21 December 2018

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

Submitted online: www.aemc.gov.au

Dear Mr Pierce

Wholesale Demand Response Mechanisms – Consultation Paper

Origin Energy Limited (Origin) welcomes the opportunity to provide comments on the Australian Energy Market Commission's (AEMC) Wholesale Demand Response (WDR) Mechanism Consultation Paper.

WDR supports reliability as it promotes efficient consumption of electricity, particularly in tight conditions. Origin therefore agrees WDR has an important role to play in the NEM. However, the underlying premise of the Public Interest Advocacy Centre / Total Environment Centre / The Australia Institute and South Australian Government rule change proposals is that the present level of WDR is below some optimal level and retailers are not incentivised to offer DR products. As discussed below, Origin does not believe this is the case and considers the proposed WDR mechanisms would likely distort wholesale market outcomes and expose consumers to unnecessary costs.

Retailer engagement in WDR activities

Vertically integrated businesses are motivated to hedge their load and reduce exposure to spot price risk in a range of ways. This can include using DR and products that share risk with customers. This was acknowledged by the AEMC in its previous review of the COAG Energy Council's proposed Demand Response Mechanism (DRM), with the AEMC noting that retailers have efficient market incentives to choose the portfolio of instruments that would best allow them to provide competitive retail offers to their customers.[1] Further, whether the retailer relies on demand response depends on how competitive demand response is with respect to the other instruments available to the retailer such as buying energy derivative financial products and/or generation assets.[2]

The uncertainty/firmness of DR has generally meant that it cannot be relied on in significant volumes to manage risk, as retailers would likely need to over procure DR capacity (to effectively increase its firmness) at a greater expense than procuring the equivalent cap contract cover. However, Origin is currently undertaking a range of DR activities/trials that will assist with understanding the performance of customers' delivery of DR and its overall value proposition under different arrangements. These include: the Greensync and Tempus trials, which will test DR and demand flexing solutions respectively with commercial and industrial customers (C&I); and the Victorian Microgrid program, which will connect over 600 residential and commercial properties across Victoria to create a virtual power plant (VPP).

Where large customers do want to assume a degree of exposure to the wholesale spot market, they can also elect to include pool pass through in their contracts. These products allow those customers to respond to high spot market prices in a similar way to under a WDR mechanism. In our experience

[1] AEMC, "Final Rule Determination – Demand Response Mechanism and Ancillary Services Unbundling", 24 November 2016.
[2] Ibid.

though, customers have not generally expressed a strong desire to participate in the wholesale market and are more comfortable with retailers managing spot price risk on their behalf. There are also other products and growing opportunities in the electricity market that are further reducing the appetite for demand side participation. The most obvious of these are solar PV and battery storage, which can be considered a form of WDR as customers are substituting away from the grid through their installation.

In addition, there are other factors that may naturally limit WDR levels.

- The current market may not be signalling a need for higher levels of WDR – the AER's recent Wholesale Market Performance Report noted the spot price only exceeded $300/MWh on 205 occasions in 2017-18 compared with 688 in 2016-17. [3]

- There are other value streams for DR that are not reliant on wholesale market participation, including: network support services (to assist with relieving congestion); ancillary service markets (to assist with frequency control); renewable firming; and the provision of emergency reserve services under the reliability and emergency reserve trader (RERT) mechanism.

- The greatest value of WDR is likely to be associated with large scale C&I customers (e.g. aluminium smelters). Many of these customers may already be participating in WDR activities through their retail contract or the RERT mechanism, which could limit the scope for future growth.

Distortionary impacts of WDR mechanisms

In an energy only market, spot and contract pricing provide key signals for decisions made by market participants across short and longer-term timeframes. As noted by the AEMC in its assessment of the COAG Energy Council's proposed Demand Response Mechanism (DRM), rewarding DR on an equivalent basis to generation can have a significant distortionary impact on these signals.[4]

- In the event DR does not a provide perfect substitute for dispatchable generation (i.e. the WDR is less firm), but does suppress wholesale prices, signals to invest in more efficient firm generation may be impeded.

- Retailers would continue to be financially responsible for their customer's baseline consumption. This may result in customers paying for hedging costs through their retail contract, even where they provide DR. If DR displaces firm generation, it would also unbalance supply/demand in the hedging market, leading to an increase in hedging contract prices.

- Customers would be rewarded not only through avoided consumption, but also by being paid for not consuming. Customers' consumption decisions would therefore be driven, at least in part, by the 'wedge' they are able to create between the baseline consumption calculated at the retail tariff rate and their metered consumption calculated at wholesale prices.

- DR aggregators would not bear the cost of inaccurate baselining of a customer's consumption, but rather benefit from baselines that overestimate the DR. If a baseline is inaccurate or 'inflated', this would ultimately result in higher costs to retailers that would be recovered from their consumers. It also creates a risk of gaming, given customers could raise their baseline energy use (potentially by shifting energy use across different sites) and thereby receive additional payments for DR.

[3] AER, "Wholesales electricity market performance report", December 2018.
[4] AEMC, "Final Rule Determination – Demand Response Mechanism and Ancillary Services Unbundling", 24 November 2016.

It is unsurprising therefore, that mechanisms similar to the WDR mechanisms proposed are more prevalent in capacity markets, as there are separate energy and capacity payments to generators allowing for the recovery of operating costs and fixed costs irrespective of whether DR is provided to the market or not. However, it's still not clear that WDR mechanisms have been successful in all cases. PJM recently undertook a review of its current market framework, which allows DR to participate in capacity, energy and ancillary service markets. One of the PJM's key findings was that DR participation should ideally be in the demand-side of the market, not the wholesale energy market. [5]

In Origin's view, the issues identified above persist under both the Public Interest Advocacy Centre / Total Environment Centre / The Australia Institute and South Australian Government proposals. Requiring WDR to be scheduled may assist with addressing some of the identified spot market issues (at least in part) by improving the firmness of WDR relative to scheduled generation. Though it is still unclear whether WDR could be relied upon the same way as can be dispatchable generation.

Assessing the need for change

Given the above, Origin does not believe a WDR mechanism is necessary or justified. DR is happening in the NEM through different products offered by retailers (which are continuing to evolve) and the ability of customers to register as market customers so they can directly participate in the wholesale market. The proposed WDR mechanisms would also give rise to a range of significant distortions that in Origin's view, could undermine wholesale market price signals and expose consumers to unnecessary costs.

It is essential these factors are taken into consideration as part of the AEMC's assessment of the rule change proposals. In particular, the AEMC's assessment framework should be premised on the principle of avoiding fundamental market distortions and demonstrating that any benefits would outweigh the associated costs. Further, consideration should be given to the overall need for a WDR mechanism given the potential impact of other related reforms/mechanisms, noting:

- the disparity between dispatch/settlement timeframes will be removed on 1 July 2021, a purported benefit of which is improved price signals for more efficient investment in capacity and DR technologies to balance supply and demand;
- the RERT framework already provides an additional mechanism for facilitating DR that is conducive to supporting high cost DR (i.e. DR with a value above the MPC) and minimising the level of wholesale market distortion (relative to a WDR mechanism); and
- the AEMC has separately advised that consideration should be given to a voluntary, contracts-based short-term forward market that could further assist with enabling DR providers to engage in the wholesale market.

Further discussion on the issues described above is provided in Attachment 1. If you wish to discuss any aspect of this submission further, please contact Shaun Cole at shaun.cole@originenergy.com.au or on 03 8665 7366.

Yours Sincerely,

Keith Robertson
General Manager, Regulatory Policy

[5] PJM, "Demand Response Strategy – PJM Interconnection", 28 June 2017.

1. Demand response activities

The rule change proposals seek to address barriers to efficient demand side participation in the wholesale market. The underlying premise is that the present level of DR is below some optimal level and that retailers are not incentivised to offer DR. While levels of DR in the NEM may be lower than in other energy markets (especially capacity markets), in Origin's view this is not indicative of the existence of significant barriers or a fundamental failing of the market. We also believe retailers face appropriate incentives to support DR.

1.1. Retailer engagement in DR activities

The AEMC notes that retailers with generation assets may have reduced incentives to undertake WDR, given utilising these products may reduce wholesale prices and in turn affect the revenue received from their generation assets. This is an overly simplistic assessment that does not consider the broader suite of factors that influence a retailer's behaviour.

It is not commercially practical or desirable for vertically integrated retailers to achieve a 'perfect hedge' of a retail load through matching generation output in terms of volume and profile of load. The interaction of gas and electricity markets can also mean that in certain circumstances, there is greater value in selling gas to the domestic market rather to dispatching a gas-fired generator. As such, vertically integrated businesses are motivated to hedge their load and reduce exposure to spot price risk in other ways, including through the use of DR and products that share risk with customers.

In the context of managing wholesale market risk, the costs of DR must ultimately be considered relative to alternative options like cap products. To this end, the uncertainty/firmness of DR has generally meant that it cannot be relied on in significant volumes, as retailers would likely need to over procure DR capacity (to effectively increase its firmness) at a greater expense than procuring the equivalent cap contract cover. However, Origin is currently undertaking a range of activities/trials that will assist with understanding the performance of customers' delivery of DR and its overall value proposition under different arrangements (see Table 1 below).

Table 1: Current activities/trials

Initiative	Overview
Greensync trial (demand response)	▪ Origin is developing a trial that will utilise Greensync's energy management software to provide DR solutions to C&I customers. Based on customer engagement to date, 67 MW of DR is in the development pipeline, with a further 50 MW identified. ▪ Under the trial, Origin will seek to schedule DR at a customer site in advance of an identified event. Two types of automated DR solutions will be tested: 1. Pre-programmed load curtailment (e.g. specific loads are curtailed). 2. Switching load to on-site generation. ▪ The DR will be used to target multiple value streams, including network support, ancillary services, portfolio management and renewable firming. Value will be shared with the customer. ▪ The accuracy of relying on baselines to measure load curtailment levels will be considered relative to the accuracy of measuring load offset at the generation source.
Tempus trial (demand flexing)	▪ Origin is trialling Tempus' flexible demand-site management platform with a group of C&I customers in South Australia. This represents 11 MW of load. ▪ The demand flexing technology uses smart controls and machine learning to predict market prices and dynamically shift non-time critical energy usage to lower price periods (e.g. ramp up refrigeration in anticipation of a high price event later in the day). This can assist with reducing costs for customers. Lower price periods also often

	correlate with higher renewable energy generation, meaning a reduction in the carbon intensity of the customers load can also be achieved. ▪ Consideration is currently being given to future platform requirements, which may include merging the platform with demand response software (e.g. software that enables load curtailment in response to an event). ▪ Tempus has now rolled out their pilot program nationally and onboarded six new customers.[6]
Victorian Microgrid (demand response)	▪ Origin was recently awarded $4.5m under the Victorian Government's Microgrid Initiative to develop a 5 MW virtual power plant (VPP). The VPP will connect over 600 residential and commercial properties across Victoria and involve: - distributed solar PV generation; - distributed battery storage (650 batteries); - embedded monitoring and control technologies; and - cloud-based demand management software. ▪ Once online, the VPP will be capable of dispatch into the NEM much like a traditional centralised power plant. The fleet of batteries will also be used to alleviate network constraints in Victoria. ▪ The program will enable both residential and C&I customers to access revenue from DR.
Residential DR solutions	▪ Origin currently offers pool pump and hot water service (HWS) demand control products that allow for third party control (i.e. load shifting and curtailment). Consideration is also being given to additional appliance control products. ▪ Retrofitting appliances can be challenging, with appliance compatibility and costs impacting take up. Origin is therefore investigating a number of alternate control options and working with hot water system manufacturers, Builders/Developers, Origin Solar, Origin Home services.

Where large customers do want to assume a degree of exposure to the wholesale spot market, they can also elect to include pool pass through and flexible purchasing products (FPP) in their contracts.[7] These products allow customers to respond to high spot market prices in a similar way to under a WDR mechanism. The AEMC's earlier finding that there is no evidence of a relevant market failure or barrier in the Rules that would prevent retailers, network businesses or DR service providers from engaging in DR activities with large customers therefore remains true today.[8]

1.2. Factors that could limit WDR

WDR is only one option that can be used by retailers to mitigate spot price risk

As discussed above, retail businesses will seek the lowest cost option to manage wholesale market risk. The cost of acquiring firm WDR must therefore be weighed against alternate risk management options such as cap products. As technology costs reduce and retailers gain a better understanding of customers' DR performance, the value proposition for both retailers and customers may change, which could lead to higher rates of uptake.

Customer preferences and technology changes

[6] https://blog.tempusenergy.com/blog/2018/11/23/update-on-our-successful-pilot-with-origin-energy

[7] Customers can also elect to use flexible purchasing products (FPP), that allow customers to accept various degrees of market risk that best suit a particular business. For example, an industrial customer could accept partial exposure to pool prices and manage that exposure as it sees fit. See link for further details (https://www.originenergy.com.au/business/commercial-and-industrial/forward-plan/purchasing.html).

[8] AEMC, "Final Rule Determination – Demand Response Mechanism and Ancillary Services Unbundling", 24 November 2016.

It is our experience that customers generally do not have a strong desire to participate in the wholesale market and are more comfortable with retailers managing spot price risk on their behalf. There are also other products and growing opportunities in the electricity market that are further reducing the appetite for demand side participation. The most obvious of these are solar PV and battery storage. These could be considered a form of WDR as customers are substituting away from the grid through their installation. Increasing uptake of solar PV and battery storage would also continue to reduce opportunities for WDR by effectively shifting or smoothing demand peaks. For example, by shifting peak demand to later in the day (when many industrial loads would be ramping down), solar PV effectively reduces the opportunity for the type of WDR envisioned under a WDR mechanism. This is because the demand from customers may no longer coincide with the maximum daily demand in the market when WDR would be of greatest value.

Wholesale market volatility

The current market may not be signalling a need for higher levels of WDR. The AER's Wholesale Market Performance Report noted that the level of spot market volatility has declined – the spot price only exceeded $300/MWh on 205 occasions in 2017-18 compared with 688 in 2016-17.

Competing value streams

There are also other value streams for DR that are not reliant on wholesale market participation. These include: network support services (to assist with relieving congestion); ancillary service markets (to assist with frequency control); renewable firming; and the provision of emergency reserve services under the RERT mechanism. As identified by the AER, a number of market participants have reported that the higher priced RERT mechanism is redirecting customers from existing DR agreements, rather than creating an incentive for new capacity and security services, or new demand response contracts.[9]

2. Impact of WDR mechanisms

2.1. Distortionary market outcomes

In an energy only market, spot and contract pricing provide key signals for decisions made by market participants in both the short and longer term. One of the purported benefits of a WDR mechanism is that it could reduce market volatility and lower wholesale pool prices. However, Origin cautions against the simplistic view that a WDR mechanism would result in better market outcomes.

As noted by the AEMC in its earlier assessment of the DRM rule change proposal, DR response on an equivalent basis to generation can have a significant distortionary impact on wholesale market outcomes. A summary of some of the AEMC's key findings is provided in Table 2 below

Table 2: Distortionary impacts of rewarding DR on the same basis generation in the wholesale market

Area	Distortionary impacts
Spot market	▪ Rewarding DR in a similar way to generation does not lead to economically efficient outcomes unless: - the consumer already purchased the energy and it is now re-selling energy (e.g. the energy was purchased, stored and resold) – this is generally not the case, which can give rise to the issue of double payments (i.e. customers being rewarded for both avoided consumption and the provision of DR); and

[9] Ibid.

	- the DR delivered by the aggregator was a perfect substitute to the electricity delivered by generators. ▪ Wholesale prices could be suppressed to inefficiently low levels. This would discourage the entry of more efficient scheduled energy resources and the energy resource mix would become dominated with less reliable DR.
Retail market	▪ Retailers would continue to be financially responsible for their customer's baseline consumption. This may result in customers paying for hedging costs through their retail contract, even where they provide DR. The AEMC's assessment of net financial outcomes (under the proposed DRM) was that this dynamic would likely result in higher electricity prices for consumers. ▪ It is retailers that are chosen to manage spot price risk on a customer's behalf. The retailers and not the DR aggregator should therefore benefit from the customer's DR and decide whether to engage in DR with their customer to manage its own exposure to the spot price. Retailers also have an efficient incentive to manage this risk cost-effectively and develop competitive pricing offers for customers. ▪ It departs from the fundamental tenants of the NEM, namely that generation receives payments for generating electricity and customers pay for electricity used. Customers would be rewarded not only through avoided consumption, but also by being paid for not consuming. Customers' consumption decisions would therefore be driven, at least in part, by the 'wedge' they are able to create between the baseline consumption calculated at the retail tariff rate and their metered consumption calculated at wholesale prices.
Financial market	▪ Retailers' demand for hedging contracts would remain aligned with that required to hedge baseline consumption levels, as retailers would remain financially responsible for the baseline consumption of their customers. This has the potential to unbalance payments under hedging contracts between generators and retailers. ▪ If DR displaces firm generation, it would unbalance demand and supply in the hedging market, leading to an increase in hedging contract prices.
Competition and gaming	▪ DR aggregators would not bear the cost of inaccurate baselining of a customer's consumption, but rather benefit from baselines that overestimate the DR. ▪ By understanding the administrative algorithm for determining the baseline, loads may be able to raise their baseline energy use and thereby receive additional payments for DR. This creates a gaming risk. ▪ If a baseline is inaccurate or 'inflated', this would ultimately result in higher costs to retailers that would be recovered from their consumers. While such an outcome may be mitigated through increased monitoring and repeated verification of baseline methodologies, the cost of this oversight would ultimately be passed onto consumers.

In Origin's view, the above issues persist under both the Public Interest Advocacy Centre / Total Environment Centre / The Australia Institute and South Australian Government proposal. Requiring WDR to be scheduled may assist with addressing some of the identified spot market issues (at least in part) by improving the firmness of WDR relative to scheduled generation. However, it is still unclear whether WDR could be relied upon the same way as can be dispatchable generation. The AEMC's assessment of Snowy Hydro's proposal to required price responsive loads to be scheduled also determined that such a requirement would place considerable costs and obligations on parties that are not justified by the limited benefits that may accrue.[10]

The creation of a separate transitional WDR market (as proposed by the SA Government) could also create additional issues. These include: further distorting incentives for participation in the wholesale market; exposing retailers to additional costs that are difficult to hedge; and exposing consumers to additional costs, with all consumers subsidising the cost of WDR undertaken.

[10] AEMC, "Final Determination – Non-scheduled generation and load in central dispatch", 12 September 2017.

2.2. International experience

As highlighted in the Brattle Group's International Review of Demand Response Mechanisms, most of the jurisdictions where there is a similar mechanism to the proposed WDR mechanism have capacity markets that differ significantly to the NEM's energy only design.[11] It is unsurprising that mechanisms similar to the WDR mechanism are more prevalent in capacity markets, as there are separate energy and capacity payments to generators allowing for the recovery of operating costs and fixed costs irrespective of whether WDR is provided to the market or not. Given a participant's revenue stream is supplemented by capacity payments, the pricing signal provided by the spot market is arguably less important relative to markets such as the NEM where such payments do not exist.

However, it is still not clear that WDR mechanisms have been successful in all cases. PJM recently undertook a review of its current market framework, which allows DR to participate in capacity, energy and ancillary service markets. As noted in the key findings listed below, PJM believe DR participation should ideally be in the demand-side of the market, not the wholesale energy market.

- One of the challenges associated with allowing DR or energy efficiency (EE) to participate in the wholesale market is how to handle DR activity that will already occur because of retail contracts, rates or other incentives. In such instances, PJM believes it is inappropriate for the customer and/or its curtailment service provider (i.e. the aggregator) to also receive compensation through the wholesale market, because such compensation is not actually driving the response or installation of the EE measures.

- Ideally, DR participation in the energy market would be in the retail market on the demand side and not in the wholesale market as a supply resource. This will avoid the double payment issue where a customer may receive wholesale energy revenue and retail cost savings for the same MW of load reduction.

- Subsidies for a single type of resource lead to inefficient market outcomes and distorted price signals, given the subsidised resource will be utilised when another type of resource may be more cost effective.

- PJM recognises that the transition away from supply-side payments will have several obstacles to overcome, but believe this direction should be the long-term goal.

3. Assessing the need for change

Given the above, Origin does not believe a WDR mechanism is necessary or justified. DR is happening in the NEM through different products offered by retailers (which are continuing to evolve) and the ability of customers to register as market customers so they can directly participate in the wholesale market. The proposed WDR mechanisms would also give rise to a range of significant distortions that in Origin's view, could undermine wholesale market price signals and expose consumers to unnecessary costs.

It is essential these factors are taken into consideration as part of the AEMC's assessment of the rule change proposals. In particular, the AEMC's assessment framework should be premised on the principle of avoiding fundamental market distortions (such as those described in Section 2) and demonstrating that any benefits would outweigh the associated costs. Further, consideration should be given to the overall need for a WDR mechanism given the potential impact of other related reforms/mechanisms, noting:

[11] Brattle Group, "International Review of Demand Response Mechanisms", October 2015.

- the disparity between dispatch/settlement timeframes will be removed on 1 July 2021, a purported benefit of which is improved price signals for more efficient investment in capacity and DR technologies to balance supply and demand;

- the RERT framework already provides an additional mechanism for facilitating DR that is conducive to supporting high cost DR (i.e. DR with a value above the MPC) and minimising the level of wholesale market distortion (relative to a WDR mechanism); and

- the AEMC has separately advised that consideration should be given to a voluntary, contracts-based short-term forward market that could further assist with enabling DR providers to engage in the wholesale market.

In addition to the above, Origin is also not supportive of the AEMC's proposed load shedding compensation mechanism (LSCM), which was presented as an additional option in the Consultation Paper. The existing market already contains strong signals for retailers to contract with dispatchable generation sources to hedge their positions against price volatility. It is also unclear how retailers would be expected to manage the risk of involuntary load shedding under the LSCM, given a retail business with fully hedged load could still be required to pay compensation if its customers are involuntarily load shed. The proposed mechanism is therefore unlikely to drive any additional benefits for consumers.