
Demand Side Participation Forecast Methodology

June 2020

Draft determination

Executive summary

This Draft Determination is AEMO's draft response to issues raised and written submissions received in the first stage of its 2020 consultation on its methodology for forecasting the level of Demand Side Participation (DSP) in the National Electricity Market (NEM). The consultation follows the Australian Energy Regulator's (AER's) Forecasting Best Practice consultation procedure¹.

DSP is a key input into AEMO's reliability processes specified in the National Electricity Rules (NER), including the Electricity Statement of Opportunities (ESOO) and its associated Reliability Forecast.

Given the importance of the Reliability Forecast in potentially triggering obligations under the Retailer Reliability Obligation (RRO), AEMO strives to engage with all relevant stakeholders to ensure the methodologies used for each component of the forecast meet stakeholder expectations. This consultation focuses on the DSP forecasting methodology.

As outlined in this document, AEMO generally supports the submissions and in many cases plans to accommodate them.

AEMO addresses stakeholder feedback in this document under the following headings:

- DSP categories, inclusions and exclusions – provides clarity on the definitions AEMO uses to ensure DSP is mutually exclusive and collectively exhaustive with respect to Demand and Generation figures.
- Methodology: triggers and percentages – considers the probabilistic element of DSP and appropriate alignment with AEMO's probabilistic demand forecast.
- Collection of DSP information – the effectiveness and efficiency of the process by which data supporting the DSP forecast is gathered.
- Medium- and longer-term DSP forecasts – incorporation of prospective and committed DSP programs across the medium to long term.
- DSP information and statistics – the scope, structure, and application of the DSP data that AEMO provides to participants.
- Updating the DSP forecast – the process by which a need to update a published DSP forecast is recognised.

On completion of the consultation, a revised DSP forecast methodology document will be published in July 2020, reflecting any updates to the approach as result of the consultation.

¹ As published in AER's Interim Forecasting Best Practice Guidelines, September 2019, at <https://www.aer.gov.au/system/files/AER%20-%20Final%20Determination%20-%20Interim%20Forecasting%20Best%20Practice%20Guidelines%20-%20September%202019.pdf>.

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1. Introduction

AEMO's Demand Side Participation (DSP) forecast is an input into AEMO's reliability and planning processes in the National Electricity Market (NEM), including:

- The Medium Term Projected Assessment of System Adequacy (MT PASA).
- The Electricity Statement of Opportunities (ESOO) and its associated Reliability Forecast.
- The Integrated System Plan (ISP).

AEMO is required to produce Reliability Forecasts¹ in accordance with Forecasting Best Practice Guidelines² developed by the Australian Energy Regulator (AER) and Reliability Forecast Guidelines established by AEMO.

AEMO published its Interim Reliability Forecast Guidelines³ in December 2019 and must consult on and publish final Guidelines by 28 February 2021, according to the National Electricity Rules (NER) clause 11.116.4.

The Interim Reliability Forecast Guidelines outlined methodology documents that explain various processes required to produce the Reliability Forecast. These methodology documents must be consulted on at least every four years using the AER's Forecasting Best Practice Consultation Procedure, to determine:

- The fundamental methodologies needed in the forecasting processes.
- The components on which the forecasts are to be based, and the way they are to be determined and used.
- The stakeholder engagement process for determining the forecasting methodologies, inputs, and assumptions.

The consultation on the DSP Methodology is one of these methodology document consultations to be undertaken by AEMO.

1.1 Consultation process

As outlined above, this consultation is being conducted in accordance with the Forecasting Best Practice Consultation procedure published in the AER's Interim Forecasting Best Practice Guidelines.

On 26 February 2020, AEMO initiated the first stage of the consultation with the publication of its Demand Side Forecasting Methodology Issues Paper², which explained how AEMO intends to forecast DSP. AEMO's 2019 DSP Forecast and Methodology³ was taken as the starting point, and the issues paper highlighted intended changes to this approach.

Through this consultation, AEMO is seeking feedback on the DSP forecast methodology to inform any changes to be applied in 2020 and beyond.

AEMO's indicative timeline for the consultation is outlined below. Dates may be adjusted depending on the number and complexity of issues raised in submissions and the outcomes of any meetings with stakeholders.

² See <https://aemo.com.au/en/consultations/current-and-closed-consultations/demand-side-participation-forecast-methodology-consultation>.

³ See https://www.aemo.com.au/-/media/Files/Electricity/NEM/Planning_and_Forecasting/NEM_ESOO/2019/Demand-Side-Participation-Forecast-Methodology-2019.pdf.

Table 1 Indicative timeline for consultation

Deliverable	Indicative date
DSP forecast methodology – issues paper published	Completed
Submissions to issues paper due	Completed
DSP methodology discussion at Forecasting Reference Group meeting	Completed
Draft determination published	5 June 2020
Submissions to draft determination due	6 July 2020
Final determination published	28 July 2020

The publication of this Draft Determination marks the commencement of the second stage of consultation. Development of this document was somewhat delayed due to the original submissions remaining open for a longer period, and fully addressing the large number of points raised throughout the informal and formal feedback. In particular, to address the clear stakeholder interest in clarity of DSP definition, this draft determination lists a set of over-arching principles in Section 2.3 and improved explanation in Section 3.1.

2. Issues raised in consultation

2.1 Questions raised in the issues paper

The AEMO Demand Side Forecasting Methodology Issues Paper asked stakeholders about the appropriateness of the DSP Methodology for use in MT PASA, NEM ESOO, EAAP, and ISP, and whether the Methodology⁴ was meeting industry expectations more generally.

AEMO posed six questions to stakeholders as outlined in the box below.

Questions for consultation

Question 1: Considering the intended purpose of the forecast, are the inclusions and exclusions of the various DSP types appropriate and well explained?

Question 2: Given the purpose of the forecast in AEMO's reliability processes, is the approach for estimating the current level of DSP appropriate?

Question 3: AEMO could ask for a forward-looking MW estimate for existing and future DSP programs for up to three years for all participants.

- What are the pros and cons for such a request?
- In particular, is it feasible for participants to estimate this with a reasonable level of confidence?
- How might AEMO validate the information provided?

Question 4: Is the approach for forecasting future levels of DSP appropriate? And if not:

- What alternative approaches could be considered?
- What data should be used for such assessments and where should it be sourced?

Question 5: Is it appropriate to have an annual update cycle as outlined in the document?

- If not, what data should drive more frequent regular updates?
- Is the proposed trigger appropriate for an out-of-cycle update?

Question 6: What additional DSP statistics from data collected through the DSP process should AEMO consider reporting on? Should AEMO seek additional data from participants for reporting purposes only?

2.2 Feedback received from stakeholders

AEMO received feedback from the Forecasting Reference Group forum and one-on-one discussions, and five written submissions from stakeholders. The written submissions were from:

- Enel X
- Energy Queensland
- ERM Power

⁴ For the methodology, the 2019 DSP Forecast and Methodology document was used as reference: https://www.aemo.com.au/-/media/Files/Electricity/NEM/Planning_and_Forecasting/NEM_ESOO/2019/Demand-Side-Participation-Forecast-Methodology-2019.pdf.

- GHD
- Mondo Power.

AEMO would like to thank stakeholders who provided feedback throughout this process. Stakeholder submissions are summarised in Appendix A1.

Key issues raised by stakeholders are summarised under the following headings:

- DSP categories, inclusions and exclusions – stakeholders emphasised the need for clarity in DSP definition and suggested various additional categories of activity that should be included in the DSP, namely Reliability and Emergency Reserve Trader (RERT) panel members, network peak shaving and load control initiatives, and ONSG related. Related points, particularly RERT, were also discussed following the DSP Methodology presentation in the FRG of 29 April 2020.
- Methodology: triggers and percentiles – stakeholders considered whether zero or negative pool prices should be considered as a trigger of DSP response, and how percentiles of DSP response should be dealt with in the context of probabilistic demand forecasts.
- Collection of DSP information – some stakeholders focused on how to minimise participant effort in supplying existing and new data. Other submissions considered how AEMO might gather broader or more frequent/continuous data, through technology suppliers and the DSP Information (DSPI) portal respectively.
- Medium-term and longer-term DSP forecasts – stakeholders considered how AEMO might incorporate industry data (RERT tenders, tariff developments, and higher-level trends) when identifying future DSP. A related question during FRG of 29 April sought to clarify the basis of DSP across the time scale of historical data through to future projections.
- Reporting of DSP information and statistics – submissions focused on structuring DSP publications, and the accuracy of DSP Information (DSPI) portal information and its potential to uplift DSP forecast accuracy.
- Updating the DSP forecast – a single submission provided feedback on the level of DSP change which warrants a DSP reforecast.

The material issues of each of these categories are discussed in Chapter 3 of this document.

2.3 Principles applied in considering this feedback

In considering how to take this feedback into account, AEMO has applied the following principles that align with the AER's forecasting best practice guidelines⁵:

- Forecasts should be accurate, unbiased, and based on comprehensive information.
- Transparency is important to provide stakeholders with confidence in the forecasts.

In particular, in assessing the merit of any proposed changes to the methodology, AEMO has considered whether:

- The change will materially improve the accuracy of the reliability forecasts.
- The expected benefits outweigh the implementation costs borne by AEMO and/or industry participants.
- The change is consistent with existing definitions of demand and supply forecasts. In other words, a potential DSP resource must not already be accounted for in either demand or supply forecasts.
- A consistent standard is applied to future DSP as is applied to other supply options for reliability forecasts and assessments of system security:
 - For the ESOO, the certainty regarding DSP must match the rigour of the generation commitment

⁵ See <https://www.aer.gov.au/retail-markets/retail-guidelines-reviews/retailer-reliability-obligation-interim-forecasting-best-practice-guideline>.

criteria. That is, there must be evidence of a very high likelihood that the resource will be committed.

- For the ISP, the modelled DSP must be consistent with the objectives of the agreed scenarios describing a range of possible NEM futures, and can include things beyond what is already committed.

3. Discussion of material issues raised

This section discusses the material issues raised by stakeholders along with AEMO’s considerations and conclusions. Appendix A1 summarises all issues raised.

The following table outlines how various forecasting timeframes are managed in developing the DSP forecast for different purposes.

Table 2 Treatment of each time horizon by DSP forecast application

	ESOO and MT PASA	ISP
Existing DSP	Included (as per definition in Section 3.1).	Included (as per definition in Section 3.1).
Medium-term	Existing plus committed DSP programs.	Existing plus committed plus prospective DSP programs.
Longer-term	Existing plus committed DSP programs (flat projection).	Existing plus committed plus prospective DSP programs plus anticipated growth.

3.1 DSP categories, inclusions, and exclusions

3.1.1 Definition of DSP

Issue summary and submissions

Stakeholders sought a robust and well communicated definition of which National Metering Identifiers (NMIs) are included in the DSP forecast. Enel X considered that this would “avoid double counting as well as avoid duplicated effort on behalf of participants”. ERM Power recommended “the methodology set out in more detail the process by which AEMO will allocate different loads (NMIs) to different DSP sub-types”.

Once it is clear which NMIs are included in DSP forecasts, the methodology should detail the level of aggregation at which the DSP response is calculated.

Assessment and conclusion

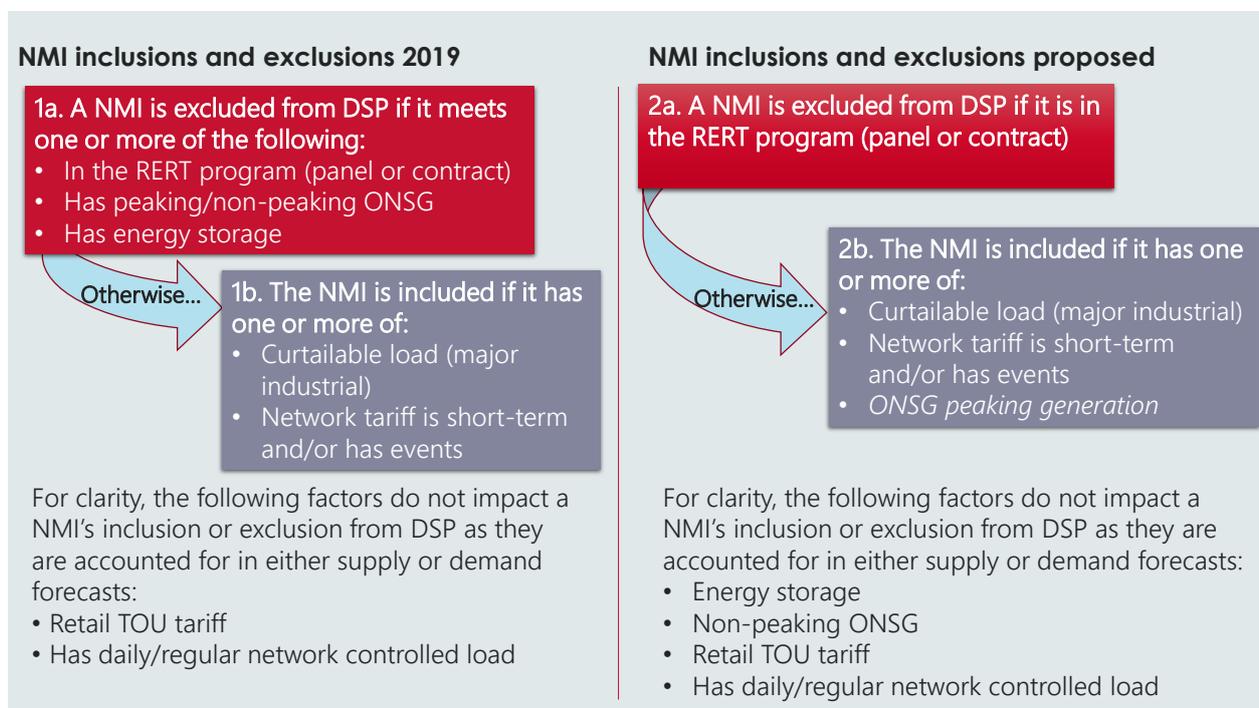
The submissions highlighted the need for clarity in detailing which types of electricity sites (NMIs) are included and excluded from DSP calculations. AEMO agrees this is beneficial and that it needs to clarify inclusions and exclusions, as well as develop an explanation that is easy to understand.

AEMO considers that the following logical structure best summarises inclusions and exclusions:

- Some factors invalidate (or exclude) a NMI from being considered for DSP forecasting purposes.
- Otherwise, a NMI is considered for DSP forecasting purposes if it has one or more of the other factors.
- For clarity, other factors that may be associated with a NMI are noted as not being relevant in determining the inclusion or exclusion of that NMI from DSP as these factors are already included in either the demand or supply forecasts.

The following diagram summarises inclusions and exclusions for the 2019 DSP process and the proposed changes for 2020 onwards.

Figure 1 NMI inclusions and exclusions in DSP definition



The NMI-centric structure of the above figure shows that a NMI in multiple DSP programs is only counted once. This is superior to a DSP program-centric explanation, which results in a set of NMI's for each DSP program, and thus necessitates detailed treatment of potential overlaps.

Submissions included proposals that various DSP resource types be included in DSP forecasts. The relevant principle states that the DSP definition must be consistent with the demand and supply definitions (see Section 2.3). Thus, to include an existing DSP resource type in the DSP forecast, it would need to be removed from whichever forecast it currently belonged. To ensure consistency of forecasts, AEMO and the industry would need to re-state historical data with the definitional change. In general, it is unlikely the cost to do so would justify the benefits of the new definition.

AEMO notes that it has selected a single definition of inclusions and exclusions from DSP, and that interested parties may need to make adjustments before applying AEMO's DSP forecasts to their own diverse needs. For example, any party using DSP as input into a price forecast should be aware that the price response may be underestimated in periods when supply scarcity risk is very low because AEMO's DSP focus is for reliability purposes. Parties wishing to use alternative DSP definitions are likely to benefit from AEMO's publication of DSP statistics, as described in Section 3.5

Regarding the level of aggregation at which DSP response is calculated, AEMO estimates DSP response at the NMI level, except when :

- Network programs are too large to be processed at a NMI level. For example, in the 2020 DSP forecast, programs with over 5,000 NMIs use the estimated response from the DSP program provider. AEMO intends to increase the ability to process large network programs at a NMI level in coming years.
- Inclusion of new loads or consumption changes are likely to result in DSP response changes during reliability events. In such cases, AEMO adjusts the combined reliability response with the estimated impact. For example, where part of a site has a potential response contracted for RERT, but the remainder of the site is still able to respond, AEMO can estimate an appropriate adjustment.

3.1.2 Inclusion of network initiatives in the DSP

Issue summary and submissions

Enel X and Mondo suggested that network initiatives (peak shaving events and load control programs respectively) be included in DSP. They cited benefits of higher accuracy and enhanced information to networks, regulators, and AEMO itself.

Assessment and conclusion

In general, the DSP forecast does already include network programs not already accounted for elsewhere in AEMO's forecasts.

Section 3.1.1 includes in the DSP forecast those NMIs where the network tariff "is short term and/or has events". Thus:

- Daily network controlled load (such as hot water heaters) is not included in DSP, as it is accounted for in the general demand forecast.
- Specific network programs that may be only implemented for limited periods of time are included in the DSP forecast. The short-term nature of these programs means their history is not already included in other forecasts, and they are therefore suitable for inclusion in the DSP forecast. AEMO currently relies on additional voluntary information being filled out showing the temporary nature of such schemes. AEMO will consider improvements to how this information is reported when consulting on the DSPI guidelines later in 2020.
- Specific network initiatives, such as voltage reduction, although not currently collected via DSPI guidelines, could be added to the DSP forecast subject to the principles in Section 2.3. These too will be considered in the DSPI guidelines consultation and, subject to stakeholder feedback, voltage reduction programs will be included in the DSPI to support their potential inclusion in the DSP forecast.

3.1.3 Inclusion of RERT in the DSP

Issue summary and submissions

ERM Power recommended AEMO only exclude contracted RERT participants, and consider the remaining RERT Panel participants as available to contribute to DSP. The rationale was that "until such time as a formal RERT contract has been signed... a RERT panel member is available to provide Market-Driven demand response".

Assessment and conclusion

AEMO notes that RERT panel members are incentivised to bid available for RERT events, and if their bid is accepted by AEMO, their capability to respond is then exclusively reserved for RERT. Consequently, for DSP forecasting purposes, AEMO considers that RERT panel members do not have capacity beyond their nomination in the RERT panel agreement. Furthermore, the DSP capacity of RERT panel members on days when RERT is not required is considered irrelevant for reliability forecasting purposes.

AEMO intends to continue considering both NMIs on the RERT panel and those that are RERT contracted as being excluded from DSP calculations. In the context of DSP forecasting, all references to RERT should be interpreted as NMIs on the RERT panel, and also those with RERT contracts.

3.1.4 Inclusion of Other Non-Scheduled Generation (ONSG) in DSP

In preparing the DSP consultation, AEMO noted that the existing treatment of ONSG needed attention to align with industry expectations. From the DSP forecast methodology issues paper:

For 2020, as identified in the AEMO's forecast improvement plan published in AEMO's 2019 Forecast Accuracy Report⁶, AEMO plans to alter the way peaking-type⁷ ONSG is accounted for in the DSP forecast. In 2019, any ONSG response was excluded, as it was included as an offset to the demand forecast instead. To increase the visibility of this rather significant contributor to total DSP, AEMO will include this as DSP in the 2020 forecast (and as result no longer offset the demand forecast).

ERM Power supported the new treatment of ONSG and stated it believed it would reduce confusion regarding the level of demand response. No submissions contained concerns regarding this new treatment.

Assessment and conclusion

The new treatment of ONSG aligns better with industry expectations, and is supported by the submission and prior feedback that helped develop the Forecasting Improvement Plan.

For clarity, with this change, AEMO's DSP forecast will, from 2020, no longer exclude peaking ONSG NMIs from DSP. This recognises that the operation times of peaking ONSG contribute to the objectives of DSP.

Non-peaking ONSG is already accounted for in the demand forecast.

3.2 Methodology: triggers and percentiles

Beyond clearly defining which NMIs are included and excluded in the DSP, the remaining aspects where clarification was sought were around triggers of DSP events, and the methodology surrounding use of percentiles from the distribution of DSP responses. Both received consultation submissions.

3.2.1 Triggers

Issue summary and submissions

When developing the DSP forecast, the responses need to be initiated from relevant real-world conditions. In AEMO's 2019 DSP forecasting process, the triggers included high pool price and lack-of-reserve (LOR) notices, for market-driven and reliability-driven conditions respectively. Enel X submitted that AEMO would be able to better understand DSP response by using NMI and SCADA data records of events related to high prices, zero/negative spot prices, and network events.

Assessment and conclusion

AEMO agrees with Enel X and will start considering DSP response during triggers associated with zero or negative spot prices, and this will be increasingly important in the future for helping to manage system security during minimum load conditions. AEMO already considers high price and network events.

AEMO's approach is based on NMI level meter data. AEMO considers SCADA data as problematic due to data quality issues and the challenges associated with automating SCADA data cleansing.

3.2.2 Percentiles

Issue summary and submissions

DSP response varies from time to time, even for identical triggers, and thus forms a distribution of response levels. For reliability assessments, AEMO currently uses a single figure (the 50th percentile of all observed DSP responses) to approximate the distribution of response for each relevant trigger used in the DSP forecasts.

ERM Power noted that:

- While AEMO allocates the 50th percentile of price driven DSP response to its DSP forecast, the full value of observed DSP is added to AEMO's historical demand records. This adjusted historical demand is used by AEMO to train maximum demand models and create half-hour demand traces used in the reliability

⁶ See https://www.aemo.com.au/-/media/files/electricity/nem/planning_and_forecasting/accuracy-report/forecast_accuracy_report_2019.pdf.

⁷ Generating plants only operating during high price events.

assessments. In ERM Power's view, this results in unnecessarily conservative assumptions being introduced into the DSP.

- The response probability curves include negative DSP values. ERM Power proposed that AEMO remove all negative DSP values (that is, consumption increase while an event takes place) prior to calculation of the response probability curves.
- Reliability DSP response is the sum of market and network components, and, in ERM Power's opinion, this suggests that:
 - During times of network reliability events, AEMO should use the 90th percentile of observed DSP responses at the highest price trigger, otherwise
 - AEMO should maintain the 50th percentile for general price-driven response.

Assessment and conclusion

For clarity of statistical terminology, the 50th percentile is the median value of the distribution of all DSP responses, rather than half of the maximum DSP response. As such, actual DSP results are equally likely to be above and below the 50th percentile. For example, if DSP responses were evenly distributed across the range 10-20 megawatts (MW), the 50th percentile response would be 15 MW.

AEMO considers the 50th percentile to be an unbiased representation of the response distribution because all the DSP values forming the distribution occurred during extreme periods of electricity use. This matches AEMO's intended application of DSP during extreme events. Thus the 50th percentile of DSP response is a neutral rather than conservative estimate of DSP during extreme events.

Regarding negative values of DSP, any baseline methodology is an approximation and will generally assume customers follow a particular trend, such as a similar day in the past. In reality, any load (aggregate or individual) will, through natural variations hour-by-hour, either be over or under this in the absence of any DSP response. In a perfect baseline, the split between over and under would be 50/50. Negative values in fact represent random drift in consumption during a non-response period. Thus, removing negative values creates a bias towards over-forecasting DSP unless a similar amount of upwards random drift is removed.

AEMO notes that even during reliability events, the half-hourly market price rarely exceeds \$7,500 per megawatt hour (MWh). Using the 50th percentile of responses for that price trigger is therefore not conservative. AEMO notes the 50th percentile of the entire distribution (that is, including negative values) has performed satisfactorily to date, as reported in the Forecast Accuracy Report (FAR)⁸. The FAR addresses accuracy during both price and reliability events. Should a different percentile be selected, adjustments may be required to remove drift to lower consumption for percentiles below the 50th percentile and remove drift towards higher consumption for percentiles above the 50th percentile. It is unlikely to alter the overall accuracy of the reliability forecast.

Subject to ongoing satisfactory performance, AEMO intends to continue using the 50th percentile of the DSP distribution (including negative values) for both reliability-driven and price-driven responses. Additionally, to support transparency and potential methodology improvements, AEMO will provide DSP distribution data in the DSP forecast report.

3.3 Collection of DSP information

3.3.1 Use of DSPI Portal

Issue summary and submissions

DSP information was recognised as a key area in the submissions, and garnered a range of feedback:

⁸ At <https://www.aemo.com.au/energy-systems/electricity/national-electricity-market-nem/nem-forecasting-and-planning/forecasting-and-reliability/forecasting-accuracy-reporting>.

- Enel X noted the importance of avoiding unnecessary duplication of participant effort in providing the same information in DSP and distributed energy resources (DER) registers. In terms of scope, Enel X advised that network service providers can have a significant DSP effect and should be included.
- Energy Queensland noted that 2019 was the first year of complete data, and suggested no additional information be requested until a better understanding of the current data set is achieved. It suggested AEMO revisit data requirements in 3-5 years.
- ERM Power suggested that the DSP portal could remain open rather than having defined information gathering periods.
- Mondo said that digital platforms which control large fleets of DER will play a larger role going forward, and AEMO should include such technology providers when seeking DER information.

Assessment and conclusion

The rapidly growing and evolving DSP environment makes for a challenging balance between maintaining DSP forecast accuracy and managing the information provision costs faced by participants. AEMO is required to consult on the DSP Information Guidelines later in 2020. In addition to ensuring alignment with the Retailer Reliability Obligation (RRO), and Wholesale Demand Response, AEMO will use the DSPI review to:

- Minimise unnecessary participant effort in completing the DER and DSP registers.
- Consider the practicalities of leaving the DSPI portal permanently open.
- Understand the costs and benefits of information collection, and where possible reduce the rate and scale of changes to the data reporting requirements.
- Take a strategic view on DSP information requirements, with the aim of avoiding need for further DSPI consultation within the next three to four years.

AEMO currently obtains DSP data from registered participants under the NER. AEMO agrees technology providers and others may provide useful insights that help AEMO understand DSP trends and will draw on their expertise as appropriate in developing future DSP forecasts.

3.4 Medium-term and longer-term DSP forecasts

3.4.1 Considerations for inclusion of future DSP

Issue summary and submissions

As context, Table 2 of this document shows the differing treatment of each time horizon by DSP forecast application in the medium and longer term. AEMO needs to be aware of, assess, and where appropriate incorporate prospective DSP programs into DSP forecasts as outlined in Table 2, subject to the principles of Section 2.3. Submissions regarding prospective DSP included:

- Enel X proposed that AEMO include demand response that has been identified but not necessarily drawn upon, for example, unsuccessful RERT tenders.
- Mondo proposed that network tariff developments and their adoption be included in DSP.
- Mondo also noted industry trends including digitisation, the emergence of new business models (such as Virtual Power Plants [VPPs] and aggregation), and new technologies like energy storage and electric vehicles. In Mondo's view, these trends increase the need for holistic DSP modelling.

Regarding the definition of committed DSP, ERM Power suggested including a broader set of future programs than just qualifying contracts under the RRO⁹, and intention to respond under the Australian Energy Market Commission's (AEMC's) current Wholesale Demand Response Rules change proposal¹⁰.

⁹ See <https://www.energy.gov.au/government-priorities/energy-programs/retailer-reliability-obligation>.

¹⁰ See <https://www.aemc.gov.au/rule-changes/wholesale-demand-response-mechanism>.

In terms of a methodology for considering future DSP levels given currently available commitment information, ERM Power supported:

- Estimation of the next three years of DSP levels via the DSP information portal.
- Using the level of estimated DSP in three years' time for the remaining seven years of the ESOO.

Assessment and conclusion

AEMO agrees to consider the following as additional sources of information when formulating DSP forecast, all subject to the general principles in Section 2.3:

- To the extent that the unsuccessful RERT applicant has submitted their DSP response capability under the DSPI process, then it will be considered. Otherwise, AEMO notes that unsuccessful RERT tender responses are treated as confidential information under its current processes.
- Other types of DSP, which can be included once committed. For example, programs under the Demand Management Incentive Scheme (DMIS) and specific government targets set for peak demand reduction would be appropriate. Commitment criteria for this example could be passing of binding targets into law and approval of DMIS initiatives through the AER's revenue reset process.
- Proposed network tariffs with significant price incentives in a few select intervals (such as capacity charge and critical peak pricing). AEMO will monitor these programs and incorporate them into future DSP forecasts, and/or use them to validate estimates. In contrast, the historical behaviour of static network tariffs, such as Time of Use (TOU) and day/night tariffs, is already included in the maximum demand forecast training data, and is already implicitly reflected and must not be double-counted in the DSP.

AEMO understands Mondo's reference to 'holistic' as a suggestion to broaden the definition of DSP. AEMO notes that many DSP resources, such as energy storage and electric vehicles, are already included in AEMO's demand or supply forecasts. A change in DSP definition would require AEMO and industry to re-baseline the historical values for DSP, demand, and/or supply, and this is unlikely to satisfy the principles in Section 2.3, which include that benefits must exceed costs.

AEMO acknowledges the importance of capturing industry trends and is committed to ongoing engagement with participants and those outside the industry (see Section 3.3). As AEMO gains experience in understanding the take-up and performance of existing DSP, it will increasingly validate and where appropriate include announced future DSP. Accordingly, AEMO proposes to monitor trends in DSP programs and their delivered responses.

AEMO agrees with the intent of ERM Power's suggestions for using the DSPI portal's committed projects up to year 3 in the years beyond, but prefers to reference the principles in Section 2.3, which are appropriately general without nominating a particular time period.

3.5 Reporting of DSP information and statistics

3.5.1 Format and content of DSP documents

Issue summary and submissions

ERM Power suggested splitting the previous DSP Forecast and Methodology document into separate documents. ERM Power also suggested that AEMO continue to monitor and report on observed levels of DSP compared to that indicated in the DSPI portal.

Assessment and conclusion

AEMO agrees that documenting the DSP methodology and separately reporting annual statistics eliminates the need to regularly update the methodology if no changes have been made, and supports easy publishing of annual statistics. This has been adopted with the publication of the methodology document under this consultation.

To increase transparency and build confidence in the DSP forecasts, AEMO will:

- Disaggregate DSP data by type and state, subject to cost and preserving confidentiality.
- Review the DSPI portal's responses as part of the FAR process. This is the means by which forecast accuracy is assessed and root causes are understood. To the extent DSPI portal data accuracy is material in the overall forecast, it will be addressed through that process.

3.6 Updating the DSP forecast

3.6.1 Criteria for DSP updates

Issue summary and submissions

AEMO proposed in the issues paper that DSP changes of greater than 1% of regional maximum demand would be a trigger to reissue a DSP forecast. ERM Power's submission proposed a threshold of 0.5% be used.

Assessment and conclusion

Upon further consideration, AEMO notes that the more relevant consideration is materiality in triggering an update to the reliability forecast. A material change in DSP forecast could be one such trigger, however a single threshold is too narrow a criterion to use as the basis of committing resources to updating the reliability forecast.

AEMO intends to use the reliability forecast guidelines as the reference for factors to be considered in determining whether new information would materially change the reliability forecast, warranting an ESOO update. Essentially, if the DSP change is material in the context of the reliability forecast, it will trigger an update.

A1. Summary of issues raised

Table 3 DSP categories, inclusions and exclusions

Organisation(s)	Comment	AEMO response
Enel X	<p>Given the development of the DER register as well as the DSPI, there is the potential for double counting of resources that may be identified as DER as well as DSP.</p> <p>It will be important for AEMO to clearly differentiate between DER sites and DSP sites to avoid any double-counting, which would incorrectly inflate the DSP forecasts.</p>	Refer to Section 3.1 and Section 3.3
ERM Power	We support AEMO's decision to include Other Non-Scheduled Generation (ONSG) as a transparent separate subtype under the Market-Driven response category. We believe this will reduce the confusion between the level of commonly observed demand response and the lower level of DSP allocated by AEMO to the reliability assessment calculation in AEMO's various planning reports.	Refer to Section 3.1.4.
ERM Power	<p>A NMI can be involved in multiple DSP programs, AEMO must make sure that this NMI response is not double counted, and that the classification should be well documented and that the primary category allocation is set to Market Price driven where relevant rather than to the Network Loading Control Response.</p> <p>ERM Power recommends that the methodology set out in more detail the process by which AEMO will allocate different loads (NMIs) to different DSP sub-types.</p>	Refer to Section 3.1.1
ERM Power	ERM Power recommends that AEMO only excludes RERT participants if these are on a RERT contract and leaves them in if on a RERT Panel only.	Refer to Section 3.1.3.
ERM Power	The Methodology would be improved by the inclusion of defined criteria for exclusion of loads participating in known programs where any response would already be embedded in the demand forecast. This would then be followed by a list of programs for which any response has been excluded.	The definition of DSP inclusions and exclusions has been refined and can be found in Section 3.1 of this Draft Determination.

Table 4 Methodology: triggers and percentiles

Organisation(s)	Comment	AEMO response
Enel X	<p>AEMO has access to NMI level data and potentially SCADA data. This information can be used to assess how a site behaved over the last three years (for example) to events such as:</p> <ul style="list-style-type: none"> • High spot prices. • Network peak shaving events (e.g. Ausnet's critical peak demand tariff). • If relevant, zero/negative spot prices (i.e. did they consume more or generate less in response to these low/negative prices). <p>This will provide AEMO with more relevant information for real-time events, including a greater understanding of how DSP responds.</p>	Refer to Section 3.1.1 and Section 3.2.1
ERM Power	While the 50th percentile value is allocated to the DSP response, the full value of any observed load response is added to the historical demand outcomes for use in the forecasts of future maximum demand outcomes and half-hour demand traces used in the reliability assessment modelling. This results in unnecessary conservative assumption being introduced for the DSP.	Refer to Section 3.2.2
ERM Power	Value used in the reliability assessment should be set at the 90th percentile whilst maintaining the price based response at the 50th percentile, with the belief that this would be more accurate, as would reflect the level of DSP expected to be available and respond at times of an actual reliability event	Refer to Section 3.2.2.
ERM Power	ERM Power recommends that all negative DSP values (i.e. DSP increase while an event takes place) should be removed prior to calculation of the response probability curves.	Refer to Section 3.2.2.
Mondo Power	Mondo Power would like to see some "program groups" based on network load control programs within the main DSP model, although this add to the complexity, [it would] not only be more accurate but the model would be able to incorporate the interaction between market and network based incentives. This would therefore be of value to networks and regulators, in the designing of network-based incentives and demand response programs.	Refer to Section 3.1.1.

Table 5 Collection of DSP information

Organisation(s)	Comment	AEMO response
Enel X	It is important to avoid unnecessary duplication of effort on behalf of participants in providing the same information via two different processes (DSP and DER)	AEMO has recognised the importance of avoiding unnecessary duplication of effort by inclusion of a principle in Section 2.3 stating that benefits must outweigh costs borne by AEMO and participants. A review of the DSPI Guidelines is due later in 2020. One of the goals of the review is to remove unnecessary duplication with the DER register. Refer to Section 3.3.1.
Enel X	It is important to include network service provider programs as these can have a significant effect in reducing demand, particularly on peak demand days. For example, this could include either: <ul style="list-style-type: none"> • loads that are directly controlled by a DNSP; • a DNSP reducing voltage across its network, which would also provide a demand response; or • specific programs that are implemented for limited periods of time (e.g. 1 to 5 years) that are intended to address a specific network constraint. 	Refer to Section 3.1 and Section 3.1.2.
Energy Queensland	As 2019 was the first year of complete data, we suggest that no additional information is requested until such time as there is a better understanding of the current data set. Accordingly, we suggest AEMO revisit the requirement for additional reporting statistics after 3 -5 years of reliable data collection.	Refer to Section 3.3.
ERM Power	ERM Power considers that the DSPIP should remain open for more regular updating by participants on an “as required” basis.	AEMO will consider the practicalities of this suggestion. The current process is resource intensive, but if a cost-effective solution to collect and process the inputs can be found, it would help ensure AEMO has access to up-to-date DSP information at any point in time. Refer to Section 3.3.
Mondo	As DER aggregation and optimisation evolves, digital platforms which control large fleets of DER will begin to play a larger role in DSP. We believe that adding relevant digital platform and technology providers to the list of market participants engaged by AEMO to develop DSP forecasts would be beneficial.	Refer to Section 3.3.

Table 6 Forecasting future DSP

Organisation(s)	Comment	AEMO response
Enel X	AEMO could consider demand response that has previously been identified but not necessarily drawn upon. This could include, for example, unsuccessful RERT tenders.	Refer to Section 3.4.1.
ERM Power	ERM Power would be supportive of AEMO requesting estimated future levels of DSP covering the next three years via the DSPIP. ERM Power notes that AEMO has indicated that future estimates could be based on; <ul style="list-style-type: none"> • A qualifying contract under the RRO, or • Intended to respond as wholesale demand response according to the Australian Energy Market Commission’s (AEMC’s) current Rules change proposal. Whilst supportive of these two criteria, we would not support that an estimate of future DSP be limited to these two criteria only and recommend that the criteria be expanded to include “Other demand response”.	Refer to Section 3.4.1.
ERM Power	ERM Power would support the level of estimated DSP indicated in year 3 being used for the remaining seven years of the ESOO.	Refer to Section 3.4.1.
Mondo	Several industry trends will tend to increase the need for more holistic DSP modelling which is able to consistently incorporate a variety of demand response incentives. Those industry trends include: <ul style="list-style-type: none"> • The ongoing evolution of technology (digitisation) enabling economic DSP at an ever smaller scale • The emergence of VPPs and various Aggregation based business models • The emergence of new controllable and energy intensive technologies, such as energy storage systems and electric vehicles • Amendments to the Demand Management Incentive Scheme (DMIS) which provide new financial incentives for networks to contract demand management rather than invest in capital assets. 	Refer to Section 3.4.1.
Mondo	Mondo proposes that forward looking DSP forecasts consider proposed network tariff developments and their adoption by customers. A consideration of Tariff Structure Statements (TSS) would be instructive in this regard.	Refer to Section 3.4.1.

Table 7 Reporting of DSP information and statistics

Organisation(s)	Comment	AEMO response
ERM Power	To improve clarity, we recommend that AEMO consider separating out the Network Service Provider's network loading control demand response from the Reliability Events responses into a separate category of Network Loading Control response leaving the centrally dispatched Reliability and Emergency Reserve Trader (RERT) response as its own category renaming the Reliability Events response category to RERT response.	Adding a third category (market driven, network reliability, RERT) is possible, but the RERT value would be for information only. AEMO does not intend to use the combined value for the three for any modelling, including the ISP because RERT is excluded from the DSP forecast for reasons described in Section 3.1. As the RERT information is already available on AEMO's website, the value to stakeholders will be limited and introduce a risk of misunderstanding of what is used in AEMO's modelling. AEMO will therefore not add this to its DSP forecast.
ERM Power	The DSP regional values for AEMO's planning documents reliability assessment process and for use in the Integrated System Plan as well as aggregate NEM statistics of DSP participation in demand response programs are embedded in the 2019 Interim DSP Forecast and methodology document. ERM Power recommends that these values be removed from the methodology document and published on a least an annual basis as the Demand Side Participation Values and Statistics Report.	Refer to Section 3.5.1.
ERM Power	In the annual reporting of statistics, ERM Power consider that there would be value in disaggregating the statistics to regional values.	AEMO is supportive, but notes that currently some programs submitted to AEMO span multiple regions. AEMO will investigate if there are alternatives to requiring the DSPI submissions to be split by region. If splitting the DSPI submissions is the only option, this will be consulted on in the DSPI Guidelines consultation.
ERM Power	ERM Power recommends that AEMO continue to monitor and report on the observed level of DSP compared with that indicated in AEMO's Demand Side Participation Information Portal (DSPIP), in particular, following implementation of the proposed wholesale demand response mechanism.	AEMO notes the ongoing review of DSP forecast accuracy as part of the Forecast Accuracy Reporting methodology consultation. This covers the means by which forecast accuracy is assessed and problematic root causes are understood. To the extent DSPI portal data accuracy is material in the overall forecast, it will be addressed through that process.
GHD	Are estimated load reductions from DSP included in the adjustments for Maximum demand, and if so can these estimates be made available?	AEMO does adjust its historical demand series on extreme demand event days for variations caused by DSP, load shedding and use of RERT to convert observed demand to adjusted demand, which reflects what demand would have been in the absence of these variations. In 2019 AEMO published the adjustments made in its Summer Forecasting Accuracy Update ¹¹ and will continue to do so in future Forecasting Accuracy Reports. Publishing adjustments for DSP for a wider number of days is currently not planned.
Mondo	Any contextual information which clarifies the relationships between different types of price responsive capacity, model inclusions, model exclusions and areas for future development is always appreciated.	AEMO has intended to clarify the requested information in this draft determination and welcomes feedback in the second round of this consultation.

¹¹ See Appendix A1 in https://www.aemo.com.au/-/media/files/electricity/nem/planning_and_forecasting/accuracy-report/2019-summer-forecast-accuracy-update.pdf.

Table 8 Updating the DSP forecast

Organisation(s)	Comment	AEMO response
ERM Power	In ERM Power’s view, only updating the DSP forecast in cases of observed changes (up or down) exceeding 1% of a regions maximum forecast demand represents a significant hurdle to activating the requirement for AEMO to update its DSP forecasts and in general exceeds the current level of forecast DSP as assessed by AEMO in the majority of NEM regions. We recommend that a value equal to 0.5% of a regions maximum forecast demand be used and this in our view would represent a more appropriate value for the purpose of triggering changes to a reliability assessment.	Refer to Section 3.6.1.