

18th May 2017

Mr John Pierce  
Chairman  
Australian Energy Market Commission  
PO Box A2449  
Sydney South NSW 1235

Reference Code: ERC0201  
Submission by email at: [aemc.gov.au](mailto:aemc.gov.au)

Dear John

### **Rule Change Proposal - Five Minute Settlement, Directions Paper**

Snowy Hydro Limited welcomes the opportunity to comment on the Directions Paper.

Snowy Hydro Limited is a generator and retailer of energy in the National Electricity Market (NEM) and a leading provider of risk management financial hedge contracts. We are an integrated energy company with more than 5500 MWs of peaking generating capacity including the iconic 4100MW Snowy Mountains Hydro-electric Scheme. We are one of Australia's largest renewable generators, the third largest generator by capacity and the fourth largest retailer in the NEM through our award-winning retail energy companies - Red Energy and Lumo Energy.

Snowy Hydro has very serious concerns with the Rule change. We believe there would be severe and adverse consequences to the NEM with higher energy and ancillary service costs, higher Spot market volatility that would jeopardise system security and reliability, and the change would not facilitate a transition to a low emissions environment. The Rule change would not advance the National Electricity Objective (NEO) and will materially increase costs to consumers in both the short and long term. Worst still we strongly believe the rule change will create structural risks that will threaten the sustainability of NEM and increase the risk of further intervention in the market.

Snowy Hydro unequivocally does **not** support the Rule change for the following reasons.

- The problem identified by the Rule change can be addressed through other means

It remains unclear what problem is now being rectified. The rule change was premised on Queensland price spikes which have already been addressed through the Good Faith Bidding rule change. The Good Faith Bidding rule change and the

enforcement powers of the AER are the appropriate means to address concerns on bidding behaviour and the exercise of transient market power. If ramping capability is desired to accommodate a different generation plant mix with intermittent generation then a better course of action is to introduce new market ancillary services products.

The 5 minute dispatch / 30 minute settlement was a deliberate market design feature which balanced off the trade-offs in dispatching the Spot market with the granularity required to optimise physical plant operation and allowing the Contract market to operate with high levels of liquidity. This trade-off remains fit for purpose.

One financial intermediary and battery storage providers are supporters of this Rule change have clear vested interest which should be discounted by the AEMC. The financial intermediary has no physical generation assets in the market and benefits from heighten market volatility. Battery storage providers believe they can continue to operate in a non-scheduled basis, coming in and out of the Spot market without informing scheduled generators of their intent to either discharge or charge. This behaviour will create increased costs, volatility and risks for all Market Participants and consumers.

- Costs will increase in all related electricity markets

Peaking generators such as Open Cycle Gas Turbines, Diesel, and Hydro generators are load following plant that provide energy and ancillary services at peak times when the value of these services is highest. All these plant cannot respond from rest in 5 minutes. The 5 minute rule change as a consequence will have major cost implications for all related electricity markets.

The detrimental impact on the liquidity of the Contracts market will be material. The Energy Edge calculated reduction of 625 MW significantly underestimates the impact of the Rule change. We provide estimates that the impact on Caps for Snowy Hydro alone is over 2600 MW. The AEMC recognises that Cap premiums will have to go up to compensate for this risk. Based on independent analysis, Cap premiums increase by up to 59%. A conservative estimate of the monetary impact of this would be a cost increase of \$121 million per year for purchasers of Cap contracts. This will have a severe impact on the ability of second tier Retailers to hedge their retail load exposure. As a consequence competition in the NEM will decrease.

Ancillary service costs would escalate as we envisage bidding behaviour that is unpredictable and volatile and as a consequence increase frequency excursions that drive the requirement for more ancillary services to maintain the power system in a secure state.

Spot prices will increase as conventional peak generation plants are unable to prudently sell the same level of Caps and must therefore attain their required revenues in the Spot market.

- Bidding behaviour will create high volatility and cause system security issues

Energy security would also be under jeopardy with the ability for conventional peaking generators selling Caps severely diminished. These generators will have to resort to Spot market exposures to earn an adequate return. The difficulty associated with accurate forecasting of Spot prices will ultimately mean conventional peaking generators will be prematurely forced to exit the NEM. This will only exasperate the problems already identified by all Stakeholders of the lack of synchronous generation.

In the transition period there will be significant increases in Spot market volatility from the inability of conventional peaking generators to sell Cap contracts and the likely bidding behaviour of non-scheduled generators and loads. A number of illustrative examples are shown in the attached submission. These examples utilise actual historical central dispatch data and utilise the same dispatch algorithm used by AEMO. The output results of much higher Spot price and volatility should be a clear warning signal to reject this Rule change.

- Does not meet the energy trilemma of affordability, security, and reduce emissions

The substitution of conventional peaking products by energy storage devices is at least 20 years from now. The costs associated with battery energy storage are up to 100 times more than conventional pump hydro storage when this comparison is made in terms of the energy that can be delivered. It does not make economic sense to crowd out conventional generation. If it is deemed desirable to accelerate the growth of battery energy storage technologies than a direct subsidy would have much less adverse market consequences.

When measured against the energy trilemma of energy security, efficient cost, and a reduction in carbon emissions, the Rule change fails all three criteria.

- Alternative alignment of dispatch and settlement periods have not been considered

The alignment of dispatch and settlement cycle should not be limited to 5 minute dispatch / 5 minute settlement. If a change is deemed by the Commission to have net benefits then serious consideration should be given to 15 minute dispatch / 15 minute settlement, which would have less adverse consequences due to the physical characteristics of the existing generation mix.

- Now is not the time to introduce this structural market change

Due to the retirement of low cost synchronous generation, high gas prices, and the increase in intermittent generation which cannot provide firm contract hedges or provide ancillary service products, consumers in the NEM are under stress from high energy prices. 5 minute settlement will only increase this stress.

Now is not the time to align the dispatch and settlement cycles with the need for synchronous generation and the high levels of regulatory and policy uncertainty that is stifling investment in synchronous generation plant. There may be a case for a monitoring regime to determine the right market conditions to initiate a review of aligning the dispatch and settlement cycles.

We have separately engaged Marsden Jacob Associates to do a critique of this Rule change. Their independent report will be submitted by Friday 26th May 2017.

Our full submission is attached to this covering letter.

In summary, the materiality of the problem is negligible. In contrast the direct cost to rectify the alignment between dispatch and settlement is significant and estimated to be at least \$250 million. The contract market impacts are likely to exceed \$121 million per annum. The impact on competition will be severe. The risk of further policy and/or regulatory intervention would increase. Ultimately we believe the risks and costs associated with this Rule change far outweigh any theoretical benefit from aligning the dispatch and settlement cycle.

The risks and costs of the Rule change have clearly been articulated by Participants to be hundred of millions compared to benefits which are theoretical. It would be a “brave” decision to ratify the Rule without due consideration to its impact to consumers.

Snowy Hydro appreciates the opportunity to participate in this consultation process. For further clarification on our submission, contact Kevin Ly - Head of Wholesale Regulation on [kevin.ly@snowyhydro.com.au](mailto:kevin.ly@snowyhydro.com.au).

Yours sincerely,



Roger Whitby  
Chief Operating Officer

# **SNOWY HYDRO SUBMISSION**

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## 1.0 Materiality of the problem

This section answers the questions posed in Question 2 of the Directions Paper.

The AEMC asserts that the adoption of five minute settlement would have a material benefit that is likely to outweigh the cost.

The AEMC states<sup>1</sup>:

*The benefit of five minute settlement over the existing five minute dispatch and 30 minute settlement is that it provides an improved price signal for the efficient use of and investment in generation and demand-side technologies. In particular, it signals the physical value of when a demand or supply response is needed by the power system, and rewards those who can deliver that response.*

Where is the Commission's analysis on benefits? It is unprecedented to consider implementing such a fundamental market change without doing a full cost / benefit analysis.

Contrary to what the AEMC says, bidding behaviour and operational decisions that result in generation or load response that occurs up to 25 minutes after it is needed by the power system has clear advantages and efficiencies which are not recognised (ie. being able to sell contracts, being able to manage load exposure). Looking at Spot prices in isolation is inappropriate. It is the integrated assessment of both Spot and Contract markets which is critical in determining the net benefit/cost of this Rule change.

**Question 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 problems this Rule change purports to address are already solved. Sun Metals submitted that the mismatch between the current dispatch and financial settlement intervals leads to inefficiencies in the operation and generation mix of the market. Specifically:

- accentuates strategic late rebidding
- impedes market entry for fast response generation and demand side response

The so-called strategic late rebidding and market manipulation, in South Australia and other jurisdictions, is contested by generators who argue that there is a fundamental lack of evidence for claims of such strategic rebidding or manipulation, and second, that any rebidding which does occur is a necessary and economically efficient response to changing developments in the marketplace.

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<sup>1</sup> AEMC, Directions Paper, page 4

The new rebidding rules introduced in 2016 to the National Electricity Rules has the effect of preventing such (alleged) behaviour from generators occurring in future. Under these rules, generators are prohibited from making false or misleading offers. If rebids are made at the last minute in response to changed market conditions, then generators must keep a record of the reasons for those decisions, which can then be interrogated by the Australian Energy Regulator. Most importantly, rebids are only permitted on the basis of significant, objective and quantifiable changes in circumstances, and must be made as as soon as practicable after the change in circumstances occurred. This effectively prevents generators from - as has been alleged by Sun Metals - deliberately submitting a 'late' rebid to withdraw generation from the market in order to increase dispatch prices.

This late strategic bidding behaviour has changed and is noted by the AEMC<sup>2</sup>,

*That said, 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 AER through its powers of surveillance and compliance can enforce these Rule obligations.

It is unclear why Sun Metals believes fast response generation is impeded from entering the market. The growth rates of companies like Reposit are contrary to this view. If Sun Metals believes there is insufficient 5 minute ramping capability then we believe a 5 minute ramping ancillary service would be a much more efficient regulatory change with no adverse market consequences.

**Question 2(b)** What extent would a move to five minute settlement address inefficiency in price signals from 30 minute settlements?

As the AEMC highlights in the Directions Paper consideration must be given to the interaction between the Spot and Contract markets. When viewed from the lenses of the Spot market the action of piling in response to a early dispatch interval price may seem inefficient under 30 minute settlement. However this type of behaviour allows peaking generators to sell financial products such as Caps which are vital for risk management. Hence it is the aggregate effect of both Spot and Contract market interactions that needs to be considered.

**Question 3** Impact of an evolving market - 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?

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<sup>2</sup> AEMC, Directions Paper, page 18

Dr Finkel has identified the trilemma of efficient energy price, system security, and reducing emissions. 5 minute settlement would not help the market transition to this evolving market in a way that meets the constraints imposed by the trilemma. That is:

- Efficient energy cost - fails because evolving technologies can't provide the products and services the markets needs for adequate risk management ie. Caps.
- Energy security - fails as peaking generators can't rely on pre-dispatch forecasts for picking when to be on to capture Spot price spikes. Ultimately this mode of operation in the NEM will deliver insufficient revenue with unacceptable levels of risk. This would lead to an acceleration of their exit from the market. Batteries cannot sustain output for more than an hour. Batteries would be useless in sustained high Spot price periods.
- Reducing emissions - peaking generators (gas and hydro) are low and/or no emissions technologies. Removing the incentive for these plant to continue operation is not in the long term interest of consumers.

The substitution of conventional peaking products by energy storage devices is at least 20 years<sup>3</sup> from now. The costs associated with battery energy storage are up to 100 times<sup>4</sup> more than conventional pump hydro storage when this comparison is made in terms of the energy that can be delivered. It does not make economic sense to crowd out conventional generation. If it is deemed desirable to accelerate the growth of battery energy storage technologies than a direct subsidy would have less adverse market consequences.

### **1.1 The focus on South Australia is unrepresentative of the NEM**

The AEMC used an example of Spot prices in South Australia for the Tuesday 21 March 2017. This example is unrepresentative of the rest of the NEM where there remains healthy competition in the Contracts market which translates to robust competition in the Spot market.

South Australia has seen volatile spot prices due to relatively concentrated generator ownership, thermal generation plant withdrawals/mothballing, and constrained interconnector import capability. High levels of intermittent wind generation and solar roof-top PVs also contributed to wholesale spot price volatility.

South Australia now has less dispatchable generation which is being replaced by renewables and rooftop solar PVs. This change in the mix of generation has consequences

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<sup>3</sup> Potter, B., "Future grid has batteries, renewables and software – Finkel", Australian Financial Review, 8th February 2017, <http://www.afr.com/news/future-grid-has-batteries-renewables-and-software--finkel-20170208-gu8j12>, accessed 13th May 2017.

<sup>4</sup> This comparison was done with a 10kWh battery and Snowy Hydro's proposed 2000MW pump hydro generator. The comparison was done on the basis of energy that can be delivered per cycle and the life expectancy of the assets.

for the efficiency of market operations and the liquidity and price of electricity derivative products

Thermal generation plant provides energy, frequency control ancillary services, inertia to dampen the impact of changes in power system frequency, and system restart services. Wind, solar, and rooftop PV are asynchronous generation plant and do not offer these services. As a consequence South Australia experiences higher volatility and prices when synchronous generation plant and/or the Heywood interconnector is unavailable.

Wind generation and solar PV are intermittent generation plant and produce output when there is wind and sunshine. As a consequence they are not well placed to offer fixed priced contracts given that they are exposed to the risk of a high spot price when they are not generating. In comparison synchronous generation can run continuously and are able to provide these financial products. With the exit of synchronous generation there would be less liquidity in the financial markets. As a consequence there is increased volatility in Spot prices and higher financial contract prices. These factors and not 30 minute settlement are the principal reasons behind the Spot prices illustrated in the AEMC's analysis of the 21 March 2017.

## **1.2 The role of the AER**

If there is an issue with the bidding behaviour shown on the Tuesday 21 March 2017 event, the AER has the powers to enforce compliance with the Rules. It seems extreme to apply a disruptive and costly structural solution to an issue that could be resolved through existing regulatory powers.

## **1.3 General comments**

Snowy Hydro disagrees with a statement on page 19 of the Directions paper:

*The current 30 minute settlement framework effectively makes operating flexible rapid response technologies for generation in the NEM more financially risky.*

This would not be the case if these rapid response technologies sold financial contracts and operated in a manner to defend these contracts in the Spot market.

## 2.0 Contract Market Impact

This section relates to **Question 9** - effects of a reduction in cap contracts

The AEMC recognise<sup>5</sup> the significant risks posed by 5 minute settlement:

*Of primary concern is that a move to five minute settlement would potentially result in an initial reduction in the supply of cap contracts, a risk management product that retailers and large energy users use as protection against high spot prices. Under 30 minute settlement, gas peaking generators can offer and physically defend these caps. With five minute settlement, there is uncertainty as to whether these generators will be able to defend and offer the same volume of these contracts. Based on independent advice, it is estimated a move to five minute settlement could decrease the supply of caps by 23 per cent, corresponding to a reduction of 625 MW in the volume of cap contracts that would otherwise have been traded.*

*A substantial, immediate reduction in the supply of cap contracts is likely to increase wholesale prices and damage retail competition. A reduction in caps would increase barriers to entry for retailers, create incentives for market participants to manage risk via vertical integration or horizontal integration, and increase retail market concentration. This will result in higher prices for consumers. The Commission notes that the economics of new types of fast response and flexible technologies is constantly improving. However, they do not yet supply electricity on a significant scale and it is unclear whether they would replace the existing supply of caps that gas peaking generators currently sell.*

We will show the 625 MW figure significantly underestimates the reduction in Cap contracts.

### 2.1 Severe reduction in Cap Contracts

We have explained in earlier submissions, the existing 30 minute settlement allows peaking generators to sell financial contracts (predominantly Caps).

Under 5 minute settlement this risk increases materially with adverse consequences.

The following is an illustrative but realistic example:

Snowy Hydro has 4000 MW of peaking hydro generation in the NEM.

#### **Current position:**

Peak swap position: 1000MW

Cap position: 3000MW

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<sup>5</sup> AEMC, Directions Paper, page iii

**Under 5 minute settlement:**

Peak swap position: 1000MW

Potential Cap position:

Is a function of what we could defend with unexpected price spikes. This would be reliant on ramp rate capability and the time delay in receiving AEMO's dispatch target.

Using AEMO data of synchronising time of 2.8 minutes and a very fast time to receive the dispatch signal<sup>6</sup> of 20 seconds, only 2/5th of the full 5 five minute ramp capability can be utilised at the end of the 5 minute dispatch interval. The probable level of Cap contracts Snowy Hydro would sell is shown in table 1 below.

Power Station	Ramping capability (MW/minute)	Signal time & synchronisation time (minutes)	Defendable Cap position (MW)
Tumut 3	100	3	$100 \cdot 5 \cdot (\frac{2}{5}) = 200$
Upper Tumut	30	3	$30 \cdot 5 \cdot (\frac{2}{5}) = 60$
Murray	50	3	$50 \cdot 5 \cdot (\frac{2}{5}) = 100$
			<b>360 MW</b>

Table 1: Calculation of the level of Cap contracts that may be available

So Snowy Hydro's Cap position from its hydro generation assets reduces by  $3000 - 360 =$  **2640 MW**

For Snowy Hydro alone this is potentially more than four (4X) the estimate of 625 MW in Energy Edge's analysis.

The AEMC states on page 60 of the Directions Paper:

*If a 30 minute price is above a strike price of \$300/MWh, then by definition there must have been at least one five minute period within the half hour with a price above \$300/MWh. However, the opposite does not hold: if a 30 minute price is below \$300/MWh, there may have been five minute periods within that half hour with prices above \$300/MWh. This would need to be reflected in the premium paid by the buyer of a five minute cap. A larger payout on the contract would correspond with the buyer paying a higher premium to enter into the contract.*

With the reduction in Cap volumes and the increase in pay-outs under 5 minute settlement, Cap premiums must significantly go up. Based on analysis by Russ Skelton

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<sup>6</sup> We note this could be a lot longer in the order of 50 seconds as noted by the AEMC on page 47 of the Directions Paper.

and Associates<sup>7</sup> of historical data, the fair value Cap premium would be expected to increase by the amounts shown in the following table. This analysis is based on 5 and 30-minute price data for calendar years 2012 to 2017.

Region	NSW	Vic	Qld	SA
Increase	23%	39%	41%	59%

Table 2 - Increase in Cap premiums

In Snowy Hydro's opinion these estimates are ultra conservative and does not factor in the 2640 MW potential reduction in Cap volumes offered by Snowy Hydro . However, using these numbers the cost implications are shown in the table below. The cost impact will be in excess of **\$121 million per annum** as shown in table 3 below.

Region	NSW	VIC	QLD	SA	
Cap Price Increase	23%	39%	41%	59%	
Fin Year 2020	\$11.30	\$8.75	\$11.05	\$9.68	
Fin Year 2020 + Increase	\$13.90	\$12.16	\$15.58	\$15.39	
<b>Cap estimated volumes from regional bidstacks: 12:30 Monday 10th April</b>					
Price bands	NSW	VIC	QLD	SA	Total (per annum)
\$240-\$300	1,400	645	0	300	2,345
\$300 - \$450	260	240	750	125	1375
\$450 - \$2500	0	0	0	115	115
Total	1,660	885	750	540	3,835
<b>\$ Impact per year</b>	<b>\$37,793,618</b>	<b>\$26,455,748</b>	<b>\$29,765,385</b>	<b>\$27,016,260</b>	<b>\$121,031,011</b>

Table 3: The financial cost of increased Cap premiums

<sup>7</sup> Russ Skelton & Associates, 5-Minute Settlement, Assessing the Impacts, page 23

### 3.0 Bidding Behaviour

The AEMC states<sup>8</sup>:

*The Commission considers that to the extent that five minute settlement reduces late rebidding and other perverse behaviour, it may also serve to improve pre-dispatch accuracy and create an environment where generator unit commitment decisions can be made more proactively.*

5 minute settlement will simply create other perverse but perfectly commercial incentives, especially if non-scheduled load and generation continue to have unfettered access to the Spot market without informing their generation/charging intentions.

Snowy Hydro has outlined the adverse and inefficient outcomes associated with non-transparent non-scheduled load and generation in its Rule change proposal. The 5 minute Rule change increases these deficiencies which are:

- Impeding the price discovery process resulting in less accurate forecasts of Projected Assessment of System Adequacy (PASA) and pre-dispatch Spot prices and demand;
- Reducing the accuracy of reserves forecasting by AEMO;
- Reducing the effectiveness of the formulation of transmission constraint equations which will adversely impact on adequate system operation and the maintenance of the power system security; and
- Less efficient contract markets as prices will be set based on less accurate forecasts of underlying supply and demand.

**Question 4** - Bidding behaviour - What kinds of generator bidding behaviours could emerge under five minute settlement as compared with 30 minute settlement?

We will demonstrate that Spot market volatility and Spot prices will significantly increase.

#### 3.1 Scheduled Generators Bidding Behaviour

##### Scenario 1

This analysis looks at Spot market volatility if Fast Start Inflexible Profile (FSIP) generators with T1 synchronisation times greater than 2 minutes cannot sell Cap contracts due to the increased risk in defending these sold contracts.

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<sup>8</sup> AEMC, Directions Paper , p 35

The example involves Queensland FSIP generator units. The assumption is that in the absence of selling Caps these generators bid their capacity at the Maximum Price Cap (MPC) of \$14,000/MWh.

Snowy Hydro has used the NEMDEQ stimulator that allows Market Participants to use historical data in AEMO's central dispatch algorithm to perform scenario analysis of Spot price outcomes. Snowy Hydro have identified the following periods in this illustrative example:

- 01/02/2017 half hour ending 16:30 to 21:00

The FSIP units in question are ROMA\_7, 8, MSTUART1, 2, 3, BRAEMAR1,2,3,5,6,7, YABULU, YABULU2.

The stimulation assesses each Dispatch Interval independently and takes all the FSIP units to MPC.

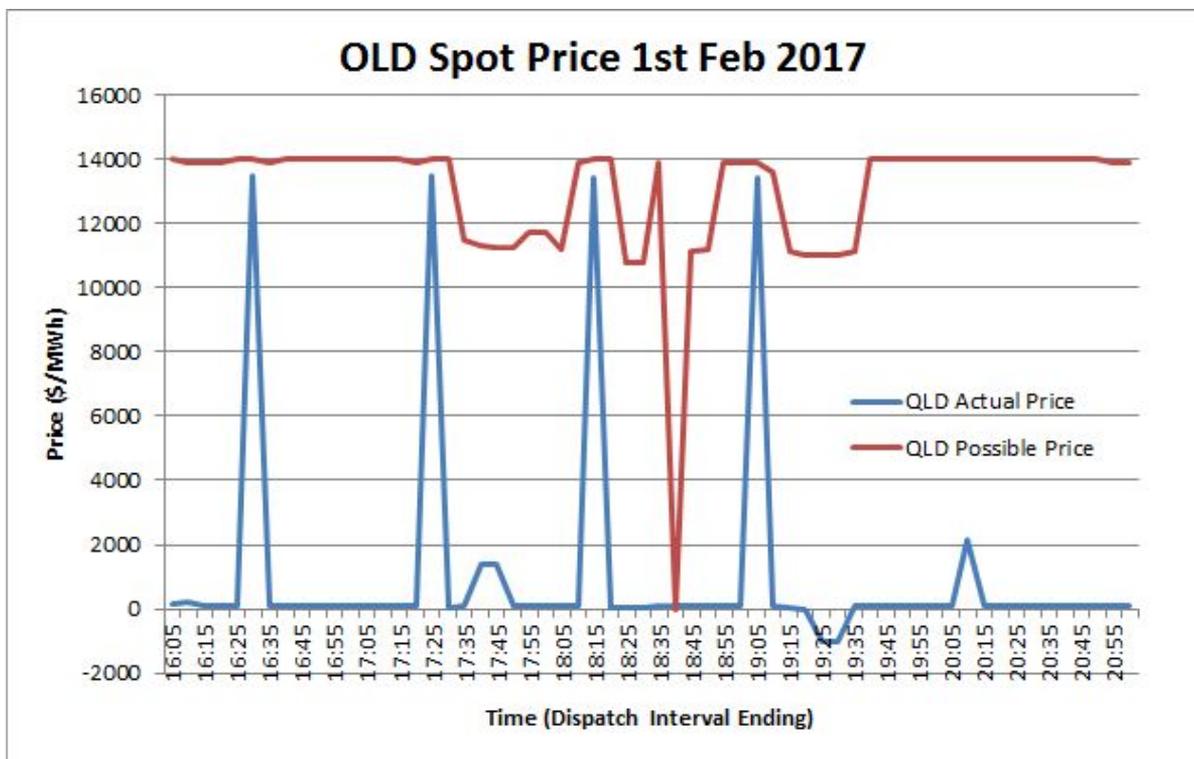


Figure 1: Stimulated QLD Spot price with bidding incentives under 5 minute settlement

#### Consequences and Observations:

- Batteries could not suppress these Spot prices
- Retailers would face much higher market risk without adequate cover
- This volatility would feed through to forward contract prices
- Competition in the market will be adversely affected
- Political risk will dramatically increase with the increased risk of intervention in the market

## Scenario 2

We have had instances where there were very tight supply and demand and the trip of a generator unit would have resulted in sustained high prices. This scenario looks at the effect of a generator unit trip.

The methodology used was:

Using NEMDEQ, record for each 5-minute Dispatch Interval the actual Spot price in NSW and QLD from 9th February 2017. NEMDEQ was used to analyse individual dispatch intervals.

Compare these actual spot prices to the same scenario when setting Eraring Generator Unit 1 (ER01) Max Avail = 0 and ER01 Initial MW = 0. That is, a trip of ER01.

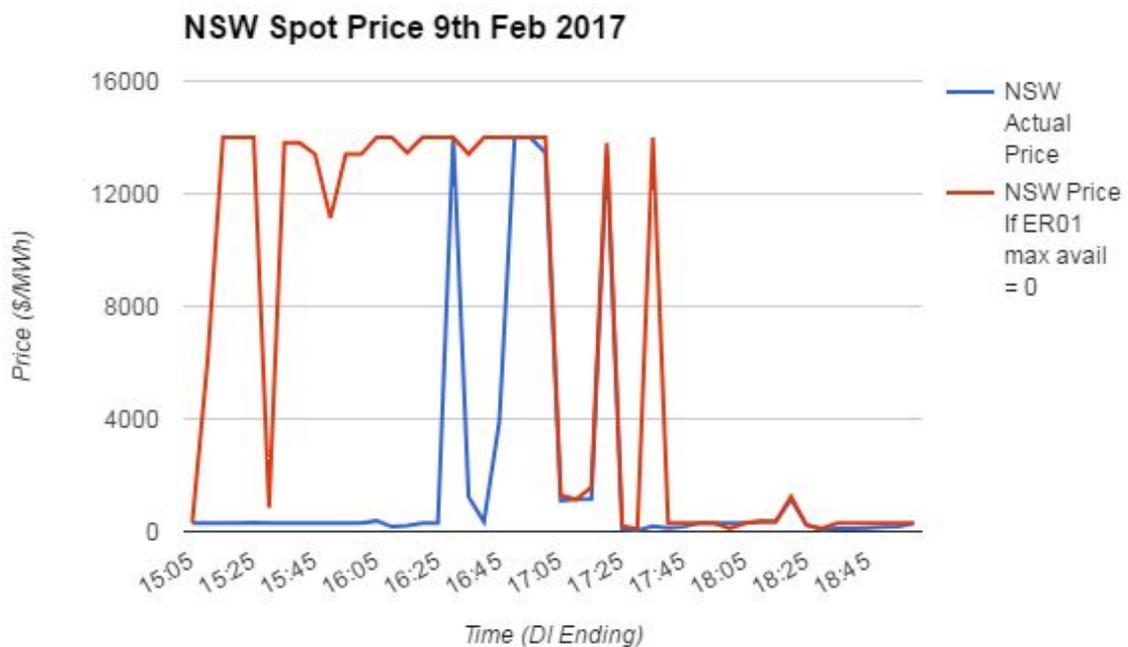


Figure 2: NSW actual and possible Spot price for 9th February 2017



Figure 3: QLD actual and possible Spot price for 9th February 2017

### Consequences and Observations:

- Batteries could not suppress these sustained high Spot prices and realistically could not sell Cap contracts to cover this period.
- The premature market exit of conventional peaking generation such as Gas and Diesel Turbines because they can't accurately forecast Spot price and generate at the right time will only accelerate their exit from the NEM. This will have adverse impacts to the affordability of electricity, will undermine system security, and will impede the move to decarbonise the economy.

### 3.2 Non-Scheduled Generators Bidding Behaviour

Non scheduled generators would have many opportunities to game the situation.

Figure 4 shows a battery gaming example. In this stylistic example batteries discharge into the market in the first 4 minutes of a Dispatch Interval. Between the 4th and 5th minute of the dispatch interval they Charge thereby creating higher "demand" for a higher ex-ante Spot price for the next Dispatch Interval. This pattern continues creating a number of adverse consequences:

- The 5 minute dispatch price is higher than in the absence of this bidding behaviour
- There is decreased transparency for scheduled generation and load to commit and operate their plant in the Spot market

- System frequency with vary as the change in MWs within a minute could vary by double the size of the battery capacity in the system. In this example this would be a demand variation of 2000MW in 1 minute. This would have both adverse higher cost implications for Frequency Control Ancillary Services and may have severe consequences for the reliability and security of the power system.

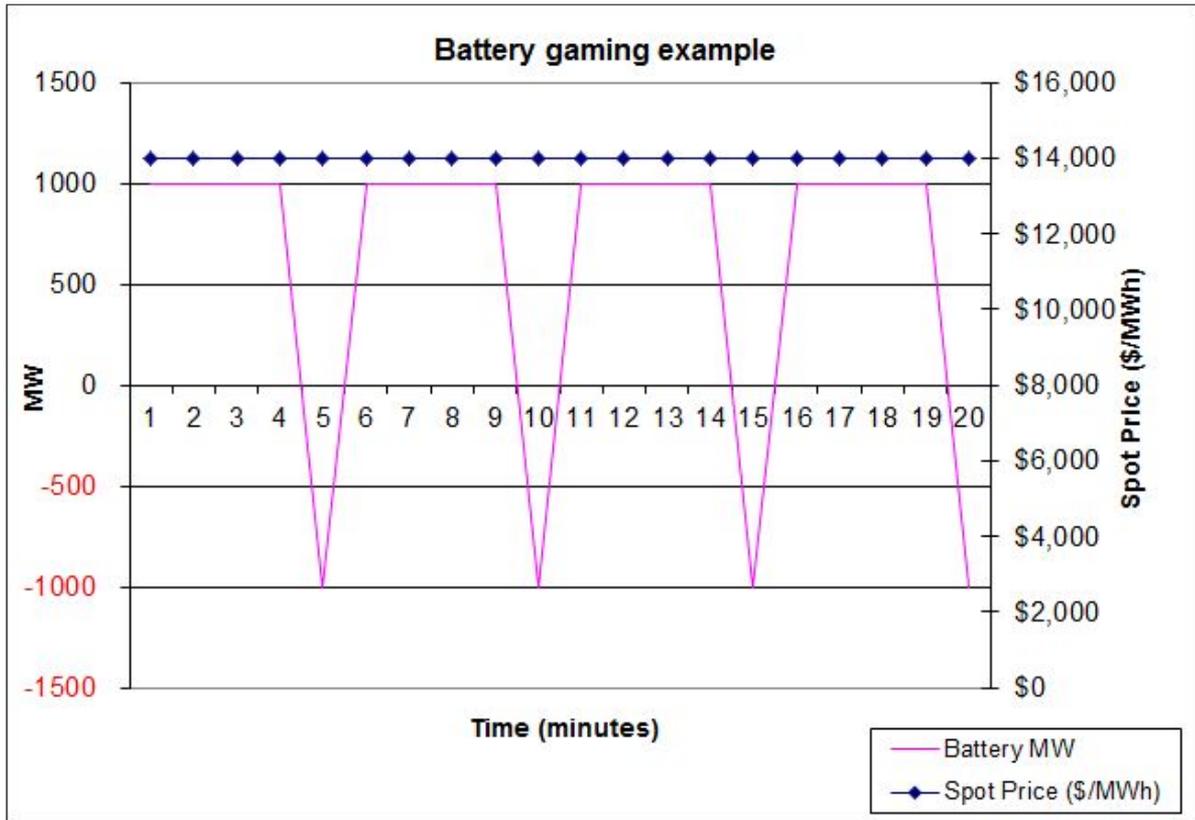


Figure 4: Battery gaming example

### 3.3 General comments

The AEMC states with respect to volatility under 5 minute settlement on page 62 of the Directions Paper:

*On the contrary, the Commission's analysis suggests that the existing volatility within the half hour is often a function of the 30 minute averaging. For example, under five minute settlement there would no longer be situations of a \$14,000/MWh price spike followed by zero or negative prices when generators all ramp up simultaneously after an early price spikes, at the same time that end users may be curtailing load in response to the same price signal. In the absence of this behaviour, under five minute settlement there should be less five minute price volatility than there is under 30 minute settlement.*

*Five minute settlement would likely produce less artificial volatility due to scenarios like the one described above, but also new volatility reflecting physical constraints (e.g. ramp rates). In a comparison between 30 minute volatility under 30 minute settlement and five minute volatility under five minute settlement, it is unclear whether volatility would be greater. Regardless, the new volatility would better reflect the physical requirements of the power system, and therefore be a better basis for participants' operational and investment decisions.*

We disagree with these assertions. There will be new yet unobserved volatility caused by, (1) generation unable to contract and being driven to attain their required revenues through the Spot market and (2) the non-transparent action of non-schedule generation and load. We have shown through the scenarios in this section that the risks and costs are significantly increased under 5 minute settlement.

#### **4.0 Demand-side optionality**

##### **Question 6 - Demand-side optionality**

The AEMC states on page 52 of the Directions Paper:

##### ***Demand Response***

*As mentioned in section 4.3.1, it is estimated that 10 per cent of existing demand response capacity in the NEM can be provided within five minutes, compared to 70 per cent within half an hour.<sup>117</sup>*

This is perverse and counter to incentives to get the demand side more active in the NEM.

#### **5.0 Costs and transition**

The AEMC<sup>9</sup> assert that a transition period can mitigate challenges of implementing five minute settlement:

*Further, it has been identified that the costs and practical challenges of implementing five minute settlement - relating to contract market disruption, metering changes, and changes to IT systems - can potentially be mitigated and managed through the use of a transition period. The optimal transition period will allow for:*

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<sup>9</sup> AEMC, Directions Paper, page iv

- *existing and new generators to address any initial shortage of cap contracts from the introduction of five minute settlement*

Snowy Hydro asserts that you can't mitigate the availability of Caps unless battery energy storage arrives in very large volumes. However as highlighted earlier in this submission, according to an article in the Australian Financial Review, Dr Finkel was quoted to say it could take more than 20 years before grid scale batteries are price competitive with pumped hydro generation.

## **5.1 A Monitoring Regime**

The AEMC has offered up to 3 years as the transition period period for implementing 5 minute settlement. The Russ Skelton Associates report highlighted long term Power Purchase Agreements (PPA) would be affected. These PPAs are struck by wind and solar developers out to 2030 and beyond (the end of the Renewable Energy Target (RET)). There will inevitably be major disputes between counter-parties when the ISDA market disruption clause is activated.

A case can be made to recognise this risk and prolong the transition period. 2030 is probably too long but a 8 year transition may be a reasonable compromise. 8 years was derived from the average of 3 years (liquid OTC period) and 13 years (PPA end of 2030) ie.  $(3+13)/2$ .

A long transition period is recognition that the benefits of the 5 minute settlement are ambiguous when weighed up against the costs which are tangible and real. Hence a case can be made to instead not ratify the Rule and introduce a monitoring regime (similar to the Optional Firm Access review (OFA)). The advantage of this is as more information comes to hand (ie. the availability and penetration of large scale batteries takes off) aligning dispatch and settlement could be implemented in the future with more certainty that it would deliver net benefits and be done with a shorter transition period.

## **6.0 Alternatives**

The rule change request relates to the mismatch between dispatch and settlement intervals in the NEM<sup>10</sup>.

If the AEMC decides that there are unambiguous net overall benefits with aligning the dispatch and settlement cycle than 15 minute dispatch / 15 minute settlement should be considered. This would enable the existing mix of generation to adapt and provide energy, ancillary service, and financial contracts required to ensure an efficient NEM.

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<sup>10</sup> AEMC, Directions Paper, page 2

## 7.0 Conclusion

Snowy Hydro does **not** support the Rule change. We believe there would be severe and adverse consequences to the NEM with higher energy and ancillary service costs, higher volatility that would jeopardise system security and reliability, and the change would not facilitate a transition to a low emissions environment. The Rule change would not advance the National Electricity Objective. We strongly believe the rule change will create structural risks in the NEM that will threaten the sustainability of NEM and increase the risk of political interference.

There has clearly been an absence of a considered analysis on costs and benefits of the Rule change. The cost and risk implications are clear. There will be increase energy and ancillary service costs, Cap premiums will go up, volatility will go up, and ultimately competition will be impeded. In contrast the benefits are tied to the theoretical benefits of aligning the dispatch and settlement cycle.

Snowy Hydro strongly believes ratifying the Rule change is not in the long term interest of consumers. It would be a brave decision to make in the absence of fullness analysis on the risks and costs.