to the price signals (what is the value of a price signal that consumers cannot respond to in sufficient volumes to create a difference?) • the costs to consumers of the new technologies and how the costs of assets made redundant by the change might be

		recovered from consumers (this recognises that the bulk of the assets that might be made redundant are owned by the dominant retailers) - the price impacts on consumers while the new technology investments are made but the existing generation fleet is unable to match the new requirements - the recognition that the lack of appropriate metering to the many small consumers will effectively preclude their ability to respond to the price signals (small consumers will be profiled due to this lack of acceptable metering), yet much of the spikiness in demand is the result of the actions of these many small consumers.
	(b) Are there any additional factors that should be considered in assessing this rule change request?	See section 1 above. See also response to Q1(a)
2	**(a) How material are the price signal inefficiencies under 30 minute settlement and are there other data or data sources that would enable this issue to be more comprehensively addressed?**	The rule change proposal was driven by high prices seen in DIs 5 and 6 which effectively retrospectively increases prices. The rule change on rebidding was intended to address this concern and so far, it seems to be effective. The rule change then becomes a more general assessment of alignment of dispatch and settlement periods. The focus of the analysis to date is about the frequency of differentials between dispatch prices and settlement prices. The MEU does not consider that the analysis of differential between a high DI price and the settlement price indicates a failure of the market and this aspect is discussed in more depth in section 1.5

	(b) What extent would a move to five minute settlement address inefficiency in price signals from 30 minute settlements?	The MEU considers that the price signals that 5 minute settlement provides would not be capable of use by most generators currently in the market or by consumers. A price signal is only efficient if it can be acted upon. If there is little action in response to the signal, it cannot be considered to be efficient. See comments in section 1 above
	(c) Are there any other inefficiencies that should be considered?	See comments in section 1 above
3	**(a) How does an aging generation fleet together with rapidly evolving digital technologies and the increasing role of intermittent generation affect the prospects of five minute settlement as compared with 30 minute settlement?**	Increasing intermittent generation has increased volatility in the volumes of electricity needed to be supplied by generators with firm dispatch characteristics (such as thermal generators). This means that while there is still a need for generators that can be dispatched on demand (eg thermal generation), the age of those generators is less of an issue but more one of availability. New investment of generation to replace old generation plant will be driven by security of supply needs as well as what can be delivered by "evolving digital technologies". While wind and solar generation are being augmented by storage options (eg batteries, pumped storage, etc), they are also being backed up with gas turbine and diesel generation options. This means that there will still be a need to assess the cost structure of the options to decide on what technology will deliver the most cost efficient outcome. However, if the market is structured in such a way that certain options are no longer viable, this will result is a bias towards one form of technology over another. The MEU considers that competition is needed to be maximised rather than putting unnecessary limitations on what options can be

		utilised.
4	**(a) What kinds of generator bidding behaviours could emerge under five minute settlement as compared with 30 minute settlement?**	See section 1 above The MEU considers that generators will implement bidding strategies to maximise the return on their investments. However, consumers do not have the same flexibility to change their bidding strategies as these are dependent on the operations of the plant they have to use to deliver their products to their markets. For example, a materials processing complex can slow down some operations (eg grinding mills) to respond to electricity price signals, but requires more than 5 minutes to safely implement a load reduction strategy and this constraint will apply to all such plant[18]
5	**(a) What other issues are likely to be material in considering the introduction of five minute settlement?**	See comments above and in section 1
	(b) Is there other data or data sources that can better inform the analysis of the materiality of the problem with 30 minute settlement or the move to five minute settlement?	See comments in section 1.5 The MEU considers that the process to assess materiality used in the Directions paper is inappropriate as it assumes the differential between the DI and TI is the main concern. As noted in sections 1.4 and 1.5 above, the MEU points out that having one DI with a high price but a low price in the TI shows that the current approach provides the maximum competition for supply after a high price occurs. The AEMC has not considered that in the absence of this competition, the high DI price might extend into subsequent DIs

[18] It must be remembered that consumers operate their facilities to the needs of their customers and not to the needs of the electricity market. They only respond to the electricity market when prices in the electricity market are too high for them to operate profitably.

		causing consumers higher overall prices. Effectively, the disparity between a high DI and a lower TI indicates that the market is working in the interests of consumers but that this might not occur if the TI is reduced to 5 minutes
6	**(a) How material are the issues identified around demand-side optionality? Are there any material issues or benefits that have not been identified?**	The MEU, while considering that consumers should have the option to have 5 or 30 minute settlement as this would allow each consumer to reflect the reality of the way their processes use electricity, recognises that such optionality would be very difficult to implement equitably and would introduce distortion in the market.
	(b) If demand-side optionality is adopted as a temporary measure, should the settlement residues be incorporated in existing *intra*-regional residue settlements? If not, how should they be treated?	The MEU considers that causer pays or causer benefits is preferable to socialising costs and benefits
	(c) How might contracting arrangement evolve if demand-side optionality is adopted on a temporary basis?	The MEU has noted that over time, stability in the rules is required to provide the necessary certainty for parties to enter into contracts. The MEU considers that if there is ultimately to be a transition, optionality would require significant time before transition to enable sensible contracting.
7	**(a) Are there any suitable alternatives to collecting five minute data from the transmission network metering installations used to compile the NSLP other than reconfiguring or replacing the existing meters?**	

	(b) What percentage of meters can be remotely reconfigured? What would this process look like and what would costs be? Conversely, what percentage would be needed to be manually reconfigured or replaced?	
	(c) The Commission has proposed aligning the transition with the timeframes for the NER test and inspection regime. Would this provide an appropriate amount of time for changes to occur?	
	(d) For which categories and situations should an exemption from providing five minute data be considered? Why?	
	(e) Are there any other metering implementation issues relevant to collecting five minute data that should be considered?	
8	**(a) To what extent would a transition period mitigate the one-off contract negotiation costs of a move to five minute settlement?**	The MEU notes that there are many contracts for buying and selling electricity in place that are considerably longer than implied by the proposed alignment timetable. For example, historically, contracting parties have sought contract terms of 15 years and longer for repayments of investments in energy assets. The MEU is aware that many contracts for electricity supply and renewable energy

		certificates are of 15 years or longer. If there is a move to 5 minute settlement, these contracts will have to be modified to reflect the changed circumstances. The MEU considers that such renegotiations could lead to significant disruption and could well lead to significant litigation. The costs of making the rule change should include the costs of such disruption in long term contracts.
	(b) What length of time would be appropriate to enable contracts to either expire or be adapted to take into account the future implementation of five minute settlement?	To avoid the inherent costs caused by the disruption, the time for any transition should be longer than contracts that are already in place. Alternatively, if a shorter transition is deemed necessary, the costs of unwinding these long term contracts needs to be included in the costs involved with the transition.
9	**(a) To what extent would contract market liquidity be affected by a move to five minute settlement, as distinct from other pressures on liquidity?**	The MEU is aware that the market for cap contracts would become significantly more illiquid due to the loss of competition and fewer parties able to provide cap contracts in a market with 5 minute settlement. Additionally, the cost of cap contracts will increase due to the lower competition.
	(b) How would the contract markets adapt to a move to five minute settlement?	The MEU sees that the market in cap contracts would become less liquid and have higher prices
	(c) To what extent would: **(i) new types of risk management products emerge?** **(ii) existing generators develop new operating strategies to underpin hedge contracts?**	While the Directions paper highlights that there would be new types of generation that might be introduced to offset the loss of existing generation (not being able to respond to 5 minute settlement) this introduction of new plant would require significant investment in the electricity market and make redundant considerable generating

	(iii) new generation plant be able to provide hedge contracts?	capacity that still can provide services to the market. This will result in the overall value of the generation fleet being higher than necessary and this increased value will ultimately be recovered from consumers. The MEU can envisage that existing plant will change their operating procedures in order to recover their sunk investment, but these changed procedures will result in higher operating costs in order to provide the services required. The change will result in there being a lower volume of demand side responses being provided to the market causing a need to increase supply side investments to offset the loss of demand side activities.
10	**(a) What are the costs, synergies and risks involved in upgrading IT systems to accommodate five minute settlement?**	
	(b) What timeframes are required to upgrade IT systems?	
11	**(a) Are there any further categories of costs that would be incurred if five minute settlement was adopted?**	See commentary in section 1 (especially section 1.8) The MEU also highlights that if other rule changes are enacted (eg demand >30 MW and generation>5 MW having to participate in the market) the 5 minute settlement rule change will require these additional new generators and consumers having to comply with the new rule, so they also will require to upgrade their IT systems to be able to operate under the proposed rule change.
	(b) How suitable is the proposed two-stage transition period to implement five minute	

	settlement? Do you consider there to be a more preferable approach to a transition period such as alternative timeframes?	
	(c) **What are the detailed benefits, costs and risks of the proposed two-stage transition to five minute settlement on:** **(i) existing contract arrangements?** **(ii) metering requirements?** **(iii) IT system requirements?**	
	(d) Are there any other practical aspects of implementing five minute settlement that should be considered?	See commentary in section 1 above In particular, the MEU is concerned that the change to 5 minute settlement will result in significantly less demand side participation in the NEM.