AEMC

RULE

Australian Energy Market Commission

CONSULTATION PAPER

WHOLESALE DEMAND RESPONSE MECHANISMS

PROPONENTS

Public Interest Advocacy Centre, Total Environment Centre, The Australia Institute
Australian Energy Council
South Australian Government

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INQUIRIES

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ABOUT THE AEMC

The AEMC reports to the Council of Australian Governments (COAG) through the COAG Energy Council. We have two functions. We make and amend the national electricity, gas and energy retail rules and conduct independent reviews for the COAG Energy Council.

EXECUTIVE SUMMARY

The Commission has published this paper to commence stakeholder consultation on three rule change requests it has received seeking to facilitate wholesale demand response in the national electricity market (NEM):

- *Wholesale demand response mechanism* - submitted by the Public Interest Advocacy Centre, Total Environment Centre and The Australia Institute.
- *Wholesale demand response register mechanism* - submitted by the Australian Energy Council.
- *Mechanisms for wholesale demand response* - submitted by the South Australian Government.

Background

These rule change requests have been received at a time of significant transformation in the electricity industry,driven by government policy, changing consumer preferences and rapidly evolving technology. These changes are cause for consideration about the changes necessary for the long-term development of the NEM.

In July 2018, the Commission concluded its *Reliability frameworks review*.[1] In the final report, the Commission made a series of complementary recommendations, which aimed to support increased demand side integration into the wholesale market:

- The implementation of a voluntary, contracts-based short-term forward market. AEMO is currently undertaking work to develop a rule change request on this to submit to the AEMC shortly.
- Permitting consumers to engage multiple retailers/aggregators at the same connection point.
- Recognising demand response providers on equal footing with generators in the wholesale market and as such, being able to more readily offer wholesale demand response in a transparent manner.

The three rule change requests covered in this consultation paper relate to the third recommendation.

Context

In the past, the demand side has been relatively passive in the wholesale market. Now, and increasingly in the future, the demand side is and will continue to contribute to efficient outcomes for consumers.

The demand side can provide a range of services and benefits that contribute to the security and reliability of the NEM. For example, it can assist with maintaining power system reliability by providing a substitute for generation in the wholesale market, assist with more efficiently utilising network capacity and therefore assist with reducing costs faced by consumers. It can

1 AEMC, *Reliability frameworks review - final report*, July 2018, available at: https://www.aemc.gov.au/markets-reviews-advice/reliability-frameworks-review.

also provide consumers with greater control and choice over the way they interact with the broader energy system.

The demand side is starting to develop and interact more with the market. Commercial and industrial consumers are dynamically responding to variations in wholesale prices. Some residential consumers can store energy generated on their rooftops to use later, or join with their neighbours to collectively form a virtual power plant. Other households use technology to adjust consumption across their household, providing demand response in a way that avoids any adverse impact on household comfort or consumer experience.

Benefits of wholesale demand response

The focus of this consultation process is on approaches to faciliating wholesale demand response in ways that benefit consumers. For a wholesale demand response mechanism to advance the NEO, the benefits it brings to consumers' need to outweigh the associated costs.

Wholesale demand response changes the quantity of electricity bought in the wholesale market and can be used to manage spot price exposure, or to help market participants manage their positions in the contract market.

In the short-term, wholesale demand response helps to address a tight-supply demand balance since it can be a lower-cost resource than peaking generation. It also provides another source of flexibility within the market. In the long term, efficient wholesale demand response could lead to reduced need for peaking capacity as the demand side responds to higher prices.

Effective use of wholesale demand response can also help consumers manage their energy costs. Consumers can avoid high prices and shift consumption to times such as in the middle of the day when increased solar output lowers wholesale prices.

Faciliating wholesale demand response has the potential to lower wholesale prices and help manage the supply-demand balance at a lower cost. In order for these benefits to be realised, it is important that demand response is facilitated in the least cost way. The benefits of faciliating demand response needs to be weighed against the associated costs and implications of any mechanism that would be introduced.

Rule change requests

Through these rule change requests, the rule proponents are seeking to address:

- the interaction between most consumers and the wholesale market is managed directly by a retailer, and so if the retailer doesn't offer a demand response product then consumers have no incentive to change their consumption
- difficulties for third party demand response providers to provide demand response products to consumers, either because of commercial barriers to enter the retail market, or difficulties gaining and maintaining the value of wholesale demand response.

The proponents have submitted three solutions for consideration:

1. **Wholesale demand response mechanism**: a mechanism that would allow third parties to offer demand response into the wholesale electricity market in a transparent, scheduled manner.
2. **Wholesale demand response register**: a proposal that would introduce an obligation for retailers to negotiate in good faith with third parties looking to provide wholesale demand response through a register.
3. **Separate wholesale demand response market**: a proposal for the introduction of a transitionary, separate market for wholesale demand response.

The Commission is seeking stakeholder feedback on these proposals, and on the questions set out in this consultation paper. In addition, the Commission has outlined a mechanism for compensating consumers in the event of reliability related load shedding. This mechanism is a possible option that may assist with the facilitation of demand response and could complement other changes to the regulatory framework to enable consumers to undertake demand response.

Submissions to this paper are due on 21 December 2018.

Interaction with trials and studies

AEMO and ARENA are assisting the rule change process through trials or studies that leverage existing ARENA projects or the knowledge of ARENA project participants. AEMO and ARENA held a workshop on 26 October 2018 with ARENA project participants, which AEMC staff attended. This workshop sought to determine whether there were some projects AEMO and ARENA could facilitate to inform the rule change process.

Any trials or studies undertaken by AEMO and ARENA will provide input into the Commission's assessment of the rule change requests.

Timing and approach

This consultation paper covers the proposals set out in the three rule change requests. The rule change requests have not yet been consolidated. The Commission will be considering the best approach to progressing the three rule change requests in a timely manner following stakeholder consultation. Given the complexity and broad scope of the issues covered by the rule change requests, the six month standard rule making process may need to be extended.

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1 INTRODUCTION

1.1 The rule change requests

In July 2018, the Australian Energy Market Commission (AEMC or Commission) published the final report for its *Reliability frameworks review*.[2] In the final report, the Commission made a series of complementary recommendations aimed at supporting increased demand side integration into the wholesale market.[3] These recommendations did not aim to lock in a particular type of demand response, but instead left it open for different types of demand response to be provided in the wholesale market in the future. This recognises that new technologies and new business models evolve over time. The recommendations were that:[4]

- A voluntary, contracts-based short-term forward market be implemented that would allow participant-to-participant trading of financial contracts closer to real time than is currently readily possible. This would provide the demand side with more opportunities to lock in price certainty, and so make it easier for large consumers to engage in the wholesale market and provide demand response (i.e. changeconsumption) in response to expected wholesale prices.[5]
- Consumers should be allowed to engage multiple retailers/aggregators at the same connection point (known as multiple trading relationships), promoting competition between retailers, supporting new business models for demand response and providing consumers with greater opportunities to engage in wholesale demand response with parties other than their incumbent retailer.
- Demand response providers should be able to be recognised on equal footing with generators in the wholesale market and so be able to more readily offer wholesale demand response in a transparent manner to the Australian Energy Market Operator (AEMO).

Since publishing the final report, the Commission has received three rule change requests relating to the third recommendation:

- On 31 August 2018, the Total Environment Centre (TEC), the Australia Institute (TAI) and the Public Interest Advocacy Centre (PIAC) submitted a rule change request to the Commission seeking to introduce a **wholesale demand response mechanism**. This mechanism would allow third parties (i.e. those who are not the financially responsible market participant (FRMP) - usually a retailer - for a consumer) to offer demand response into the wholesale electricity market in a transparent, scheduled manner.[6]
- On 18 October 2018, the Australian Energy Council (AEC) submitted a second, related rule change request to the Commission, seeking to introduce an obligation for retailers to negotiate in good faith with third parties looking to provide wholesale demand response

2 AEMC, *Reliability frameworks review - final report*, July 2018.
3 These recommendations are discussed in more detail in chapter 2.
4 AEMC, *Reliability frameworks review - final report*, July 2018, p. 45.
5 AEMO has started undertaking work to design a possible short term forward market.
6 This rule change request is available on the AEMC website under project code ERC0247. See: https://www.aemc.gov.au/rule-changes/wholesale-demand-response-mechanism

through a **wholesale demand response register**. These third parties would also be scheduled in the wholesale market.[7]

- On 30 October 2018, the South Australian Government submitted a third, related rule change request to the Commission. As with the first rule change request, this proposal would change the regulatory framework to allow third parties to offer wholesale demand response into the wholesale market. The rule change request also proposed the introduction of a transitionary market for wholesale demand response, a **separate wholesale demand response market**.[8]

This consultation paper covers the proposals set out in the three rule change requests.

1.2 Purpose of consultation paper

This consultation paper has been prepared to facilitate public consultation on the rule change requests and to seek stakeholder submissions.

This paper:

- sets out a summary of, and a background to, the rule change requests
- identifies a number of questions and issues to facilitate the consultation on these rule change requests
- outlines the process for making submissions.

We welcome submissions on this consultation paper. We also welcome interested stakeholders to contact us if they would like to meet with us to discuss this consultation paper or related issues.

All enquiries on this project should be addressed to Declan Kelly on (02) 8296 7861 or Declan.Kelly@aemc.gov.au.

1.3 Timing of rule change process

Given the complexity and broad scope of the issues covered by the rule change requests, the six month standard rule making process may need to be extended depending on feedback provided by stakeholers. In addition, the receipt of multiple, related rule change requests may necessitate an extended period of consultation to consider the detail of the various options proposed.

There is a strong desire, particularly given the current tight supply-demand balance, to introduce a mechanism to faciliate demand response sooner rather than later.[9]

Therefore, in contemplating the timeframes for these rule change requests, the Commission needs to balance these two considerations against each other.

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7 This rule change request is available on the AEMC website under project code ERC0248. See: https://www.aemc.gov.au/rule-changes/wholesale-demand-response-register-mechanism

8 This rule change request is available on the AEMC website under project code ERC0250. See: https://www.aemc.gov.au/rule-changes/mechanisms-wholesale-demand-response

9 This point was made in the rule change requests submitted by PIAC, TEC and TAI, and the South Australian Government. PIAC, TEC and TAI, *Wholesale demand response mechanism - rule change request*, p. 11; South Australian Government, *Mechanisms for wholesale demand response - rule change request*, p. 1.

The Commission invites stakeholders to comment on the timing of the rule change process.

Once submissions are received and considered, the Commission will notify stakeholders of the timeframes and the process that will be adopted for these rule change requests.

1.4 Structure of consultation paper

The remainder of this consultation paper is structured as follows:

- Chapter 2 sets out background information relevant to these rule change requests
- Chapter 3 summarises the rule change requests
- Chapter 4 sets out the proposed assessment framework for consideration of these rule change requests
- Chapter 5 sets out a range of issues for stakeholder comment that are common between the three proposals
- Chapter 6 sets out how stakeholders can respond to this consultation paper
- Appendix A sets out issues for stakeholder comment that are specific to the wholesale demand response mechanism
- Appendix B sets out issues for stakeholder comment that are specific to the separate wholesale demand response market
- Appendix C sets out issues for stakeholder comment that are specific to the wholesale demand response register and two possible extensions to the register
- Appendix D describes a potential compensation mechanism for involuntary load shedding and issues for stakeholder comment in relation to the possible impacts of such a mechanism on wholesale demand response.

2 BACKGROUND

Demand response is likely to play an increasingly important role in the future of the national electricity market (NEM), notably as an alternative to peaking generation. This development is being driven by technological advancements allowing the demand side to become more dynamic. Further, there is a need for flexible and dispatchable resources on both the supply and demand side to accommodate the increasing penetration of variable renewable generation and changing consumer preferences. . As this transition continues, the contribution of the demand-side of the market to power system reliability is expected to increase.

This section explains what demand response is, and explores the context for these rule change requests.

2.1 What is demand response?

Demand response refers to consumers of electricity changing their level of consumption in the short-term in response to signals to do so.

There are different types of demand response: wholesale, emergency, network and ancillary services, as shown in the table below. While the equipment that provides these different types of demand response is often the same, the services provided are distinct. There are also clear interactions between these different types of demand response. For example, there are interactions between wholesale and emergency demand response. Emergency demand response is being considered in the *Enhancement to the RERT* rule change request.[10]

The Australian Competition and Consumer Commission (ACCC) has also highlighted these interactions in its recent *Retail Electricity Pricing Inquiry*, noting that there are coordination issues to consider when it comes to demand response participating in different markets (e.g. high spot prices, which may incentivise wholesale demand response, may not occur at the same time as localised network issues).[11] It should also be noted that emergency demand response typically sits outside of the wholesale market.

Table 2.1: Four types of demand response in the NEM

TYPE	DESCRIPTION	CURRENT STATUS
Wholesale demand response	Demand response used to change the quantity of electricity bought in the wholesale market, which could be used to manage spot price exposure, or to help market participants manage their positions	Due to the lack of transparency around how much wholesale demand response is currently being utilised, it is difficult to draw firm conclusions about how much demand response is occurring in the NEM, or whether this

10 For more information, see: https://www.aemc.gov.au/rule-changes/enhancement-reliability-and-emergency-reserve-trader

11 ACCC, *Restoring electricity affordability and Australia's competitive advantage, Retail Electricity Pricing Inquiry—Final Report*, June 2018, available at: https://www.accc.gov.au/publications/restoring-electricity-affordability-australias-competitive-advantage.

TYPE	DESCRIPTION	CURRENT STATUS
	in the contract market.	level is efficient. **Wholesale demand response is the subject of these rule change requests.**
Ancillary service demand response	Demand response employed for providing ancillary services. For example, responding quickly to brief, unexpected imbalances in supply and demand by participating in the frequency control ancillary service (FCAS) markets.	Large energy users have used demand response to provide FCAS. Market ancillary service providers (MASPs) can offer customers' loads into FCAS markets. Currently, there are two MASPs using demand response to provide FCAS.
Emergency demand response	Demand response employed by the system operator during supply emergencies, with the service being centrally dispatched or controlled to avoid involuntary load shedding. This is generally provided by out-of-market reserves.	Demand response can – and currently is – participating in the Reliability and Emergency Reserve Trader (RERT). The Commission is currently considering ways to enhance the RERT through its consideration of AEMO's rule change request on enhancing the RERT.[12]
Network demand response	Demand response employed to help a network business to provide network services to consumers.	The existing regulatory framework provides a number of incentives and obligations for non-network options (including demand response) to be adopted by a network service provider where it is efficient to do so. For example, the Demand Management Incentive Scheme (DMIS) provides distribution network service providers (DNSPs) with an incentive to undertake efficient expenditure on relevant non-network options relating to demand management and the Demand Management Incentive Allowance (DMIA) mechanism provides an allowance to DNSPs to undertake innovative projects related to demand management. The ACCC

12 Available at: https://www.aemc.gov.au/rule-changes/enhancement-reliability-and-emergency-reserve-trader.

TYPE	DESCRIPTION	CURRENT STATUS
		recommended in its *Retail Electricity Pricing Inquiry* that both the DMIS and DMIA be extended to also apply to transmission network service providers (TNSPs).

An active demand-side, characterised by the presence of demand response, promotes efficient consumption of electricity. Consumers would be able to trade off consumption against price signals from across the power system. In practice, benefits from an active demand side would include consumers:

- electing to avoid consumption during local network peaks and defer investment in capital intensive networks
- adjusting consumption during scarcity to maintain the supply-demand balance, often at a lower cost than doing so with expensive peaking generation
- providing the least cost resource for maintaining the power system within its secure limits, e.g. by responding to and correcting frequency deviations
- providing a low cost, controllable resource to correct the supply demand balance in the place of involuntary load shedding.

Where consumers are able to effectively respond to prices, it would be an efficient outcome for consumers to "choose" their level of consumption based on the range of different services they can access or provide.

2.1.1 How does wholesale demand response work under the current arrangements?

To provide wholesale demand response under the current arrangements, a consumer must be exposed to the spot price for electricity either directly (e.g. as a market customer) or indirectly (e.g. through a retailer), and must be able to change its exposure by changing its level of consumption in response to price.

A market customer sees price signals that enable it to respond to spot prices in line with its willingness to consume at different prices.

Energy retailers must source supply for their customers from the wholesale market. The spot price is currently set every 30 minutes,[13] and can fluctuate significantly depending on the conditions in the market in a given trading interval.

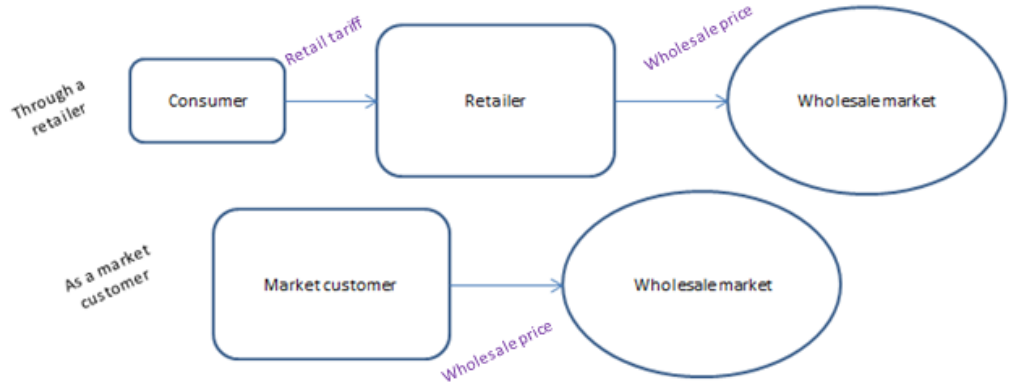
Energy retailers manage the risks associated with spot price volatility through the purchase of hedging products on the contract market and through vertical integration with generators.

This leads to a mismatch between the way most retailers purchase electricity and how they recover the costs from their customers. Small customers are generally charged a fixed rate for their energy consumption for a particular period of time, which removes price signals that

13 On 1 July 2021, the settlement period for the electricity spot price will change from 30 minutes to five minutes to align operational dispatch and financial settlement.

would otherwise enable small customers to reduce their consumption in response to changes in spot prices.

Figure 2.1: Wholesale demand response under current arrangements



Under the current arrangements, wholesale demand response is primarily undertaken through energy retailers (although, as mentioned above, some consumers may be able to participate directly in demand response by becoming a market customer). In some circumstances, it may be commercially beneficial for market customers, including retailers, to offer wholesale demand response to the extent that load curtailment may offset their exposure, if any, to the spot price.[14] For example, it can be used as a spot price risk management tool, analogous to a cap contract.[15]

When undertaken by a retailer, wholesale demand response is currently bundled with the retail supply of energy to a consumer. This is due to the fact that there can only be one FRMP at each connection point (i.e. each consumer can only have one retailer for each connection point). As a result, third parties cannot currently 'disaggregate' demand response from a customer's energy consumption for the purpose of providing wholesale demand response.

2.1.2 How does this proposal relate to other demand response initiatives?

There are a number of initiatives which have been recommended or are currently underway with the aim of facilitating the integration of demand response in the NEM.

Recommendations from the Commission's *Reliability frameworks review*

14 See, for example, ACCC, *Restoring electricity affordability and Australia's competitive advantage, Retail Electricity Pricing Inquiry—Final Report*, June 2018.

15 Cap contracts are generally bought by buyers of electricity to help manage exposure to high wholesale prices.

The *Reliability frameworks review* recommended ways to remove barriers to demand response and provide a range of additional tools for parties to undertake wholesale demand response. These recommendations were:[16]

- A voluntary, contracts-based short-term forward market be implemented.
- Consumers should be allowed to engage multiple retailers/aggregators at the same connection point (also known as multiple trading relationships).[17]
- Demand response providers be able to more readily offer wholesale demand response in a transparent manner to AEMO.[18]

ARENA/AEMO demand response trials

In May 2017, the Australian Renewable Energy Agency (ARENA) and AEMO partnered to trial demand response services using the RERT arrangements in the NER.[19] Ten pilot projects, representing a broad range of technical and commercial solutions, were awarded funding under the initiative to manage electricity supply during extreme demand peaks. The trial has contracted for 143 MW of demand response in 2017-18, 190 MW in 2018-19 and 203 MW in 2019-20, across New South Wales,[20] Victoria and South Australia.[21]

Building on the learnings gained from this trial to date, ARENA and AEMO will apply these to the use of RERT for the upcoming summer.

In addition, ARENA and AEMO are working to develop some trials and studies that will be used as an input to the Commission's consideration of these rule change requests; as well as any implementation tasks that follow these rule change requests. These trials are expected to encompass both technical and practical considerations, such as the ability for a load or demand response provider to follow dispatch instructions.

Powershop "Curb Your Power" demand response program

Powershop is an electricity retailer with more than 100,000 residential and business customers across Queensland, New South Wales and Victoria. In 2017, Powershop received funding from ARENA to help it launch its Curb Your Power demand response program.[22] The program allows Powershop customers in Victoria who have a smart meter to reduce their electricity usage at times of peak demand in return for "power credits" which are applied to a customer's account. Participating customers are notified of an "event" by text message when the grid is under strain or high demand, or when usage is forecast to outstrip supply. An event can only occur between 10am and 10pm on weekdays and the customer will receive

16 These recommendations and the context for the recommendations are available in Appendix A of the *Reliability frameworks review* final report. See AEMC, *Reliabilty frameworks review - final report*, pp. 115 - 175.

17 We recommended that, subject to the outcomes of relevant trials, AEMO should develop a rule change request to submit to the Commission to implement multiple trading relationships.

18 This is the subject of this rule change request.

19 The RERT is a function conferred on AEMO under the NER. Under the RERT, AEMO can enter into reserve contracts so it can call upon resources not available to the market if needed to ensure reliability of supply meets the reliability standard, and to maintain power system security.

20 Funding for the procurement of reserves in New South Wales was provided by the New South Wales Government through the AEMO/ARENA tender process.

21 AEMO, *Summer 2017-18 operation review*, p. 31.

22 For more information, see: https://www.powershop.com.au/demand-response-curb-your-power/

between 60 minutes and seven days warning time before the event, depending on the circumstances.

Under the program, a customer's baseline[23] is based on their usage data from the previous 14 days, which is used to create a profile of what their usage would otherwise be at a given time were it not for any demand response. Customers can receive a reward (a $10 power credit for residential customers and a $10 - $200 power credit for business customers) for reducing their usage during an event by 10% or 1 kW relative to their baseline, or by 0.05 kW for each hour of the event for solar customers. Customers can also receive a bonus reward of between $150 and $900, also in the form of a power credit, for an average reduction between 5 kWh and 30 kWh if they have taken part in all of the events across the year.

South Australia virtual power plant and demand response trials

In February 2018, the South Australian Government announced plans to establish a 250 MW virtual power plant (VPP) in partnership with Tesla by creating a network of 50,000 homes fitted with smart meters, rooftop solar panels and battery storage systems.[24] The first stages of the trial involve installing these technologies in 1,100 SA Housing Trust properties. The first 100 of these systems had been installed as at July 2018. Once these installations are complete, Tesla will test the ability of the systems to operate together to reduce demand during peak periods, thereby reducing electricity bills for participating households. If the initial phase of the trial is successful and other key criteria for the initiative are met, the full program may be rolled out to a further 24,000 public housing properties and 25,000 private properties from mid-2019.

The South Australian Government has also recently announced an $11 million trial scheme which will seek to incentivise energy consumers to utilise new technologies to change their consumption behaviour, particularly during periods of peak demand. Under the scheme, South Australian businesses will be provided grants of up to $2.5 million to implement innovative demand response ideas. [25]

2.2 Context for these rule change requests

These proposals have been received in an environment where there is an increasing focus on the role of the demand-side in promoting efficient outcomes in the wholesale market. Compared with the past, consumers are becoming increasingly willing and able to actively participate, and technology is evolving to better facilitate this. It is anticipated that a more active demand-side means that consumers will play an increasingly important role in helping to match supply and demand in the NEM. Demand response can be more cost-effective for both the consumer and the power system than building new generation and network capacity.

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23 Demand response baselines are discussed in detail in chapter 5.

24 For more information, see: https://virtualpowerplant.sa.gov.au/

25 For more information, see: http://www.energymining.sa.gov.au/energy_and_technical_regulation/energy_resources_and_supply/south_australian_demand_management_trials_program

3 DETAILS OF THE RULE CHANGE REQUESTS

This chapter summarises the issues raised by the rule proponents, the proposed solutions and the costs and benefits identified by the rule proponents. The Commission encourages readers to review the copies of the rule change requests published on the AEMC website.[26]

3.1 Issues identified

The three rule change requests identified the requirement that third party demand response providers either be registered as a retailer or have a commercial relationship with a retailer to provide wholesale demand response as creating challenges for the integration of demand response in the NEM.[27]

PIAC, TEC and TAI argued that there are commericial barriers to developing the required partnerships between retailers and demand response providers, which has contributed to a sub-optimal level of demand response in the NEM in comparison to other energy markets.[28]

The AEC suggested that a key concern of demand response providers is that their investments (for example, in equipment to faciliate demand response) are at risk of becoming stranded should their customers change retailers, as a subsequent retailer may decide not to continue with the previous retailer's existing demand response arrangement.[29]

The South Australian Government raised the related issue that if a retailer does not offer demand response products, or provide a direct signal of the wholesale price to customers, its customers have no incentive to change their energy consumption.[30] Further, the South Australian Government noted that the lack of a mechanism for portfolio demand response, and the fact that consumers may not have the capacity to manage their demand at all times, limits consumers' ability to take advantage of demand response offerings.[31]

3.2 Proposed rule changes

3.2.1 Wholesale demand response mechanism

To address the issues identified their rule change requests, PIAC, TEC and TAI and the South Australian Government proposed changes to introduce a wholesale demand response mechanism in the NEM and create a new category of market participant in the NEM: the demand response service provider (DRSP).[32]

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26 Available of the AEMC website project pages for ERC0247, ERC0248 and ERC0250. See: https://www.aemc.gov.au/

27 PIAC, TEC and TAI, *Wholesale demand response mechanism - rule change request*, p. 7; AEC, *Wholesale demand response register mechanism - rule change request*, p. 1; South Australian Government, *Mechanisms for wholesale demand response - rule change request*, p. 3.

28 PIAC, TEC and TAI, *Wholesale demand response mechanism - rule change request*, p. 7.

29 AEC, *Wholesale demand response register mechanism - rule change request*, p. 1.

30 South Australian Government, *Mechanisms for wholesale demand response - rule change request*, p. 2.

31 Ibid, p. 3.

32 PIAC, TEC and TAI, *Wholesale demand response mechanism - rule change request,* p. 3; South Australian Government, *Mechanisms for wholesale demand response - rule change request*, p. 4.

This proposal involves transferring the value of wholesale demand response from the existing FRMP (i.e. the retailer) to a demand response service provider, who may be the customer or a third party service provider engaged by the customer. This role is referred to by the rule proponents as a DRSP. The model proposed by the rule proponents has the following features:[33]

- DRSPs could submit demand response bids into the wholesale market.
- Demand response offers would be scheduled in a manner similar to bids submitted by generators.
- The DRSP would be exposed to the spot price for the difference between a baseline level of consumption estimated to have occured were it not for the demand response, and the actual level of consumption. The FRMP would be settled in the wholesale market at the spot price for the baseline level of consumption. This would allow the value of the wholesale demand response to accrue to the DRSP without the involvement of the retailer.
- The DRSP would earn the spot price from the wholesale market for the reduction in energy demand by its participating customers and would pay customers for the value of their demand reduction based on agreed commercial arrangements.
- All retail energy customers would be free to participate in this mechanism.

The rule change requests from PIAC, TEC and TAI and the South Australian Government did not include drafting for a proposed rule.

In addition to the proposed rule changes, the rule proponents identified a number of additional considerations which should be considered as part of the rule change.[34] These are discussed throughout chapter 5 and appendix A of this consultation paper.

3.2.2 Wholesale demand response register

To address the issues identified in its rule change request, the AEC proposed rule changes to create a framework within which parties can negotiate agreements to facilitate demand response in the NEM. The key features of the proposal include:[35]

- the creation of a new category of market participant, the Demand Response Aggregator (DRA), which would apply to parties that control demand response and behind-the-meter generation at a connection point (the DRA could also be the FRMP at the connection point)
- requiring AEMO to maintain a register of the demand-side capabilities of registered DRAs
- where a customer who is already participating in demand response changes FRMP, the new FRMP would be required to accept the previous FRMP's DRA arrangements or negotiate changes to DRAs and associated agreements in good faith

33 PIAC, TEC and TAI, *Wholesale demand response mechanism - rule change request*, p. 9; South Australian Government, *Mechanisms for wholesale demand response - rule change request*, p. 4.

34 PIAC, TEC and TAI, *Wholesale demand response mechanism - rule change request*, p. 15; South Australian Government, *Mechanisms for wholesale demand response - rule change request*, p. 10.

35 AEC, *Wholesale demand response register mechanism - rule change request*, p. 2.

- where a customer who is already participating in demand response intends to change demand response arrangements and has provided written notice of this intention to their FRMP, the FRMP would be required to negotiate changes to DRAs and associated agreements in good faith
- where a customer who is not participating in demand response intends to enter into a demand response arrangement and has provided written notice of this intention to their FRMP, the FRMP would be required to negotiate in good faith with prospective DRAs
- loads registered with a DRA may either be continuously classified as scheduled loads, or alternatively could remain "dormant" until such time as the DRAs intended the loads to be active in the market or a Lack of Reserve Notice is issued by AEMO.

The rule change request from the AEC did not include drafting for a proposed rule. This proposal is discussed throughout chapter 5 and appendix C of this consultation paper.

3.2.3 Separate wholesale demand response market

The South Australian Government has proposed the creation of an additional market, which is designed specifically for demand response and operates separately from the wholesale electricity market. It is proposed to be introduced as a transitional measure prior to the implementation of a wholesale demand response mechanism (if applicable) to enable the benefits of the mechanism to be realised sooner.[36]

This market, as described in the rule change request, would be operated by AEMO and would be co-optimised with the existing spot market to ensure demand can be met in the most cost-efficient way. Retailers would be responsible for costs associated with the market, which they would be able to spread across their customers.

This new market would require the use of baselines to measure demand response activities of customers. That is, in order to determine the quantity of wholesale demand response being offered into the separate market, a baseline for participating consumers would be needed.

As it would be a separate market to the spot market, it would not require changes to existing settlement processes in the spot market.

The rule change request from the South Australian Government did not include drafting for a proposed rule to implement this additional market. This proposal is discussed throughout chapter 5 and appendix B of this consultation paper.

36 South Australian Government, *Mechanisms for wholesale demand response - rule change request*, p. 7.

3.3 Proponents' expected costs and benefits of the proposed rule changes

3.3.1 Wholesale demand response mechanism

PIAC, TEC and TAI, and the South Australian Government, considered that their proposed rule changes would have the benefits of:[37]

- Providing consumers with greater opportunities to participate in wholesale demand response by transferring the value of that demand response to the consumer and allowing additional parties to provide demand response, and so promoting competition for these services. This would also have the effect of potentially decreasing prices in the wholesale market.
- Providing greater transparency of demand side participation to other market participants, which will help market participants to make more efficient decisions in both operational and investment time frames on both the supply and demand side of the market.
- Improving the reliability of the power system, as there are many instances where wholesale demand response can more efficiently contribute to reliability than building new generation.
- Increased transparency of demand response for AEMO, which will also contribute to efficient operation and management of the wholesale electricity market. AEMO will be able to better forecast demand and supply, as well as power flows across the system.

The rule proponents noted several challenges and costs involved with the proposed rule changes:[38]

- Retailers and AEMO would face costs to upgrade their systems and procedures.
- There may also be system costs and complexities associated with aggregating portfolios of small customers to participate in wholesale demand response, including the application of a baseline to a diverse collection of individual customers.

The South Australian Government acknowledged that costs may be imposed on distribution networks to manage changes in electricity flows where wholesale peaks do not coincide with local network constraints.[39] However, PIAC, TEC and TAI cited analysis from the COAG Energy Council from 2015 which suggested that cost impacts on network businesses to support the introduction of a demand response mechanism are likely to be minimal.[40]

In its rule change request, the AEC suggested that the model proposed by PIAC, TEC and TAI is likely to be inefficient, as:[41]

37 PIAC, TEC and TAI, *Wholesale demand response mechanism - rule change request*, p. 16; South Australian Government, *Mechanisms for wholesale demand response - rule change request*, pp. 1, 8.

38 PIAC, TEC and TAI, *Wholesale demand response mechanism - rule change request*, p. 18; South Australian Government, *Mechanisms for wholesale demand response - rule change request*, p. 10.

39 South Australian Government, *Mechanisms for wholesale demand response - rule change request,* p. 12.

40 COAG Energy Council, *Demand Response Mechanism and Ancillary Services Unbundling - rule change request*, March 2015, p. 19, available at: https://www.aemc.gov.au/rule-changes/demand-response-mechanism.

41 AEC, *Wholesale demand response register mechanism - rule change request*, p. 3.

- a "one size fits all" approach to procuring, valuing and metering demand response risks both excluding some valuable resources and valuing demand response that is not truly additional
- standardised baseline methodologies are unlikely to be applicable for many commercial and industrial loads, and especially for residential loads.

3.3.2 Wholesale demand response register

The AEC believes that the proposed changes set out in its rule change request, which differ from those proposed by PIAC, TEC and TAI, and the South Australian Government, would have the following benefits:[42]

- Facilitating participation in demand response in the NEM and the optimisation of competitive alternatives to satisfy the supply-demand balance, thereby maintaining reliability and increasing market efficiency.
- Allowing retailers and DRAs to negotiate mutually beneficial arrangements, and facilitating the maximum value of the arrangement to be extracted and shared, for all parties and for the market as a whole.
- Providing greater confidence and certainty to customers, retailers and DRAs.
- Allowing for the development, and evolution over time, of a range of standardised contracts for different demand response services.
- Increasing transparency of the availability and dispatch of distributed generation, which will also assist AEMO in improving demand forecasting, minimising the procurement of ancillary services, and reducing RERT procurement and activation.

The AEC noted that there will be costs associated with:[43]

- the establishment of the Connection Point DRA Register
- the negotiation of demand response agreements between new retailers and DRAs
- system changes for AEMO to accommodate scheduling.

However, the AEC suggested that the wholesale demand response register would have considerably lower costs than the wholesale demand response mechanism, as the AEC's proposal does not require changes to the FRMP-AEMO settlement relationship.[44]

3.3.3 Creation of separate market for wholesale demand response

The South Australian Government's rule change request provided limited information on how a separate market for demand response would operate. However, the South Australian Government suggested that the key benefit of this proposal is that it could be implemented faster than a demand response mechanism in the wholesale market, as it would not require changes to existing settlement and billing processes in the wholesale market.[45] The time

42 Ibid, p. 4.
43 Ibid.
44 Ibid.
45 South Australian Government, *Mechanisms for wholesale demand response - rule change request*, p. 7.

required to implement this proposal would ultimately depend on how the new market is designed.

The South Australian Government has suggested that the costs associated with this market would be borne by retailers and that retailers would be able to spread these costs across their customer base.[46]

46 Ibid, p. 8.

4 ASSESSMENT FRAMEWORK

4.1 Contributing to achieving the NEO and NERO

The Commission has different rule making tests for making rules under the NEL and NERL.

Under the NEL the Commission may only make a rule in the NER if it is satisfied that the rule will, or is likely to, contribute to the achievement of the national electricity objective (NEO).[47] This is the decision making framework that the Commission must apply under the NEL.

The NEO is:[48]

> To promote efficient investment in, and efficient operation and use of, electricity services for the longer term interests of consumers of electricity with respect to -
>
> (a) price, quality, safety, reliability and security of supply of electricity; and
>
> (b) the reliability, safety and security of the national electricity system.

Similarly, under the NERL, the Commission may only make a rule in the NERR if it is satisfied that the rule will, or is likely to, contribute to the achievement of the national energy retail objective (NERO).[49] This is the decision making framework that the Commission must apply under the NERL.

The NERO is:[50]

> to promote efficient investment in, and efficient operation and use of, energy services for the long term interests of consumers of energy with respect to price, quality, safety, reliability and security of supply of energy.

The Commission must also, where relevant, satisfy itself that the rule in the NERR is "compatible with the development and application of consumer protections for small customers, including (but not limited to) protections relating to hardship customers" (the "consumer protections test").[51]

Where the consumer protections test is relevant in the making of a rule in the NERR, the Commission must be satisfied that both the NERO test and the consumer protections test have been met.[52] If the Commission is satisfied that one test, but not the other, has been met, the rule cannot be made.

There may be some overlap in the application of the two tests in the NERL. For example, a rule that provides a new protection for small customers may also, but will not necessarily, promote the NERO.

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47 Section 88 of the NEL.
48 Section 7 of the NEL.
49 Section 236(1) of the NERL.
50 Section 13 of the NERL.
51 Section 236(2)(b) of the NERL.
52 That is, the legal tests set out in sections 236(1) and (2)(b) of the NERL.

4.2 Making a more preferable rule

Under s. 91A of the NEL and s. 244 of the NERL, the Commission may make a rule that is different (including materially different) to a proposed rule (a more preferable rule) if it is satisfied that, having regard to the issue or issues raised in the rule change request, the more preferable rule will or is likely to better contribute to the achievement of the NEO or the NERO (as applicable).

4.3 Northern Territory

From 1 July 2016, the NER, as amended from time to time, apply in the Northern Territory, subject to derogations set out in Regulations made under the Northern Territory legislation adopting the NEL (the NT Act).[53] Under those Regulations, only certain parts of the NER have been adopted in the Northern Territory.[54] The rules that may be made pursuant to the rule change requests may relate to parts of the NER that have been adopted in the Northern Territory. The Commission may therefore be required to assess the proposed rules against additional elements required by the NT Act, which relate to the interpretation of the NEO and to whether to make a differential rule.

Under the NT Act, the Commission must regard the reference in the NEO to the "national electricity system" as a reference to whichever of the following the Commission considers appropriate in the circumstances having regard to the nature, scope or operation of the proposed rule: [55]

(a) the national electricity system

(b) one or more, or all, of the local electricity systems[56]

(c) all of the electricity systems referred to above.

Under the NT Act, the Commission may make a differential rule if, having regard to any relevant MCE statement of policy principles, a different rule will, or is likely to, better contribute to the achievement of the NEO than a uniform rule. A differential rule is a rule that:

- varies in its term as between:
  - the national electricity system, and
  - one or more, or all, of the local electricity systems, or
- does not have effect with respect to one or more of those systems

but is not a jurisdictional derogation, participant derogation or rule that has effect with respect to an adoptive jurisdiction for the purpose of s. 91(8) of the NEL.

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53 NT Act: *National Electricity (Northern Territory) (National Uniform Legislation) Act 2015*. NT Regulations: *National Electricity (Northern Territory) (National Uniform Legislation) (Modifications) Regulations 2017*.

54 For the version of the NER that applies in the Northern Territory, refer to: www.aemc.gov.au/regulation/energy-rules/northern-territory-electricity-market-rules/current.

55 Section 14A of Schedule 1 to the NT Act, inserting section 88(2a) into the NEL as it applies in the Northern Territory.

56 These are specified Northern Territory systems, defined in schedule 2 of the NT Act.

4.4 Proposed assessment framework

The Commission will assess the rule change requests against an assessment framework focussed on a consideration of consumers and the promotion of their interests in the long term.

Wholesale demand response relies on consumers changing their consumption of energy in response to a signal to do so. Consumers can respond to these signals and choose to consume less or more compared to what they otherwise would have. For example, consumers can consume less or shift consumption at a particular time in order to reduce their exposure to high spot prices, or to help market participants manage their positions in the contract market.

An active demand-side, characterised by the presence of wholesale demand response, can promote efficient consumption of electricity in the wholesale market. Where load is able to effectively respond to prices, it would be an efficient outcome for it to "choose" its level of consumption based on its willingness to pay for consuming electricity compared to the cost of supplying that electricity.

Wholesale demand response can be more efficient than dispatching generation. Economic inefficiency results when electricity is consumed despite the cost of supplying it exceeding the value gained by its consumption. By having the demand side respond to high spot prices by reducing consumption, wholesale demand response can provide a more cost-effective peaking capacity than using peaking generation.

In other words, by changing their load patterns in response to a signal relating to wholesale prices, consumers are able to make the trade-off between the costs of consuming electricity and the costs of reducing their electricity consumption (and so, for example, not being able to produce widgets or heat their home).

The Commission is seeking stakeholder views on its proposed assessment framework which includes criteria to assess whether the proposed rules are likely to promote the NEO and NERO, namely the impact the rule has on:

- promoting competition and consumer choice
- resilience of the framework
- not distorting efficient market outcomes
- transparency
- appropriate risk allocation
- administrative and implementation costs.

These principles are discussed in more detail below.

Competition and consumer choice

Where feasible, providing for consumer choice in their provision of services generally leads to more efficient operational and investment decisions. Competitive markets which enable consumers to choose also tend to be more flexible to changing conditions because they provide incentives for participants to innovate and minimise costs over time.

Competition is a process by which inefficient costs are discouraged. It lowers the combination of supply-side and demand-side resources at any given moment in time, as well as through time. Alternatively described, competition provides incentives for market participants to provide service standards that consumers value (including with regard to the level of reliability), given the price.

Competitive markets also provide a mechanism for collating information from participants and providing signals to inform future actions. Competitive markets therefore encourage efficient decision making on the basis of this information.

Competition should therefore promote the efficient levels of electricity consumption and generation.

The proposed wholesale demand response mechanisms will be assessed for how they facilitate consumer choice in service provision through competitive markets.

Resilient framework

Regulatory arrangements must be flexible to changing market conditions. They should not be implemented to address issues specific to a particular time period or jurisdiction, or the prevailing technology or business model of the day. Regulatory frameworks should support the right mix of resources over time, encompassing technological developments and changes in consumer behaviour. Markets with resilient designs are characterised by:

- innovation, because business models are able to emerge without being unnecessarily restricted by regulatory frameworks and because participants face incentives to provide services in a least cost manner
- low barriers to entry and exit, because regulatory frameworks provide consistent signals for undertaking investment decisions.

When considering how to facilitate demand response in the wholesale market, the Commission will consider how this can be achieved in a changing market environment while supporting the dynamic efficiency of the NEM.

Non-distortionary

Efficient electricity markets are characterised by:

- allocative efficiency: efficient allocation of electricity services to market participants who value them the most, typically through price signals that reflect underlying costs
- productive efficiency: provision of, and investment in, electricity services at lowest possible cost through employing the least-cost combination of inputs
- dynamic efficiency: the ability of the market to readily adapt to changing supply and demand conditions over the long-term by achieving productive and allocative efficiency over time.

Changes to the regulatory framework to facilitate demand response in the wholesale market should not distort efficient market outcomes. That is, any regulatory changes should not detract from the ability of the NEM to provide for the least cost combination of supply-side and demand-side options at any point in time. A distortionary change to regulatory

frameworks would detract from the allocative and dynamic efficiency of the current market frameworks.

We also need to consider the relationship between wholesale demand response and other types of demand response. If a proposal to facilitate wholesale demand response can promote efficient use of other types of demand response, this would contribute to the net benefit provided. Conversely, these changes should not distort the efficient use of demand response in other parts of the supply chain.

Therefore, the Commission will consider whether the proposed demand response mechanisms distort wholesale market outcomes, or outcomes from other uses of demand response.

Transparency

Market participants make investment and operational decisions based on market signals in the spot and contract markets. Prices in these markets provide signals for adequate generation and demand-side resources to be built and dispatched, as well as information about the balance of supply and demand across different places and times. Providing greater amounts of information to market participants will improve their ability to make efficient decisions in both operational and investment timeframes on both the supply and demand side of the market.

The Commission noted in the final report for the *Reliability frameworks review* that there is currently limited visibility regarding wholesale demand response in the NEM.[57] Having demand respond to wholesale prices impacts on other market participants by changing the amount of demand that must be met by the system in total and so impacting upon the wholesale price, driving the operational and investment decisions of other participants.

To provide more information to the rest of the market, wholesale demand response should be provided in a way that is transparent to the rest of the market. In addition to improving efficient decision making in the wholesale market, for demand response to contribute to reliability outcomes it is important that wholesale demand response is transparent to the system operator as well as networks.

Therefore, the Commission will consider how the various demand response mechanisms enhance transparency. Transparency is typically in the long-term interests of consumers, provided that any costs associated with the transparent provision of information are offset by the benefits associated with creating the transparency.

Risk allocation

Risk allocation and the accountability for investment and operational decisions should rest with those parties best placed to manage them. Placing inappropriate risks on consumers, who may not be best placed to manage these risks, is likely result in higher prices if these risks cannot be managed and reduced over time.

57 AEMC, *Reliability frameworks review - final report*, p. 123.

Conversely, placing risk with market participants (who may be better placed to manage them) will only be passed on to consumers in terms of higher prices where competition permits. Solutions that allocate risks to market participants, such as commercial businesses, who are better able to manage them are preferred, where practicable.

Administrative and implementation costs

Changes to regulatory frameworks come with associated costs. These costs include both those imposed to implement change and the ongoing costs associated with making the change. These costs result from necessary changes to information technology systems, billing arrangements and other market process. Generally costs should be attributed to the party who is best able to reduce the extent of the costs over time. However, where costs are imposed in implementation and cannot be mitigated through market mechanisms, these costs should be minimised relative to the benefits of the regulatory changes.

The proposals set out in the rule change requests need to be assessed for the most efficient implementation. This is necessary so that the implementation and ongoing costs, ultimtately borne by consumers, do not exceed the benefits of introducing a mechanism.

The Commission will therefore consider the costs (both implementation and ongoing costs) associated with each option.

QUESTION 1: ASSESSMENT FRAMEWORK

Do stakeholders agree with the proposed assessment framework? Alternatively, are there additional principles that we should be taking into account?

5 ISSUES FOR CONSULTATION

Taking into consideration the assessment framework, we have identified a number of issues for initial consultation. Stakeholders are encouraged to comment on these issues as well as any other aspect of the rule change requests or this paper, including the proposed assessment framework.

This chapter sets out issues for consultation in relation to:

- the extent of the issues raised in the rule change requests
- the benefits of making a change to the regulatory frameworks
- the costs associated with making these changes
- the role of baselines in wholesale demand response
- the role of retailers in these mechanisms
- the inclusion of embedded generation and energy storage
- thresholds for participation in a mechanism
- timeframes for implementation.

Each issue raised for consultation is accompanied by questions for stakeholder consideration.

The issues raised in this chapter are common to the three rule change requests. Appendices A through C raise additional issues for consideration that are specific to each of the proposals set out in the rule change requests.

5.1 Extent of the issue being addressed

The rule change requests all raise issues with the current regulatory framework. These proposals suggest that, broadly, the current arrangements are not conducive to a customer, or third party on the customer's behalf, providing demand response for participation in the wholesale market. This issue is explored in more detail below.

5.1.1 What is the issue being raised?

The issues raised by the proponents, as submitted in the respective rule change requests, are:

- **PIAC, TEC and TAI**: there are commercial barriers to developing the required partnerships between retailers and demand response providers, which have contributed to a sub-optimal level of demand response in the NEM in comparison to other energy markets.[58]
- **South Australian Government**: the lack of a mechanism for demand response and the fact that consumers may not have the capacity to manage their demand at all times limits consumers' ability to take advantage of demand response offerings.[59]

58 PIAC, TEC and TAI, *Wholesale demand response mechanism - rule change request*, p. 7.

59 South Australian Government, *Mechanisms for wholesale demand response - rule change request*, p. 3.

- **AEC**: a key concern of demand response providers is that their investments are at risk of becoming stranded should their customer change retailers, as a subsequent retailer may decide not to continue with the previous retailer's existing demand response arrangement.[60]

The proponents suggest that the current regulatory framework could be changed such that the barriers to consumers or third parties (including aggregators) providing wholesale demand response are lower.

The rule change requests all also highlight the value of increasing the transparency of wholesale demand response through some form of participation in central dispatch.

5.1.2 Nature of the issue

Assuming a sufficiently competitive retail market, retailers are incentivised to provide services to consumers which they value, to innovate new products and services to adapt to consumers' preferences and technology changes, and to do so in manner that minimises the cost of running their business.

Therefore, it would be expected that retailers should offer demand response products to consumers since this has the potential to both reduce the cost of service and provide services to consumers which they value. There are examples of some retailers offering demand response products, such as Powershop's 'Curb Your Power' program (discussed in chapter 2). If retailers were not providing a product valued by consumers, other retailers should enter the market to offer wholesale demand response products, which could displace the higher cost generation.

However, not all retailers may have the experience or the organisational expertise to utilise wholesale demand response. Retailers that also own generation assets may also have reduced incentives to undertake wholesale demand response. That is, such retailers may not want to invest in demand response offerings since to utilise these products may have the effect of reducing wholesale prices which could in turn affect the revenue received from their generation assets. In addition, the payback period for installing demand response equipment is typically longer than the consumer's retail contract and so retailers may be reluctant to offer a demand response product.

Given the reasons above, there may be a role for stand-alone demand response providers in faciliating wholesale demand response in the NEM.

Under the current arrangements in the NEM, most consumers can only access the wholesale market via their retailer. Consequently, the benefits of wholesale demand response will accrue in the first instance to the the FRMP (i.e. for most consumers, their retailer) through either lower exposure to high wholesale prices or as an additional tool to help manage flutuations in prices. This necessarily creates challenges for third parties looking to assist customers to provide wholesale demand response. These third parties must enter into commercial relationships with the FRMP as well as the customer in order to facilitate wholesale demand response and receive some of this value.

60 AEC, *Wholesale demand response register mechanism - rule change request*, p. 1.

Even if a third party was able to strike a commercial arrangement with a retailer to provide demand response, the third party could be exposed to the risk of having stranded assets if its customer switched retailers to one that the third party did not have a relationship with. This could only be avoided if the third party was able to enter into an agreement with all possible retailers. However, as retailers all have individual, unique ways of managing risk it is unlikely that a third party would be able to contract with all possible retailers and, even if it was possible, it would be very resource and time intensive to do so. This may restrict the opportunities for third parties to facilitate wholesale demand response. In the absence of having a relationship wtih a retailer there is no avenue in the current regulatory framework for these third party aggregators to offer wholesale demand response products to consumers.

Alternatively, a prospective demand response provider could attempt to win the customer by taking on the role of a retailer. However, demand response service providers may not necessarily have the capabilities to be a successful retailer. Retailing electricity typically requires expertise in risk management, marketing, IT systems administration and being able to meet prudential and consumer protection requirements. The third parties looking to provide wholesale demand response may instead be experts in load production processes, and dispatch and control technologies. As such, it can be difficult for third parties to facilitate demand response under the current framework.

As discussed in section 5.2, wholesale demand response can be used as a substitute in the wholesale market for generation. Faciliating wholesale demand response by increasing the number of products offered to consumers can result in increased comptition in the wholesale market, which may potentially reduce contribute to a decrease in prices in the wholesale market and so promote affordability.

In summary, the issues as put forward by the rule change proponents are that:

- there are various reasons why retailers may not offer demand response products, including that vertical integration may limit a retailer's interest in offering demand response
- the interaction between most consumers and the wholesale market is managed directly by a retailer, and so if the retailer doesn't offer a demand response product then consumers have no incentive to change their consumption
- it is difficult for third party demand response providers to provide demand response products to consumers, either because of barriers to enter the retail market, or difficulties gaining and maintaining the value of wholesale demand response.

5.1.3 Why is this issue being raised?

A number of factors suggest that a growing number of consumers may be willing to respond to wholesale prices. These factors include increasing consumer awareness of demand response and technological advancements that enable and reduce the cost of undertaking demand response. This is coupled with a perception that there is a reluctance or inability from traditional retailers to offer demand response products in an overt or open manner, as discussed above.

The materiality of this issue is difficult to assess due to the challenge in observing the existing quantity of wholesale demand response. The question of the efficient level of demand response is explored in section 5.1.4.

There are conflicting opinions regarding the availability of demand response style products to consumers. There are a number of consultants and retailers in the NEM that either utilise demand response or enable consumers to do so themselves. Conversely, other stakeholders have raised concern that consumers are unable to undertake wholesale demand response due to absence of offers being made available by retailers.

Box 1 highlights some retailers that are facilitating wholesale demand response under the current arrangements. We note that despite these developments, it appears as though few retailers currently offer demand response products to small consumers.

BOX 1: EXAMPLES OF RETAILERS FACILITATING WHOLESALE DEMAND RESPONSE

ERM Power

ERM Power is an electricity retailer and generator that operates across the NEM. ERM Power is predominantly an energy retailer for commercial and industrial customers. As a part of its energy retailing, ERM Power develops bespoke demand response contracts with its customers. These commerically-negotiated contracts include arrangements that:

- pass through spot prices and help the customer anticipate and minimise exposure to price spikes
- involve ERM Power calling upon these customers to reduce consumption to help manage ERM Power's exposure to the wholesale electricity price.

Flow Power

Flow Power is an electricity retailer that operates in all regions of the NEM. Flow Power emerged from a company that offered energy management services (specialising in demand management) to medium and large energy users. It has since opted to register as a retailer and connect customers to the wholesale market.

Flow Power's retail contracts pass on wholesale price signals to its customers, and it helps those customers manage consumption in a way that reduces costs. Flow Power's customers are typically medium to large energy users who are able to change consumption in response to wholesale spot prices. These customers can either do this manually or install a device that allows Flow Power to remotely adjust demand.

Amber Electric

Amber Electric is a new entrant electricity retailer. It participates in the NEM through the retail license platform offered by Energy Locals. Amber Electric initially launched in Sydney in mid-2018 and has subsequently expanded to South Australia. Amber Electric intends to start offering retail contracts in Victoria before the end of 2018.

Amber Electric offers wholesale price pass-through contracts to residential customers. These customers therefore get direct exposure to the wholesale price and have the opportunity and incentive to reduce their energy consumption during peak periods when wholesale energy prices are high. Amber assists consumers in undertaking wholesale demand response by providing price forecasts and notifications of expected price spikes so that customers can respond accordingly. It is also looking to incorporate technologies that provide consumers with the ability to remotely respond to wholesale prices.

It may be the case that, even if there are opportunities for consumers to participate in demand response, these opportunites are limited. If this were the case, consumers may not be receiving the value of providing wholesale demand response or innovation in services that would be expected in a competitive market for these services.

QUESTION 2: NATURE OF THE ISSUE RAISED

(a) Is it difficult for consumers to participate in wholesale demand response? If so, which consumers face the greatest amount of difficulty? What is the cause of this difficulty?

(b) What demand response providers and products are currently avaliable in the market?

(c) Is there effective competition for demand response as a service to be used by retailers? If not, are consumers able to access the benefits of wholesale demand response directly? Is competition for wholesale demand response as a service increasing?

5.1.4 What is the efficient level of wholesale demand response?

If the efficient level of wholesale demand response existed in the NEM, consumption would occur, at most, at a price reflecting the marginal benefit of consumption.

Over the course of the *Reliability frameworks review*, the Commission consulted with stakeholders on their views regarding the level of demand response present in the NEM. Stakeholder views were mixed. While some stakeholders suggested that wholesale demand response has been limited in the NEM, others have suggested that it is present in substantial quantities that are not visible to the rest of the market. This is because demand response occurs but is not centrally dispatched - consumers unilaterally change their consumption in response to wholesale prices without necessarily informing the rest of the market what their consumption would have been were it not for the demand response. This makes it difficult to determine how much wholesale demand response there is, and where it occurs. It is additionally difficult to assess whether the efficient level of demand response exists as this is contingent on knowing the actual amount of demand response *and* the level that would represent the efficient amount.

The efficient level of wholesale demand response is constantly changing. As it involves consumers making the trade off between consuming and not consuming, the efficient level of

demand response is a function of the ability for consumers to understand and make this trade-off. Additionally, the trade-off being made by consumers is influenced by a number of different, variable factors:

- When consumers have access to new information about cost of inputs and outputs, it will change the economic trade-off they make when undertaking demand response.
- Increased consumer awareness about the ability to undertake demand response, and the associated value, is also unlocking new low-cost opportunities for demand response.
- Changing wholesale price profiles, such as peakier prices in the evening, may impact of the level of wholesale demand response expected to occur at the time.
- Increased uptake of embedded generation, energy storage and new or better technology that facilitates load shifting such as thermal storage that can be remotely controlled are changing the costs of reducing grid consumption. Where demand response may have previously come at the cost of lost production, this can now be offset by the use of embedded generation and storage. Every time a residential battery or a controllable air conditioner is installed, the amount of demand response available increases. The amount of wholesale demand response available would increase if these devices responded to wholesale price signals.

Estimating the efficient level of wholesale demand response becomes more difficult when also considering increasing consumption during low priced periods, or shifting consumption into these periods.

Typically, wholesale demand response is viewed to be a reduction in consumption during high wholesale prices. However, wholesale demand response would also include, for example, a dairy factory shifting refrigeration loads to midday when wholesale prices tend to be lower. Trying to quantify this demand response will become increasingly challenging.

There are significant difficulties associated with determining the actual or theoretically efficient level of demand response.

Nevertheless, stakeholder feedback and evidence is welcomed, particularly from retailers, relating to the existing levels of wholesale demand response including wholesale demand response products being offered. Also welcome is feedback and evidence of consumers being unable to access the benefits of providing demand response.

Consideration will be given to overseas markets where the level of wholesale demand response may be more transparent or observable. However, analogies made with overseas markets should caveat any differences in market structures. The different structure of these overseas markets may also mean these markets may have a different efficient level of wholesale demand response.

QUESTION 3: WHOLESALE DEMAND RESPONSE CURRENTLY IN THE NEM

(a) Do stakeholders have views on the existing levels of wholesale demand response in the NEM? Please provide evidence or data to substantiate these views where possible.

(b) Can retailers indicate to the Commission what they are currently doing to facilitate wholesale demand response?

5.1.5 How best to facilitate flexible, price responsive demand in the long term

The energy market is undergoing a signficant transformation. A cornerstone of this is the growing capability of the demand-side to actively participate. As increasing amounts of intermittent generation enter the system, the wholesale market will increasingly need to incorporate the flexible and dynamic resources that make up a growing portion of the demand side.

The proposals set out in the rule change requests focus on two key aspects of this longer term view of the development of the wholesale market:

- consumers being actively involved in responding to the wholesale price of electricity
- transparency of the consumers' intention to respond to price signals.

The proposals set out in the rule change requests seek to overcome the challenge for third parties in facilitating wholesale demand response by customers, as described above. The wholesale demand response mechanism and separate wholesale demand response market would introduce a regulatory mechanism that would force a retailer to transfer the value of wholesale demand response to a customer, or third party acting on the customer's behalf. The wholesale demand response register would introduce a mechanism to encourage the incoming retailer to engage with the third party aggregator. In each case, these appear intended to address issues associated with retailers facilitating the efficient level of wholesale demand response.

The proposals also suggest increasing the transparency of the demand side through scheduling.

Alternative approaches to promoting an efficient level of demand reponse or improving the transparency of the demand side are discussed below.

Engaging the demand side in the wholesale market

The three rule change proposals suggest the introduction of regulatory mechanisms to either encourage or oblige the retailer to compensate the customer or third party for providing demand response. However, there may be other changes that could be made to the regulatory framework to provide consumers with opportunities to respond to wholesale price.

There is no inherent need to bundle the wholesale market risk management services and other services typically undertaken by retailers. An alternative approach is for retailers not to provide wholesale price risk management, with the consumer on a spot price pass through arrangement. This would mean a retailer would pass through wholesale prices to the consumer and, in doing so, shift the wholesale market risk to the consumer. Therefore, consumers would be exposed to the wholesale price and responsible for their own risk management.

A retailer's role in this case would then include the remaining services that a retailer provides including: billing, metering, provision of consumer protections such as those for hardship customers and life support customers etc.

Allowing consumers freedom in how they manage exposure to the wholesale price, including electing to have a third party manage this risk on their behalf, may provide a robust and resilient framework for enabling consumers to respond to the wholesale price and undertake wholesale demand response.

Increasing transparency of demand side participation in the wholesale market

As the demand side increasingly engages with the wholesale market, the Commission considers it will become increasingly important to provide greater transparency of the demand side's intention to respond to prices.

The three rule change requests received by the Commission proposed scheduling of demand response as an option for increasing the visibility of wholesale demand repsonse.

As with the above, the Commission would like to understand from stakeholders if this would represent the best option for increasing transparency of the demand side.

For example, placing an obligation and a financial incentive on retailers to submit accurate forecasts of their retail load may represent an approach to increasing transparency that would be consistent with the longer term development of the NEM. It may also be a framework that is more resilient as the structure of the NEM continues to change. This could build on the final rule made by the Commission in 2015 that sought to improve the quality of information on demand side participation in the NEM. Under the final rule, registered participants in the market are required to provide information on demand side participation to AEMO, in accordance with guidelines.[61]

QUESTION 4: APPROACH FOR FACILITATING TRANSPARENT, PRICE RESPONSIVE DEMAND

Do stakeholders consider there are other regulatory solutions:

(a) to providing the demand side with greater access to wholesale prices, and

(b) to increase the transparency of demand side response to these prices?

5.2 Benefits of making a change

This section discusses the benefits of introducing a mechanism to better enable customers and third parties to offer demand response into the wholesale market.

The benefits of wholesale demand response participating in central dispatch, as discussed below, include:

61 AEMC, Improving demand side participation information provided to AEMO by registered participants, final determination, March 2015, available at: https://www.aemc.gov.au/rule-changes/improving-demand-side-participation-information-pr.

- facilitating the efficient consumption of electricity by providing greater opportunities for consumers to respond to wholesale energy prices
- increased competition for wholesale demand response, and so in turn the wholesale market
- providing greater transparency of the price responsiveness of the demand side.
- facilitating the use of demand response to provide other services.

These proposals would also have the benefit of increasing the level of competition for wholesale demand response as a service.

5.2.1 Efficient consumption of electricity

Efficient consumption occurs when consumers' benefit of consuming electricity exceeds the costs of supplying that electricity. When consumers make efficient consumption decisions, it leads to an efficient clearing of the spot market. That is, the intersection of supply and demand results in a price and quantity that maximises net benefits to producers and consumers of electricity.

In the short term, wholesale demand response would result in demand shifting from high priced periods to low priced periods. This would have the benefit of suppressing high wholesale spot prices. Futher, given that wholesale demand response can potentially be used as a substitute for generation in the wholesale market it would be expected that providing for efficient wholesale demand response would increase competition in the wholesale market. It would also be able to address a tight supply-demand balance at lower-cost than some peaking generation. As a result, wholesale demand response would lower wholesale prices and help manage the supply-demand balance at a lower cost.

In the long term, efficient wholesale demand response should lead to the development of the least-cost combination of resources to meet the supply-demand balance. For example, efficient wholesale demand response should lead to:

- reduced need for peaking capacity as the demand side responds to higher prices
- consumers being able to take better advantage of low prices, for example during the middle of the day as a result of increasing solar output lowers wholesale prices or during other periods where the wholesale price is low.

Efficient wholesale demand response should also assist with managing the 'duck curve' to the extent that the wholesale price is able to reflect the value of electricity during solar troughs and as the solar output declines and operational demand ramps up.

The net effect would be a reduction in generation with high marginal costs and an increase in the utilisation of generation with a low marginal cost. This would flow through to reduced total system costs which would in turn reduce the costs as seen by consumers.

> QUESTION 5: EFFICIENT CONSUMPTION OF ELECTRICITY
>
> (a) Do stakeholders agree with our characterisation of how efficient wholesale demand

response would improve outcomes in the wholesale market?

(b) What are stakeholders views on how facilitating wholesale demand response could affect outcomes in the wholesale energy market?

5.2.2 Increased competition for wholesale demand response services

These proposals would provide third parties with greater opportunities to aggregate demand response for participation in the wholesale market. Doing so would likely have the effect of increasing the level of competition among providers of wholesale demand response services to customers. As a result, consumers should receive a more competitive price for providing a given level of wholesale demand response, or the same price for a less costly provision of demand response.

The benefits of increasing competition would be proportional to the extent an absence of competition for this service exists under the current arrangements. If consumers are currently able to access sufficient competition for the provision of wholesale demand response services, the benefits of increasing competition would be lesser. Conversely, to the extent these proposals facilitate more consumers being able to participate in the provision of wholesale demand response, it should result in consumers benefitting from increased competiton for these services.

QUESTION 6: COMPETITION FOR WHOLESALE DEMAND RESPONSE SERVICES

Are consumers able to access competitive offers from retailer or third parties to assist consumers to undertake wholesale demand response? Is the level of competition greater for larger consumers?

5.2.3 Increasing the transparency of demand response

The proposals received by the Commission all contemplate wholesale demand response operating in a manner that is transparent to the rest of the market. This would occur through having the demand response scheduled. The role of scheduling and how it would apply to wholesale demand response is explored in more detail below.

Transparency of demand response under the current arrangements

As noted above, there is a lack of transparency about how much wholesale demand response is currently being utilised in the NEM.

The Commission made a final rule in 2015 that sought to improve the quality of information on demand side participation in the NEM. Under the final rule, registered participants in the

market are required to provide information on demand side participation to AEMO, in accordance with guidelines.[62]

This has now been implemented through the creation of AEMO's demand-side participation portal.[63] The data provided through this process is expected to provide greater visibility of demand-side resources that are price sensitive, and so those which are engaging in wholesale demand response. The information provided to AEMO through the portal should include:

- contractual arrangements between a retailer and a customer, in which they agree to the curtailment of non-scheduled load or the provision of unscheduled generation in specified circumstances
- non-contractual arrangements entered into between a registered participant and a person, or between two registered participants, in relation to demand response.

The information sought by AEMO is relatively detailed and should provide greater transparency regarding the extent of wholesale demand response in the NEM. This information is important in being able to draw conclusions on the efficiency of the system-wide level of demand response.

Market participants were required to submit their data to the online portal by 30 April 2018. The deadline was subsequently extended to 8 May 2018. However, more than half of the total expected responses regarding demand side participation were not received by this extended deadline.[64] This resulted in AEMO not receiving sufficient demand side participation information in time to be included in its 2018 Electricity Statement of Opportunities publication. It is unclear why there has been a lack of engagement from market participants. Compliance with the reporting requirement may improve in future years.

Why are market participants scheduled?

Scheduling participants has two main benefits:

- By being cleared through the dispatch engine, scheduled participants' bids and offers are accounted for in determining price and the quantity of electricity cleared.
- Through submitting their bids and offer in advance of real time, scheduled participants provide greater amounts of information to other market participants. Providing greater amounts of information to these market participants will improve their ability to make efficient decisions in operational and investment timeframes on both the supply and demand side of the market.

As the demand side of the market becomes increasingly capable of making dynamic consumption decisions, it will be important to increase the information flows from these demand side participants to the rest of the market. Scheduling is one way of eliciting this information from the demand side.

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62 AEMC, *Improving demand side participation information provided to AEMO by registered participants, final determination,* March 2015, available at: https://www.aemc.gov.au/rule-changes/improving-demand-side-participation-information-pr.

63 For more information, see: https://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Planning-and-forecasting/Demand-Side-Participation-Information-Guidelines.

64 AER, Quarterly compliance report: National electricity and gas laws, *1 April - 31 June 2018*, May 2018.

Current arrangements for scheduling loads

Under the current arrangements, a market customer can request that AEMO classify any of its market loads as a scheduled load.[65] If AEMO is satisfied that the market customer has submitted the right data and has adequate telemetry/communications equipment to support the issuing of dispatch instructions and audit of responses, AEMO must classify the market load as a scheduled load.[66]

Notably, the choice of being scheduled or non-scheduled lies with the market customer. It is only if a customer decides, in respect of its load, to become a scheduled load that the customer will participate in AEMO's central dispatch process.

To date, with the exception of a few pump storage facilities, no market customers have currently elected to become and remain a scheduled load. Under the current arrangements, there is little incentive for a load to become scheduled. Typically, being scheduled has an associated cost and, from the perspective of an individual load, neglible benefit.

The Commission has previously considered rule changes relating to the scheduling of loads.[67] In 2015, the AEMC recevied two rule change requests which would require additional participants to participate in the central dispatch process. Specifically, the rule change requests sought to alter the way the following resources participate in the market:

- price responsive loads with maximum demand greater than 30 MW
- non-intermittent non-scheduled generators with nameplate generation capacity 5 MW or greater

Among other proposed solutions, the rule change considered making it mandatory for these resources to participate in central dispatch processes. At the time, the Commission decided not to make a rule. The Commission was of the view that the materiality of the issue raised by the rule change requests was insufficient to warrant making the proposed changes.

Wholesale demand response should act as a scheduled load in dispatch, not 'negawatts'

If demand response participates as a scheduled participant in the wholesale market, this should potentially occur as a load as opposed to a proxy generator submitting bids for 'negative load'. Scheduling the quantity of demand response may either have perverse outcomes for system security or provide the demand response provider with ample opportunity to game the baseline.

If demand response was scheduled, a demand response provider would need to bid in a quantity of demand response. That is, the difference between the actual consumption and the baseline consumption. The NEM dispatch engine (NEMDE)[68] would clear and set dispatch targets for all of the scheduled participants. This could have two outcomes:

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65 Clause 2.3.4(d) of the NER.

66 Clause 2.3.4(e) of the NER.

67 AEMC, *Non-scheduled generation and load in central dispatch - final determination*, September 2017, available at: https://www.aemc.gov.au/rule-changes/non-scheduled-generation-in-central-dispatch.

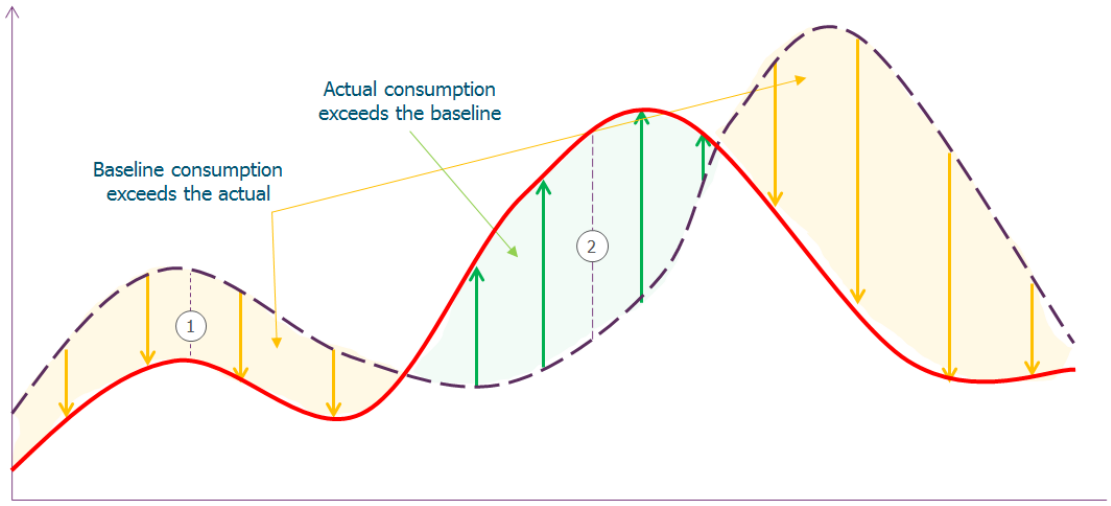
68 The NEM dispatch engine is used by AEMO to determine the most efficient dispatch targets for scheduled market participants accounting for participant bids and constraints.

1. If the baseline was set based on historical data, it is likely the baseline consumption would not be exactly equal to the actual consumption at the start of the dispatch interval.
2. If the baseline was adjusted such that, at the time of dispatch, the actual consumption and the baseline consumption were equal, the demand response provider would easily be able to influence the baseline by inflating actual consumption just prior to dispatch. This would lead to inefficient outcomes in both the short- and long-term.

In Figure 5.1, the actual and baseline consumption are shown for a consumer.

- The red line shows actual consumption.
- The purple dashed line is the baseline.
- The yellow areas show where the actual consumption has fallen below the baseline due to inaccuracy in the baseline.
- The green area shows where actual consumption exceeds the baseline due to inaccuracy in the baseline.

Figure 5.1: Differences between actual and baseline consumption



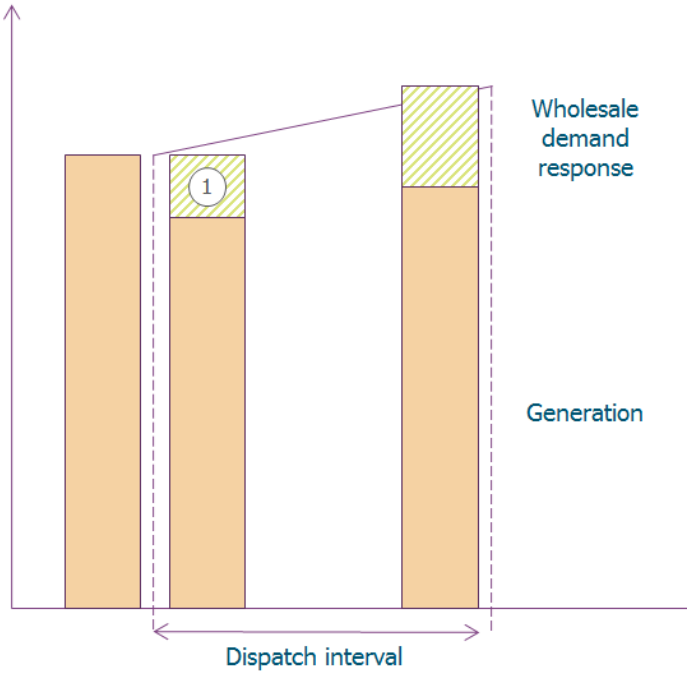
Note: This figure shows the difference between actual consumption (indicated by the red line) and the baseline level of consumption (the purple dashed line) over the course of a day. As the baseline cannot perfectly predict actual consumption, there will be differences between the two lines.

Consider the implications of a third party being scheduled to provide 'negawatts' and points 1 and 2 in the figure above.

If a third party was cleared to provide negawatts of demand response at point 1, the starting amount of demand response being provided would be greater than zero. That is, the third party would receive a dispatch target to a provide certain amount of demand response by the end of the dispatch interval, *some of which was already being provided.* Consequently, at the start of the dispatch interval NEMDE would substitute a source of existing supply for the amount of demand response being provided at point 1. This is shown in Figure 5.2.

NEMDE would suddenly be accounting for a non-zero amount of demand response that did not physically occur prior to dispatch of the demand response. As a result, NEMDE would be incorrectly setting dispatch targets that account for a demand response that has not occured, which could lead to an imbalance between supply and demand, which would in turn lead to perverse impacts on the frequency of the power system.

Figure 5.2: Scheduling 'negawatts' would lead to supply-demand imbalance



These issues would also arise at point 2, just that the third party would be seen to be providing a negative amount of demand response at the start of the dispatch interval.

This could be corrected if the baseline was equal to the actual consumption. However, a baseline cannot ever perfectly predict the counterfactual level of consumption. Therefore, the only way the baseline could be equal to the actual consumption would be if the baseline was adjusted. However, if the baseline was always adjusted to match the actual level of consumption, this would provide the demand response provider with an avenue to manipulate the baseline with minimal effort.

For these reasons, if a wholesale demand response mechanism were to be introduced, it may be preferable for demand response to participate as a scheduled load instead of as scheduled demand response. Stakeholder input is invited on whether this would be technically feasible and avoids some of the potentially perserve implications discussed above.

Participating as a scheduled load

Scheduled participants have to provide information to AEMO through a SCADA link which an associated costs that would be relatively substantial for a small market participant. The information provided through SCADA is important for managing the security of the power system. However, it is not clear if AEMO would necessarily need the same granularity of information from demand-side participants, or whether this information could be provided in a more cost-effective manner.

Requiring demand response to be scheduled in the wholesale market would place a number of obligations on the demand side participant. These obligations include:

- submitting offers in price-quantity pairs into the market
- receiving and responding to dispatch intructions
- having the appropriate communications links
- participating in short-term PASA and medium-term PASA (discussed later).

In the PIAC, TEC and TAI rule change request, the proponents noted:[69]

> "There will need to be some consideration of the exact form of scheduling that is most appropriate for offers of flexibility from aggregated demand-side resources, as their characteristics are quite different from those of conventional generators."

The AEC rule change request outlined two options for how a third party aggregating demand response could act as a scheduled load:[70]

1. All demand response loads allocated to a DRSP would be classified as scheduled loads and continuously provide availability information to AEMO, and bid and rebid with the same obligations as scheduled generators.
2. Demand response loads would be scheduled under certain conditions, such as the DRSP intending to participate in the wholesale market or scarcity conditions being present.

For demand response to be scheduled in the wholesale market, it would need to follow dispatch targets every five minutes. This may be challenging for demand side participants, particularly those that provide demand response through interruptible loads. These loads may be able to turn off in line with a dispatch instruction but may not be able to increase load to meet subsequent dispatch targets. There are features in the NER that may be useful in accomodating these challenges, including:

- unit ramp rates[71]
- dispatch inflexibility profiles.[72]

These aspects of the NER may need to be altered or alternative features implemented to accommodate application to demand response participating in the wholesale market.

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69 PIAC, TEC and TAI, *Wholesale demand response mechanism - rule change request*, p. 15.
70 AEC, *Wholesale demand response register mechanism - rule change request*, p. 3.
71 Clause 3.8.3A of the NER.
72 Clause 3.8.19 of the NER.

Scheduled participants are incentivised to follow dispatch targets through two regulatory mechanisms:

- Compliance with dispatch targets: the AER assesses the compliance of scheduled participants with the dispatch targets issued by NEMDE. The AER will enforce compliance where appropriate.
- Causer-pays: cause pays is a procedure for apportioning regulation FCAS costs amongst market participants. This provides scheduled participants with an incentive for scheduled participants to follow dispatch targets in a linear manner and to minimise the extent of negative impact of power system frequency.

We are interested in how these two mechanisms should apply to demand response provided through a mechanism, particularly where the schedulded participant may not be the FRMP.

The Commission also notes that AEMO, the Commission and the AER are developing a joint work program on distributed energy resources, including consideration of how to best integrate virtual power plants into the NEM. This work program could provide valuable insights into the trade-off between the impost of the scheduling obligations and relative benefits gained.

Information provision ahead of real-time

In the proposals, demand response providers would also be required to provide information to the market ahead of real time.

Scheduled participants currently provide information that feeds into a number of processes ahead of real time. This information is valuable for assisting AEMO in its safe, secure and reliable operation of the power system and helping market participants form expectations about future price outcomes to guide operational decisions.

However, a demand response aggregator has limited control over the operational decisions being made by the consumer particularly in relation to the part of the consumer's load which is not subject to demand response controls. As a result, information submitted by a demand response aggregator may not be as accurate as the information submitted by market participants with full control over their facilities e.g. generators. Having demand response aggregators participating in information provision over longer timeframes may not provide useful information to the market.

QUESTION 7: DEMAND RESPONSE PARTICIPATING AS A SCHEDULED LOAD

(a) Has the Commission appropriately characterised the benefits of increasing transparency relating to wholesale demand response?

(b) Do stakeholders consider that if demand response were to participate in the wholesale market, it should do so as a scheduled load (rather than scheduled "negawatts")? Would the pros and cons of participating as a scheduled load differ for different types of demand response providers, e.g. those that have demand response controls on all or only part of their

load?

(c) Do stakeholders consider the obligations placed on scheduled load remain appropriate in the context of demand response? If not, how might they be changed to better allow loads to participate in central dispatch?

(d) Which information provision processes should a demand response provider participate in, i.e. pre-dispatch, ST-PASA, MT-PASA?

(e) How should compliance with dispatch targets and the causer pays procedure apply to demand response providers?

Note: For more information on information provision processes undertaken by market participants, see chapter 3 in the final report of the Commission's *Reliability frameworks review*.

5.2.4 Reducing barriers to a range of demand response

As noted in chapter 2, demand response can provide a range of different services throughout the power system. While these services are distinct, a single consumer is likely to be able to provide different services by undertaking the same activity.

For a consumer to be able to offer and provide demand response, a variety of education, equipment and time will be needed, depending on the type of demand response. More firm and faster acting demand response require more time, education and equipment to develop. In contrast, there is wholesale demand response that can be achieved through simpler methods such as sending a message to customers inviting demand response; however, this form of wholesale demand response is likely to be less firm and more variable in quantity and duration.

The time and effort that are necessary to set up a demand response portfolio of sufficient size is one reason several market participants have suggested there is not more wholesale demand response in the NEM. The costs of compiling a demand response portfolio have fallen with technological developments. These costs are likely to continue to fall over time.

To the extent that these proposals reduce the barriers to providing wholesale demand response, it is likely to increase the amount of demand response capacity available to provide other services, including network services and ancillary services.

QUESTION 8: REDUCING BARRIERS TO A RANGE OF DEMAND RESPONSE

To what extent will these mechanisms facilitate more demand side participation throughout the NEM?

5.3 Costs of making a change

This section discusses the costs of making a change to the regulatory frameworks to introduce a mechanism to facilitate wholesale demand response. The extent of these costs are likely to change with the design of the proposed mechanism.

In order to be able to weigh the relative benefits against the costs of making a change to the regulatory framework, stakeholder input is sought to better understand the extent of the costs imposed in implementation and in an ongoing sense.

5.3.1 What are the upfront costs to participants?

To implement a wholesale demand response mechanism, costs are likely to be imposed on:

- retailers/market customers
- AEMO
- the customers and third parties looking to faciliate demand response.

Ultimately, the majority of these costs will be borne by all consumers.

The Commission would like to better understand the costs that would be imposed on participants under the different proposals for different mechanisms.

Costs imposed on retailers

Retailers would bear some upfront costs, which would depend upon the design of the mechanism.

- **Wholesale demand response mechanism:** the costs incurred by retailers would be in altering systems to accommodate settlement under the proposed mechanism. Retailers would need to alter IT systems and manual processes to accomodate billing participating consumers on baseline energy during periods where wholesale demand response has been dispatched.
- **Separate wholesale demand response market**: the costs imposed to introduce a separate market for wholesale demand response would mostly lie with AEMO. AEMO would need to make the necessary changes to its systems to accomodate a separate market for wholesale demand response.
- **Wholesale demand response register**: it is not clear whether the AEC proposal would impose additional costs on retailers; however, there may be some costs imposed in complying with any obligations to negotiate in good faith to maintain a demand response arrangement with a demand response aggregator.

In an Oakley Greenwood report on the costs that would be imposed under a similar proposal for the introduction of a wholesale demand response mechanism in 2014, the cost estimate for retailers was $112 million over ten years.[73] However, this figure was disputed in the rule change request submitted by PIAC, TEC and TAI. The rule change request noted that these costs were self-reported and remain unsubstantiated.[74]

73 Oakley Greenwood, *Cost-benefit analysis of a possible Demand Response Mechanism,* final report, p. 11, December 2014.

74 PIAC, TEC and TAI, *Wholesale demand response mechanism - rule change request*, p. 5.

PIAC, TEC and TAI also note that under the proposal they have submitted, retailers are not required to update automated systems to accommodate the demand response mechanism, as they can opt to manually modify data at lower cost until the cost of doing so is higher than the incremental cost of system upgrades. They also noted that retailer systems are being substantively upgraded to accomodate the introduction of five-minute settlement. It is suggested that this would substantially reduce the incremental costs attributable to the introduction of a wholesale demand response mechanism.[75]

Costs imposed on AEMO

Introducing these proposals would also be likely to impose costs on AEMO. Where costs are imposed on AEMO, these costs are recovered from market participants, with these costs ultimately recovered from consumers. The costs imposed on AEMO would include:

- **Wholesale demand response market:** during the development of a wholesale demand response mechanism proposal in 2014, Oakley Greenwood estimated the costs that would be imposed on AEMO to implement that demand response mechanism. This estimate was based on information from AEMO. Oakley Greenwood estimated that the costs AEMO would incur would be in the order of $8 to $14 million over ten years (NPV).[76]
- **Separate wholesale demand response market:** the costs imposed on AEMO to introduce a separate market for wholesale demand response are likely to exceed the costs of introducing a wholesale demand response mechanism due to the costs in setting up a new market that is separate from the existing wholesale market.
- **Wholesale demand response register:** AEMO would incur some costs in any changes necessary to accomodate the scheduling of demand response. It is unclear what the extent of these costs would be.

Costs imposed on demand response providers

Under these proposals, there are also likely to be some costs imposed on customers or third parties providing demand reponse. Under all three, demand response providers would need to install the necessary equipment and develop systems necessary to participate in central dispatch. These parties will be able to make commercial decisions to trade-off these upfront costs against the revenue gained through participation in a mechanism, provided they can accurately forecast the expected revenue.

QUESTION 9: COSTS OF IMPLEMENTING MECHANISMS

(a) What is the extent of the upfront costs that would be imposed on participants to introduce the proposals outlined in the rule change requests? Please provide evidence or data to substantiate these views where possible.

75 Ibid, p. 14.

76 Oakley Greenwood, *Cost-benefit analysis of a possible Demand Response Mechanism*, final report, p. 11, December 2014.

(b) Will demand response providers have sufficient information regarding expected revenue to make commercial decisions regarding the cost/benefit trade-off of incurring upfront costs in order to participate in the mechanism?

5.3.2 How can these costs be reduced?

We would like to understand from stakeholders whether there is potential for these costs to be reduced. For example, whether any costs imposed on retailers in undertaking systems changes might be able to be mititgated due to coincident changes being made to systems to account for five minute settlement, as suggested by PIAC, TEC and TAI.

In addition, the costs imposed on AEMO may be able to be reduced if they are made at the same time as other related changes.

QUESTION 10: REDUCING EXTENT OF UPFRONT COSTS

Do stakeholders have suggestions for ways these upfront costs could be minimised? For example, is it possible for there to be savings by making changes at the same time as other systems changes?

5.3.3 What are the potential indirect costs?

The introduction of a mechanism to facilitate wholesale demand response should not distort efficient market outcomes. However, it is possible that there may be some indirect costs arising from the introduction of the proposals set out in the rule change requests. We consider the potential for indirect costs is likely to be attributable to:

- the use of baselines that credit an incorrect quantity of demand response in market settlement
- the allocation of costs or risks in a manner that does not allow them to be managed over time.

We would like to understand from stakeholders the extent to which they consider a wholesale demand response mechanism might have indirect costs.

The potential indirect costs associated with the proposed wholesale demand response mechanism are considered in more detail in appendix A.

QUESTION 11: INDIRECT COSTS OF PROPOSALS

(a) What is the likely extent of any indirect costs imposed through these proposals?

(b) How could any such costs be minimised?

5.4 Baselines

Baselines are an integral aspect of determining the value of wholesale demand response - regardless of whether the demand response is provided by the retailer or a third party aggregator. A baseline is used to determine the quantity of demand response being provided.

Baselines are discussed in more detail below. In appendix A, centrally determined baselines, which feature in the wholesale demand response mechanism and the separate wholesale demand response market, are discussed in further detail.

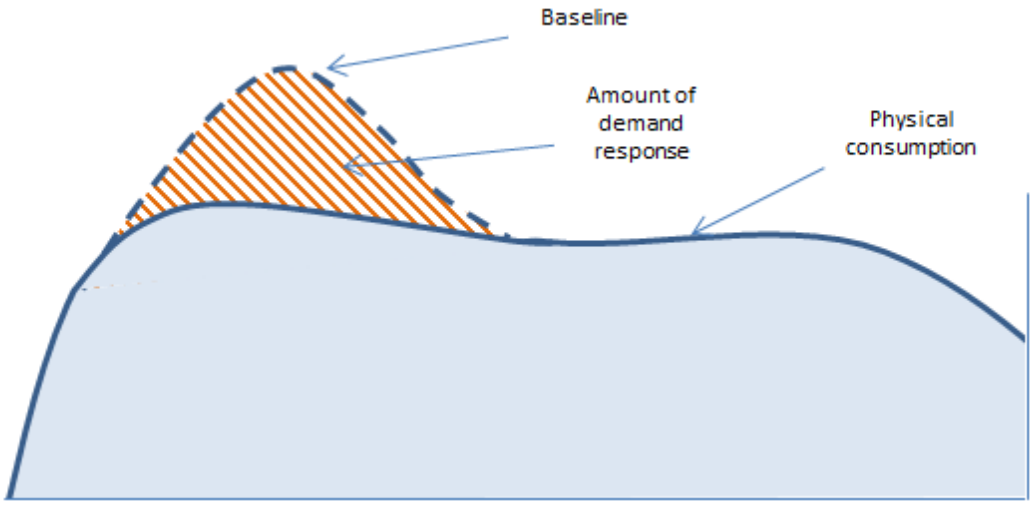
5.4.1 What is a baseline?

A baseline is an estimate of expected behaviour. It is similar to a forecast in many ways. Specific to wholesale demand response, a baseline tries to emulate the behaviour of a consumer in the absence of any response to short term changes in the wholesale price for electricity. Baselines are used in other contexts, such as in relation to energy efficiency programs.

The baseline is used to establish the counterfactual i.e. how much demand would a consumer have consumed if it hadn't demand responded? The difference between the actual consumption and the baseline forms the amount of demand response that is provided by that particular consumer.

The concept of a baseline in demand response is shown in Figure 5.3.

Figure 5.3: Baseline used to quantify demand response



Baselines can either be:

- **Centrally determined:** the methodology for determining the baseline and the calculation of the baseline are determined by a central party. Concerns have been raised about the extent to which centrally determined baselines allocate risk and whether it

would present opportunities for gaming. In centrally determined baselines there are two ways in which they can be calculated:

  - The central party can fully determine the baseline generally using data from the consumer. For example, in the AEMO/ARENA RERT demand response trial, AEMO is responsible for centrally determining the baseline for the consumer providing demand response that participates in the RERT. Concerns have been raised about the extent to which centrally determined baselines may be gamed.

- **Centrally administered**: calculated by participants and administered in settlements by a central party. For example, in the Singapore market, demand response aggregators themselves submit a baseline to the system operator, who then adminster this baseline on behalf of the aggregators and retailers.
- **Disaggregated:** not calculated by a central party but agreed between two or more market participants. Two examples of how this could occur currently are:
  - A consumer with direct spot price exposure undertakes wholesale demand response on its own accord, in order to reduce its electricity bills. To make the decision to undertake this type of response, the consumer has to weigh up the costs and benefits of its reduced level of consumption relative to what it would have done with its consumption otherwise. This "counterfactual" consumption is the baseline in this example. If the cost savings associated with reduced energy bills offset the cost of lost production, then the consumer will undertake demand response. In this situation, the consumer has a good undersatnding of what their effective baseline would be, and so can make an informed trade-off.
  - A retailer has a contract with a consumer for wholesale demand response in which the retailer can pay the consumer to reduce consumption. In this case, the retailer determines the payment under the customer's contract based on the retailer's estimate of a baseline. The retailer and the consumer may therefore agree on a methodology for determining this baseline. This places pressure on the baseline - the retailer may seek to make sure that the baseline is as low as possible to reduce payments, and the consumer will seek to increase the baseline to increase its payout. The relative bargaining power of the parties may affect the outcome here.

Baselines will be a feature of the use of wholesale demand response in the NEM. The wholesale demand response mechanism and separate wholesale demand response market utilise a centrally determined baseline. In contrast, the wholesale demand response register relies on baselines being set in a disaggregated manner.

Each of these approaches to setting baselines impact on the incentives and risks that are placed on parties. The Commission considers that in order to minimise the risk of inefficient or unmanageable costs being imposed on consumers, it is preferable that:

- incentives are placed on parties to reveal an honest baseline
- the risk of the baseline being wrong is borne by the party who can best control that risk
- incentives drive the development of baselines that are able to trade-off the administrative costs of increasing the baseline against the benefits of a more accurate baseline.

The Commission is interested in stakeholder feedback on how risks associated with baselines can be best managed.

> QUESTION 12: RISK ALLOCATION FOR BASELINES
>
> Do stakeholders have views on how risks and costs can be best allocated under a baseline used for demand response?

5.5 Retailer participation

The proposals set out different ways in which retailers would be required to participate in the demand response mechanism:

- **Wholesale demand response mechanism**: retailers would be unable to opt out of participation on behalf of their customers, and would be required to change their billing and settlement systems to accommodate bills on baseline energy use.
- **Separate wholesale demand response market**: as with the first mechanism, the retailer would not be able to prevent its customers from participating, and would need to pay (and recover from customers) the costs associated with the separate demand response market.
- **Wholesale demand response register**: retailers would be required to negotiate in good faith to enter into or maintain commercial demand response relationships with third parties facilitating demand response.

These new obligations would likely to impose some implementation costs on retailers, as discussed in section 5.3.1.

The proposal for the introduction of a demand response mechanism considered in the *Demand response mechanism and ancillary services unbundling* rule change request did not oblige retailers to participate.[77] However, without requiring participation from retailers in some form, any proposal is unlikely to address the issues being raised by the proponents.

> QUESTION 13: RETAILER PARTICIPATION
>
> (a) Is it necessary to place an obligation on retailers to participate in the mechanism for it to address the issues raised by the proponents?
>
> (b) Are there additional obligations these proposals would place on retailers, and do they differ between the proposals?

77 For more information, see: https://www.aemc.gov.au/rule-changes/demand-response-mechanism.

5.6 Inclusion of embedded generation and energy storage

The increased ability of the demand side to participate and respond to wholesale prices can be partially attributed to the proliferation of embedded generation.

Where an embedded generator is connected behind a market load connection point and its output is less than the quantity of load drawn from the grid, its output is seen from the perspective of the grid and settlements as a reduction in load.

Embedded generation paired with energy storage can be bidirectional. That is, batteries are able to optimise between consuming (charging) and exporting. This means the demand response that can be provided by these resources is unlikely to be confined to a reduction in net consumption during high prices, it would also include increased consumption during low wholesale prices.

Initial observations include:

- where possible, these mechanisms should be designed such that they can accomodate increased consumption during low price periods, including by charging batteries, as well as decreased consumption during high price periods as a result of using embedded generation, as these are growing sources of demand-side flexibility
- there may be challenges in accomodating embedded generation in baseline methodologies. To the extent that baselines cannot accurately capture this behaviour, it is likely to result in inaccurate quantites of demand response being credited.

The integration of aggregated embedded generators into the wholesale market is being considered through the joint work program between AEMO, the AER and the Commission. To the extent that this work program is underway during this rule change process, it may provide useful insights.

> QUESTION 14: EMBEDDED GENERATION AND STORAGE
>
> (a) Do stakeholders have preliminary views about the ability for the proposed mechanisms to accomodate embedded generation, in the form of reduced consumption of electricity from the grid in high price periods?
>
> (b) Do stakeholders have preliminary views about the ability for the proposed mechanisms to accommodate, as demand response, increased consumption during low price periods (whether due to charging batteries, increasing production or any other action by the customer)?

5.7 Thresholds for participation

Stakeholder views are sought on the appropriate thresholds for participation in the proposals. There are multiple aspects to this issue:

- Thresholds for individual consumer participation: is it likely that larger consumers would be better equipped to participate in a centrally dispatched demand bid? In addition,

applying the mechanism only to large customers may reduce the need to find methods to provide appropriate consumer protections to demand response customers. Applying the mechanism to large customers may also result in a faster implementation process. However, we note that small customers are those customers that potentially have the least access to the ability to provide wholesale demand response currently, and as such, a large portion of the benefits of a mechanism may be in unlocking the demand response capability of small consumers.

- Thresholds for aggregated third party portfolios for participation: if small customer demand response is included, it may be necessary to have a minimum threshold for participation in the mechanism, which could be met by a third party aggregating the demand response of a number of customers.
- Thresholds for scheduling obligations: another threshold to be considered is the threshold at which different scheduling obligations should apply. It may be that more onerous sets of obligations apply to wholesale demand response above a certain level and that these obligations apply to a lesser extent to smaller wholesale demand response bids.

To the extent that stakeholders have feedback on these participation thresholds, this will inform the approach to considering these rule change requests. As noted above, the application of a mechanism to different customer sizes may to have an impact on how these rule change requests are progressed.

> QUESTION 15: THRESHOLDS FOR PARTICIPATION IN A MECHANISM
>
> (a) What thresholds, if any, should apply to partcipation in the mechanism for individual consumers and aggregated portfolios? For example, large consumers as opposed to small consumers; a MW size threshold?
>
> (b) Should there be thresholds at which different scheduling obligations apply?

5.8 Implementation timeframes

The Commission would also like to understand the implementation timeframes associated with the proposals set out in the rule change requests.

If a demand response mechanism is introduced, the accompanying implementation timeframe will need to account for time taken for AEMO, retailers and other affected participants to make the necessary changes to their systems, contracts and other arrangements.

There may be some options for how to shorten the implementation timeframes. For example, introducing the wholesale demand response mechanism in a way that minimised the upfront changes that would need to be made by AEMO and all retailers.

One such option for reducing the implementation timeframes would be to place the obligation on the third party undertaking wholesale demand response to convey metering data (including, where relevant, baseline data) to the retailer. This could mean that the retailer

would not need to change its billing and settlement systems as the third party would take on the responsibility for sending through baseline and actual consumption data together. This would likely mean that these third parties would need to be accredited to read meters, and would need to be prepared to provide regular meter reads.

QUESTION 16: IMPLEMENTATION TIMEFRAMES

(a) How long do stakeholders think would be reasonably required to implement the proposals as set out in the rule change requests?

(b) How could the implementation timeframe be reduced? What trade-offs may need to be made to the design to achieve this?

6 LODGING A SUBMISSION

Written submissions on the rule change request must be lodged with Commission by 21 December 2018 via the Commission's website, www.aemc.gov.au, using the "lodge a submission" function and selecting the project reference code ERC0247.

The submission must be on letterhead (if submitted on behalf of an organisation), signed and dated.

Where practicable, submissions should be prepared in accordance with the Commission's guidelines for making written submissions on rule change requests.[78] The Commission publishes all submissions on its website, subject to a claim of confidentiality.

Alongside this consultation paper, the Commission has published a template for stakeholder responses. Stakeholders may elect to use this template when preparing a submission.

All enquiries on this project should be addressed to Declan Kelly on (02) 8296 7861 or Declan.Kelly@aemc.gov.au.

78 This guideline is available on the Commission's website www.aemc.gov.au.

ABBREVIATIONS

ACCC	Australian Competition and Consumer Commission
AEC	Australian Energy Council
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
ARENA	Australian Renewable Energy Agency
Commission	See AEMC
DMIA	Demand management innovation allowance
DMIS	Demand management incentive scheme
DNSP	Distribution network service provider
DRA	Demand Response Aggregator
DRSP	Demand Response Service Provider
FCAS	Frequency control ancillary services
FRMP	Financially responsible market participant
LSCM	Load shedding compensation mechanism
MASP	Market ancillary service provider
MCE	Ministerial Council on Energy
MPC	Market price cap
MT PASA	Medium Term Projected Assessment of System Adequacy
NECF	National Energy Customer Framework
NEL	National Electricity Law
NEM	National electricity market
NEMDE	National electricity market dispatch engine
NEO	National electricity objective
NER	National Electricity Rules
NERL	National Energy Retail Law
NERO	National energy retail objective
NERR	National Energy Retail Rules
NMI	National meter identifier
PIAC	Public Interest Advocacy Centre
RERT	Reliability and Emergency Reserve Trader
SCADA	Supervisory control and data acquisition
ST PASA	Short Term Projected Assessment of System Adequacy
TAI	The Australia Institute
TEC	Total Environment Centre
TNSP	Transmission Network Service Provider
USE	Unserved energy

VPP	Virtual power plant

A WHOLESALE DEMAND RESPONSE MECHANISM

This appendix presents issues for consultation that are specific to the proposed wholesale demand response mechanism submitted in the rule change requests from PIAC, TEC and TAI, and the South Australian Government.

This appendix is structured as follows:

- the role of centrally determined baselines
- how settlement would work under this model
- other considerations specific to this model.

A.1 The role of baselines

In the wholesale demand response mechanism and the separate wholesale demand response market, a baseline has a central role in determining the quantity of demand response. While baselines would also be used with the wholesale demand response register mechanism, they would not be centrally determined but negotiated between the retailer and demand respnse provider. The register would not require changes to the NER to establish governance for a baseline methodology.

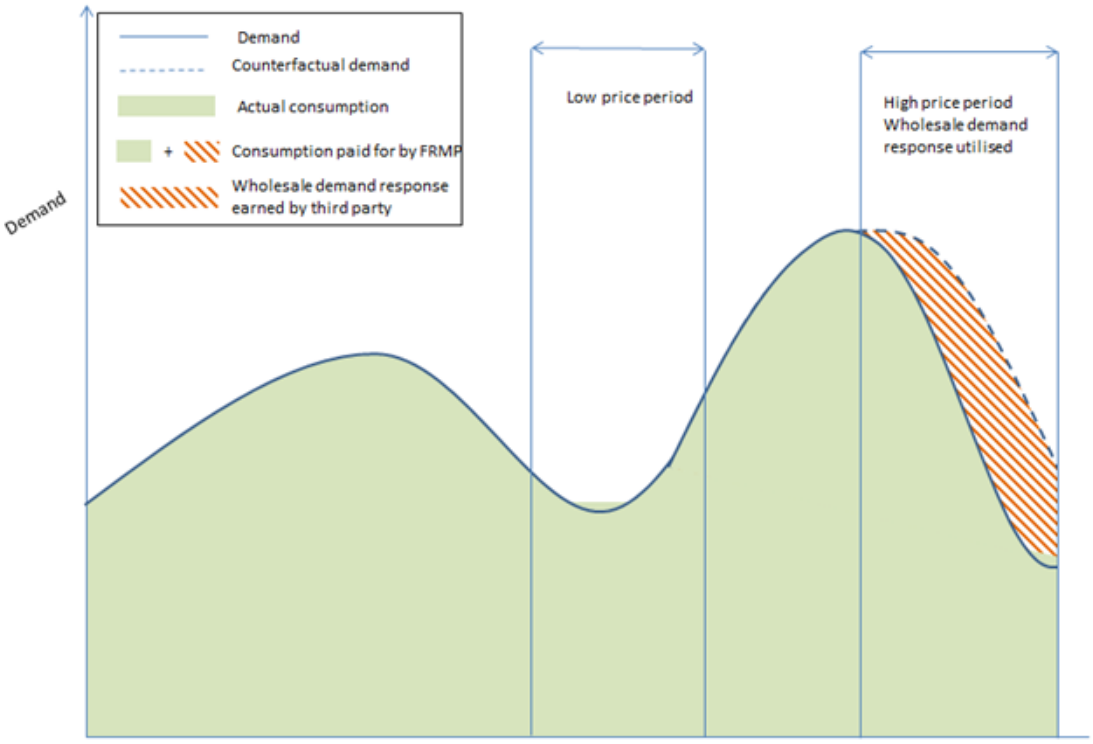
Baselines are discussed in a more generally in chapter 5. This section discusses the role of centrally determined baselines.

A.1.1 What is different under these proposals?

The proposed wholesale demand response mechanism would formalise and regulate the role and use of baselines in the spot market. These baselines would be centrally determined and used to quantify the amount of wholesale demand response. This would have a direct consequence for market settlements. The interaction between baselines and market settlements is shown below in Figure A.1.

- the underlying physical energy consumption is the green area, which the customer purchases from the retailer
- the striped area represents the amount of demand response - the customer purchases this quantity from the retailer and a third party 'sells' it on the spot market and pays the customer an amount agreed through commercial arrangements between the customer and third party
- the retailer would purchase the green *and* striped areas from the spot market
- if the customer offered demand response by shifting or deferring some consumption (rather than reducing overall consumption), the customer would need to purchase that electricity from the retailer at the relevant time. This would be in addition to the customer paying the retailer for the baseline consumption (the striped area).

Figure A.1: Formalised baselines



As discussed in chapter 5, baselines used in central dispatch may have perverse outcomes for the security of the power system. As such, baselines may be used only for settlement purposes. Central dispatch would instead rely on the scheduling of load (i.e. the green area), rather than demand response (i.e. the striped area).

A discussion of settlement is provided in section A.2 of this appendix.

It should be noted that under the rule change proponents' proposal, participation by a retailer in the mechanism would be mandatory. That is, the retailer would be obliged to buy both the green and striped area from the spot market (potentially at a high spot price), despite the fact that the consumer has only physically consumed the green area.

The reason given is that were it not for the demand response by the consumer, the consumer would have consumed the green and striped area, so that retailer is no worse off than it would have been without the demand response.

A.1.2 What is important for a centrally determined baseline?

The Commission considers there are two key characteristics that should be present in a centrally determined baseline:

- The baseline does not have any systemic bias
- The risks and incentives associated with the baseline are allocated so that no party is able to influence the baseline to induce inefficient outcomes.

It is also important that, to the extent possible, the baseline is an accurate predictor for consumption in lieu of wholesale demand response.

Systemic bias

When the baseline is not correct on average, it has a distortionary impact on the market. It either results in a retailer facing a cost (ultimately recovered from the retailer's customers) where there was no efficient change in consumption, or a demand response provider recovers revenue from the wholesale market that does not reflect the value of any efficient demand side decisions it has made.

For this reason, it is important that there is confidence that a baseline methodology is consistent and unbiased - to the extent that it has a systemic bias, there are likely to be distortionary impacts on the market.

A bias would arise if inaccuracies in the baseline tended to either over or underestimate the quantity of demand response (or, put another way, under or overestimate the amount of consumption that would have occurred were it not for the demand response). A tendency to be either too high or too low may be the result of the demand response provider or the retailer having the ability to influence the setting of the baseline.

The Commission considers it important to understand the implications of the ability for a participant to game the baseline.

How could a participant game the baseline?

Participants would be economically incentivised to maximise the amount earned through a wholesale demand response mechanism. Ideally, this mechanism would incentivise participants to reveal their true marginal value of reducing consumption. However, a baseline provides an opportunity for a participant to increase the quantity of demand response it is credited for without necessarily physically undertaking that demand response.

Gaming could occur if:

- the demand response provider has the ability to artificially inflate the baseline or the retailer could artificially deflate the baseline. Depending on the methodology for determining the baseline, it is possible that the demand response provider would have the opportunity to 'inflate' the baseline such that, when the demand response was dispatched, the baseline was artificially high. This would result in the demand repsonse provider being credited for a greater amount of demand response than actually occured. The opposite could occur if a retailer has influence over the baseline.
- the demand response provider could observe the inaccuracy in the baseline and use this to inform commitment decisions. A demand response provider could elect to provide demand response when the baseline was inaccurate and overestimating expected consumption. If a demand response provider could do so, it would be more likely to

provide demand response when the baseline was inaccurately high and less likely when the baseline was inaccurately low. This would lead to the average error in the baseline being non-zero and the baseline being used more frequently when it was overestimating the quantity of demand response available. Put another way, while the baseline methodolgy may be unbiased over all times, the demand response provider may introduce bias in settlement by favouring demand response at those specific times that the the baseline was favourable (too high).

The ability of a participant to game the baseline will depend on the baseline methodology being used. Some baselines may be more robust to opportunities for gaming. For example, if a baseline was reliant on an extensive catalogue of consumption history, it would be difficult for a consumer to undertake short term measure to game the baseline. However, the downside of such an approach would be that the baseline would likely become increasingly inaccurate if it did not reflect the natural variations in a consumer's load profile occuring closer to real time. There is therefore a trade off between basing the baseline on recent data (which is more easily gamed) and long term data (which is more likely to be inaccurate when applied to any specific short time interval).

QUESTION 17: CENTRALLY DETERMINED BASELINES

(a) How important is it to design against the possibility for bias and gaming?

(b) How can a baseline methodology appropriately align incentives such that the risk of systemic bias is minimised?

Accuracy of baselines

As is the case with forecasting, a baseline will always be incorrect to some extent. It is not possible to perfectly determine the counterfactual level of consumption.

When a baseline is wrong (i.e. it does not reflect what the consumer's electricity use would have been in the absence of demand response), it means that the quantity of demand response that was accounted for will be wrong. If the baseline is too high, the amount of demand response will be overestimated. If the baseline is too low, the amount of demand response will be underestimated. As a result, either too much or too little value relating to demand response will be transferred from the retailer to the demand response provider.

In a single instance, if the baseline is wrong, the demand response will either be over or undervalued. However, if the baseline is correct *on average*, over time, the fair value for the demand response should be exchanged between the retailer and the demand response provider. If it is correct on average, the over- and under-valuation of the demand response should cancel out over time. So, while in the short-term, the value attributed to demand response through settlements may be incorrect, the distortionary impacts should be at least partially mitigated in the medium-term if the average error in the baseline is zero.

How accurate should a baseline be?

In assessing the role of a baseline in a wholesale demand response mechanism, it is important to consider why the baseline should be as accurate as possible. A baseline will never be 'perfect' but if it maintains a certain level of accuracy, this may be sufficient.

Assessing the accuracy of a baseline is likely to be challenging, particularly over time as the consumer changes behaviour and/or level of consumption. As discussed above, it is important the average error in the baseline is minimised.

When determining how accurate a baseline should be, there is a trade-off being made between the administrative costs of improving the baseline and the distortionary impacts of an inaccurate baseline. A baseline could be made to be more accurate; however, this is likely to require increased amounts of information being collected from the consumer as well as increased administrative compliance costs to regularly assess accuracy.

Inaccuracy will arise when the baseline methodology does not account for variables which influence consumption. A number of factors will contribute to the level of demand and the demand profile as seen at the connection point, including:

- staff availability
- production schedules
- temperature
- day of the week, time of day
- use of embedded generation.

All of these variables will influence the consumer demand. Some variables will be more relevant for different consumer types. For example, residental consumption might be more temperature sensitive, whereas some commercial loads will vary substantially with production schedules. Importantly, the wholesale demand response mechanism should not value (or penalise) changes in consumption that would have occured irrespective of the wholesale spot price of electricity.

If the baseline methodology does not control for these variables, there is likely to be a difference between the actual demand and the baseline demand that is **not** wholesale demand response. If the baseline methodology does not account for this, these variations in demand may either be credited as wholesale demand response or reduce the amount of wholesale demand response a consumer is credited for.

One way to improve the accuracy of the baseline methodology is to only allow participants with predictable consumption patterns to participate. That would mean participants with consumption profiles that can be easily and accurately baselined. This approach would have implications for participation in a wholesale demand response mechanism. For example, energy storage, which is able to respond quickly to a range of different conditions, is likely to be difficult to accurately baseline due to its dynamic nature.

QUESTION 18: ACCURACY OF BASELINES

(a) How important is it that the baseline methodology is able to accurately estimate consumption?

(b) What administrative mechanisms would improve baseline accuracy without imposing excessive burdens? For example, regular review of baseline methodologies by independent experts, or cross-checking against consumption data from customers that are similar to the demand response provider but are not engaging in demand response.

(c) Can a baseline accurately account for embedded generation and other dynamic resources that might exist behind the meter?

(d) Should a wholesale demand response mechanism apply only to the types of customers for which baselines can be accurately set, and if so, what types of customers should be eligible?

(e) How should long-term or permanent changes in a customer's overall level of demand be addressed in baselines? For example, factories may add or retire production lines; households may increase or decrease in size, and may install or remove equipment such as pool pumps or solar panels.

A.2 Settlement

A.2.1 How would settlement work under the proposals?

The value of wholesale demand response arises from the changed level of exposure to the wholesale price.

These proposals seek to allocate the value of wholesale demand response to a demand response provider (which may be the consumer or a third party appointed by the consumer) through a regulatory mechanism. This has direct implications for market settlements. In Box 2, an example is worked through, showing the financial flows for wholesale demand response under the current arrangements[79] and the wholesale demand response mechanism.

BOX 2: COST RECOVERY UNDER DIFFERENT APPROACHES TO WHOLESALE DEMAND RESPONSE

In these examples, a consumer purchases electricity through their retailer who subsequently purchases this electricity on the spot market. Four scenarios are considered:

1. The first scenario demonstrates a typical arrangement between a consumer and a retailer where the consumer is not undertaking demand response.

79 This is relevant to the proposal set out in the AEC rule change request as this request is not proposing to change market settlements.

2. In the second scenario, the consumer provides wholesale demand response through an arrangement with their retailer. This is how some wholesale demand response happens under the current arrangements.
3. In the third scenario, the consumer provides wholesale demand response through a third party and the retailer purchases the baseline amount of energy from the wholesale market. This is how settlement would work under the wholesale demand response mechanism.

For simplicity, we've excluded the consideration of network costs.

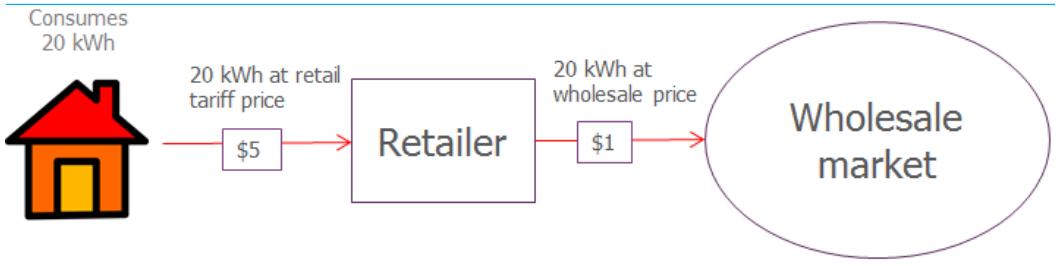
Scenario 1 - No wholesale demand response being provided

In the figure below, the money flows for a typical retail arrangement are demonstrated. The wholesale is price is $50/MWh.

Over the course of two hours:

- The consumer consumes 20kWh at a retail price $0.25/kWh. The consumer pays the retailer $5 (20 kWh * $0.25/kWh).
- The retailer purchases 20kWh from the wholesale market at the wholesale market price $50/MWh. The retailer pays $1 in the wholesale market (50 * 0.02).
- The retailer has profited $4. Of course, at other times the wholesale market price will exceed the retail price, in which case the retailer would make a loss. The retailer can hedge this risk by entering into financial contracts or vertically integrating with generators.

Figure A.2: No demand response being provided



Scenario 2 - Wholesale demand response under the current arrangements

This scenario demonstrates the money flows in an example of a demand response agreement between a retailer and a consumer. This agreement can exist under the current regulatory arrangements.

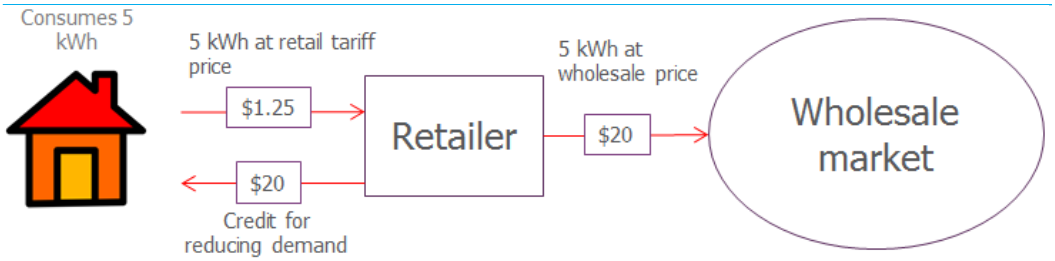
The retailer offers the consumer a $10/hr credit for reducing consumption for two hours due to high expected spot prices. The $10/hr reflects the expected value the retailer expects to receive from the reduced load. In response, the consumer reduces consumption to 5 kWh for the two hours.

The wholesale price reaches $4,000/MWh.

Over the course of the two hours:

- The consumer has reduced consumption and only consumes 5 kWh over the two hours, rather than 20 kWh. The consumer pays the retailer $1.25. For providing demand response, the consumer receives $20 credit from the retailer. The consumer would want to do this if it values consuming the 15 kWh of foregone electricity less than the $23.75 it saves/gains from not consuming ($20 credit plus $3.75 less from not consuming 15 kWh at a price of $0.25/kWh).
- The retailer purchases 5 kWh from the wholesale market for $20.

Figure A.3: Demand response under the current arrangements



This is also an example of the type of arrangement that could be registered in the wholesale demand response register (see appendix C).

Under this arrangement, the retailer has avoided the costs of having to purchase 20 kWh from the wholesale market during high prices. It has hedged the risk of exposure to high wholesale prices by entering into a demand response arrangement with the consumer. It is able to share the benefits of this with the consumer.

Scenario 3 - Wholesale demand response mechanism

This scenario demonstrates the money flows in the proposed wholesale demand response mechanism.

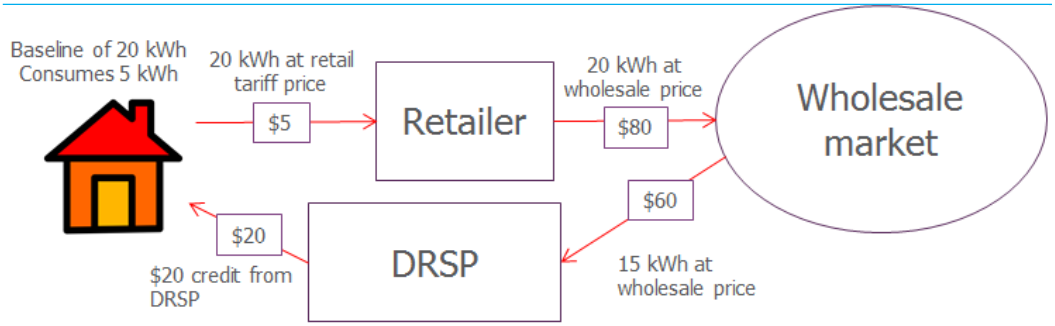
Under this arrangement, a third party sees forecasts of high prices and calls on the consumer (with whom it has a pre-existing commercial relationship) to reduce consumption. The consumer reduces actual consumption to 5 kWh. The baseline level of consumption is centrally determined to be 20 kWh.

The consumer purchases the baseline quantity from the retailer, who subsequently purchases the baseline quantity from the spot market. The third party is credited for the quantity of wholesale demand response in the spot market and shares some of this value with the consumer.

The wholesale price reaches $4,000/MWh. Over the course of the two hours:

- The consumer has reduced consumption and only consumes 5 kWh over the two hours. The consumer pays the retailer $5 for the baseline amount of energy, 20 kWh. The retailer subsequently purchases 20 kWh from the wholesale market for $80.
- The third party is credited $60 for the quantity of demand response. The third party shares $20 with the consumer for undertaking the demand response, in accordance with the previously agreed contract between the third party and the consumer.

Figure A.4: Demand response under this proposal



A.2.2 How is the value of demand response recovered?

The examples shown in Box 2 demonstrate how the value of demand response can be recovered. There are three options:

1. Under wholesale demand response undertaken under the current arrangements (and under the demand response register), the value of wholesale demand response will automatically accrue to the retailer. The retailer and the consumer then determine how to share the value through commercial arrangements. There is no need to change the market structure to recover the value of wholesale demand response.
2. Recover the value directly from the retailer and the participating consumer. This is how the value would be recovered in the wholesale demand response mechanism. The retailer would purchase the baseline amount of energy and would also bill the consumer who undertook demand response for the baseline amount of energy. This value would be transfered to the demand response provider, who (if it was not itself the consumer) would then share the value with the consumer through commercial arrangements.
3. Recover the costs of wholesale demand response from all consumers. This is what is being proposed for the separate wholesale demand response market, considered in appendix B.

The different approaches to cost-recovery also have different implications for risk allocation and incentives on market participants. The Commission is interested in stakeholder views on incentives and risk allocation under these approaches to cost recovery.

> QUESTION 19: SETTLEMENT UNDER THIS PROPOSAL
>
> Do stakeholders consider one of the settlement options outlined to be preferable? How would this approach to settlement impose costs and risks on market participants?

A.3 Other considerations

A number of other issues remain to be considered in relation to the design of a wholesale demand response mechanism.

These issues include the following:

- Are there any circumstances in which a third party demand response service provider would be responsible for selling electricity to the customer, for example when the demand response service provider was dispatched to provide demand response but the customer did not comply (or did not comply fully) with the instruction to reduce consumption? What should the consequences be when this happens? Which party is best placed to manage this risk?
- Considering the nature of the relationship between a third party demand response service provider and a customer, would it be appropriate for any of the consumer protections in the NERR to apply, and if so, which ones? Or would it be sufficient for this relationship to be subject to general consumer protections such as those in the Australian Consumer Law? Does the answer depend on whether the customer is a small or large customer?
- Should life support customers be permitted to participate in the wholesale demand response mechanism? If so, should any restrictions be imposed on their participation, for example not being permitted to offer demand response at a level which would curtail supply to their life support equipment? If not, in what way should this prohibition be managed?
- In addition to the changes to retailer billing systems discussed earlier in this paper, what degree of changes to the terms of retailers' existing contracts with their customers would be needed to accommodate the customer providing demand response and the retailer billing at the baseline (instead of billing for actual energy use)? Could these changes be made during the term of the contract or would customers and retailers need to enter into new contracts? What implications would this have for implementation timeframes? Should customers seeking to provide demand response be responsible for contacting their retailer to request a new contract that allows for this, and what should retailers be obliged to do when they receive such a request?
- What is the potential impact of the new arrangements on existing retail contract and hedging models? For example, retail contracts for larger customers may include provisions (which may be mutually beneficial) restricting the use of demand management, such as contracted load parameters or constraints on the sale of demand management capability without retailer consent. This reduces the extent of any load variability, making it easier for the retailer to hedge this load. This reduces the costs paid

by the consumer. However, if the customer requests a new contract that allows for demand response, the retailer's hedging arrangements may need to change.

QUESTION 20: OTHER CONSIDERATIONS FOR THE WHOLESALE DEMAND RESPONSE MECHANISM

Do stakeholders have views on these other considerations set out above?

Are there other considerations not raised here that should also be considered when designing a wholesale demand response mechanism?

B SEPARATE WHOLESALE DEMAND RESPONSE MARKET

In its rule change request, the South Australian Government outlined a proposal for a transitional arrangement which would consist of a separate market for wholesale demand response. It suggested that establishing the wholesale demand response mechanism as proposed would potentially have a lengthy implementation timeframe, and the Commission should consider the introduction of a separate wholesale demand response market that would enable the benefits of the mechanism to be realised sooner.

This appendix is structured as follows:

- an overview of the proposal
- the role of baselines
- how settlement would work under this separate market
- the rationale for a separate market.

B.1 Overview of proposal

The proposal set out in the South Australian Government's rule change request would involve an additional market that would operate prior to the commencement of the complete mechanism. This separate market, operated by AEMO, would take bids for demand response and co-optimise them with supply bids from other market participants in the wholesale market. The settled price of this market would be *separate* to the wholesale electricity market price. The costs associated with paying providers supplying the wholesale demand response market would be recovered from all consumers, similar to the way in which RERT costs are currently recovered.

Unlike the proposed wholesale demand response mechanism, this separate wholesale demand response market would bill retailers for actual consumption as opposed to the baseline level of consumption because it is settled separately. This has the consequence of not needing to change retailer systems to accommodate this separate market.

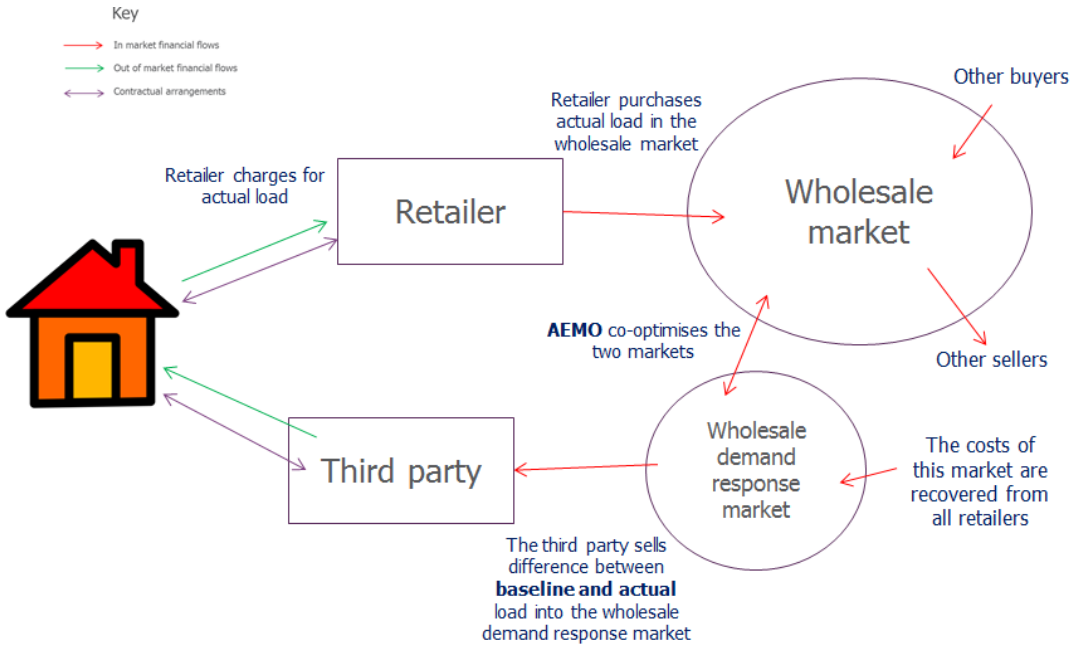
In summary:

- A retailer would continue to bill a consumer on actual consumption as is the case under the current arrangements.
- The retailer would continue to purchase this actual load from the wholesale market.
- The demand response provider (the customer or a third party with an agreement with the customer) would submit bids into a separate wholesale demand response market. These bids would be for the quantity of wholesale demand response, measured as the difference between the actual consumption and the baseline level of consumption. These demand response providers would be paid for dispatched wholesale demand response through this separate market.
- AEMO would operate this separate market and co-optimise it with the existing wholesale market.

- All retailer would be billed to make up the costs of the separate wholesale demand response market.

The proposed arrangement of this market is set out in Figure B.1 below.

Figure B.1: Separate wholesale demand response market



To set up this market, AEMO would need to develop separate systems and infrastructure to facilitate this market. This market would need to be able to accept bids for wholesale demand response, dispatch bids and co-optimise them with the existing wholesale market as well as the FCAS market.

B.2 Role of a baseline

The proposal to establish a separate wholesale demand response market would employ a baseline in the same manner as the proposed wholesale demand response mechanism. As such, baselines play an integral role in the functionality of this proposal. The Commission's preliminary thinking and questions for consultation in relation to baselines are set out in appendix A. Stakeholder feedback on baselines should be directed to these questions.

B.3 Settlement

B.3.1 How would settlement work under this proposal?

This proposal would allow third parties to sell wholesale demand response into a market, which is separate from the wholesale market. This would have implications for market settlement. In Box 3, an example is worked through, showing the financial flows for

wholesale demand response under the current arrangements and the separate wholesale demand response market.

BOX 3: COST RECOVERY UNDER THE SEPARATE WHOLESALE DEMAND RESPONSE MARKET

In this example, a consumer purchases electricity through their retailer who subsequently purchases this electricity on the spot market. This example is a continunation of the example shown in appendix A. Three scenarios are considered:

1. The first scenario demonstrates a typical arrangement between a consumer and a retailer where the consumer is not undertaking demand response.
2. In the second scenario, the consumer provides wholesale demand response through an arrangement with their retailer. This is how some wholesale demand response happens under the current arrangements.
3. In the third scenario the consumer provides wholesale demand response through a third party and the retailer purchases the actual amount of energy from the wholesale market. The cost of the demand response is then recovered from all market customers. This is how settlement would work under the separate wholesale demand response market, as the Commission understands the proposal in the rule change request.

For simplicity, we've excluded the consideration of network costs.

For the examples showing the first two scenarios, refer to the worked example in appendix A.

Scenario 3 - Smeared cost recovery

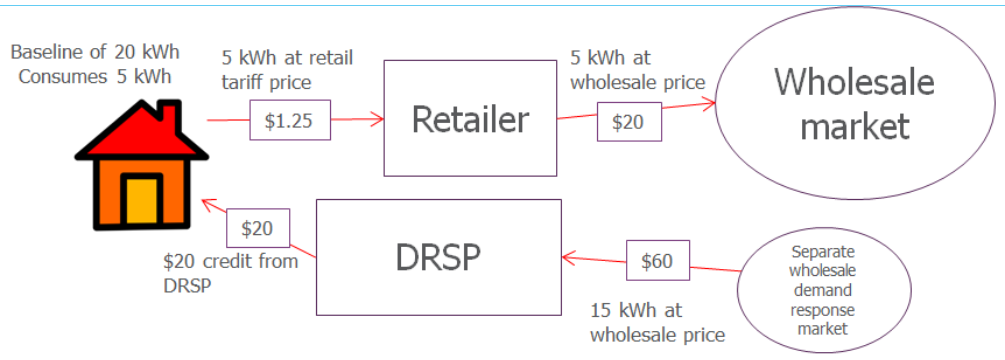
This scenario demonstrates the money flows in the proposal for a separate wholesale demand response market.

Under this arrangement, the actual consumption is 5 kWh and the baseline level of consumption is 20 kWh. The consumer purchases the *actual* quantity from the retailer, who subsequently purchases the *actual* quantity from the spot market. The consumer's demand response service provider (a third party) is credited for the quantity of wholesale demand response in the spot market and shares some of this value with the the consumer, in accordance with the agreement between them.

The wholesale price reaches $4,000/MWh. Over the course of the two hours:

- The consumer has reduced consumption and only consumes 5 kWh over the two hours. The consumer pays the retailer $1.25 for the actual amount of energy. The retailer subsequently purchases 5 kWh from the wholesale market for $20 (5 kWh at the spot price of $4,000/MWh).
- The third party is credited $60 for the quantity of demand response from the separate wholesale demand response market (15 kWh at the spot price of $4,000/MWh). The third party shares $20 with the consumer for undertaking the demand response.

Figure B.2: Demand response with smeared cost recovery



From the perspective of the rest of the market, the consumer has been paid for consuming electricity.

Even though the consumer has a positive demand and the wholesale price is positive, the amount paid to the DRSP exceeds the amount paid by the retailer. This shows that the net costs for the wholesale demand response must come from elsewhere.

Under this prosposal, that money would be recovered in a smeared manner - all consumers would effectively be subsidising the wholesale demand response undertaken by the consumer.

B.3.2 How is the value of wholesale demand response recovered?

The separate wholesale demand response market would recover the costs for wholesale demand response from all consumers in a smeared manner. This is similar to the way in which the current RERT costs are recovered. We are interested in stakeholder views on this proposal for cost recovery. On the one hand, it avoids retailer billing system changes, since the costs would just be recovered across all consumers, which may reduce implementation costs associated with this mechanism. On the other, it reduces the ability of retailers and consumers to anticipate costs. This would make it more difficult for these parties to hedge against any wholesale demand response costs or payments.

QUESTION 21: COST RECOVERY FOR THE SEPARATE MARKET

What do stakeholders think about the proposed cost recovery arrangements for the separate market?

B.4 Rationale for a separate market

The proponent suggests that introduction of this separate market could happen sooner and therefore allow the benefits of increased wholesale demand response to be realised sooner. The Commission is interested in stakeholder views on whether or not this is the case.

The South Australian Government suggests that this market could be introduced sooner than the wholesale demand response mechanism, because this separate market would not require changes to retailer billing and settlement systems.

The process of establishing a separate market and the associated changes to AEMO's systems and to NEMDE requires consideration. The Commission's understanding is that AEMO's preliminary view is that establishing this separate market may require a substantial amount of time and resources in order to be implemented.

We are interested in stakeholder views as to whether or not this separate market could be implemented more quickly than the wholesale demand response mechanism.

Notwithstanding the timing aspect of this proposal, the idea of a separate wholesale demand response market is another way to address the issues identified by the rule change proponents and facilitate wholesale demand response in the NEM. The Commission therefore intends to explore this separate market as an alternative to the other mechanisms discussed in this paper i.e. the wholesale demand response mechanism and wholesale demand response register.

Currently, the provision of FCAS is co-optimised with the wholesale energy market. Participants bid into both markets and NEMDE dispatches the least-cost combination of resources such that the supply demand balance is maintained, and there is sufficient FCAS available. In considering this rule change request, the Commission will need to work through how a wholesale demand response market would be co-optimised with the wholesale energy market, since they are both seeking to provide the same service i.e. provision of energy.

QUESTION 22: INTRODUCTION OF A SEPARATE MARKET

(a) Would the proposal set out in this appendix be faster to implement than the wholesale demand response mechanism discussed in appendix A?

(b) If stakeholders do not consider that it would be faster to implement, is there merit in exploring this as an alternative to the other proposed demand response mechanisms? What are the costs and benefits that should be considered in doing so?

(c) Are there any additional mechanisms that could be implemented more quickly than a wholesale demand response mechanism?

(d) What are stakeholder views on the feasibility of co-optimising this separate market with the existing wholesale market?

C WHOLESALE DEMAND RESPONSE REGISTER

To address the issues identified its rule change request, the AEC proposed changes to create a framework within which parties can more easily negotiate agreements to facilitate demand response in the NEM. The key element of this framework is a register which would record information relating to demand-side activities for a particular connection point. This appendix is structured as follows:

- how the proposed register will be established
- what would be included in the register
- the obligations that would be associated with the register.

This appendix also sets out two proposed approaches that facilitate the intent of the register.

C.1 How will the register be established?

The AEC has proposed the creation of a new category of registered participant under the NER - the demand response aggregator (DRA) - for parties that control demand response and behind-the-meter generation at a connection point.

The register of demand-side capabilities of DRAs, deemed the "Connection Point DRA Register" by the rule proponents, would be established and maintained by AEMO using information provided by DRAs.

It is important to note that registration of existing demand response activities at a connection point would not be mandatory. This means that existing demand response arrangements could continue to operate under the existing framework as a commercial matter between a customer and its FRMP, without registering notice of the arrangement with AEMO.

C.2 What will be included in the register?

The AEC has proposed that the register of demand-side capabilities of DRAs include the following information:

- each connection point for which a DRA has voluntarily elected to notify AEMO of the DRA's involvement in a demand-side activity - for simplicity a maximum of one DRA could be registered for each connection point at any given time
- the identity of the DRA for that connection point - this could be the same party which acts as the FRMP for that connection point, or a third party which has the express informed consent of the customer or the customer's FRMP (where the FRMP has the authority to provide consent on the customer's behalf).

FRMPs would be able to access from the register the name of the DRA (if any) in relation to their NMIs and any NMIs they are potentially acquiring. However, FRMPs would not have access to any other demand response-related information in relation to a particular NMI.

C.3 What are the obligations associated with the register?

This section sets out the different obligations that would be imposed on various parties as a result of the establishment of the proposed register.

AEMO

AEMO would be required to maintain the register of the demand-side capabilities of registered DRAs.

AEMO would also be obliged to consider the likely contribution of demand response as determined with regard to the register in its projections of system availability and other forecasting reports, such as the Electricity Statement of Opportunities and the Integrated System Plan.

DRAs

As mentioned, registration of a demand-side activity at a connection point with AEMO by a DRA would be voluntary.

DRAs which elect to participate in the register would also be required to participate in the spot market as scheduled loads. The AEC has proposed two options to facilitate this:

- All loads registered with a DRA could be classified as scheduled loads, which obliges the DRA to continuously provide short and long-term availability information to AEMO and to bid and re-bid their behaviours to the same level of transparency as scheduled generators.
- Alternatively, loads registered with a DRA could remain dormant until the DRA intends for the loads to be active in the market, or a Lack of Reserve Notice is issued by AEMO, at which time the DRA would be required to participate in the spot market as a scheduled load for the relevant period. This means the DRA would only incur the compliance burden associated with being a scheduled load during the relevant period.

The AEC has suggested that the compliance burden of the second option would only be marginally less than that of the first option, given that a DRA would be obliged to have the systems and processes in place to participate in the market regardless.

DRAs would also be required to demonstrate that they have exercised their demand response arrangements at least once every financial year for each registered connection point for which a demand response arrangement has been in place for at least six months. This is intended to prevent anti-competitive behaviour by DRAs, including, for example, DRAs registering demand response arrangements for connection points where they do not regularly exercise those arrangements.

FRMPs

The key purpose of the register, namely to facilitate the negotiation of agreements to provide demand response in the NEM, is underpinned by the following obligations which would be imposed on FRMPs:

- Where a customer who is already participating in demand response changes FRMP, the new FRMP would be required to accept the previous FRMP's DRA arrangements or negotiate changes to DRAs and associated agreements in good faith.
- Where a customer who is already participating in demand response intends to change demand response arrangements and has provided written notice of this intention to their FRMP, the FRMP would be required to negotiate changes to DRAs and associated agreements in good faith.
- Where a customer who is not participating in demand response intends to enter into a demand response arrangement and has provided written notice of this intention to their FRMP, the FRMP would be required to negotiate in good faith with prospective DRAs.

The AEC considers that this framework would provide greater certainty about the governance of demand response in the NEM compared to the status quo, particularly in relation to the continuity of demand response arrangements where a customer changes retailer, thereby increasing the incentive for DRAs to identify and engage with potential customers.

Conseqently, the AEC considers that this framework would overcome the barriers faced by third parties looking to facilitate wholesale demand response and result in greater amounts of demand side participation in the wholesale market.

However, the framework proposed by the AEC would only require FRMPs to negotiate demand response arrangements with DRAs in good faith. This would not impose any binding obligation on an FRMP to come to an agreement with a DRA following a negotiation. The FRMP would still retain the discretion to require changes to existing agreements or to not enter into a new demand response arrangement with a DRA. The proposal notes that:

- An FRMP would not be obliged to honour commitments made by the customer's previous FRMP to a DRA if doing so would be materially inconsistent with the new FRMP's business strategy, systems or processes.
- When negotiating revised arrangements with a new DRA, the FRMP would be entitled to consider material changes to its bargain with the customer, under the principle that the FRMP should be kept whole from any variation.

The AEC has proposed that any disputes arising from such negotiations be dealt with in accordance with the dispute resolution framework in Chapter 8 of the NER.

Where FRMPs and DRAs are able to negotiate a demand response agreement, the agreement would need to deal with certain issues prescribed by the NER and potentially the NERR, including, for example, the measurement of energy consumption, the activation of demand response and operational control over a customer's energy supply.

AEMC

The rule change proponents have suggested that the AEMC conduct a market review three years after the rule change takes effect to assess whether the new framework is working as intended.

QUESTION 23: WHOLESALE DEMAND RESPONSE REGISTER MECHANISM

1. What are stakeholder views on this option to facilitate demand response?
2. What do stakeholders consider the benefits of this option would be?
3. What do stakeholders consider to be the costs associated with this option?
4. Are there any implications (regulatory or otherwise) that are not raised in the discussion of this option?

C.4 Extensions to AEC proposal

In its rule change request, the AEC noted that it expected a range of standardised contracts to be developed for different services, emerging from repeated market experience.[80] The Commission has extended this idea and proposed two alternative approaches that may facilitate the intent of the AEC's proposal while minimising some of the associated challenges. The Commission notes that these alternatives would also impose costs in implementation.

These alternative proposals both set out an obligation on retailers to offer a standard retail tariff, at prices determined by each retailer:

- a standing wholesale demand response offer
- a wholesale price pass through tariff.

These proposals may have the benefit of reducing the extent of some of the challenges associated with the wholesale demand response register. Namely, they may provide an avenue for a customer to change retailers and maintain a relationship with the incoming retailer that faciliates wholesale demand response but in a more transparent manner with lower transaction costs. Instead of relying on negotiations between the incoming retailer and the demand response aggregators, the consumer would be able to sign up to an established, standardised retail tariff offered by the incoming retailer and maintain the provision of wholesale demand response.

The two alternative proposals are set out in more detail below.

C.4.1 Standard wholesale demand response offer

This section sets out a proposal which would build on the wholesale demand response register mechanism proposed by the AEC. In order to supplement the register and increase its utility, a standard contract could be developed which sets out the terms of engagement between a demand response provider, a retailer and a customer. Developing such a standard contract and making it available to these parties could reduce transaction costs and simplify the negotiation process where customers are changing retailers.

Overview of the proposal

80 AEC, *Wholesale demand response register mechansim - rule change request*, p. 4.

There would be a number of relevant considerations in implementing this proposal, particularly in relation to the role of the standard demand response contract and the extent to which DRSPs and retailers have to offer demand response to customers in accordance with the standard contract. There is a spectrum of options available in this regard, ranging from mandating that retailers offer a specific form of demand response contract to customers and demand response providers, to simply making the standard demand response contract available as a tool to facilitate negotiations (without mandating its use or adoption). These options are discussed in more detail below:

1. **Mandating that retailers must offer demand response contract to customers:** If a customer requests demand response arrangements on the standard terms and conditions the retailer would not be able to refuse the request. The standard demand response contract would therefore operate in a similar way to the model terms and conditions for standard retail contracts and deemed standard connection contracts, which are set out in Schedules 1 and 2 to the NERR. The standard demand response contract could also be periodically reviewed to assess whether changes to the terms and conditions are necessary. Retailers would still be able to make alternative demand response offers to customers (similar to market retail offers). A variation of this approach is currently being considered in the European Union (EU). The EU proposal seeks to ensure that electricity consumers are able to freely choose and change demand response aggregators, are entitled to a dynamic price contract and are able to engage in demand response.[81]
2. **Developing the standard demand response contract as a facilitatory tool:** No obligations would attach to the use of the standard demand response contract. The contract would be published as a tool to assist retailers, DRSPs and customers who wish to engage in demand response. However, these parties would also be free to negotiate different terms and conditions and the retailer would not be required to make an offer to the customer. Under this approach, the standard contract would likely be most useful for small customers, demand response providers and retailers who lack the resources of larger market participants.

The role of the standard demand response contract could also sit somewhere in between the above options. For example, the use of a standard contract could be a pre-requisite for participation in the wholesale demand response register.

How the proposal would address the issues raised in the rule change requests

This proposal could be implemented in conjunction with the wholesale demand response register proposed by the AEC. It would therefore address the issues raised in the AEC's rule change request, including third party demand response providers' concerns about the continuity of their arrangements with customers where the customer changes retailer, while also providing increased transparency of demand response arrangements and facilitating demand response for market participants that would benefit from the adoption of standardised terms and conditions.

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81 European Commission, *Directive of the European Parliament and of the Council on the common rules for the internal market in electricity*, 2016/0380, 30 November 2016.

Impact on market participants

The level of impact on market participants would depend on the approach taken to implementing the standard demand response contract and the extent to which its adoption by retailers is mandated (as discussed above).

Mandating that retailers offer demand response on the standard terms and conditions would impose implementation costs on all retailers. This approach may also incentivise competition between retailers in developing non-standard or "market" demand response offers.

Alternatively, developing the standard demand response contract purely as a facilitatory tool would be unlikely to have a significant impact on market participants, given that no obligations would attach to the standard contract.

C.4.2 Mandatory wholesale price pass through offer

This section sets out another proposal for how to facilitate wholesale demand response. Similar to the above proposal, this would require each electricity retailer to offer retail contracts that directly pass through the wholesale cost of electricity.

This proposal would provide consumers with greater opportunity to self-manage the wholesale market risk, regardless of the retailer they have elected to engage with. If they wanted to, consumers would then be able to engage a third party to help them manage this risk through various means, including demand response.

Overview of the proposal

The proposal would require each retailer to offer a tariff that passes through the real time wholesale electricity price. The retail tariff would also encompass all the other components of a retail bill, including (but not necessarily limited to):

- network charges
- environmental charges
- costs associated with maintaining consumer protections
- costs associated with meeting prudential requirements
- the retailer's margin.

There would be no obligation on a consumer to sign up to this spot-price pass through tariff. However, it would allow consumers to opt to self manage the wholesale market risk in the wholesale market or outsource this to a third party. It would also allow consumers to change retailers, or remain with a preferred retailer, and maintain access to price signals in the wholesale market.

Retailers would still need to cover prudential arrangements, consumer protections and billing and settlement functions. Retailers would be able to do so in a manner that is consistent with their current approach but would also do so in a way that minimises the cost of providing these services.

This proposal would effectively allow consumers to unbundle management of variable wholesale prices from the other functions traditionally undertaken by a retailer. It would allow

for multiple approaches to managing risk management for consumers, including but not limited to:

- undertaking wholesale demand response
- utilising embedded generation
- the use of financial products.

How the proposal would address the issues raised in the rule change requests

This proposal would provide all consumers with the opportunity to unbundle the management of wholesale price risks associated with participating in the wholesale market from the other functions traditionally undertaken by a retailer. Broadly, this would result in consumers entering into one of two types of arrangements with their retailers:

- consumers that elect to have retailers supply their energy at a price that does not reflect the real time changes in the wholesale price, and for whom the retailer plays the traditional risk management role
- consumers that elect to manage the volatility of the wholesale price either by themselves or through a third party, and for whom the retailer plays the remaining non-risk management roles currently traditionally undertaken by a retailer.

This proposal would not necessarily improve the transparency of wholesale demand response. This could partially be addressed through AEMO's demand side participation portal or through a separate mechanism to elicit price responsive intentions from currently unscheduled demand side resources.

We also note that it is possible under the current arrangements for retailers to offer wholesale price pass through. Amber Electric and Flow Power are two examples of retailers that offer wholesale price pass through (more detail on this is provided in chapter 5).

Impacts on market participants

This proposal would impose some implementation costs on retailers. Retailers would need to develop billing and settlement systems that facilitate spot price pass through arrangements.

It would also facilitate retail competition for services outside wholesale price risk management. For example, retailers would compete for customers on their ability to provide remaining the suite of retail services.

This proposal would also lead to increased demand for third parties with the ability to manage wholesale exposure for consumers. This would include parties who are equipped to undertake wholesale demand response, but also parties who offer services through embedded generation or derivative products.

QUESTION 24: STANDARD WHOLESALE DEMAND RESPONSE OFFER AND MANDATORY WHOLESALE PRICE PASS THROUGH OFFER

(a) What are stakeholder views on these options to facilitate demand response?

(b) Do stakeholders consider these options to be preferable to a wholesale demand response register?

(c) Do stakeholders consider these options to be complementary to a wholesale demand response register?

D LOAD SHEDDING COMPENSATION MECHANISM

This appendix introduces and explores another possible option that may help to incentivise an efficient level of demand response, and so promote the long term interests of consumers with regard to the price and reliability of electricity.

The Commission considers this mechanism could complement other changes to the regulatory framework to enable consumers to undertake demand response. We are seeking stakeholder views on this mechanism.

The "load shedding compensation mechanism" (LSCM) would require retailers to provide compensation to their customers (i.e. end consumers) in the event that those customers are involuntarily load shed because there is insufficient generation to meet demand. In turn, this would place more of the risk of load shedding in the hands of retailers rather than consumers, who may be better placed to manage that risk (through, for example, contracting for additional generation capacity or demand response). In turn, less reliance may need to be placed on the RERT to manage reliability, replacing a risk for retailers which is currently unhedgable with a risk which is hedgable through existing NEM and contract market mechanisms.

This appendix discusses:

- the possible issues that the LSCM is attempting to address
- how the LSCM might address those issues
- some details of how the LSCM might work in practice
- links between the LSCM and the proposed wholesale demand response mechanism
- possible benefits and issues of the LSCM.

D.1 Possible issue due to the allocation of the risk of load shedding

Retailers typically enter into retail contracts with end consumers for the delivery of an unknown quantity of electricity at a price which does not vary dynamically with the wholesale market spot price.[82] As a result retailers take spot price risk, arising from the difference between the spot price (highly variable) and the retail price (typically largely fixed). Retailers then manage this risk by entering into financial hedging contracts (or vertically integrating) with generators or demand respond providers (or financial intermediaries). In turn, these entities manage the risk of their own contractual positions through the physical provision of generation or demand response. As described in the reliability frameworks review, the financial contract market is therefore a crucial mechanism through which generation and demand response capacity is provided and hence a reliable supply of electricity is delivered to consumers.[83]

82 While fixed price retail contracts are typical, particularly for residential and other small consumers, not all customers have this type of arrangement. All customers, particularly large customers, can and do enter into retail contracts where the price varies dynamically, for example spot price pass through contracts.

83 AEMC, *Reliability frameworks review - final report*, July 2018 pp. 16-17; *Reliability frameworks review - interim report*, December 2017, pp. 79-100.

No electricity system can guarantee that there will be zero unserved energy (USE), as this would require sufficient generation to be available at all times to meet any conceivable level of demand. Instead, the NEM has a reliability standard of a maximum expected USE in a region of 0.002% of the total energy demanded in a region for a given financial year.[84] The Reliability Panel then recommends the appropriate level for the market price cap and other reliability settings with regard to that standard. The market price cap limits retailers' and generators' spot price exposure, and so limits their incentives to contract for, and invest in, generation capacity.

When load shedding occurs for reliability reasons,[85] the spot price rises to the market price cap,[86] but retailers are not liable for the electricity that would otherwise have been consumed by their customers. Consumers, not retailers, bear the risk of load shedding for reliability reasons through the loss of value that they would otherwise derive from the consumption of electricity (e.g. not being able to produce widgets or heat homes).

Retailers take account of their expected exposure to the spot price when determing their contractual positions.[87] Retailers are not exposed to the spot price for load that is shed. This in turn may be resulting in inefficent under contracting for demand response or generation because retailers may have a financial incentive to hedge only their expected exposure (ie, the expected load served) rather than the level of demand including USE. By not contracting for as much generation or demand response than would otherwise be the case, the overall level of reliability may be inefficiently reduced.

D.2 How the LSCM addresses this issue

Under the LSCM, in the event of involuntary load shedding as a result of reliability issues (i.e. a lack of supply to meet demand), retailers would be exposed to the volume of load that it would otherwise have purchased, at the market price (the MPC).[88]

This would shift risks of load shedding from consumers to retailers, who may be better placed to manage it than end consumers because they are better able to participate in risk management activities such as entering into financial contracts with generators or demand response providers. In order to manage these risks, it is likely that retailers would choose to contract more with generators and demand responders to manage the risk, which lessens the probability of load shedding since there would be more resources avaliable in the market.

Since the risks of load shedding would now be on retailers, there would be additional costs placed on these parties through having to enter into more contracts. As a consequence of the increased cost of entering into additional hedging contracts, it might be expected that retail prices go up if the reliability settings such as the market price cap remain unchanged. It may

84 NER, clause 3.9.3C.

85 The Commission notes that the significant majority of unserved energy experienced by consumers is caused by outages in the networks supplying consumers. Based on Commission analysis, only 0.23% of all supply interruptions between 2007-08 and 2016-17 resulted from reliability related events.

86 NER, clause 3.9.2(e)(1).

87 The retailer reliability obligation, if implemented, would also require retailers to hold contracts or invest directly in dispatchable energy or demand response to meet demand.

88 Clause 3.9.2(e)(1) of the NER.

therefore be appropriate that the market price cap is reduced, to counteract this effect, with the intent of reducing prices for any given level of reliability.

> QUESTION 25: ISSUE ADDRESSED BY LSCM
>
> (a) Do stakeholders agree that reliability related load shedding inefficiently allocates risks to end consumers? Does the proposed LSCM address this issue?
>
> (b) Would a LSCM facilitate greater levels of wholesale demand response?

D.3 How the LSCM might work in practice

In the event of reliability related load shedding, a baseline would be used to determine the amount of electricity expected to be consumed by a consumer were it not for the load shedding. As with wholesale demand response mechanism, estimating the baseline would be key challenge, although arguably it would be less challenging for the LSCM because:

- end consumers are unlikely to attempt to manipulate the baseline for the unlikely prospect that their load is shed
- it may not be necessary to determine the amount that would have been consumed by each individual consumer whose load is shed. Instead, it may be appropriate to estimate the total shed behind a feeder. However, unless consumers were provided with an averaged level of compensation, individual baselines may be required to apportion the compensation to individual consumers.

Retailers would be settled on the baseline quantity of electricity, at the spot price (MPC). The actual amount of electricity delivered multipled by the spot price (MPC) would go to generators (as is the case currently), while the difference between the actual and baseline amount multiplied by the spot price (MPC) would be provided to the end users whose load was shed, perhaps through a reduction in the next bill from their retailer.[89] Each consumer behind a particular feeder might be compensated the average amount related to that feeder, or a more sophisticated division of compensation could be used.

The LSCM would not compensate consumers for non-reliability related outages such as outage resulting from network failures. Non-reliability related outages constitute the vast majority of supply interruptions experienced by consumers.

D.4 Relationship to proposals set out in the rule change requests

In effect, the LSCM is a compulsory payment to customers in the event of reliability related load shedding. It would operate in a manner that has some similarities to the wholesale

89 Strictly, the consumer should continue to pay the retail tariff for the energy it did not consume. The *net* compensation per unit of electricity not delivered would therefore be the difference between the market price cap and the retail tariff. Given the market price cap is several orders of magnitude greater than a typical retail tariff, the net level of compensation is likely to be considerable. The AEMC crudely estimates approximately $10/peak-half-hour for a typical household.

demand response mechanism. A comparison of the two options is provided in Table D.1, with differences highlighted in bold.

Table D.1: **Comparison of LSCM and the wholesale demand response mechanism**

WHOLESALE DEMAND REPONSE MECHANISM	LSCM
A regulatory body estimates the demand that would have occurred were it not for the **voluntary** demand response (the baseline)	A regulatory body estimates the demand that would have occurred were it not for the **involuntary** load shedding (the baseline)
Payment made by retailer to **demand response providers** (customers or their agents), equal to spot price times the difference between actual and baseline	Payment made by retailer directly to **involuntary load shed consumers** equal to spot price (equal to MPC) times the difference between actual and baseline

As noted earlier, this LSCM proposal may complement the intent of the demand response proposals and provide greater incentives for retailers to undertake wholesale demand response where it is efficient to do so.

D.5 Possible benefits and issues of the LSCM

As noted above, the LSCM provides an incentive for retailers to manage the risk of load shedding. By managing the risk better than end consumers, this may deliver a more efficient level of generation and demand response and so a more efficient level of reliability, or allow for a reduction in prices for a given level of reliability. This would be consistent with the NEO: the long term interests of consumers, in this case with respect to the price and reliability of electricity.

There are a number of possible issues with the LSCM that would need to be carefully considered. These include:

- As is the case with the wholesale demand response mechanism, errors in the baseline would result in inefficient incentives for retailers, although there may be a lower risk of systemic bias in LSCM baselines compared to demand response baselines.
- It would have to be possible to accurately distinguish between load shedding as a result of wholesale market reliability and other causes of load shedding, such as network outages or system security events. Retailers should not be liable for any risks that they themselves cannot manage.
- In the current arrangements, there is nothing stopping retailers providing compensation to end consumers in the event of load shedding. Arguably, provided the retail market is sufficiently competitive, retail offerings which provide compensation in the event of load shedding should emerge, to the extent that consumers value it and are willing to pay for it through an increase in tariffs. This would suggest a regulatory solution to this issue may not be necessary.

There would also be costs associated with settlements and systems changes associated with this option that would need to be considered.

The introduction of an LSCM would have consequential impacts on other aspects of the frameworks underpinning power system reliability in the NEM:

- The market price cap: As noted above, it may be appropriate for the MPC to be adjusted downwards given the expected higher level of reliability delivered for any given MPC under the LSCM.
- The RERT: Providing the level of compensation for consumers was set at the value of consumer reliability (i.e. providing the market price cap was set at the value of consumer reliability), consumers would be indifferent between having their load shed (with compensation) and continuing to have access to electricity.[90] Implementing the LSCM may allow for less reliance to be placed on the RERT. Retailers would be able to manage the risk of the LSCM through contractual positions, unlike the RERT, which is an unhedgable risk to retailers. In addition. retailers, and not the market operator through the RERT, would be managing the risk of load shedding. Retailers would have financial incentives to manage the risk efficiently, and, to the extent that they do not, it is they and not consumers who bear the cost.
- The reliability standard: Under the LSCM, retailers would be incentivised to deliver the lowest cost combination of generation, voluntary demand response and compensation for involuntary load shedding. This in turn should deliver the level of unserved energy that minmises the combined cost of load shedding, demand response and generation. This could effectively deliver the optimal amount of unserved energy. The implications for the reliability standard would require further thought.

QUESTION 26: BENEFITS AND ISSUES OF AN LSCM

(a) Do stakeholders agree with the outline of the benefits and challenges associated with the introduction of an LSCM?

(b) What other issues would need to be considered?

90 The level of compensation can never equal the value that each individual consumer places on the supply of electricity at any given time. Nevertheless, a level of compensation which approximates most consumers' value of reliability may represent an improvement on the status quo.