

21 December 2018

Mr John Pierce  
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Australian Energy Market Commission  
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By electronic submission

Dear Mr Pierce

### **Wholesale Demand Response Mechanisms – Consultation Paper**

AEMO welcomes the opportunity to provide input to the Commission's Consultation Paper on wholesale demand response (WDR) mechanisms for the National Electricity Market (NEM), which has been published following the lodgement of three rule change requests in relation to WDR.

As the Commission recognised during the Reliability Frameworks Review, the energy sector is experiencing multiple disruptions that are resulting in rapid transformation, characterised principally by a changing generation mix, more active demand side and the introduction of storage technologies. The variability of the power system is increasing on both the supply and demand sides, with more parties actively responding to price signals that may not align with system requirements (e.g. simple retail tariffs). It is vital to adapt market frameworks and the operation of the power system to address the issues that this transformation presents.

AEMO considers that demand response can play a much greater role than at present, especially in the context of technological advancements and the need for flexible and dispatchable resources. Effective integration of WDR can improve the visibility and predictability of demand response and expand the options for it to be scheduled in response to central price signals that relate to physical system requirements. These measures can enhance the overall efficiency of the market and support the reliability and security of the power system.

To achieve these aims, AEMO supports proposals to provide access to third party aggregators to offer WDR to the market via the central dispatch process. The unbundling of aggregated demand side services from retailing will help drive competition, greater consumer choice, and enable AEMO as system and market operator to access available resources.

AEMO considers that the integration of WDR will support other reform work that is underway to support the decentralisation of the power system. The integration of WDR into the spot market would be supported by a short-term forward market that would allow demand-side participants to manage their risk in the market. WDR will also be an important enabler for distribution-level optimisation and markets, which are being investigated in the Open Energy Networks collaboration between AEMO and Energy Networks Australia.

In the attached submission, AEMO has described its preferred overarching model for the integration of WDR, shared some preliminary considerations on elements of detailed design and implementation, and provided responses to questions in the Consultation Paper.

AEMO looks forward to supporting the work of the AEMC and industry in integrating WDR into the NEM. And would welcome working with the AEMC and industry to develop detailed design framework to effectively inform the AEMC's process.

If you would like to discuss the contents of this submission further, please do not hesitate to contact Violette Mouchaileh on 03 9609 8551 or [Violette.Mouchaileh@aemo.com.au](mailto:Violette.Mouchaileh@aemo.com.au).

Yours sincerely



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Attachment: Wholesale Demand Response Mechanisms – AEMO Submission to Consultation Paper



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# Wholesale Demand Response Mechanisms

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**December 2018**

AEMO Submission to Consultation Paper

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# 1. Introduction

Activating the demand side to participate in the National Electricity Market can support power system reliability and increase competition, both in the wholesale market and for energy services delivered to consumers.

## 1.1 Context

The energy industry, the power systems that operate them, and the energy markets that optimise them are undergoing rapid transformational change in Australia and overseas. Power systems are shifting from dominance by central large-scale, synchronous power plants, and passive consumption, to the current emerging environment with rapid increases of distributed energy resources and variable renewable energy, and the impending retirement of conventional plant over the coming decades. Both supply and demand resources in the NEM are much more diverse than when the market commenced, and this change will continue.

Fortunately, many of the same changes in technology and resources that are creating challenges for the existing system operations may also become solutions if approaches to the market and regulatory conventions are recalibrated to address the changed conditions. Specifically, the advent of advanced intelligence in the networks, and increased levels of distributed energy resources (DER) investment that supports more elastic and flexible price-responsive demand, can become an asset for supporting reliability in a more efficient manner if they can be relied upon by AEMO.

AEMO described these challenges and opportunities in its report *AEMO Observations: Operational and market challenges to reliability and security in the NEM* (March 2018).<sup>1</sup> The International Energy Agency has also recognised the need to promote flexibility in market and power system operations:<sup>2</sup>

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**“ With higher variability in supplies, power systems will need to make flexibility the cornerstone of future electricity markets in order to keep the lights on. The issue is of growing urgency as countries around the world are quickly ramping up their share of solar PV and wind, and will require market reforms, grid investments, as well as improving demand-response technologies, such as smart meters and battery storage technologies. ”**

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As market operator for the National Electricity Market (NEM) and Western Australian Wholesale Electricity Market (WEM), AEMO’s ultimate objective is to operate efficiently, using competitive market processes to the extent practicable, to support affordability for Australian consumers, while delivering power system security and reliability, using all available resources.

Historically, the predominant method to avoid involuntary load reductions during peak periods or to address unplanned generation or system outages would be to construct new peaking generation, along with the transmission and distribution necessary to accommodate peak conditions.

Now, with the increase in DER and the growing capability for voluntary price -responsive demand to contribute to the reliability and security of the power system, properly designed wholesale markets can increase competition and support more economically efficient system-wide asset utilisation. The net outcome of a well-designed two-way market can create significant consumer benefits – a more efficient, reliable and secure system at a lower total cost at the meter.

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<sup>1</sup> This report is available at [https://www.aemo.com.au/-/media/Files/Media\\_Centre/2018/AEMO-observations\\_operational-and-market-challenges-to-reliability-and-security-in-the-NEM.pdf](https://www.aemo.com.au/-/media/Files/Media_Centre/2018/AEMO-observations_operational-and-market-challenges-to-reliability-and-security-in-the-NEM.pdf).

<sup>2</sup> Press release for World Energy Outlook 2018, 13 November 2018, available at <https://www.iea.org/newsroom/news/2018/november/world-energy-outlook-2018-examines-future-patterns-of-global-energy-system-at-a-t.html>.

## 1.2 Role of wholesale demand response (WDR)

The potential benefits of WDR have been recognised in various market reviews that have recommended the development of a mechanism that facilitates provision of WDR by third--party aggregators and energy service companies. These include the 2012 Power of Choice review (AEMC)<sup>3</sup>, the Independent Review into the Future Security of the National Electricity Market (Finkel Review)<sup>4</sup>, the 2018 Retail Electricity Pricing Inquiry (Australian Competition and Consumer Commission (ACCC))<sup>5</sup> and the 2018 Reliability Frameworks Review (AEMC)<sup>6</sup>. The three rule change requests lodged with the AEMC, leading to the Consultation Paper, reflect the momentum for greater WDR participation.

The establishment of a WDR mechanism was previously considered through the rule change process in 2015 and 2016<sup>7</sup>, but the AEMC recommended not to make the rule at that time. The AEMC acknowledged the benefits of WDR but based its decision on its finding that there are no barriers in the National Electricity Rules (NER) to demand side participation and that the cost of implementation would exceed the incremental benefits that would be realised.

AEMO agrees with the findings of the various market reviews that an effective WDR mechanism can boost competition and improve efficiency in operation and investment in the long-term interests of consumers. AEMO considers that demand response can play a much greater role than at present. Effective integration of WDR can improve the visibility and predictability of demand response and expand the options for it to be scheduled in response to central price signals that relate to physical system requirements. These measures can enhance the overall efficiency of the market and support the reliability and security of the power system.

In addition, a cursory evaluation of the demand response market in Australia reveals that as a limitation of not allowing direct access to the wholesale market the number of demand response providers, the number of customers participating, and the sophistication of the offerings has been somewhat limited. This lack of innovation has also meant that the price benefits from demand response to date in the NEM are opaque at best or non-existent at worst. In addition, AEMO foresees that Demand Response may also be able to provide new services once a bidding and dispatch capability is developed under each of the proposed WDR mechanisms; this could include voltage support or reactive power services at a Distribution or Transmission level. AEMO also notes that In the US there are an ever-increasing amount of value streams DR can access, see figure below<sup>8</sup>.

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<sup>3</sup> Details of this review are available at <https://www.aemc.gov.au/markets-reviews-advice/power-of-choice-stage-3-dsp-review>.

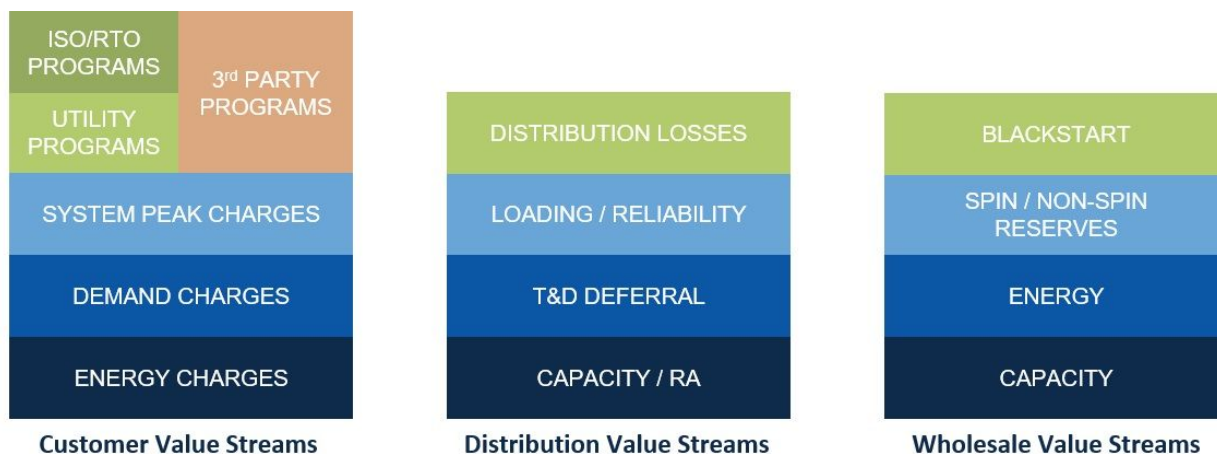
<sup>4</sup> Details of this review are available at <https://www.energy.gov.au/government-priorities/energy-markets/independent-review-future-security-national-electricity-market>.

<sup>5</sup> Details of this review are available at <https://www.accc.gov.au/regulated-infrastructure/energy/electricity-supply-prices-inquiry/final-report>.

<sup>6</sup> Details of this review are available at <https://www.aemc.gov.au/markets-reviews-advice/reliability-frameworks-review>.

<sup>7</sup> *Demand Response Mechanism and Ancillary Services Unbundling* rule change request, available at <https://www.aemc.gov.au/rule-changes/demand-response-mechanism>.

<sup>8</sup> Details of this review are available <https://www.woodmac.com/reports/power-markets-the-u-s-utility-demand-response-landscape-programs-case-studies-and-economics-58129308>



Source: GTM Research

Demand Response is a feature of almost every energy market around the world, including every US market, Japan, Korea, the UK and our own WEM. It features in energy markets such as the Texas ERCOT market which has very similar “Energy Only” design to that of the NEM. While each market has faced design and implementation challenges – such as the formulation of baselines, definition of participant categories, bidding and dispatch of Demand Response; regulators and rule makers in all these international markets have concluded that the benefits of specifically targeting the inclusion of demand side participation in their markets outweighs the costs.

AEMO considers that it is timely to reconsider the need for new avenues for WDR. While the NER may not present barriers to demand side participation, the ACCC noted that a new mechanism for third parties to offer WDR directly into the wholesale market may boost competition by:

- harnessing specialist demand response expertise that retailers may not possess; and
- addressing the situation whereby existing retailers (particularly those that are vertically integrated with generation) may have insufficient incentives to use demand response to manage risk, given greater familiarity with other risk management tools.

Further, AEMO considers that the growing variability of the power system is likely to have increased the potential benefits of a WDR mechanism, while design differences could be made from the previous proposal to lower the potential implementation costs.

An effective WDR mechanism would create valuable new information including an established pool of demand response providers and indicative cost thresholds. This information could facilitate enhanced processes to explore non-network alternatives to investment in transmission and distribution assets as part of AEMO’s work to develop the Integrated System Plan (ISP). A rigorous, impartial assessment of demand response opportunities will help to ensure that the ISP sets out a path for the efficient development of the power system on a whole-of-system basis.

### 1.3 Linkage to a broader DER integration

The implementation of a WDR mechanism would complement a range of related work programs and reforms that are exploring changes to market frameworks to support the decentralisation of the power system.

AEMO considers that activating demand side resources by enabling demand response service providers (DRSPs) to participate directly in the wholesale spot market is a critical and needed step in the evolution of the market to adapt to a more decentralised resource mix, and would continue the trend of recent reforms to allow DRSPs to independently deliver services.

DRSPs have successfully demonstrated their capability to provide services independently from retailers following the ancillary services unbundling rule change and through participating in the reliability and emergency reserve trading (RERT) mechanism. Demand response was also designated a reliable hedging product under the reliability obligation element of the National Electricity Guarantee.

As noted in the Consultation Paper, AEMO has submitted a rule change request to establish a voluntary, contracts-based forward market, which was recommended in the Reliability Frameworks Review. AEMO considers that such a market would complement WDR participation in the spot market by providing additional risk management options for demand-side participation. The greater confidence that would be derived from forward price signals can lower barriers to entry for new demand-side resources, particularly those for which notice is required to modify consumption from the grid in an orderly manner.



# 2. Core principles for WDR

AEMO supports the following fundamental principles for activating the demand side through a WDR mechanism:

- Promoting competition by facilitating third-party service providers and aggregators to engage directly in the wholesale spot market
- Demand response above a certain threshold should be a transparent resource in the dispatch process, through a form of scheduling in the spot market. This will enable it to respond to price appropriately.

## 2.1 Assessment framework

AEMO supports the principles in the AEMC's proposed assessment framework, as detailed in section 4.4 of the Consultation Paper.

Within these principles, AEMO considers it will be important to ensure that any WDR mechanism improves the visibility, predictability and dispatchability of the power system. These characteristics are vital for the flexible markets of the future, not only for the maintenance of system security but also to provide credible market forecasts and price signals to participants to promote efficient decision-making.

It will also be important that the detailed design of such a mechanism ensures the integrity of WDR services. For WDR to be an alternative to other sources of supply, it will need to meet equivalent technical requirements where applicable (including its visibility and controllability) to promote a level playing field. Given the impact that a WDR mechanism may have on wholesale settlement, it will also be essential that settlement quantities are based upon methodologies that are broadly consulted on and agreed with industry.

A WDR mechanism that improves visibility, predictability and dispatchability, with measures to ensure the integrity of WDR services, would promote flexibility, transparency and competition, minimise market distortion and be more resilient to future market changes.

## 2.2 Core elements of AEMO's preferred model

### **WDR mechanism should facilitate direct access for third-party service providers and aggregators**

AEMO considers that the long term interest of consumers is served by maximising the opportunities and incentives for customers with price-responsive demand to offer services to the market that contribute to the cost-efficient satisfaction of reliability and security standards, as signalled through central price signals that relate to physical system requirements.

To achieve these aims, AEMO supports the proposals to provide direct access for third-party service providers and aggregators to offer WDR to the market. The unbundling of aggregated demand side services from retailing will increase the avenues through which wholesale price signals can reach end consumers to elicit behaviour that benefits the system as a whole. This can enable those individual customers to benefit from their contribution to the power system, while lowering total costs for all consumers.

AEMO recognises that demand side participation can occur today – demand response arrangements can be incorporated in the arrangements between a customer and its retailer, while larger customers may also choose to engage directly with the wholesale market. However, AEMO agrees with the ACCC's assessment that facilitation of third-party WDR could overcome situations where retailers may not have strong incentives to offer demand response. AEMO also agrees with the ACCC that retailers should not be able to limit the

ability of their customers to engage with third party service providers and aggregators to the extent that it is not prevented by the retailer's contract with the customer. It should be noted that retailers would be able to participate in any new WDR mechanism and that existing demand side participation options could continue.

AEMO considers that facilitation of direct market access for third-party service providers and aggregators would promote competition and consumer choice, and would enable AEMO as system and market operator to access available resources to support the reliability and security of the power system.

AEMO envisions that this added competition and consumer choice may be particularly beneficial as the market evolves to consider more localised (distribution) network constraints in the dispatch process<sup>9</sup>, and facilitate local resources (including demand side resources) addressing local network constraints, voltage and other relevant services.

AEMO considers that the WDR register mechanism proposal<sup>10</sup> is unlikely to promote competition and consumer choice to the extent that would be achieved by the facilitation of direct market access for third-party WDR providers. In particular:

- third-party WDR providers may have little incentive to register WDR arrangements given the ability of an incoming retailer to veto WDR arrangements on the basis that they are materially inconsistent with its business model, systems or processes;
- the requirement for negotiated WDR agreements between retailers and third-party WDR providers may diminish the realised benefits of greater WDR participation due to the administrative overhead and the potential misalignment with core retail business activities; and
- the ability for a retailer to register WDR arrangements with its own customers could be used to impede retail competition and customer churn by requiring negotiation between the incumbent and incoming retailers.

However, AEMO considers that elements of the WDR register proposal may be useful for conveying information about any WDR that is procured by the retailer from its own customers, where that WDR sits outside the central dispatch and scheduling processes.

### **WDR resources should be transparent in the dispatch process through a form of scheduling**

A fundamental tenet of the NEM is its central dispatch process, in which resources are scheduled in the spot market to satisfy energy demand and support system security at least cost. The transparency and visibility of forward prices promote efficient dispatch, while the resulting spot prices signal the marginal value of energy and ancillary services to encourage participation and investment.

Ensuring market arrangements are structured in a way that draws on and co-optimises the diversity of resources available will deliver improved customer outcomes. In the transforming power system, the scheduling of WDR resources in the spot market will promote flexibility and assist in managing the increasing variability of both supply and demand. A well-designed WDR mechanism would maximise the transparency and visibility of WDR resources and would enable them to be coordinated with system needs in the spot market to support the secure, reliable and efficient operation of the power system.

In addition, we see a role for new markets for system security service provisions at both the bulk supply and distribution level that Demand response could play a role in. An example is an RFI AEMO recently published due to changes in network operating conditions where we identified that Demand Response could be a potential source of reactive power services<sup>11</sup>. Should Demand Response providers be able to build up

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<sup>9</sup> Potential models to achieve this are being considered in AEMO's collaboration with the ENA on the Open Energy Networks process, available at <https://www.energynetworks.com.au/joint-energy-networks-australia-and-australian-energy-market-operator-aemo-project>.

<sup>10</sup> *Wholesale demand response register mechanism*, proposed by Australian Energy Council, details available at <https://www.aemc.gov.au/rule-changes/wholesale-demand-response-register-mechanism>.

<sup>11</sup> AEMO did not receive any response to this RFI from Demand Response or traditional service providers <https://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Planning-and-forecasting/Victorian-transmission-network-service-provider-role/Request-for-Information-for-reactive-power-Non-market-Ancillary-Services-in-VIC>

capability to provide Wholesale Demand Response services – this same capability (communication bid and dispatch with DR assets) could then be used to provide these kinds of network services. Another example is work done to trial demand response for voltage control by National Grid under the CLASS (Customer Load Active system Services) project in the UK proved to be successful and AEMO would welcome similar trials in Australia.<sup>12</sup>

In addition, allowing WDR resources to bid in the spot market and set spot prices, for both increases and reductions in demand, will promote efficient price signals and facilitate the benefits mooted by the ACCC: “to constrain the pricing of generation businesses, limit the need for additional generation and lead to lower prices”.<sup>13</sup>

Transparency in the dispatch process requires an agreed level of operational visibility. AEMO obtains operational visibility of scheduled generators at a 4 second resolution through the SCADA system. It is anticipated that many resources that could participate in DRSP portfolios in future may not be connected to SCADA and other means of obtaining operational visibility should be explored. AEMO is investigating this through its Virtual Power Plant (VPP) Demonstrations.<sup>14</sup> AEMO has proposed a framework for the Demonstrations in which participating VPPs submit operational data for their aggregated fleets on a five-minute resolution, refreshing every five minutes.

AEMO intends to utilise the VPP Demonstrations to learn what level of operational transparency is appropriate to securely integrate VPPs into the NEM at scale (potentially in the hundreds of MWs), taking into account the capability of VPPs to transfer data at a more granular resolution and its associated cost.

AEMO agrees with the AEMC’s assessment in the Consultation paper that scheduling load is preferential to scheduling ‘negawatts’ in dispatch. AEMO agrees with the Australian Energy Council’s assessment that the current dispatch process accommodates scheduled loads, and that the requirements for scheduled loads as part of a WDR mechanism could be improved and refined, providing an added benefit for participants.

AEMO is also working with ARENA to develop a short trial using the pre-production environment of the NEM Dispatch Engine (NEMDE) to enable a potential DRSP to test their capability to act as a scheduled market participant responding to live market price signals, but in an off-market setting.

AEMO intends to run a short, targeted trial as soon as possible in 2019 so that insights from this trial can inform the AEMC’s ongoing assessment of the WDR rule change proposals. Potential insights arising from this trial relate to a potential DRSP’s capability to forecast their load, bid and re-bid into the dispatch process, respond reliably and accurately to meet a dispatch target, and how their resources ramp up and down between dispatch targets. These insights can help inform how DRSPs should bid into the dispatch process, and what requirements should be set for participating in central dispatch.

## 2.3 Load Shedding Compensation Mechanism (LSCM)

In addition to the proposed models for WDR in the three rule change requests, the Consultation Paper also floated the concept of a Load Shedding Compensation Mechanism (LSCM).

While a LSSCM could strengthen incentives for retailer-led demand response, AEMO advises that further development of such a mechanism would need to consider the following:

- Demand response is a service not a load shedding tool: The implementation of such a mechanism would represent a retrograde step in that it would run the risk of entrenching the idea that demand response is only useful as load shedding tool. AEMO can envisage demand response to supporting the overall optimisation of NEM minimising the need for such traditional emergency mechanisms.

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<sup>12</sup> See details at <https://www.enwl.co.uk/innovation/class/>

<sup>13</sup> ACCC, *Retail Electricity Pricing Inquiry – Final Report*, June 2018, p204, available at [https://www.accc.gov.au/system/files/Retail%20Electricity%20Pricing%20Inquiry%E2%80%94Final%20Report%20June%202018\\_0.pdf](https://www.accc.gov.au/system/files/Retail%20Electricity%20Pricing%20Inquiry%E2%80%94Final%20Report%20June%202018_0.pdf).

<sup>14</sup> AEMO, 2018. *Virtual Power Plant Demonstrations*. Available: <https://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/DER-program/Virtual-Power-Plant-Demonstrations>.

- **Appropriate risk allocation:** Retailers may have different risk appetites with respect to the potential liability for customer compensation, leading them to contract demand response to different levels. However, when involuntary load shedding is required to maintain system security, it is impossible to selectively shed customers of an individual retailer. Consequently, a retailer that did the 'right thing' and contracted additional demand response could be disproportionately penalised following a load shedding event.
- **Transparency and efficient market outcomes:** One attraction of WDR mechanisms is the increased transparency of WDR activities, whereas a LSCM would keep demand response activities 'off market'. The continued decentralisation of the power system will require greater coordination and optimisation of the distribution system to ensure that distribution networks operate within technical limits, as is being explored in the Open Energy Networks collaboration. The resilience of a LSCM framework would be challenged if it was unable to support the coordination and optimisation that will be needed.
- **Competition and customer choice:** At face value, the facilitation of third-party service providers and aggregators would appear to offer greater customer choice than under a LSCM, promoting competitive tension between these third parties and retailers.

# 3. WDR issues to consider

AEMO welcomes the opportunity to work with the AEMC and industry to develop new WDR arrangements, and develop design proposals to inform how such a mechanism can best facilitate demand response resources.

As input for this work, this chapter details some of AEMO's preliminary considerations on matters associated with a WDR mechanism that will need to be considered.

## 3.1 Aggregation

To facilitate WDR, the detailed design must recognise the potential for very large numbers of customers to participate in the mechanism, requiring the design of mechanisms for aggregation of consumers for presentation to the market.

AEMO offers the following considerations related to aggregation:

- **Associating customers with the facility:** A guideline (subject to the rules consultation procedure) would be needed to detail the information that a third-party WDR provider must submit to AEMO to associate a customer site with its aggregated facility. AEMO considers that the evidence and process detailed in clauses 2.29.5B to 2.29.5L of the WEM Rules would provide a useful starting point, requiring contractual evidence that the third-party WDR provider is able to control the customer's consumption, start and end dates for the association of the customer, details of the connection point and metering, and expected consumption limits.
- **Geographical limitations:** The detailed design should consider whether any geographical limitations should be placed on the loads within an aggregated facility, to ensure that the transparency/scheduling of WDR is consistent with the management of security constraints in the central dispatch process. One of the rule change requests suggested that a single dispatchable unit could "represent the aggregated response of multiple customer sites across a NEM region"<sup>15</sup>, though AEMO considers the aggregation may need to provide further information on the expected operation of the fleet in relation to specific transmission nodes or virtual transmission nodes to support the management of intra-regional constraints in the NEM Dispatch Engine.
- **Co-optimisation and multiple trading relationships:** The Reliability Frameworks Review recommended the development of rule changes to allow customers to engage multiple retailers/aggregators at the same connection point (multiple trading relationships). Such a framework could, for example, allow a single customer to be associated with one aggregated facility for the provision of WDR and a separate aggregated facility (with a different grouping of customers) for the provision of frequency control ancillary services (FCAS). It will be important to consider whether the aggregation arrangements should consider the co-optimisation of multiple service from the same customer site to ensure physically feasible dispatch.

## 3.2 Thresholds for participation

AEMO agrees that threshold for participation should apply to exempt small customers from the obligations associated with participating. Setting appropriate thresholds not only relates to the size of the threshold but also to how resources are associated with market participants, particularly when considering aggregations.

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<sup>15</sup> Wholesale Demand Response Energy Market Mechanism rule change request, submitted by the Public Interest Advocacy Centre (PIAC), Total Environment Centre and The Australia Institute, p10, available at <https://www.aemc.gov.au/rule-changes/wholesale-demand-response-mechanism>.

For instance, setting a threshold of participation at 5 MW without considering the association of resources could result in a single entity setting up many different aggregations of 4.5 MW each, that may all be operated to deliver the same strategy, to avoid the WDR obligations. Participation thresholds should be designed to avoid such distortions.

### 3.3 Settlement

While AEMO favours the scheduling of WDR resources via the spot market, including the ability for WDR resources to set spot prices, AEMO notes that various alternatives would exist for settlement of WDR, including:

- Baseline settlement, where the financially responsible market participant (FRMP) is settled on a baseline consumption profile and the WDR provider is settled on the difference between the baseline and the metered consumption;<sup>16</sup> and
- Separate WDR settlement, where the FRMP is settled on the metered consumption and the WDR provider receives a separate payment that is separately funded.<sup>17</sup> Although the South Australian Government rule change proposal indicated this could represent a transitional arrangement to the baseline settlement design, AEMO considers this to be an alternative option for the WDR design.

Both these options should be further explored noting the following:

#### Baseline settlement

Baseline settlement would maximise the integration of WDR into the NEM and support equivalent treatment of supply-side and demand-side offers in the market, which will support more fulsome integration of DER in the future.

AEMO considers that baseline settlement would also minimise market distortions that can arise from separate payment of WDR, such as where an end customer that curtails its consumption receives benefits from reduced energy costs and is also paid WDR payments.<sup>18</sup> As the quantity of demand response grows, baseline settlement avoids the inefficiency of potentially large additional WDR dispatch costs that are smeared across consumers.

Baseline settlement may require greater implementation time and cost due to the larger impact on retailer settlement. In the AEMC's 2016 final rule determination that considered a demand response mechanism, the estimate of implementation costs for retailers was approximately ten times the estimated implementation cost for AEMO. However, AEMO intends to work with industry to explore various approaches to implementation of a baseline settlement process that would minimise the implementation costs for industry. Settling the FRMP on a baseline level of consumption could also disrupt retailers' current contracts and risk management strategies, and would amplify the potential for disputes regarding the baseline methodology.

#### Separate WDR settlement

Separate WDR settlement offers the benefit of avoiding the use of baselines to settle the FRMP at a customer site. Energy settlement in the NEM seeks to maximise the use of metering data from compliant metering installations, while the recently approved Global Settlement and Market Reconciliation rule change<sup>19</sup> seeks to increase the use of compliant meter data to reduce the magnitude of unaccounted for energy (UFE). In this context, separate WDR settlement would maintain consistency with the principle of energy settlement being underpinned by metering and would be directionally consistent with the global settlement rule change.

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<sup>16</sup> This approach was proposed by PIAC et al (op. cit.) and the South Australian Minister for Energy (*Mechanisms for wholesale demand response rule change request* available at <https://www.aemc.gov.au/rule-changes/mechanisms-wholesale-demand-response>). It was previously proposed in the *Demand Response Mechanism and Ancillary Services rule change request* (op.cit.).

<sup>17</sup> This approach was proposed as a transitional mechanism by the South Australian Minister for Energy (op. cit.), as part of a separate WDR market.

<sup>18</sup> Similarly, an end customer that increases its consumption through WDR receives the benefit of increased energy consumption (perhaps when the spot price is negative, or through arbitrage) and is also paid WDR payments.

<sup>19</sup> Details of this rule change are available at <https://www.aemc.gov.au/rule-changes/global-settlement-and-market-reconciliation>.

AEMO expects that separating the settlement of WDR and avoiding changes to the energy settlement process could also offer significant reductions in implementation cost, time and risk. AEMO anticipates that the cost for retailers would be lower if changes to their energy settlement processes were avoided.

However, as noted above, separate WDR settlement requires additional payments that may, in some circumstances (and subject to detailed design), increase short-term costs for consumers. These additional payments could be distortionary, particularly as the utilisation of WDR increases.

The Consultation Paper also suggested that a separate settlement approach may reduce the ability of retailers and consumers to anticipate costs that they would bear through the 'smeared' cost recovery process for this model.<sup>20</sup> However, AEMO considers that this could be mitigated through the provision of timely information from the spot market process.

If separate WDR settlement is preferred, it will be important to mitigate the potential for perverse incentives where the WDR provider for a customer is also the retailer. Consideration will also need to be given to payments and cost recovery where consumption increases are scheduled through the WDR mechanism. For example, it could be argued that generators are the main beneficiaries of consumption increases (through increased operation and higher clearing prices) so could bear the associated WDR costs.

### 3.4 Nature of demand response

By paying DRSPs for providing a response that differs from their normal behaviour (their baseline load), AEMO considers the WDR would incentivise most responses during high market price events triggered by peak demand or an unexpected generator outage, rather than the potential daily occurrence of high photovoltaic generation causing low or negative prices in the middle of the day.

The prevalence of low or negative prices, in themselves, should incentivise load adjustments over time to take advantage of consistently low prices during the middle of the day or night. If this does not materialise there may be other mechanisms to incentivise load increases during these times by linking the benefits that storage (both battery and pumped hydro) obtains from discharging at high prices to a requirement to charge/pump at certain times.

### 3.5 Implementation and linkage to other reforms

There are a number of major reforms in the NEM that are either underway or potentially in the pipeline. Examples in addition to the potential WDR mechanism include:

- Five-minute settlement and global settlement reforms.
- Potential Short Term Forward Market (STFM).
- Broader review of market participant categories.
- Distributed level markets, and integration of DER more broadly.

AEMO agrees with the AEMC's assessment that the WDR, the STFM and other reforms should be considered as a package of reforms to streamline the resources required to implement the resulting changes required, but designed in such way to be foundational to broader distribution level market and DER integration more generally.

In addition, AEMO will seek to undertake the scoping of a study to consider the value of flexible demand and storage technologies and the most appropriate way to incentivise the owners of these assets to provide specific services such as spinning reserve or ramping.

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<sup>20</sup> See Section B.3.2 of the Consultation Paper.