AEMO
AUSTRALIAN ENERGY MARKET OPERATOR

Wholesale Demand Response: High-level Design

March 2020

High-Level Design to Support AEMC Draft Determination

Important notice

PURPOSE

AEMO has prepared this document to provide information about the potential design of AEMO processes and systems to support the proposed introduction of a Wholesale Demand Response (WDR) Mechanism. The design has been prepared based on assumptions that have been confirmed with the AEMC, and which are set out in Section 1.3. AEMO may choose to make a submission to the draft determination should ongoing analysis result in policy considerations that may improve the implementation and operation of the rule change.

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VERSION CONTROL

Version	Release date	Changes
1.1	12/3/2020	Correction to Table 2 Example of settlement inputs during a demand response interval
1.0	12/3/2020	Initial version to be read in conjunction with March 2020 AEMC's WDR draft rule determination

Executive summary

Introduction

As part of the second draft determination process, AEMO has worked with the AEMC to provide informed advice on key design and implementation aspects of the proposed Rule change[1] (proposed Rule) to implement the wholesale demand response mechanism (WDRM) in the National Electricity Market (NEM) in a cost- and time -efficient manner.

This high-level design (HLD) document is published by AEMO and accompanies the AEMC's March 2020 draft determination. It is intended to provide guidance and act as a point of reference for industry on implementation and operational considerations which will underpin the operation of the WDRM in the NEM. Stakeholders may choose to refer to this document during the consultation or when making a submission as part of the AEMC's consultation process on the second draft determination.

The specific objectives of the document are to:

- Enable market participants and other affected stakeholders to evaluate the system, process, and operational changes they may need to make, quantify the associated one-off and ongoing costs, and provide feedback as part of their submissions to the draft determination.
- Detail AEMO's main system and market operator criteria which are required to give effect to the mechanism, for the AEMC's consideration when determining the most appropriate effective date, eligibility criteria, and other aspects of the rule change.
- Advise and provide information to the AEMC in respect of AEMO's understanding of the draft rules that will be provided along within the draft determination.

The HLD has been determined given a set of base policy requirements as outlined in Section 1 of this document, and through a process of discovery and collaboration with the AEMC on their intentions with respect to the draft determination.

AEMO may also seek to make a submission on the second draft determination as part of the consultation process.

Objective

The objective of the HLD is to meet the requirements of the AEMC's proposed Rule, as understood by AEMO, and simultaneously seek to minimise cost and shorten implementation timeframes. This allows for the most cost-effective solution to meet the AEMC's policy goals ahead of transition to a two-sided market framework for demand side participation.

Design priorities

The following HLD elements have been key in meeting AEMO's objectives:

- A third-party registered participant to engage one or more end users to provide wholesale demand response.
- Wholesale demand-responsive capability registered into the market.
- Wholesale demand response participation in dispatch through standard bidding and dispatch processes.
- Wholesale demand response telemetry and metering requirements for system operations and visibility.
- Wholesale demand response visible to market participants and AEMO.

[1] See https://www.aemc.gov.au/rule-changes/wholesale-demand-response-mechanism.

- Simple baseline methodology, with a level of parameterisation, for the start of the WDR mechanism.
- Wholesale demand response included in market recovery and compensation mechanisms (for example, ancillary services) where cost-effective and logical to do so.
- Accommodation of wholesale demand response within short-term and pre-dispatch forecasting processes.
- Performance assessment and compliance based on the available data.

Implementation

The HLD solution for the WDRM has been developed to minimise cost by leveraging the existing functionality of a 'normally on'-scheduled load in dispatch processes. By minimising the scope of changes required in dispatch and forecasting systems to effect the WDRM, the HLD allows an October 2021 start date to be achieved.

Implementation changes include:

- Registration – Demand Response Service Provider (DRSP) registration and wholesale demand response unit (WDRU) classification, including portfolio management to track aggregations of WDRU, demand response capacity, and eligibility status.
- Settlements – calculations and financial flows at the single WDRU (that is, National Metering Identifier [NMI]) level to allow recovery of demand response from the financially responsible market participant (FRMP).
- Baselining – eligibility criteria and baseline methodology to allow establishment of the counterfactual against which demand response settlement can occur for both the DRSP and the FRMP.
- Prudentials – management of DRSP prudential risk through the standard collateral requirements setting and prudential processes.
- Dispatch and forecasting – dispatching, pre-dispatch, and short term forecasting of WDRU energy to occur primarily through existing scheduled load functionality.
- Demand side participation – DRSP data requirements in the medium term forecasting timeframes to be delivered through the demand side participation information portal.
- Retail Systems – DRSP role to be included in retail systems and B2B transactions to be made visible to DRSPs.

A new system for portfolio management is required. The implementation of this HLD is delivered through changes to existing systems and the development of new interfaces. AEMO estimates its cost of implementing the WDRM based on this HLD as $13 million to $17 million.

Contents

1. Context for design

1.1 Context of demand response within the current framework

When considering the conceptual interaction and engagement of the demand side in electricity markets, demand can potentially participate both:

- On the demand side (as passive price-taker load, price-responsive load, or scheduled load), and
- On the supply side (in the form of selling 'negawatts' for a demand reduction, or bidding in supply).

The participation of the demand side as a 'response' to wholesale electricity prices is an aspect of the market framework which has seen limited engagement and evolution since the inception of the National Electricity Market (NEM).

Methods by which the demand side actively engages within the current framework can be broadly categorised into:

- Arrangements such as directly participating in the market as a scheduled load, or
- Arrangements provided through a retailer, network service provider, or AEMO as the system operator. For example, retailers may facilitate their customers entering into a pool pass through retail contract or may directly contract with customer load through bi-lateral agreements. Networks may enter bi-lateral agreements and contract demand response to manage network constraints or send signals to encourage behavioural-based response through peak-pricing network tariffs. AEMO as the market and system operator may sign emergency reserve (RERT) contracts with demand response resources for the provision of capacity to reduce demand in emergency conditions.

1.2 Context of this design

This high-level design (HLD) describes how AEMO will operationalise the wholesale demand response mechanism (WDRM) described in the AEMC's draft determination published March 2020.

This HLD is made in the context of an AEMC consultation on three Rule change proposals received by the AEMC in 2018 regarding the incorporation of demand response in the NEM's wholesale electricity market[2].

Further to the AEMC's publication of a draft determination in July 2019[3], in November 2019 AEMO provided supplementary information to the AEMC to advise that a simpler and more cost-effective design should be pursued to deliver a mechanism for demand response to participate in the wholesale electricity market in an earlier timeframe compared to design contemplated in the draft determination.

On 4 December 2019, the AEMC extended the timeframe for the final determination. This HLD achieves many of the core objectives of the AEMC's original draft determination, while adjusting certain design parameters to deliver earlier implementation and operational efficiencies.

1.3 HLD priorities and constraints

The following operational priorities and constraints have guided AEMO's development of the WDRM HLD to incorporate demand response within the NEM's wholesale electricity market. These considerations are important to contextualise the introduction of the mechanism within the current NER framework while

[2] See AEMC, Wholesale Demand Response Mechanisms, Consultation Paper, 15 November 2018, at https://www.aemc.gov.au/sites/default/files/2018-11/Consultation%20paper.pdf.

[3] See AEMC, Wholesale Demand Repose Mechanism, Draft Rule Determination, July 2019, at https://www.aemc.gov.au/sites/default/files/2019-07/Draft%20determination%20-%20ERC0247%20-%20Wholesale%20demand%20response%20mechanism.pdf.

affording suitable consideration to parallel design work underway by the ESB to support a two-sided market design, described further in section 1.4.

These operational priorities and constraints are to:

- Design, build and operate a mechanism which can be in place prior to summer 2021.
- Leverage AEMO's existing systems and processes as far as practicable, while enhancing functionality through prudent capital and ongoing operational expenditure where required.
- Develop a mechanism which is operationally efficient and maintainable for both AEMO and market participants.
- Deliver value and confidence by developing a mechanism which can provide the market assurance of the introduction of demand response (visible and verifiable).
- Provide a level of flexibility within the mechanism, via procedures and operational design, to adjust and amend operational aspects of the mechanism as participation in the mechanism changes and while demand response levels are revealed to AEMO and the market.

1.4 WDR in the context of two-sided markets

Concurrent with the introduction of this mechanism, the Energy Security Board (ESB) is undertaking work on the high-level design of a two-sided market. This work is being conducted as part of the ESB's advice on a long -term, fit-for-purpose market framework to support reliability of the NEM. Design work on a two-sided market is continuing throughout 2020 and will feed into the ESB's post-2025 market design project.

The two-sided market would encourage innovation and empower end users to participate in trade with the market. At its core, a two-sided market allows a buyer to procure a service from sellers at a price that reflects the buyer's valuation of that service and the seller's willingness to provide that service. Central to this feature is the ability of an end user to provide bids reflecting their willingness to send out or consume electricity and participate in dispatch as a function of trade taking place.

By enabling avenues for end users to provide their willingness to change their injection or withdrawal patterns in response to a wholesale price signal, end users themselves will be able to make the trade-off between the costs of consuming electricity (withdrawing) and the costs of generating electricity. This presents dual benefits to both the end user (by promoting consumption of electricity at an efficient price) and the market (by reducing the costs of supply).

In establishing this HLD to bring WDRM into the market, it is important to recognise that certain elements of the design may be transitory when considered in the context of the future evolution of two-sided markets. It is likely that the mechanism itself, or elements within it, will need to evolve as technology, innovation, and new business models enable more efficient means by which trade can occur in the NEM. In addition, while concurrent work on the post-2025 market design continues, it is plausible that any change to the framework will bring with it a scale of change which will impact existing or recently introduced mechanisms such as this.

2. WDRM Design

This section outlines AEMO's proposed design for the WDRM, based on the policy considerations outlined in Section 1.

2.1 Overview

The WDRM design allows for a single or an aggregation of demand-responsive, controllable market load connection point(s) within a region to be identified as eligible (a qualifying load), classified, scheduled, and dispatched as a Wholesale Demand Response Unit (WDRU) by a new registered market participant category known as a Demand Response Service Provider (DRSP).

The WDRU has a maximum demand responsive component determined through registration which is scheduled and dispatched through the standard bidding and dispatch processes, in much the same way as a 'normally on'-scheduled load. The maximum demand responsive component of each WDRU is the portion of the load at the connection point(s) which is controllable and able to provide the demand response in accordance with the requirements of dispatch. It may or may not be the total load of the WDRU's connection points.

Figure 1 and Figure 2 provide a conceptual overview of these arrangements.

Figure 1 Conceptual depiction of demand responsive component behind one connection point (CP)

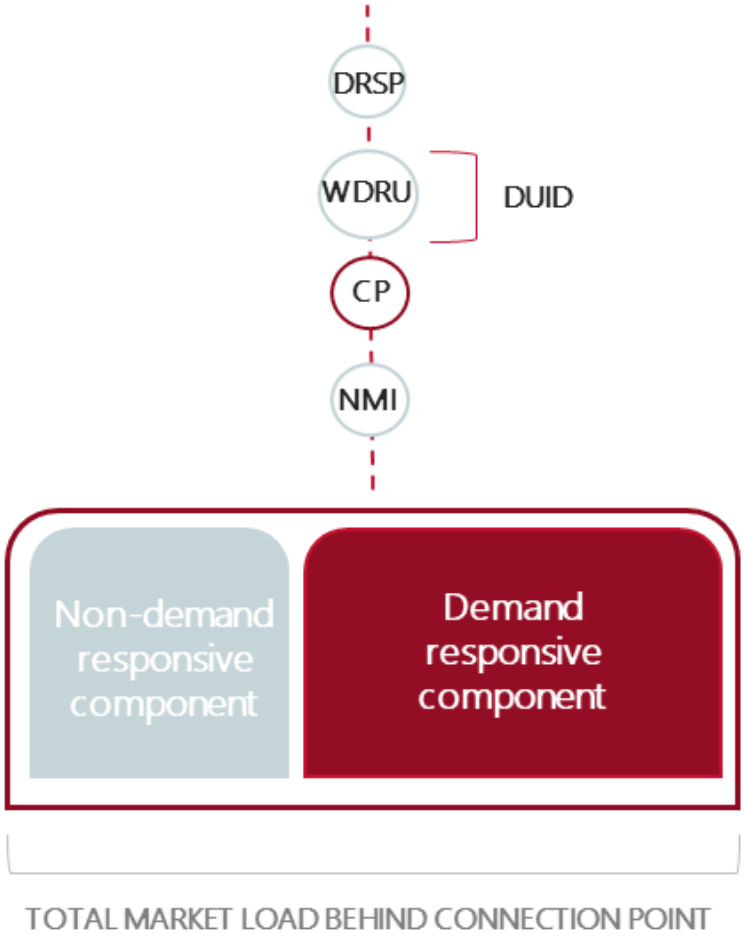
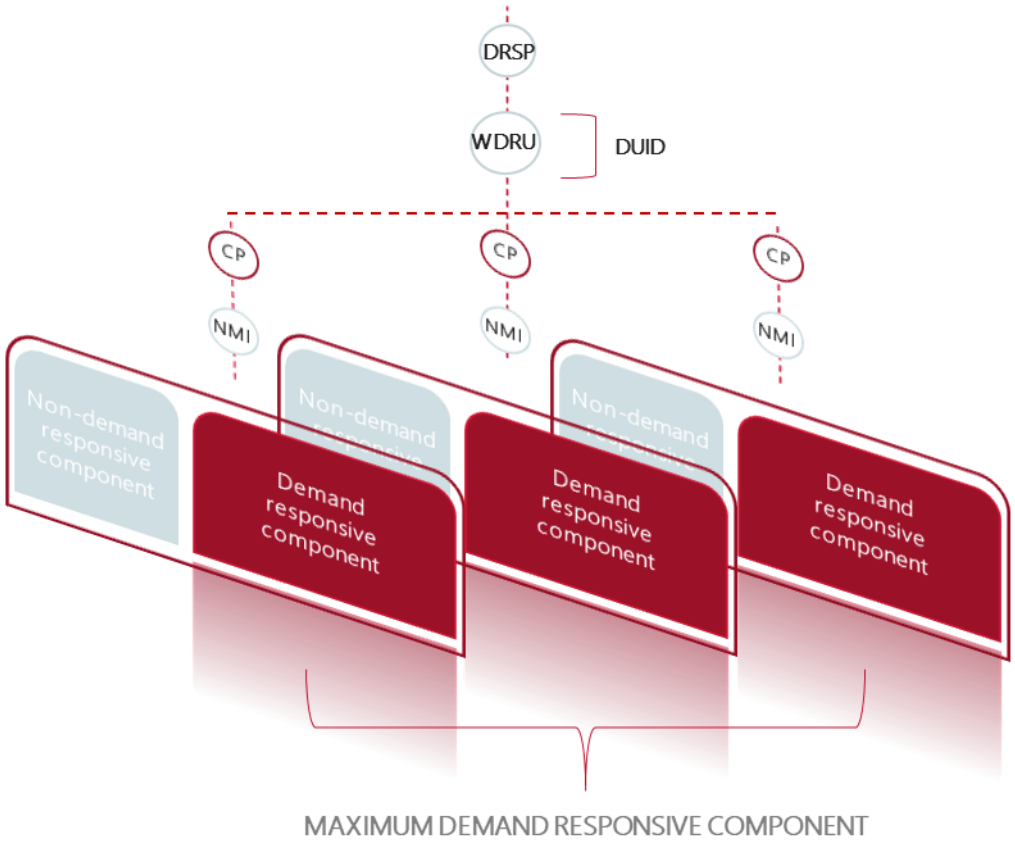


Figure 2 Conceptual depiction of aggregated demand responsive components behind multiple connection points



When the DRSP wishes to provide demand response, typically when there is a high price event, the DRSP will bid in some or all its demand responsive component at the price above which it is prepared to respond. When the market price reaches this bid price, the WDRU dispatched consumption target will reduce accordingly, and the WDRU will need to provide this reduction.

When the DRSP does not wish to provide demand response, it will be required to bid to ensure that the WDRU is being dispatched to consume all its demand responsive component (represented in a bid by maximum availability). This can typically be achieved by bidding the maximum availability, at the market price cap.

The component of the load in a WDRU that is not demand responsive is not subject to dispatch and can vary as it would normally.

When a DRSP has a consumption dispatch target that is less than the maximum availability of the WDRU, then a demand response event will be identified and the DRSP will reduce its consumption to the given target. A demand response event will result in a demand response settlement process. There will also be a post-event assessment of compliance with the dispatch target to ensure the anticipated demand response occurred from the WDRU.

To assess dispatch performance, a counterfactual against which to assess any reduction in consumption is required. This process will rely on the baselining methodology. For transparency, information will be provided to the financially responsible market participant (FRMP) of any WDRU being dispatched below its maximum availability, that is, providing a demand response.

The demand response settlement process requires the establishment of a baseline for each single WDRU (not in aggregate) represented as a National Metering Identifier (NMI) within the retail systems. The settlement process and establishment of a baseline are described in Section 2.2.2 and Section 2.2.3 respectively.

To be classified as a WDRU, a load is required to meet certain eligibility criteria. These include:

- The need to be a market load.
- The need to include a controllable component.
- Metering requirements.
- Telemetry for system operational visibility. Details on telemetry can be found in Section 2.2.5.

The location and size of aggregations within a region have the potential to cause operational issues. AEMO has the right to refuse a given aggregation and require disaggregation for system operation (including operational forecasting) reasons.

The short term projected assessment of system adequacy (ST PASA) and pre-dispatch (PD) processes will be identical to those for a scheduled load. The operational forecasting process will produce regional demand forecasts assuming no demand response event has occurred, by reconstituting the measured demand with the total WDRU dispatched reduction in consumption. The non-demand responsive component of the WDRU will continue to be forecast in the regional demand; it must not intentionally act to counter a dispatched reduction in consumption provided by the demand responsive component of the WDRU but otherwise can operate as normal. There will be no medium term projected assessment of system adequacy (MTPASA) requirements, because these longer--term forecasts for demand response will be served by existing and additional information supplied through the demand side participant information portal.

A DRSP will require access to metering systems and will be included as a new role in the Market Settlement and Transfer Solutions (MSATS) system. No additional transactions will be required for DRSPs, but they will need access to standing data and metering data, and will need to see transactions associated with their loads. AEMO will consult on required changes to the MSATS procedures as part of the transitional arrangements.

A series of reports will be required to support the demand response settlement and baselining outcomes for both the DRSP and the FRMP.

A compliance program for baselining outcomes at the single WDRU used in demand response settlement, and a conformance program for dispatch performance to ensure that the required demand response was provided, will be established.

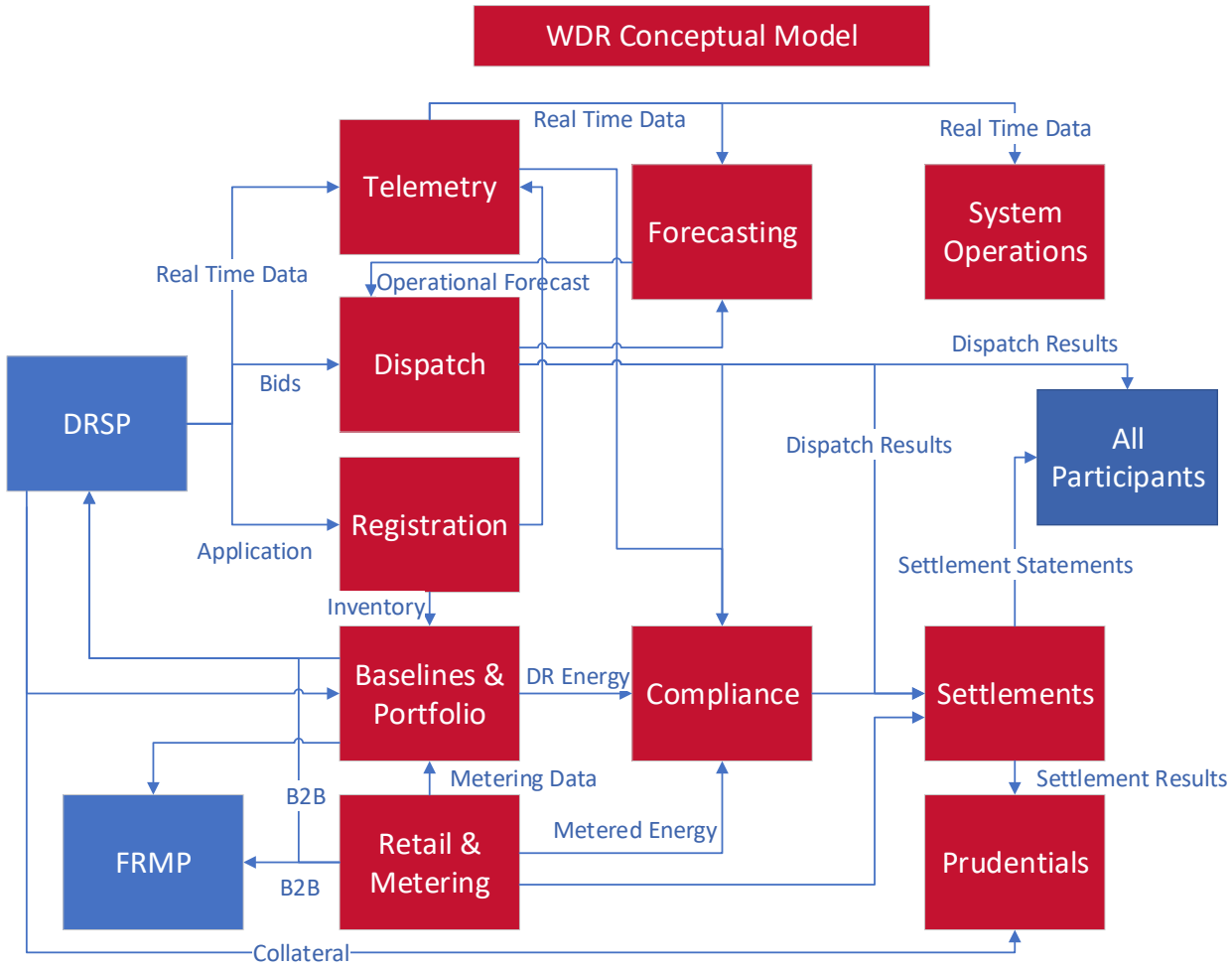
The rest of this section provides detail on the following design elements including process, procedural and system considerations:

- Registration – DRSP registration and WDRU classification.
- Settlements – calculations and financial flows.
- Baselining – eligibility and baseline methodology.
- Prudentials – management of DRSP prudential risk.
- Dispatch/ST PASA/Operational forecasting – dispatching and forecasting WDRU energy.
- Demand side participation – DRSP data requirements.
- Retail systems – include DRSP role.

In developing this HLD AEMO has made a series of assumptions which are subject to change following industry engagement and in particular consultation on procedures and guides in accordance with the NER.

The following diagram shows the data flows between each of the functional areas.

Figure 3 Wholesale demand response functional model



2.2 Design elements

2.2.1 Registration

NEM registration process

Under the proposed Rule, a person wishing to provide wholesale demand response or market ancillary services in the NEM from a market load connection point must register with AEMO as a DRSP and classify the market load as a WDRU and/or an ancillary service load.

As is currently the case under the NER, a Market Customer may also apply to classify a connection point that it has classified as a market load connection point for market ancillary services. However, AEMO will not be able to approve the classification of a load at a connection point as an ancillary services load by one person, if that load has separately been classified as WDRU by a different person.

The DSRP category will replace the existing Market Ancillary Service Provider (MASP) category. The registration procedure, process, and fees payable will be governed by rule 2.9 of the NER.

DRSP capability

An applicant wishing to register in the category of DRSP with respect to WDR must at the same time apply to have a qualifying load classified by AEMO as a WDRU.

A DRSP is a market participant that will be controlling the demand-responsive component of a WDRU that is to be dispatched in real time into the market.

The applicant will need to meet a range of eligibility requirements and demonstrate a range of operational capabilities in common with all other participants taking on this type of role. These include:

- Organisational capability and eligibility as an Australian entity.
- Demonstrable understanding of the bidding and dispatch processes and systems.
- Operational capability including 24/7 coverage.
- Financial capability with processes in place to manage demand response settlement and prudential obligations.
- Appropriate IT access and capability including MarketNet and APIs as required.

Qualifying load eligibility

A DRSP may only apply to have a load classified as a WDRU if it is a qualifying load. A DRSP is responsible for ensuring the load meets the requirements of a qualifying load, including:

- Retail customer consent.
- Type 1 to 4 metering installation.
- Not a scheduled load.
- At a market load connection point.
- Not a small customer load.
- The load can provide a wholesale demand response.

If a load ceases to be a qualifying load, it will no longer meet the eligibility requirements for a WDRU, and cannot participate in dispatch

The WDRM design does not exclude a connection point from participating in WDR where it is capable of providing net generation – that is, export to the grid – from the market load connection point as demand response.

Any generating system that is 5 MW or larger connected to the grid, or which is part of an embedded network which in total is capable of exporting 5 MW at the parent connection point, must be registered or exempted from registration in accordance with AEMO's Guide to Generator Exemptions and Classification of Generating Units[4]. A registered generating system will be connected at a generator connection point and not eligible as a qualifying load.

Aggregation and amending a WDRU

Following registration and classification of the initial WDRU(s), a DRSP may choose to apply to classify further qualifying loads as WDRUs. Under the proposed Rule, a DRSP may apply to have WDRUs aggregated.

AEMO will strive to provide an efficient process for classifying initial and additional loads, extending an existing aggregation under a WDRU or adding a new WDRU. However, the desirability of speed must be weighed up against the technical assessments required to ensure that any decision to classify and aggregate does not put the system at risk. These include:

- All loads are within the same region and are qualifying loads.
- Validation of the level of the demand-responsive component at each connection point and in aggregate (will become registered maximum demand responsive component in MW).
- Appropriateness of the proposed baseline methodology against baseline methodology metrics.
- The DRSP has adequate controls, communications, and telemetry in place.

[4] At https://www.aemo.com.au/energy-systems/electricity/national-electricity-market-nem/participate-in-the-market/registration/exemption-from-registering-as-a-generator-in-the-nem.

- Aggregation is acceptable for system operation and operational forecasting purposes.
- Load has not been classified as a WDRU or as ancillary services load by another Market Participant.
- 5-minute meter data is provided for energy at the connection point to support production of a baseline.

Table 1 Example of information that will be maintained against a WDRU for classification and inclusion in dispatch

WDRU/ NMI	Region	DRSP	Aggregated WDRU / DUID	Max load MW	Max DR Component	Baseline methodology	FRMP	In Dispatch
1	NSW1	DR1	WDRU1	6	2	A	ABC	Y
2	NSW1	DR1	WDRU1	10	8	A	DEF	Y
3	NSW1	DR1	WDRU1	15	10	A	GHJ	Y
4	NSW1	DR1	WDRU1	5	3	A	GHJ	N
Total	NSW1	DR1	WDRU1	31	20	-	-	Y

To perform the registration functions described above, a portfolio management system is to be developed. This system will provide visibility to DRSPs of:

- Their loads aggregated under each WDRU.
- The dispatchable unit identifier (DUID) that represents it in dispatch systems.
- The MW maximum demand-responsive component.
- The status of the WDRU with respect to dispatch.
- WDRU aggregations.

The system will also allow submission of new qualifying loads and updates to existing aggregations.

Registration fees

Registration has a cost for service recovery process. Each application for registration, classification, and aggregation will incur a fee. Review of the current registration fees for MASPs classifying ancillary service load will provide an idea of the level of these costs.

2.2.2 Settlements

Under the proposed Rule, a DRSP participating in the WDRM is required to settle for reduction in consumption against a baseline, participant fees, and registration fees. WDRUs are not included in the recovery of regulation or contingency frequency control ancillary services (FCAS). The cost of implementation to include the DRSP's WDRU in these mechanisms is considered to outweigh the value of the potential recovery from DRSPs, given demand response is only expected to take place during significant high price periods.

Settling demand response

The performance of each WDRU in dispatch against the target consumption (reduction reflecting a demand response) is determined at the aggregate level. Conversely, demand response settlement values are determined at each individual WDRU (NMI) level.

The proposed Rule requires the FRMP, in other words the retailer, at the WDRU to fund the demand response. During a demand response event (represented by a consumption target in dispatch less than

maximum available demand responsive component of the aggregated WDRU), the retailer will be settled with respect to both the energy market settlements (based on metering data) and the baseline energy level. The baseline energy is the counterfactual to the actual metered energy if there had been no demand response. The DRSP will be paid based on the energy difference between the baseline and the metered energy. The metered energy amounts will be loss-adjusted as normal. Demand response settlement amounts will be determined for each trading interval at the regional reference price.

To ensure that the retailer is compensated following a demand response event, there will be a wholesale demand regional reimbursement rate (WDRRR) calculated, which is charged to the DRSP based on the energy difference between the baseline and the metered energy. This amount will be paid to the retailer. The WDRRR is intended to reflect the cost of the electricity the FRMP is liable to purchase in the wholesale market which is not consumed by, and therefore not charged to, the customer.

A demand response event occurs when the WDRU is dispatched at a consumption level below its maximum availability. This will trigger the demand response settlement process. An example of settlement inputs and outputs is provided in Table 2 and Table 3 below.

Table 2 Example of settlement inputs during a demand response interval

NMI	Region	DRSP	FRMP	RRP $/MWh	WDR RRR $/MWh	MWh baseline	MWh metered energy	DR MWh
1	NSW1	DR1	ABC	10,000	1,000	3	2	1
2	NSW1	DR1	DEF	10,000	1,000	5	1	4
3	NSW1	DR1	GHJ	10,000	1,000	7.5	2.5	5
Total	NSW1	DR1	-	-		15.5	5.5	10

Table 3 Example of settlement outputs during a demand response interval

NMI	DRSP	RRP $/MWh X DR MWh	WDRRR $/MWh X DR MWh	FRMP	RRP $/MWh X Baseline MWh	WDRRR $/MWh X DR MWh
1	DR1	10,000	-1,000	ABC	-30,000	1,000
2	DR1	40,000	-4,000	DEF	-50,000	4,000
3	DR1	50,000	-5,000	GHJ	-75,000	5,000
Total	DR1	100,000	-10,000	-	-155,000	10,000

Note: For simplicity the examples above have assumed a 30 minute trading interval, however with 5 minute settlement this will of course transition to 5-minute trading intervals when WDRM comes into effect.

Figures 4 and 5 provide further illustration of the settlement flows under the WDRM.

Figure 4 Wholesale demand response financial flows

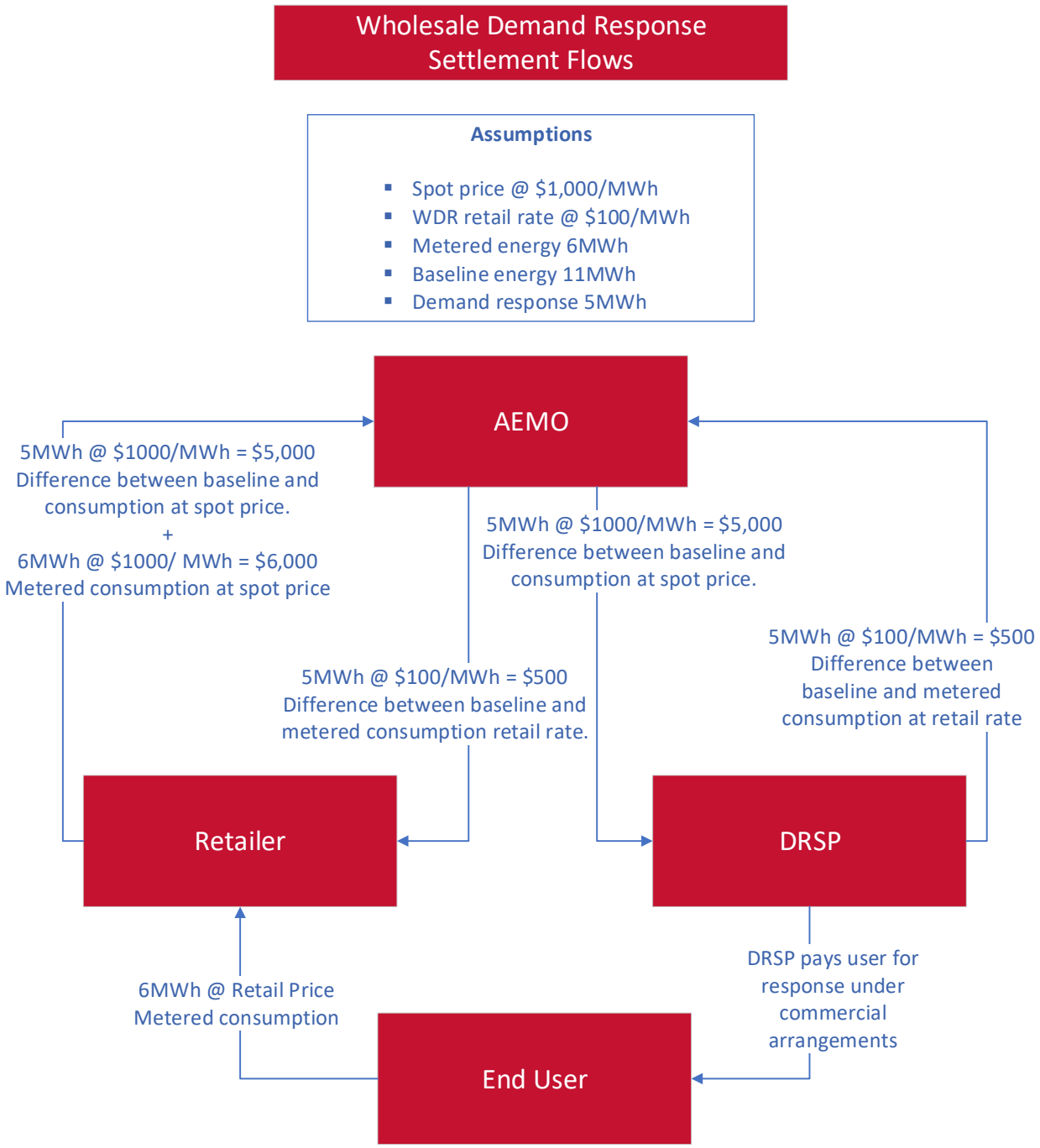
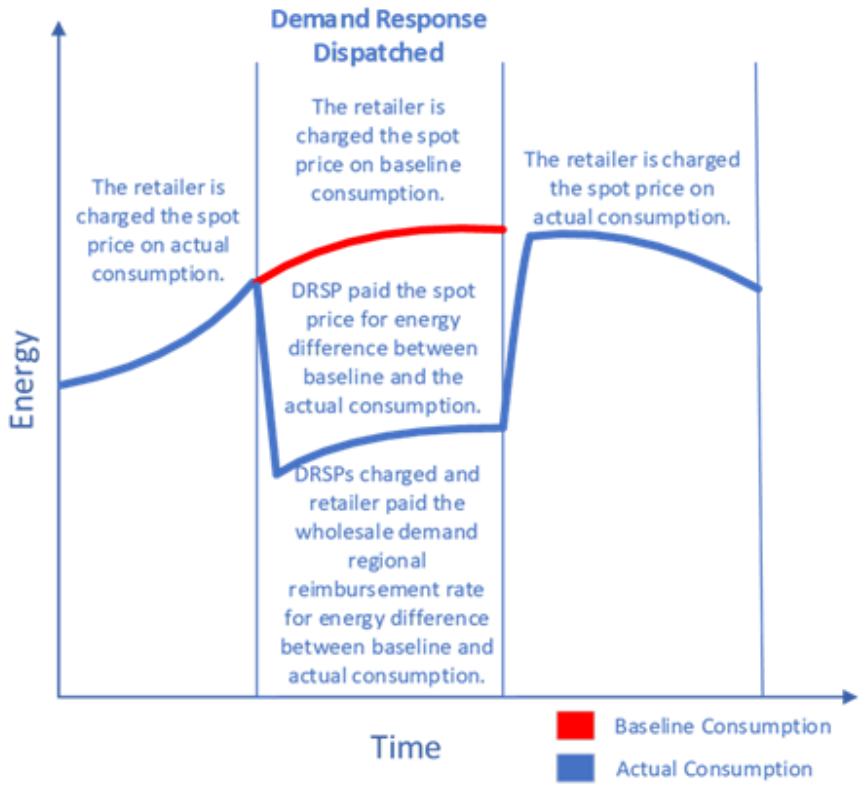


Figure 5 Illustration of demand response financial flows relative to baseline and actual consumption



Settling negative demand response

If the baseline is less than the metered energy for any given single WDRU, resulting in a negative demand response amount at the NMI level, then this results in a payment from the DRSP to AEMO and from AEMO to the retailer.

Settlement in the NEM

A DRSP is a registered market participant and will be required to manage the settlement of any amounts owed or owning in accordance with the established settlement timetable, systems, and processes. This currently involves settlement through Austraclear, with amounts owed being paid by 10.30 am on settlement day. Failure to do so will result, as for all market participants, in a default process being initiated. All DRSPs need to be aware of, and have processes in place so that they can meet, their settlement obligations.

Participant fees

Participant fees are required to recover from each participant their share of the cost of operating the market in which they are participating. Typically, fees are based on the number of connection points, the size of plant, or the energy amounts represented by a market participant providing energy and non-energy services into the market. In 2021, AEMO will run a fee methodology consultation to consider all fees for market participants to ensure best practise cost-to-cause methodologies are in place. This consultation will include the new DRSP participants as appropriate. Once established, fees will be charged through the standard settlement system and process.

2.2.3 Baselining

Baselines are an estimate of the consumption per trading interval during a day, based on a history of like days in the near past. Baselines are required in the draft Rule for two main purposes:

- They are the counterfactual energy amount for each single WDRU that is dispatched individually or as part of an aggregated WDRU for demand response. This baseline is required for demand response settlement.

- They are the counterfactual energy amount for the WDRU that is dispatched for demand response. The aggregate WDRU baseline (or single WDRU baseline if no aggregation) is required to assess performance against dispatch targets.

To minimise cost and time to market, AEMO will most likely develop and implement a single baseline methodology, with a level of parameterisation, for the start of the WDR mechanism. As the implications of a two-sided market, and uptake of demand response becomes clearer, this can be extended as the need evolves in the future.

AEMO intends to perform further analysis on the optimal baselining methodology, and consult with industry on the baseline solution. It is considered likely (but by no means a certainty) that the form of the baseline methodology will be similar to that which has evolved over the last few years to support the Reliability and Emergency Reserve Trader (RERT), and will be based heavily on AEMO's Demand Response Mechanism (DRM)[5] proposals in 2013. Aspects of this methodology are described below.

The selection of a baseline methodology that balances accuracy, simplicity, and integrity will be key to the ongoing success of the WDRM.

Predictability of the load

To take part in WDR, and to have a baseline, the load at the NMI must demonstrate a level of predictability so the baseline can be established against which demand response settlement and dispatch performance will occur.

The predictability of each WDRU load (non-demand-responsive component plus demand responsive component) needs to be tested to ensure it meets the eligibility criteria for participating in the WDRM. Under the proposed Rule, the baseline is set at the single WDRU level for demand response settlement purposes. Predictability of the WDRU's load can be tested by applying the baseline methodology (BM) to a history of days for which a demand response did not occur, and using statistical techniques to ensure agreed accuracy and bias measures are met.

Baselining fundamentals

The following information is provided as an illustration of concepts for baselining. It is not a predetermination of the methodology that will be provided for WDRM; this will be the subject of consultation with industry. The example provided is suitable for weekdays.

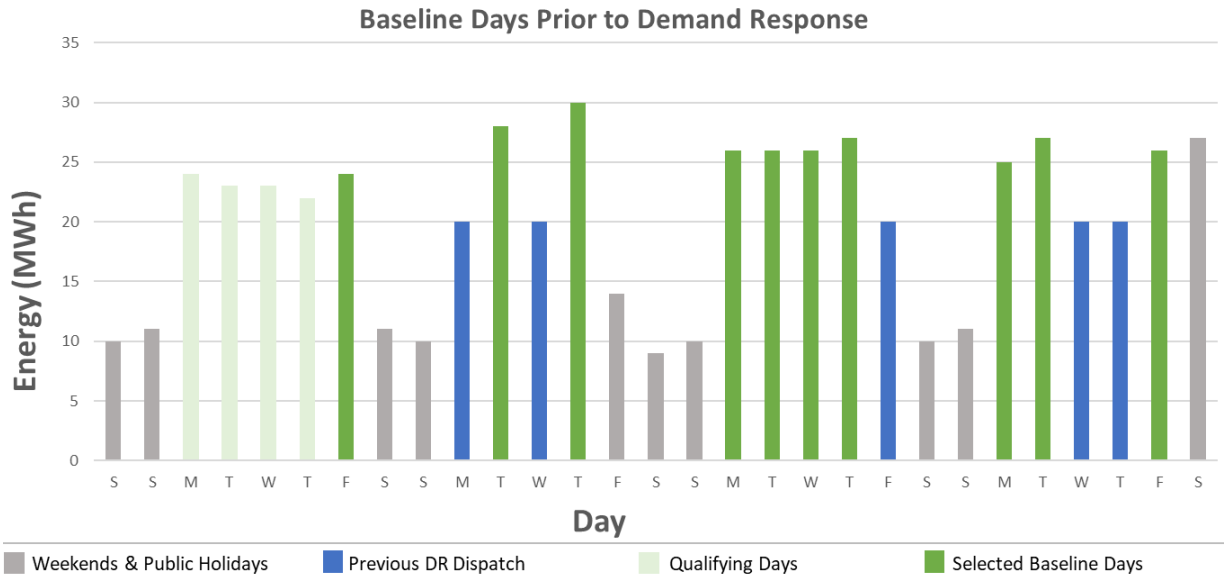
For the settlement of a demand response event where the WDRU has received a consumption target below the maximum available level, an unadjusted baseline energy is derived from the meter data of a set number of prior qualifying days, collectively called the selected days. A qualifying day must satisfy requirements such as not having been dispatched or tested for demand response on that day, or not being a weekend or public holiday. The set of qualifying days is taken from the baseline window period. The unadjusted baseline energy profile is then adjusted to the actual metered energy prior to the demand response, relative to the baseline estimation of what this energy would be.

The adjustment window is a time period prior to the dispatch of the demand response, and differences between metered data on the day of dispatch and a corresponding derived value from the selected days is used to determine an additive adjustment (which may be negative). This is added to the unadjusted baseline energy to give the adjusted baseline energy. The demand response in a trading interval is the amount by which metered consumption is less than the adjusted baseline energy.

The following diagrams illustrate the core concepts used to generate a dynamic baseline for a weekday.

[5] See https://aemo.com.au/initiatives/trials-and-initiatives/nem-demand-response-mechanism.

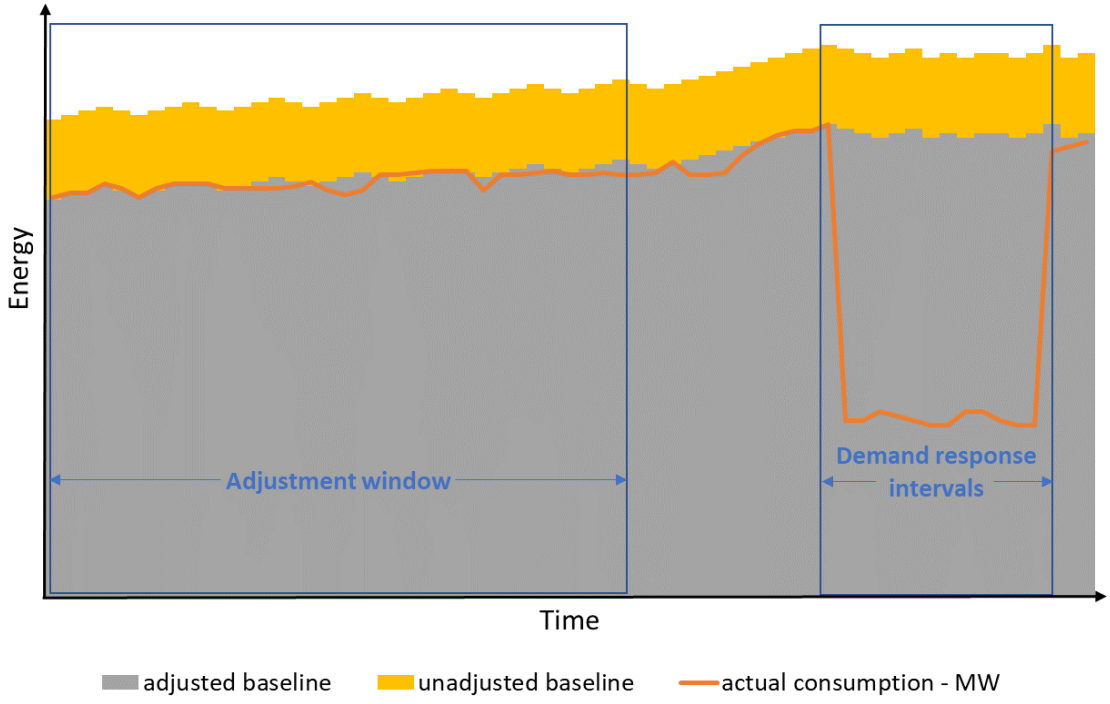
Figure 6 Illustration of selected baseline days for a weekday BM



Key items in Figure 7 include:

- Selected baseline days used to calculate unadjusted baseline, 10 most recent days from qualifying days.
- Excluded days, that is, non-business days and previous demand response dispatch or test days.

Figure 7 Illustration of baseline adjustment



Key items in Figure 8 include:

- The three-hour baseline adjustment window that ends an hour prior to demand response dispatch.
- The decrease in the baseline that is indicated during the baseline adjustment period.

Baseline methodologies

Following the dispatch of demand response on a day, an unadjusted baseline energy is derived from meter data for a set number of prior qualifying days, collectively called the selected baseline days.

The following tables describes the terms for a weekday BM. This detail is provided as a guide to concepts that AEMO believe may be involved in a BM. It is not a predetermination of what the optimum baseline methodology will be.

Table 4 Weekday BM terms

Component	Detail
baseline energy	Unadjusted baseline energy + additive adjustment.
unadjusted baseline energy	For a trading interval, the average metered values for the corresponding trading interval on each of the selected days.
selected days	The most recent 10 qualifying days within the baseline window. If fewer than 10 qualifying days exist but five or more qualifying days exist, then use the number of qualifying days available. If fewer than five qualifying days are available, then a process to manage this outcome is required.
qualifying days **(as defined by exclusion rules)**	Calendar weekdays which are not (local) state public holidays (in that region) and on which demand response events have not been called or tested for the WDRU.
baseline window	45 calendar days. This time range is long enough to allow for a significant number of qualifying days but not so long as to create serious distortions due to changing seasons.
additive adjustment	Average actual adjustment window energy – average baseline adjustment window energy. This may be positive or negative.
average actual adjustment window energy	The simple average of the metered energy over the adjustment window.
average baseline adjustment window energy	The simple average of the unadjusted baseline energy over the adjustment window.
adjustment window	If the event starts in trading interval *t*, then this is trading intervals t-48, to t-13 (that is, the three hours ending one hour before the start of the event). The adjustment will apply across all demand response trading intervals during the dispatch of a demand response. Rules are required to manage a scenario where the adjustment interval contains a demand response interval

Baselines under abnormal conditions

The draft Rule allows AEMO to consider a way in which some adjustments to baseline might occur during a period of abnormal conditions, for example, where due to maintenance a known reduction in baseline levels from the norm will occur. This will be a matter for consultation. Any such process will need to be simple – for example, subtracting a set value from the baseline or multiplying the baseline by a factor. A more sophisticated solution is likely to be cost- and time-prohibitive.

As the demand response market evolves, the need may increase, and a more sophisticated solution could be sought. Where abnormal conditions are likely to have a material impact on baseline compliance, the DRSP will be required to remove the WDRU from dispatch and discuss the matter with AEMO.

2.2.4 Prudentials

Under the proposed Rule, the DRSP is a market participant and as such is subject to prudential obligations. AEMO must establish a credit support requirement for each market participant in accordance with the Credit Limit Procedures (CLP) in order to meet the 2% prudential standard.

Additionally, each market participant must ensure that its daily prudential exposure (its current total liabilities in the NEM) does not exceed its trading limit (the amount of credit support less the prudential margin plus any security deposit amount being held by AEMO). To manage this requirement, AEMO estimates the total liabilities of a market participant and compares these against its trading limit daily. Where there is a breach of the trading limit, the market participant is required to manage this position, typically by provision of collateral in the form of a security deposit, by 11.30 am (Sydney time).

Maximum Credit Limit

The Maximum Credit Limit (MCL) is the amount of credit support that a market participant must provide to AEMO in the form of a bank guarantee. It is a fundamental aspect of AEMO's prudential process that seeks to ensure a failing market participant does not leave the market with an exposure (shortfall).

The MCL covers the five weeks of exposure of a market participant that is unsettled at any given time. A market participant that typically is owed money by the NEM would likely have an MCL of zero. In a case of market participant default, any shortfall amounts are funded by market participants proportional to the settlement amounts owed in aggregate to them by AEMO over the financial year

The settlement of demand response with a DRSP, although based at the single WDRU level, is representative of the aggregate of each WDRU. AEMO has yet to form a view on the level of prudential risk represented by a DRSP incurring a negative settlement amount (that results in an overall liability to the market) following dispatch of its WDRU for demand response.

As required under the NER, AEMO will consult with industry on any changes to the CLP as a consequence of the proposed Rule. As such, the setting of DRSP collateral requirements in the CLP will consider industry views on the level of risk posed by negative settlement amounts and the manner in which this risk should be managed.

Daily prudential management

AEMO does not consider that estimation of the exposure of a DRSP prior to metering data being available is practical. Any collateral requirements will need to consider the fact that a number of days can elapse between a demand response activity and calculation of the settlement amounts. In the case of net negative settlement outcomes, DRSPs will need to manage their daily position (typically by the provision of a security deposit) like all other market participants.

2.2.5 Dispatch/STPASA/Operational forecasting

The proposed Rule requires that AEMO include the maximum demand responsive component of the WDRU within dispatch and settle the WDRU following dispatch of the WDRU to a level of consumption less than the maximum availability, that is, a demand response.

Demand response settlement occurs against the baseline that represents the total consumption that would otherwise have occurred at the WDRU.

The inclusion of demand response in dispatch is aligned with the current dispatch systems by scheduling it in a manner analogous with a scheduled load, but recognising that:

- Only the demand-responsive component of the WDRU is dispatched, and it is this component of the WDRU that is visible to real-time operations and identified in terms of the maximum demand responsive component of the WRDU during the registration process.
- The intention is not that WDRU is required to meet a consumption target in dispatch reflecting the total load at the connection point; that is, the non-demand-responsive component of the load is not scheduled.

- The WDRU non-demand-responsive component is not under the control of the DRSP.
- It is necessary to identify when the WDRU is being dispatched for demand response purposes.
- When settling the WDRU, this occurs against the demand-responsive component and non-demand-responsive component of the WDRU to ensure that overall an appropriate level of demand response has occurred and that there is no load shifting from the responsive to the non-responsive component.

Bidding

The demand-responsive component of the WDRU will be established in dispatch under a dispatchable unit identifier (DUID), in line with all other scheduled plant.

A DRSP can include the same NMI within an aggregation for both ancillary services load and demand response (for demand response, this aggregation is a WDRU). It is always up to the DRSP to bid the WDRUs in such a way that the bidding is complementary and both the contingency FCAS and demand response energy bids, if scheduled, can be met. NEMDE will not perform a co-optimisation against the energy from a WDRU and the FCAS from an ancillary service load classified at the same NMI by a DRSP. Within the dispatch systems, even if a WDRU has an identical aggregation of NMIs classified as WDRUs for demand response and as ancillary service loads for ancillary services, they will have separate DUIDs and energy bids and FCAS bids will be submitted against the appropriate DUID. A naming convention for WDRU DUIDs and FCAS DUIDs will be adopted to assist in distinguishing the two.

The bidding process for the WDRU for demand response will include the standard set of 10 price and volume bands. The Spot Market Operations Timetable will need to be met, with the same restrictions that apply to scheduled generation and load on changes to the 10 price bands, with an ability to move volumes across price bands ahead of the dispatch interval. The same requirements to explain any late changes to the bid are also established. (Details can be found in clause 3.8 of the NER.)

The dispatch target of the WDRU is the consumption target of the demand-responsive component of the WDRU. It is anticipated that, in order to be normally consuming (that is, not being dispatched for demand response), the maximum availability in the bid will reflect the maximum demand response component of the WDRU and this volume will be bid in at the market price cap.

Conversely, if all the response is to be dispatched, then the total maximum availability can be bid in at the market price floor. In this way, the consumption target of the demand-responsive component of the WDRU will be reduced to zero.

The DRSP will need to ensure it can translate a reduction in consumption target to a demand response target. If the consumption target is reduced by 10 MW, then a demand response of 10 MW is to be provided, in accordance with standard dispatch performance requirements.

A DRSP will be required to provide all the bidding artefacts for its WDRU that are associated with other dispatchable plant, such as a scheduled generator. This includes, for example, a ramp up and down rate, price-volume pairs ,and maximum availability. When dispatched, the DRSP will need to understand that the dispatch targets are based on consumption and respond accordingly.

In the case of an aggregated WDRU, the bid band prices will not be loss factor-adjusted. AEMO considers it impractical to determine the level of losses associated with loads distributed across a region which are dispatched as an aggregated WDRU. Loss factors will be assumed to be unity for the purposes of bidding and dispatch.

The DRSP must understand and monitor the availability of the demand-responsive component of their load and reflect this into their bid maximum availability. This is to ensure that the AEMO control room understands the level of demand response that is physically available, should it need to be mobilised for system security purposes.

Bidding scenarios

The following are some theoretical bidding scenarios of a DRSP bidding a WDRU into the energy market. These scenarios are provided for conceptual purposes. Assumptions are:

- Maximum demand responsive component (registered) = maximum possible demand response from WDRU.
- Maximum availability = maximum demand responsive component of WDRU available at time of bid for the relevant trading interval.
- Maximum availability is a value that ranges from zero to maximum demand responsive component.

The following four scenarios assume maximum demand-responsive component = 100 MW:

- Scenario 1: No demand response being offered. The maximum availability is 100 MW.
- Scenario 2: All demand response being offered. The maximum availability is 100 MW.
- Scenario 3: Part demand response being offered. The maximum availability is 100 MW.
- Scenario 4: All demand response being offered. The maximum availability is less than maximum demand-responsive component, for example, 80 MW.

Table 5 Dispatch outcomes for WDRU that consumes at the connection point

Scenario	Maximum availability	Bid	Comment
1	100 MW	100 MW at market price cap	Consumption target 100 MW No demand response
2	100 MW	100 MW at market price floor	Consumption target 0 MW Demand response 100 MW
3	100 MW	80 MW at market price floor 20 MW at market price cap	Consumption target 20 MW Demand response 80 MW
4	80 MW	80 MW at market price floor	Consumption target 0 MW Demand response 80 MW 20 MW is not consumed or under control so identified as unavailable

Note: the bid indicates the spot price at which the quantity of demand response being offered is available to be dispatched

This design, dispatching the demand-responsive component of the WDRU, also successfully caters for demand response which results in a reversal from import from the grid to export to the grid, or an increase in export to the grid at the connection point.

Two demand response as export scenarios are provided:

- Scenario 5: All demand response being offered. The maximum availability is 3 MW. WDRU delivers demand response resulting in a change in connection point flow from 2 MW import to 1 MW export.
- Scenario 6: All demand response being offered. The maximum availability is 3 MW. WDRU delivers demand response resulting in a change in connection point flow from 1 MW export to 4 MW export.

Table 6 Dispatch outcomes for WDRU that exports at the connection point

Scenario	Maximum available	Bid	Comment
5	3 MW	3 MW at market price floor	Consumption target 0 MW Demand response 3 MW Initial flow = -2 MW, Final flow = 1 MW
6	3 MW	3 MW at market price floor	Consumption target 0 MW Demand response 3 MW Initial flow = 1 MW, Final flow = 4 MW

Note: the bid reflects the spot price above which the volume will not be dispatched for consumption. The DRSP needs to understand the target based on how it is providing a demand response at the connection point.

The following table and figures are a further, simplistic illustration of how bidding, dispatch, and telemetry (where required) is envisaged to work. When the market price goes above the price at which the demand-responsive component is offered, the consumption target decreases, and the demand response is dispatched accordingly.

Table 7 Bid data and resultant consumption target for a WDRU (DUID).

DI	Max availability MW	Bid volume MW	Bid price $/MWh	Market price $/MWh	Consumption target MW	Telemetry at end of interval MW	Demand response MW	Settlement
9.30	30	30	500	50	30	30	-	No
9.35	30	30	500	50	30	30	-	No
9.40	30	30	500	50	30	30	-	No
9.45	30	30	500	300	30	30	-	No
9.50	30	30	500	600	0	0	30	Yes
9.55	30	30	500	650	0	0	30	Yes
10.00	30	30	500	700	0	0	30	Yes
10.05	30	30	500	600	0	0	30	Yes
10.10	30	30	500	300	30	30	-	No
10.15	30	30	500	200	30	30	-	No
10.20	30	30	500	200	30	30	-	No
10.25	30	30	500	200	30	30	-	No
10.30	30	30	500	200	30	30	-	No

Figure 8 Consumption target reduction in line with bid and market data in Table 7

Bid price is that price at which the WDRU is prepared to reduce consumption by the bid volume.
Consumption target changes from 30 MW to zero when market price exceeds bid price
The DRSP reduces the consumption of the demand responsive component (max avail) of the WDRU to the dispatched target
The baseline is determined post event as the counterfactual for settlement and dispatch performance
Good dispatch performance and baseline outcomes will show a WDRU reduction in metered consumption of 30 MW

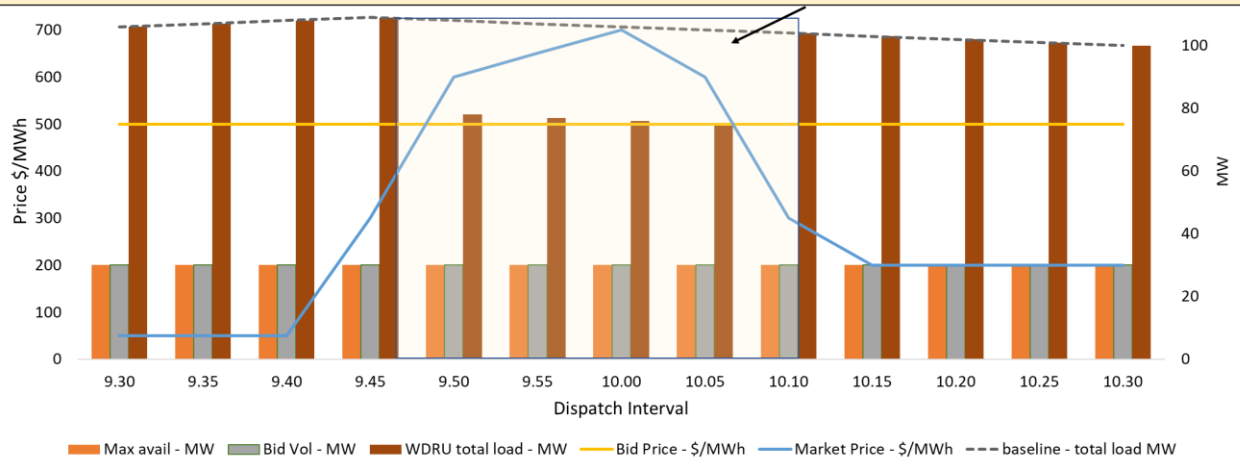
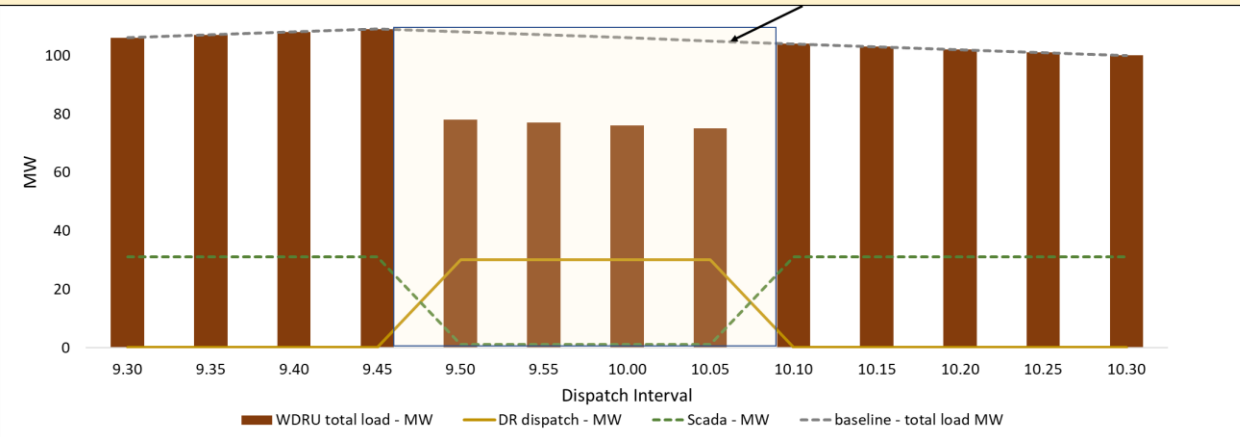


Figure 9 Consumption target reduction and telemetry in line with bid and market data in Table 7

The DRSP reduces the consumption of the demand responsive component (max avail) of the WDRU to the dispatch target (zero)
SCADA reflects the amount of consumption of the demand responsive component from 30 MW to zero
The demand response dispatched is the reduction in dispatch target and is 30 MW
The baseline is determined post event as the counterfactual for settlement and dispatch performance
Good dispatch performance and baseline outcomes will show a WDRU reduction in metered consumption of 30 MW



Dispatch

Under the proposed Rule, the WDRU would normally be dispatched in a manner that correlates to the dispatch of 'normally on'-scheduled load. Under all circumstances, the maximum availability is reflective of the capacity of the demand-responsive component of the WDRU. Under normal circumstances, the price is not sufficiently high for the WDRU to be dispatched (noting that if a DRSP has frequent dispatch its baseline will steadily decrease or not be possible to determine), and the consumption target will match the maximum availability. No demand response will occur. Dispatch of a demand response is reflected by a reduction in the consumption target from the bid maximum availability, and will occur when some of or all the demand-responsive component is offered in at a price lower than the regional reference price. In this way the DRSP can set price through its dispatch bids if marginally dispatched.

The premise of this model is that the DRSP can control the demand-responsive component of the WDRU.

It is intended that, where it is possible to do so, a WDRU should meet a dispatch target by ramping linearly from one target to the next. This includes an orderly return to full consumption of the demand-responsive component at the end of a demand response.

Where there is no visibility of the consumption of the demand-responsive component of the WDRU through telemetry, then the dispatch system will assume perfect dispatch target conformance and use the dispatch target from the previous dispatch run as the initial condition for the current dispatch run.

AEMO will assess conformance of WDRUs in a post-event process, summarised further below. If a WDRU is dispatched to provide WDR (consume less than the maximum availability represented in the bid), then settlement will occur. Demand response settlement will occur with reference to metered energy and the baseline that represents all, and not just the demand-responsive component of, load at the WDRU.

The DRSP will require access to AEMO's bidding interfaces and an understanding of how the bidding and dispatch processes work. The DRSP will also need to be able to respond to dispatch instructions, and for this reason 24/7 operational capability is required.

Dispatch conformance

There are risks to system operation and security if a DRSP that is dispatched for a given consumption reduction does not provide the intended outcome. AEMO will develop a post-event process that will assess performance in dispatch. The process will be post-event because, under the HLD design, there is no mechanism by which real-time conformance can be measured.

The conformance assessment process will include regular assessment that the consumption reduction provided against a dispatch target occurred at the WDRU. This might include:

- Determining the metered energy (on aggregate for the WDRU) during the dispatch period based on meter data.
- Establishing a counterfactual based on baselines (on aggregate for the WDRU).
- Reviewing the metered energy directly before the demand response to ensure the counterfactual is reasonable (although baselines will also automatically adjust for this).
- Reviewing data available from the demand-responsive component of the WDRU, including SCADA where available.
- Requesting evidence from the DRSP on the response provided as required.

If AEMO identifies that a WDRU is non-conforming, AEMO can request modification of plant parameters and adjustments to the maximum responsive component of the WDRU. If AEMO is not satisfied that the WDRU will respond to future dispatch instructions as required, AEMO may limit the WDRU's participation in dispatch (either as removal of a single WDRU in an aggregate or an aggregated WDRU entirely).

A WDRU, or a single WDRU within an aggregated WDRU, may also need to be excluded from participation in dispatch if the WDRU's baseline is identified as being not baseline compliant. In this instance, either AEMO or the DRSP will need to be able to identify the single WDRU as not currently being included within the aggregated WDRU. In turn, this may require a change to the maximum demand-responsive component value. If this is the case, it must be notified to AEMO.

AEMO will follow standard processes in notifying the Australian Energy Regulator (AER) of instances of non-conformance.

Real-time operations, visibility, and power system security

AEMO is concerned that a lack of visibility of significant amounts of WDRU activity has the potential for system operation uncertainty and risk. Under the proposed Rule, DRSPs are required to follow AEMO's policy on communication and telemetry.

AEMO's current consideration of this matter is that qualifying loads that can provide a demand response of 5 MW or over, or that already have SCADA feeds into the network, will be required to provide telemetry in

real time. Currently this means SCADA, however, as the participation of the demand side in a two-sided market evolves, AEMO is working with industry to develop new, more cost-efficient, forms of telemetry to support visibility of this type of participant. AEMO will look to adopt this type of protocol as soon as it is practical to do so.

The SCADA signal is required to reflect the consumption of the demand-responsive component of the WDRU. If the consumption target reduces to zero, SCADA should reflect a value of zero, although the non-demand-responsive component of the load may continue to consume energy. If a WDRU is bidding unavailable because it has temporarily lost the ability to control the demand-responsive component of the load, but continues to consume that component, then SCADA should reflect the new level of availability, in this case zero.

AEMO will allow WDRUs with a demand-responsive component under 5 MW to be aggregated without telemetry to more than 5 MW in a region. This means potentially significant volumes of price-responsive and dispatchable load will not be visible in real time, and good performance will need to be assumed. The proposed Rule allows AEMO to set an upper limit on the amount of non-visible demand response that it can reasonably accept per region and, if necessary, within a regional zone. AEMO will engage with industry when determining the methodology that will be used to set this limit.

AEMO will need to perform analysis to provide industry with values on the limits that will apply in each region to non-telemetered WDRUs. However, the regional pre-dispatch load forecasting error thresholds published in the Power System Operation Procedure – Load Forecasting (SO_OP_3710) is considered an indication of the order of magnitude of these levels. These are presented below:

Table 8 Regional pre-dispatch load forecasting error thresholds

Region	Forecast Error Threshold (MW)
Queensland	100
New South Wales	150
Victoria	100
South Australia	50
Tasmania	50

WDRUs without telemetry will not be required to retrospectively establish it, unless a system security issue requires it. AEMO currently holds this power for all plant, and WDRUs are no exception. Additionally, under the proposed Rule AEMO has the right to require a disaggregation of WDRUs under an aggregated WDRU should system security require it.

It is important to note that aggregations under a WDRU are binary where telemetry is concerned. All single WDRUs within an aggregation are covered by SCADA, or none of them are. It is not possible to manage single WDRUs with SCADA and without SCADA within one aggregated WDRU.

Operational forecasting

The proposed HLD allows for a WDRU to have a demand-responsive component which is dispatchable and an uncontrolled non-demand-responsive component. Within AEMO's operational forecasting processes, this allows for the demand-responsive component of the WDRU to be removed from the demand forecast and managed in the scheduling function. The rest of the WDRU load, the non-demand-responsive component, continues to be included within the demand forecast and can vary as it usually does.

Where the operational forecasting system has zonal elements below the regional level for the purpose of demand forecasting, a WDRU aggregate may be restricted within zonal boundaries. AEMO will provide information to support the development of an aggregation by a DRSP for this purpose.

PASA processes

Under the draft Rule, AEMO is required to take DRSP information into account in its pre-dispatch, dispatch, and ST PASA processes. The DRSP is required to provide forward information through the AEMO systems in an identical fashion to other scheduled plant for this purpose.

AEMO intends to review and consult on the ST PASA methodology, and potential DRSPs may choose to participate in this process. However, it is not currently anticipated that the inclusion of WDRU in dispatch will result in any system changes to this short-term process. WDRU information will be included in values reported to market, but no new reporting artefacts will be developed as part of the PASA system changes associated with the proposed Rule.

DRSPs will not be required to participate and provide information with respect to medium term projected assessment of system adequacy (MT PASA). AEMO will use information provided through the demand side participant information portal to meet the medium term forecasting requirements.

2.2.6 Demand Side Participation

Under the proposed Rule, additional requirements are placed on market participants with demand-responsive load to provide information into the demand side portal (DSP). AEMO will be updating the demand side participation information (DSPI) portal to cater for the additional requirements. DRSPs will need to provide the required information through the DSPI portal.

In addition, AEMO has a requirement to review and update the statistical analysis that is performed on the DSPI data to inform the market about the level of participating demand response. This will be outlined in the DSPI guidelines, and these changes will be subject to the NER consultation process.

2.2.7 Retail systems

Role of MSATS

The Market, Settlements and Transfer Solution (MSATS) system is a retail system maintained by AEMO which stores data for each connection point in NEM. The connection point is identified by its NMI, and the information held for each NMI includes:

- Standing data pertaining to that NMI.
- Who is responsible for the various roles associated with the NMI, such as the relevant FRMP (for example, the retailer), relevant metering parties (metering co-ordinator, meter data provider) and the distribution network operator.
- Metering data associated with the NMI.

The processes for transferring customers or changing current roles are implemented via MSATS. MSATS also compiles settlement-ready metering data for the settlement system.

The DRSP will be identified with the role in MSATS following successful WDRU classification. This will allow the FRMP and any other roles associated with the NMI to understand if there is a DRSP and provide visibility to the DRSP of the other roles. Not all NMIs will have an identified DRSP; it is not a mandatory role. Each NMI can only have one DRSP. The DRSP will need to know the identity of roles for its NMIs. The DRSP will receive the completed notifications from these roles' change requests, as well as other appropriate notifications about activity at the meter.

NMI discovery process

When a search is performed for any NMI, the NMI standing data will be available. If the NMI is actively participating in demand response (that is, it has a DRSP role assigned) this will be visible. Existing participants

allowed to use the NMI discovery process (prospective retailers, FRMPs, and the current LNSP for the NMI) will receive this information when performing the NMI discovery search.

It is the expectation that if there is a need for a DRSP to contact the retailer of a site as part of signing up a consumer for DRM – for example, to establish or confirm requirements such as metering, or understand existing contractual agreements – this would be facilitated by discussions with the consumer.

3. Implementation

This section outlines the considerations in respect to implementing WDRM.

3.1 Procedures

AEMO anticipates the following procedures will be amended (or developed) in consultation with industry:

Procedure	Nature of change	Consultation approach
Wholesale Demand Response Guidelines	New – baselines, eligibility	Rules consultation
Power System Security Guidelines (SO_OP_3715)	Existing – include WDR	Rules consultation
Intervention, Direction and Clause 4.8.9 instructions (SO_OP_3707)	Existing – include WDR	Rules consultation
B2B Procedure: Meter Data Process	Existing – include WDR	Rules consultation
CATS Procedures	Existing – include WDR	Rules consultation
Metrology Procedure: Part A	Existing – include WDR	Rules consultation
Metrology Procedure: Part B	Existing – include WDR	Rules consultation
Service Level Procedure (ENM)	Existing – include WDR	Rules consultation
Service Level Procedure (MDP)	Existing – include WDR	Rules consultation
Service Level Procedure (MP)	Existing – include WDR	Rules consultation
WIGS Procedures	Existing – include WDR	Rules consultation
Spot Market Operations Timetable	Existing – include WDR	Rules consultation
NEM Settlement Estimates Policy	Existing – include WDR	Rules consultation
Credit Limits Procedures	Existing – include WDR	Rules consultation

There will also be a significant number of external procedures and guides which do not require formal consultation, but which AEMO will include in its program of stakeholder engagement for consultation if appropriate to do so. These external documents include:

Procedure	Nature of change
Power System Data Communication standard	Existing – include WDR
Dispatch (SO_OP_3705)	Existing – include WDR
Pre-Dispatch (SO_OP_3704)	Existing – include WDR
Short Term Reserve Assessment (SO_OP_3703)	Existing – include WDR
Glossary (SO_OP_2000)	Existing – include WDR
Reserve Management (SO_OG_NEM_54)	Existing – include WDR

Non Conformance Management (SO_OG_NEM_12)	Existing – include WDR
Load Forecasting (SO_OP_3710)	Existing – include WDR
Treatment of Dispatchable Loads in the NEM (Guide to Scheduled Load)	Existing – include WDR
Publication of HistDemand Data - Business Specification	Existing – include WDR
Factors Contributing to Differences between Dispatch and Pre-dispatch Outcomes	Existing – include WDR
Operation of the Intervention Price Provisions in the NEM	Existing – include WDR
Standing Data for MSATS	Existing – include WDR
B2B Accreditation and Revocation	Existing – include WDR
NMI Procedures	Existing – include WDR
B2B Guide	Existing – include WDR
B2B Procedure: Technical Delivery Specification	Existing – include WDR
Settlement Estimation Guide	Existing – include WDR
Registration application forms and guides	New – DRSP registration and WDRU classification
Baseline compliance guideline	New – testing for baseline accuracy and bias

3.2 Costs

The indicative AEMO cost for implementation of the system, process, and procedure changes described in this document, based on AEMO's current interpretation of what the proposed Rule will require, is $13 million to $17 million.

3.3 Timelines

The timelines are broadly as provided below, but require development of a detailed project plan by AEMO:

Timing	Activity
12 March 2020	Draft determination of WDR Rule
April 2020	Kick off stakeholder engagement process for project delivery
11 June 2020	Final determination of the WDR Rule
December 2020	Complete procedural work stream
July 2021	Registration open
September 2021	Market Trial
24 October 2021	WDRM go live

3.4 Market readiness

A program of stakeholder engagement will commence for this project shortly after the draft determination. This will include the establishment of targeted working groups to enable AEMO to consider stakeholder views and develop new and amend existing documentation in the most efficient way possible. The current project plan includes a market trial period and a time prior to the start of the Rule during which participants can apply to register as a DRSP and classify their market loads.

Glossary

The following is a list of abbreviations used in this document. This document uses many terms that have meanings defined in the National Electricity Rules (NER), these NER meanings are adopted. Other terms are described in the body of the document as they arise.

Term	Definition
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
API	Application programming interface
ASL	Ancillary service load
BM	Baseline methodology
B2B	Business to business
CATS	Customer and transfer solution
CLP	Credit Limit Procedures
CP	Connection point
DR	Demand response
DRSP	Demand Response Service Provider
DSPI	Demand side participant information
DUID	Dispatchable unit identifier
ESB	Energy Security Board
FCAS	Frequency control ancillary service
FRMP	Financially Responsible Market Participant
HLD	High-level design
LNSP	Local network service provider
MCL	Maximum Credit Limit
MSATS	Market settlement and transfer solutions
MT PASA	Medium term projected assessment of system adequacy
MW	Megawatt
MWh	Megawatt hour
NEM	National Electricity Market
NER	National Electricity Rules

NEMDE	National Electricity Market Dispatch Engine
NMI	National Metering Identifier
PD	Pre dispatch
RERT	Reliability and Emergency Reserve Trader
SCADA	Supervisory Control And Data Acquisition
ST PASA	Short Term Projected Assessment of System Adequacy
WDRM	Wholesale demand response mechanism
WDRRR	Wholesale demand regional retail rebate
WDRU	Wholesale demand response unit