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Nicole Dodd

Manager, DER and Retail Reform

By email: nicole.dodd@aemo.com.au

27 March 2024

Dear Ms Dodd

RE: New baseline methodology requests for the wholesale demand response mechanism

On behalf of Enel X, I am pleased to submit three new baseline methodology requests for AEMO's consideration and public consultation under section 4 of the *WDR guidelines*.

Enel X operates Australia's largest virtual power plant.[1] We work with commercial and industrial energy users to activate demand-side flexibility and offer it into the NEM's energy and ancillary services markets, the WDRM, the RERT mechanism, and to network businesses. Enel X is the NEM's first demand response service provider (DRSP) for wholesale demand response.

The WDRM was introduced in October 2021, and has not delivered significant uptake to date. As the grid continues to evolve and the NEM's reliability needs become more pressing, now is an appropriate time to consider ways that eligibility for the WDRM can be expanded, including through the introduction of new baseline methodologies.

Section 4 of AEMO's *WDR guidelines* sets out the process by which a market participant can propose a new baseline methodology for the WDRM. This paper represents Enel X's formal application under those guidelines for three new baseline methodologies.

This request sets out:

- a summary of the issues with the current set of baseline methodologies
- a description of each new proposed baseline methodology, including:
    - its key settings
    - which load types it would enable to participate in the WDRM
- the expected benefits of implementing the three new baseline methodologies.

Enel X has developed and tested a large number of other baseline methodologies. The three put forward in this proposal are those that we believe are straightforward to implement and will provide considerable benefits in terms of expanded eligibility for the WDRM.

We have also provided comments on other ways in which eligibility for the WDRM can be expanded.

We will separately provide a list of NMIs that AEMO can use to test the new baseline methodologies requested in this paper.

Please feel free to contact me if you have any questions regarding these new baseline methodology requests.

Regards
Claire Richards
Head of Reserves Demand Response, ANZ
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[1] Per AEMO registrations.

1. Background

1.1 Overview of the current arrangements

The wholesale demand response mechanism commenced in October 2021. AEMO's current *Baseline methodology register* includes four baseline methodologies that DRSPs can choose from to enrol a load in the WDRM, based on the CAISO 10 of 10 framework and differentiated by day type:

1. All days
2. Business days
3. Non-business days
4. Business + non-business days

All four options apply a ±20 per cent multiplicative adjustment cap in the three hours ending one hour prior to the first trading interval of dispatched wholesale demand response. The register sets out the other key settings for each option.

For a load to be eligible to participate in the WDRM, a DRSP must demonstrate that it meets the requirements of AEMO's *Baseline eligibility compliance and metrics policy*. Among other things, this policy requires that the load meet a 20% RRMSE (accuracy) threshold and a ±4% ARE (bias) threshold for the chosen baseline option.[2] The policy allows the DRSP to propose eligibility exclusion days, which means that AEMO will not include those days in its baseline eligibility assessment. Eligibility exclusion days are defined as "days on which NMI load was not measurable or is deemed to be far outside the usual for the NMI".[3]

While this combination of baseline, day options and eligibility thresholds is well suited to some (mostly flat) loads, it rules out a significant number of other load types that are otherwise good candidates for wholesale demand response.

In developing the above baseline framework in 2021, AEMO acknowledged that it would not suit all loads but indicated that there was insufficient time to consider other options ahead of market start.

1.2 Issue and impact

The WDRM has now been operating for over two years. There is one registered participant and only 65 MW of registered load NEM-wide. This outcome was foreshadowed by Oakley Greenwood in 2021 who, in its analysis for AEMO during the development of the WDRM, concluded that the CAISO 10 of 10 methodology "will not suit a material proportion of the customers who are eligible to participate in the WDRM by virtue of their annual consumption, but whose load shapes are more variable." Specifically, it estimated that ~80% of loads in the 160-750MWh category and ~65% of loads in the 750MWh-100GWh category would be excluded under a CAISO 10/10 baseline with a 20% RRMSE threshold.[4]

This analysis reflects Enel X's experience enrolling customers for participation in the WDRM. Many loads, particularly loads with atypical weekly operations, loads with solar PV, temperature-sensitive loads and loads with variable daily operations do not meet the eligibility criteria under the existing set of baseline methodologies, and are thus unable to participate in the WDRM. Eligibility for the WDRM has been flagged by Enel X and many others as a key barrier to greater uptake of the mechanism.

As the grid continues to evolve and the NEM's reliability needs become more pressing, now is an appropriate time to consider ways that eligibility for the WDRM can be expanded. Demand response

[2] RRMSE = relative root mean square error; ARE = average relative error. Both are explained and defined in AEMO's *Baseline eligibility compliance and metrics policy*.
[3] AEMO provides examples of eligibility exclusion days: blackout/outage, plant shutdown, scheduled maintenance, scheduled and unscheduled outages and site commissioning.
[4] AEMO, Consultation on the baseline eligibility compliance and metrics policy, Issues paper, December 2020, pp7-8, available here.

is a critical part of the energy transition, and is particularly valuable at delivering much-needed firming capacity as the traditional providers of this service exit the NEM.

The need to review the WDRM eligibility arrangements has become even more acute with the introduction of two additional programs that utilise the WDRM, specifically:

- The NSW Peak Demand Reduction Scheme. This scheme is proposing a new activity that utilises the WDRM as the mechanism for the certification and dispatch of C&I demand response.
- The Capacity Investment Scheme. The NSW Government has recently contracted with demand response through long term energy service agreements, and will use the WDRM as the mechanism for dispatch of demand response resources. Consultation on the design of the ongoing federal CIS is underway, and utilisation of the WDRM as the mechanism for dispatching DR resources cleared through future CIS tenders is being discussed.

2. Proposed new baseline methodologies

This section sets out a detailed outline of the three new baseline methodologies we propose. In all cases, the intention for proposing the baseline methodology is to expand eligibility to a broader range of loads. Table 1 below summarises the key elements of each proposal.

Table 1: Summary of new baseline methodologies proposed

	1: 10 of 10 (all days)	2: High 3 of 10 (all days)	3: High 3 of 10 (business days)
Framework	10 of 10	High 3 of 10	High 3 of 10
Day type	All days	All days	Business days only
Baseline window	20 days	20 days	20 days
Selected days	Most recent 10 days (minimum 5)	Most recent 10 days (minimum 5)	Most recent 10 business days (minimum 5)
Unadjusted baseline energy for TI	Average metered energy for TI for selected days.	Average metered energy for TI for selected days.	Average metered energy for TI for selected days.
Baseline adjustment	Multiplicative adjustment, with 20% cap on upward adjustment and no cap on downward adjustment.	Multiplicative adjustment, with 20% cap on upward adjustment and no cap on downward adjustment.	Multiplicative adjustment, with 20% cap on upward adjustment and no cap on downward adjustment.
Baseline adjustment window (settlement)	3 hrs ending 1 hr prior to the first TI of WDR.	3 hrs ending 1 hr prior to the first TI of WDR.	3 hrs ending 1 hr prior to the first TI of WDR.
Baseline adjustment window (PoL)	3 hrs ending 1 hr prior to the first TI of WDR.	3 hrs ending 1 hr prior to the first TI of WDR.	3 hrs ending 1 hr prior to the first TI of WDR.
Required number of eligibility days	20 days	20 days	20 days

Eligibility TIs window	3pm to 8pm (market time)	3pm to 8pm (market time)	3pm to 8pm (market time)
Required number of compliance days	20 days	20 days	20 days
Compliance TIs window	3pm to 8pm (market time)	3pm to 8pm (market time)	3pm to 8pm (market time)
End of Period date	Any day within the bi-annual testing season that complies with the required number of compliance days	Any day within the bi-annual testing season that complies with Required number of compliance days	Any day within the bi-annual testing season that complies with Required number of compliance days

Three of the proposed settings are common to all new baseline methodologies in this paper – specifically, the 20-day lookback window, uncapped negative adjustments, and the "end of period' date. We have set out the rationale for these settings here, and provide more detail on each baseline proposal in the sub-sections further below.

20 day lookback window

The existing set of baseline methodologies specify a 50 day lookback window for the eligibility and compliance assessments. The rationale for requiring 50 days is not clear. AEMO's underlying assumption might be that a load that meets a 20% RRMSE over a 50 day look back window is more accurate than a load that meets a 20% RRMSE over a 10 day lookback window, thus the intention is to constrain eligibility to only those loads that are very accurately baselined over a long period of time.

However, the challenge this raises is that a 50 day lookback window captures the effects of load seasonality, and thus baseline accuracy decreases the longer the lookback window. For loads with solar PV, the changing solar irradiance from winter to spring, for example, can be captured in the 50 day baseline eligibility and compliance lookback window and lead to a RRMSE fail. The same occurs for seasonal loads, where the changing demand profile due to changing operations on site between seasons can deliver a RRMSE fail.

The WDRM is a real-time, price-based dispatch mechanism. In Enel X's view, the eligibility and compliance metrics should give more weight to recent data, as that is likely to be the more accurate predictor of counter-factual demand when dispatched. Further, baselines for settlement are calculated using a 10-day lookback window, so the purpose of a 50 day eligibility/compliance lookback window is unclear. In general, we do not agree with setting a different lookback window for eligibility and compliance (currently 50 days) and for settlement (currently 10 days). We are not aware of any other market that takes this approach to program eligibility.

Nevertheless, if a longer lookback window is to be used, we propose a cap of 20 days. A 20 day lookback window will eliminate the effects of seasonality whilst delivering AEMO a level of comfort over longer term baseline accuracy and bias. For the NMIs we have tested, a shorter lookback window decreases RRMSE and thus increases baseline accuracy because it removes the effects of seasonality. This is consistent with the findings of a recent report by the Centre for Net Zero, which concluded that "using roughly two weeks of data generally results in lower errors" and that "if using more historical data, more recent data should be up-weighted."[5]

[5] Centre for Net Zero, Quantifying demand flexibility: Towards a standardised approach to baselining, January 2024, p11, available here.

We propose a 20-day lookback window for eligibility and compliance because we believe that this approach is good practice across the board, to remove the effects of seasonality on any load type, and thereby improve accuracy.

Uncapped negative day-of adjustments

We propose that uncapped negative adjustments apply across all baseline methodologies put forward in this paper.

The purpose of a day-of adjustment is to account for intraday variability in a WDRU's baseline. Day-of adjustments increase accuracy by allowing increases or decreases to the baseline to better reflect what the load is doing on the day.

All existing WDRM baseline methodologies impose a 20% cap on positive and negative day-of adjustments. Baseline accuracy should be AEMO and DRSPs' primary objective. Caps on day-of adjustments run counter to this objective because restrictions to the baseline restrict its accuracy. We understand that AEMO imposed the cap on positive adjustments to address concerns about gaming (specifically, a concern that a customer would artificially increase its consumption during the adjustment window to set a higher baseline and thus increase the quantity of WDR provided if dispatched).[6] However, this logic does not apply to negative adjustments. A DRSP has no incentive to artificially *decrease* its baseline because doing so would reduce the quantity of WDR that would be credited if dispatched. Further, this approach means that any site that incidentally shuts down would not be able to bid into the WDRM because its baseline would be zero. The likelihood of an incidental site shutdown coinciding with prices above the retailer reimbursement rate (i.e. the rate at which the provision of WDR would be worthwhile) is almost nil, which further eliminates any incentive to game.

Some C&I energy users see a significant drop in load due to the nature of their operations, e.g. at the end of a shift or production run. Sites with solar PV will also see a drop in grid demand when solar output is high. In some cases, the cap on negative day-of adjustments means that this drop in load cannot be accurately reflected in the baseline. For baseline eligibility and compliance, this means that the baseline does not reflect actual load, which decreases baseline accuracy and can result in a RRMSE fail. For settlement, this can mean that more WDR is credited than is actually dispatched.

Uncapped negative adjustments mean that any load reduction on site can be more accurately reflected in the baseline, and enable participation by these sites where currently they would be ruled ineligible.

We believe that this approach is good practice across the board, and therefore propose that it apply to all new baseline methodologies proposed in this paper. An uncapped negative adjustment would enable DRSPs to provide a more accurate baseline for a WDRU given specific conditions on the day that may not otherwise be accounted for in the baseline methodology. This approach reflects international best practice, and also reflects a recent policy decision by the WA Government to uncap negative adjustments for the baseline methodology it will apply to demand side programmes in the WA Reserve Capacity Mechanism.[7]

End of period date

The current baseline compliance framework tests a WDRU's compliance with the baseline methodology twice yearly – once at the end of May and again at the end of November. In conducting these assessments, AEMO's PoL tool currently requires a registrant to specify the earliest possible date in the "end of period date" field. When combined with a lookback window of 50 days, this means that baseline compliance is assessed using data from the very start of the lookback window. This data often captures a shoulder season and therefore the effects of seasonality described above, and can result in a RRMSE fail.

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[6] As an aside, we do not believe that there is any incentive for a load to artificially inflate its consumption ahead of a WDR dispatch, because ultimately there is no guarantee that the WDRU will be dispatched. There is a real risk, therefore, that the customer increases its consumption (at a considerable cost) in the expectation of a dispatch outcome that doesn't eventuate.
[7] Section 3.3, *Review of the Participation of Demand Side Response in the Wholesale Electricity Market*, Information Paper, January 2024, available here.

WDR is most likely to be dispatched in summer (heatwaves) and winter (cold snaps). Conducting the compliance assessments over a shoulder period does not show baseline accuracy during times of the year that WDR is most likely to be dispatched. We therefore propose that the compliance assessments be conducted using data that better reflects the two distinct dispatch seasons for WDR, and that this be given effect by leaving the "end of period" date in the PoL tool open. This would allow DRSPs to set the date themselves, while ensuring that there are still the minimum required number of compliance days included in the assessment.

2.1 New baseline methodology #1: 10 of 10 (all days)

This baseline methodology is targeted at two load types: those with solar PV, and those with seasonal operations.

Many C&I energy users with roof space or other available land on site either already have a solar PV system installed, or have plans to install one. However, many of these energy users, particularly those with PV systems that can supply a large portion of the site's daytime load, fail a RRMSE assessment because the variation in solar irradiance between seasons is too great. In Enel X's experience, the energy users most affected by this issue currently are refrigeration and HVAC loads (e.g. cold storage facilities, grocery stores, commercial properties). These businesses are valuable sources of wholesale demand response because they act like batteries: using thermal inertia to maintain appropriate heating/cooling levels while temporarily shutting off their systems during spot price spikes. Importantly, the underlying demand profile of these load types is often very predictable – it therefore doesn't seem fair or appropriate to prevent an energy user from participating in the WDRM purely because it has a solar PV system installed.

The second load type we are trying to capture with this new baseline methodology are loads with seasonal operations, for example irrigation and other agricultural loads, where the summer demand profile often looks different to the spring demand profile, for example, due to changes in site operations between seasons. This issue was flagged by Oakley Greenwood in 2021 as an area that may require further consideration.[8]

The key settings of this baseline methodology (as distinct from the existing set of methodologies) are:

- a baseline lookback window of 20 days for eligibility and 20 days for compliance
- a new setting, which would give DRSPs the ability to specify the "end of period date" for the compliance assessment
- uncapped negative day-of adjustments.

Each of these settings is described in further detail above. This new baseline methodology builds on the existing CAISO 10 of 10 methodology, but adds in the three enhancements above, which we believe are good practice across the board. The alternative would be to amend the existing four baseline methodologies with these enhancements.

2.2 New baseline methodology #2: High 3 of 10 (all days)

This baseline methodology is targeted at temperature-sensitive loads – that is, loads whose demand is driven by weather. The most common example of this is energy users with HVAC load, for example air conditioned spaces that draw significantly more energy from the grid during hot or cold weather. The high prices that cause WDR to be dispatched tend to be driven by extreme weather events, e.g.

[8] Oakley Greenwood, *Phase 2 – Baseline methodology and participant testing, WDRM – Baseline methodology testing and metrics*, March 2021, p13, available here.

heatwaves, thus it's important for temperature-sensitive baselines to be able to reflect the likely increase in load on those types of days.

A report prepared by Oakley Greenwood for ARENA in 2019 for the AEMO–ARENA demand response trial noted the following in relation to the CAISO 10 of 10 baseline:

> *"The CAISO '10 of 10' baseline load profile is derived from the 10 preceding qualifying days, adjusted for actual consumption on the day of the demand response event. This works best for facilities with load profiles that are quite consistent from day to day, such as the large industrial and some commercial loads that have been the traditional sources of DR in Australia and the USA."*
>
> *However, where the load shape is not relatively consistent from day to day – and particularly where the load shape on an event day is different to the average load shape – the CAISO '10 of 10' method can result in the baseline not being an accurate estimate of what the consumption would have been on a DR event day in the absence of DR being provided.*
>
> *This was primarily an issue for residential facilities, but also for some smaller commercial facilities where weather (and particularly ambient temperature) has a material impact on total energy demand."*[9]

Shell Energy also identified the lack of temperature-sensitive baseline methodologies as a barrier to WDRM participation in its Smart Energy Hubs Deployment Project.[10]

The key settings of this baseline methodology (as distinct from the existing set of methodologies) are:

- a high 3 of 10 baseline, for all days
- uncapped negative day-of adjustments
- a baseline lookback window of 20 days for eligibility and 20 days for compliance
- the ability for DRSPs to specify the "end of period date" in the compliance assessment.

The high 3 of 10 proposal is described in further detail below. The three other settings are described in more detail at the start of this section, as settings that we believe should apply across all baseline methodologies.

High 3 of 10 baseline

We propose a high 3 of 10 baseline for this baseline methodology – that is, a methodology that selects the three highest kWh days out of the preceding 10 eligible days. This methodology uses all 10 of the eligible days in the lookback window.

A 3 of 10 baseline is a more accurate methodology for temperature sensitive loads because the selected three baseline days more accurately reflect the load's demand profile on high demand days when that load is likely to be dispatched.

2.3 New baseline methodology #3: High 3 of 10 (business days only)

The third new baseline methodology is essentially the same as number #2 above – the only difference is the day type. New baseline #2 proposes all days, and new baseline #3 proposes business days only. The combination of baseline #2 and baseline #3 will expand eligibility to all types of temperature-sensitive loads – those that run on all days, and those that only operate during the working week.

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[9] Oakley Greenwood, *Baselining the ARENA-AEMO demand response RERT trial*, September 2019, p3.
[10] See Seed Advisory, *Smart Energy Hubs: Accelerating growth in C&I flexible demand participation*, 30 March 2023, p56, available here.

3. Expected benefits of implementing the proposed baseline methodologies

It is widely acknowledged that the demand side can and must play a key role in the energy transition. In mature markets, approximately 5 per cent of peak demand is delivered by demand response. For example:

- In the USA, Enel X's own analysis over the last ~10 years has shown DR penetration in the main US markets (MISO, PJM, NY-ISO, CAISO, ISO-NE, ERCOT) of between 2-10 per cent of peak load, but it generally centres around 5-7 per cent. In MISO specifically, "demand response capability constitutes around ten per cent of peak load."[11]
- In South Korea, in 2021 there were 28 aggregators bringing together 4,168 demand response participants, delivering up to 4.3 GW of demand response, with a target to get to 7.1MW by 2034. Against a peak demand of 85 GW, this ratio is about 5 per cent.[12]
- In Ireland, demand response providers have been awarded 400-600 MW in recent capacity auctions, against a peak demand of ~5.5GW (i.e. 7-11 per cent).[13]

While the exact level of demand response participation in the NEM is unclear (because much of it occurs under confidential retail agreements), what is clear is that the NEM falls far short of international best practice in this regard, and significantly short in terms of dispatchable demand response capacity (roughly 0.2%, with 65 MW of dispatchable WDR capacity against a NEM-wide peak demand of 32 GW).

Broadening eligibility for the WDRM through the introduction of new baseline methodologies will encourage other providers to join the market and increase participation from current levels. Increased participation will enhance the mechanism's ability to deliver on its original objectives – that is, to bring the demand side into central dispatch, support reliability and increase competition in the wholesale market.

Materiality of introducing these new baseline methodologies

As noted above, Oakley Greenwood estimated that only ~20% of commercial and industrial loads above 160MWh annual consumption would be eligible for the WDRM under the existing baseline methodologies. This broadly reflects our own experience running PoL assessments for a large and wide range of potential WDRM customers.

To get to a target of 5% of peak demand being served by dispatchable demand response (in line with international best practice outlined above), the NEM would need 1,600 MW of WDRM capacity. If the current framework caps eligibility at 20% of commercial and industrial loads, this equates to roughly 320 MW of WDRM capacity, which is only ~1% of peak demand. As shown above, current levels of WDR capacity are well short of 1%.

Baseline proposal #1

Based on our experience, around 35% of commercial refrigeration loads are ruled ineligible for the WDRM because they have solar PV. With roughly 500 MW of WDR capacity in the refrigeration sector NEM-wide, this means that about 170 MW is ineligible under the current arrangements. As more and more commercial refrigeration facilities install solar PV, and install large systems designed to maximise output against available roof space, we expect ineligibility to increase to around 50% of refrigeration loads under the currently available baselines. We estimate that making the changes proposed under baseline proposal 1 will increase eligibility to 80% of commercial refrigeration loads with solar PV and unlock an additional 230 MW of WDR capacity. While we have not conducted

[11] See *2022 MISO State of the Market Report*, available here.
[12] See p49, Figure 2.4 and Figure 4.5 of the *2021 Korea Electricity Security Review*, available here.
[13] See recent capacity auction results, available here.

similar analysis for other load types with solar PV, or seasonal loads, we expect that the relative eligibility improvement will be similar.

Baseline proposals #2 and #3

As noted above, the lack of a temperature sensitive baseline has been flagged by Oakley Greenwood and Shell Energy as the main barrier to temperature sensitive loads participating in the WDRM. If not ruled entirely ineligible, the day-of adjustment can be used to accommodate some of the impact of temperature on a load. However, the 20% cap limits the extent to which the baseline can be adjusted to reflect actual load on a dispatch day, and therefore the value that an eligible temperature-sensitive load can derive from the WDRM. A baseline that better accommodates the characteristics of temperature-sensitive load is therefore likely to expand eligibility and increase the incentive to participate in the WDRM.

We do not have sufficient data to draw detailed conclusions about the proportion of temperature sensitive loads ruled ineligible for the WDRM. However, we estimate that there are around 400,000 buildings with conditioned space in the NEM with approximately 4 GW of curtailable load. The vast majority of these buildings will exhibit an element of temperature sensitivity. While not all of these sites will be WDRM-suitable, the significant size of this sector warrants consideration of a baseline to encourage these load types into the WDRM.

We expect that the combination of baseline methodologies proposed in this paper will expand eligibility to several hundred MW of additional WDR capacity from the refrigeration and commercial building sectors alone – likely still short of a 5% of peak demand target, but higher than current levels. We have not estimated the potential for these baselines to expand eligibility to additional loads in other sectors or with other characteristics.

Increased levels of controllable and verifiable demand response

Demand response has value to the system when it is controllable by the system operator, and verifiable. Increased eligibility for the WDRM will drive higher uptake, and thereby increase the level of demand response capacity that is controllable and verifiable by AEMO. By *controllable*, we mean that the demand response capacity is visible in central market systems, is incorporated into central forecasting processes, and is dispatchable by the system operator. This means that, ultimately, it is the system operator who has control over whether and when demand response is delivered. By *verifiable*, we mean that the demand response provided can be accurately measured and independently audited. The only way that demand response activity can be accurately measured is through meter data and baselining. When demand response activity is verifiable, we have assurance that it was actually provided, and can therefore attribute a specific value to it. We can also then calculate the size and contribution of demand response to system reliability, which at the moment is largely unknown.

The only existing in-market mechanism that meets these criteria is the WDRM. Other existing mechanisms for demand response (e.g. forms of retailer-driven demand response) are not controllable or verifiable by the system operator, and consequently do not provide much value in terms of system reliability or efficient market dispatch.

Expanding eligibility under the WDRM will increase the incentive to participate and bring more of this "invisible" wholesale demand response into AEMO's central forecasting and dispatch process.

Various other policy initiatives have increased the incentive to participate in the WDRM, for example:

- the NSW Government has made participation in the WDRM a requirement for demand side capacity awarded a contract in its recent tender for firming capacity[14]

[14] See here.

- access to the demand response component of the NSW Peak Demand Reduction Scheme will require WDRM participation[15]
- the NSW Government has accepted a recommendation for its agencies with large electricity loads to investigate participating in the WDRM themselves[16]
- DCCEEW is consulting on the design of future CIS tenders, and has indicated its intention to allow demand response and VPPs to participate. While the mechanism for participation is not yet decided, DCCEEW has previously contemplated using the WDRM.[17]

As a result of these policy initiatives, interest in the WDRM has grown in NSW, and will grow in other NEM regions where incentives to participate are sufficient.

Enel X understands that the controllability and verification issues of retailer-driven demand response are intended to be addressed through the *Integrating price-responsive resources into the NEM* rule change. However, the design of that mechanism is not yet clear, and the timing of its implementation is even more uncertain. In Enel X's view, AEMO cannot afford to wait for such a mechanism to be implemented. A few small fixes to the WDRM eligibility arrangements, such as through implementing the baseline methodologies proposed in this paper, have the potential to significantly, and quickly, increase the amount of dispatchable demand response in the NEM.

The NEO case for change

In Enel X's view, the relevant aspects of the NEO are:

- the price and reliability of the supply of electricity, as well as the price and reliability of the national electricity system
- the achievement of targets set by a participating jurisdiction – for reducing Australia's greenhouse gas emissions; or that are likely to contribute to reducing Australia's greenhouse gas emissions.

The new baseline methodologies proposed in this paper are, if implemented, likely to promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to price, reliability and emissions reduction by:

- Supporting competition in the energy market and driving lower prices for all energy consumers. If implemented, the proposed baseline methodologies will lower inefficient barriers to participation in the WDRM and will create a more level playing field for the provision of WDR by all large customers. Broadening eligibility under the WDRM is likely to increase participation in the mechanism. Increased participation will drive competition in the spot market, particularly at peak demand times when prices are high and WDR is most likely to be dispatched. This may have the effect of reducing spot prices at critical peak times, the benefits of which are passed on to all electricity consumers.
- Supporting consumer choice and creating more opportunities for more energy users to offer demand flexibility. Expanded eligibility will enable more energy users to participate in the mechanism and receive the benefits of providing WDR. Further, enabling a broader range of energy users to provide WDR supports value stacking and the provision of other flexibility services, such as firming, frequency response, load shifting and network support.
- Increasing the amount of demand flexibility under AEMO's control. Reliability can only be delivered in a renewables-dominated power system where there is sufficient flexibility. The WDRM provides an incentive for energy users to offer their flexibility to the market. Unlike

[15] Office of Energy and Climate Change, *Peak demand reduction scheme: Rule change 2 consultation paper*, October 2023, pp18-20, available here.
[16] Office of Energy and Climate Change, *Electricity supply and reliability check up: NSW Government response*, September 2023, p14, available here.
[17] Department of Climate Change, Energy, the Environment and Water, *Implementation design paper: Capacity investment scheme*, p27, available here.

other forms of wholesale demand response, the WDRM gives AEMO visibility and control over its operation. These proposed baseline methodologies will increase participation in the mechanism and therefore increase the amount of flexibility at AEMO's disposal to support system reliability.

- Supporting emissions reductions. WDR is most likely to be dispatched in response to high spot prices, which generally arise when the supply/demand balance is tight. This most often occurs during the early afternoon/evening demand peaks, when solar output drops off for the day and other sources of capacity are needed to step in to fill the gap. At the moment, this gap is most often filled by emissions-intensive coal and gas generators, but can equally be filled by demand response. Enabling more energy users to participate in the WDRM will increase the WDR capacity available to provide firming capacity in these peak periods and displace emissions-intensive coal and gas supply, thereby contributing to emissions reductions.

4. Other options to expand eligibility under the WDRM

It is generally acknowledged that the eligibility criteria for the WDRM are strict and are unnecessarily limiting participation.

In Enel X's view, there are three options to significantly expand eligibility under the WDRM.

1. Increase the RRMSE threshold
2. Significantly increase the range of available baselines
3. Calculate baselines and RRMSE on a portfolio (DUID) basis

Enel X and others have advocated for an increase in the RRMSE threshold (option 1) for some time. An increase in the RRMSE threshold is the simplest and quickest way to expand eligibility under the WDRM. In its final determination on the *Baseline eligibility compliance and metrics policy* AEMO flagged that the RRMSE and ARE thresholds would be reviewed in 2022 "when relevant aspects of the WDRM are more certain" and to "ensure that [they do] not unnecessarily restrict WDRM participation." The final determination also states that the "suitability of the eligibility and compliance methodology, as well as the metrics thresholds, will be reviewed annually, starting in 2022" and that "AEMO will seek participant feedback during the review". As far as Enel X is aware, no such public reviews have been undertaken. Recent feedback from AEMO has indicated that it considers the current settings to be appropriate. Nevertheless, we encourage AEMO to initiate a formal and public review of the baseline eligibility thresholds as soon as possible, alongside consideration of the new baseline methodologies proposed in this paper.

This paper attempts to deliver on option 2, whilst maintaining the current RRMSE and ARE thresholds. Implementation of all three baselines in this paper will significantly expand eligibility under the WDRM. However, more are likely to be required in future. In PJM, a comparable market and arguably the most successful in terms of integrating the demand side, a 20% RRMSE threshold is used but there is a greater range of baselines to choose from, and PJM can approve loads with a RRMSE higher than 20%. PJM's baselines have been developed "to provide options, especially for variable load customers that have a RRMSE above 20%.[18]

Option 3 (calculating baselines on a portfolio basis) is the approach taken in many other demand response programs internationally, and for other programs here in Australia (specifically, the RERT, SRC and NCESS mechanisms). In general, the calculation of RRMSE on a portfolio basis results in a more permissive eligibility framework, allowing more loads to participate. As it's the approach used for RERT here in the NEM, this has the perverse effect of pushing customers ineligible for the WDRM into a RERT portfolio instead. Implementation of this option would require a rule change, so is not

[18] See section 10.4.2 of PJM Manual 11, available here.

considered further here. However, it may be an option to consider in future if no new baselines are introduced, or the suite of available baselines still does not drive efficient uptake of the WDRM.