



Demand side participation forecast methodology

Draft Report

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New South Wales | Queensland | South Australia | Victoria | Australian Capital Territory | Tasmania | Western Australia
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Executive summary and consultation notice

The publication of this draft report commences the second stage of the consultation conducted by AEMO to review its Demand Side Participation (DSP) forecast methodology. This consultation is intended to satisfy AEMO's requirements to review each key component of its Forecasting Approach at least every four years, as required by the Australian Energy Regulator's (AER's) Forecasting Best Practice Guidelines (FBPG)¹, and AEMO's Reliability Forecast Guidelines².

DSP is a key input into a number of AEMO's reliability processes specified in the National Electricity Rules (NER), including the Electricity Statement of Opportunities (ESOO) and its associated reliability forecast. It refers to the flexibility by electricity consumers to reduce, or avoid, electricity consumption at times, typically if electricity prices are at high levels or if risks are forecast to the reliability of the power system.

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 reflect stakeholder feedback and insights.

Several key issues were raised by stakeholders in response to the consultation paper published by AEMO on 1 September 2023. Feedback was received on a range of topics, including:

- The way AEMO defines DSP for the purposes of forecasting.
- The manner in which AEMO assesses current DSP levels, including the data collected and AEMO's modelling approach.
- The duration of DSP and the data collection process, both of which are part of a concurrent consultation on the DSP Information Guidelines³.
- The approach used to forecast short-term and long-term DSP.
- The DSP validation process, including the assessment of the accuracy of AEMO's DSP forecasts.

This draft report sets out the feedback received on the consultation paper, together with AEMO's responses and how the feedback has been considered in developing the draft DSP forecast methodology, which is published alongside this draft report.

Consultation notice

AEMO invites written submissions from interested persons on the draft proposal and issues identified in this draft report to energy.forecasting@aemo.com.au by **5:00 pm (Melbourne time) on 28 November 2023**.

Submissions may make alternative or additional proposals that stakeholders consider may better meet the objectives of this consultation and the national electricity objective in section 7 of the National Electricity Law. Please include supporting reasons.

Before making a submission, please read and take note of AEMO's consultation submission guidelines, which can be found at <https://aemo.com.au/consultations>. Subject to those guidelines, submissions will be published on AEMO's website.

Please identify any parts of your submission that you wish to remain confidential, and explain why. AEMO may still publish that information if it does not consider it to be confidential, but will consult with you before doing so. Material identified as confidential may be given less weight in the decision-making process than material that is published.

¹ <https://www.aer.gov.au/system/files/AER%20-%20Forecasting%20best%20practice%20guidelines%20-%2025%20August%202020.pdf>

² https://aemo.com.au/-/media/files/electricity/nem/planning_and_forecasting/rsig/reliability-forecast-guidelines.pdf

³ <https://aemo.com.au/consultations/current-and-closed-consultations/demand-side-participation-forecasting-methodology-and-dsp-information-guidelines-consultation>

AEMO is not obliged to consider any submission received after the closing date and time except in exceptional circumstances. Any late submissions should explain the reason for lateness and the detriment to you if AEMO does not consider your submission.

Interested persons can request a meeting with AEMO to discuss any particularly complex, sensitive or confidential matters relating to the proposal. Please refer to NER 8.9.1(k). Meeting requests must be received by the end of the submission period and include reasons for the request. AEMO will try to accommodate reasonable meeting requests but, where appropriate, we may hold joint meetings with other stakeholders or convene a meeting with a broader industry group. Subject to confidentiality restrictions, AEMO will publish a summary of matters discussed at stakeholder meetings.

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1. Stakeholder consultation process

This draft report commences the second stage of consultation conducted by AEMO to review its Demand Side Participation (DSP) forecast methodology.

This consultation is intended to satisfy the requirements in the Australian Energy Regulator's (AER's) Forecasting Best Practice Guidelines (FBPG) and AEMO's Reliability Forecast Guidelines, which require that AEMO review each component of its Forecasting Approach at least once every four years. The DSP forecast methodology is one component of AEMO's Forecasting Approach and was last consulted on between February and August 2020.

AEMO's process and expected timeline for this consultation are outlined below. Future dates may be adjusted and additional steps may be included as needed, as the consultation progresses. In the event that these dates change, AEMO will clearly identify the timetable on the webpage for this consultation⁴.

Table 1 Consultation process and timeline

Consultation steps	Dates
Publication of consultation paper, with stakeholder consultation for this paper commencing.	1 September 2023
Discussion at Forecasting Reference Group meeting	27 September 2023
Submissions on consultation paper due	29 September 2023
Publication of draft determination and draft methodology, with stakeholder consultation for these papers commencing	31 October 2023
Final day for submissions on draft determination	28 November 2023
Publication of final determination and final methodology to be applied in 2024 Electricity Statement of Opportunities and other relevant reliability modelling	20 December 2023

In response to its consultation paper on the DSP forecast methodology, AEMO received two formal written submissions, one informal written submission obtained via the Forecasting Reference Group (FRG), and one consumer advocate verbal submission.

AEMO thanks all stakeholders for their feedback on the consultation paper. The feedback provided has been considered in preparing this draft report, and AEMO looks forward to further constructive engagement through the next stages of this methodology consultation. Concurrent with this consultation, AEMO is also consulting on the DSP Information Guidelines, which is seeking stakeholder feedback on:

- Whether changes should be made to the information collected.
- Whether the process or portal used to collect the data should change.
- Whether the quality of the information submitted can be improved.

Stakeholders may benefit from reading this draft report in conjunction with the draft report on the DSP Information Guidelines.

⁴ <https://aemo.com.au/consultations/current-and-closed-consultations/demand-side-participation-forecasting-methodology-and-dsp-information-guidelines-consultation>

2. Background

2.1. Context for this consultation

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

- The Medium Term Projected Assessment of System Adequacy (MT PASA).
- The ESOO and its associated reliability forecast.
- The Integrated System Plan (ISP) and the Inputs, Assumptions and Scenarios Report (IASR), which may be used across the industry in other planning activities.

AEMO is required to produce reliability forecasts in accordance with the AER's FBPG and the Reliability Forecast Guidelines.

AEMO's Forecasting Approach⁴ sets out the various components that contribute to AEMO's NEM forecasting and planning publications, including the reliability forecast. AEMO's Reliability Forecasting Guidelines outline a number of methodology documents that explain the methodologies used for the various processes required to produce the reliability forecast. These methodologies must be consulted on at least every four years using the consultation procedures outlined in Appendix A of the FBPG, 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 DSP Forecast Methodology is one of the methodologies within AEMO's Forecasting Approach and was last consulted on between February and August 2020. This consultation therefore intends to meet the FBPG requirement to review and consult on the components of AEMO's Forecasting Approach at least once every four years.

2.2. The national electricity objective

Within the specific requirements of the NER applicable to this proposal, AEMO will seek to make a determination that is consistent with the national electricity objectives (NEO) and, where considering options, to select the one best aligned with the NEO.

The NEO is expressed in section 7 of the National Electricity Law as:

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:

- (a) price, quality, safety, reliability and security of supply of electricity; and
- (b) the reliability, safety and security of the national electricity system; and
- (c) the achievement of targets set by a participating jurisdiction—
 - (i) for reducing Australia's greenhouse gas emissions; or
 - (ii) that are likely to contribute to reducing Australia's greenhouse gas emissions.

3. List of material issues

AEMO received two formal written submissions, one informal written submission obtained via the FRG, and one consumer advocate verbal submission from the following stakeholders:

- Energex and Ergon Energy (EQ).
- Energy Users Association of Australia (EUAA).
- Shell Energy (submission via FRG).
- Queensland Energy Users Network (QEUN, verbal submission).

The three written submissions are published on AEMO’s consultation webpage:

Table 2 List of material issues

No.		Issue	Raised by
1.	Categorising DSP	Market-driven and reliability-driven drivers of DSP	EQ, QEUN
2.	Categorising DSP	Inclusions and exclusions in DSP forecast methodology	EQ, EUAA, Shell Energy
3.	DSP forecasting cycle	DSP information portal submission window	EQ, EUAA, Shell Energy
4.	Estimating current levels of DSP	Analysing data over a three year time series	EUAA, Shell Energy
5.	Estimating current levels of DSP	Adopting 50 th percentile response for reliability forecast	Shell Energy
6.	Estimating current levels of DSP	Duration of DSP response	EUAA, QEUN, Shell Energy
7.	Estimating current levels of DSP	AEMO’s proposed methodology for wholesale demand response	AEMO (nil submissions)
8.	Estimating current levels of DSP	Other elements of AEMO’s methodology	EUAA
9.	Forecasting DSP	The use of existing and committed DSP in the ESOO	EUAA, Shell Energy
10.	Forecasting DSP	The use of international studies for long term DSP forecasting	EUAA, Shell Energy
11.	Validating DSP	Adequacy of the FAR methodology for DSP	EUAA, Shell Energy

Each of the material issues in Table 2 are discussed in Section 4.

4. Discussion of material issues

4.1. Categorising DSP

4.1.1. Issue summary and submissions

Stakeholders made a number of comments on the way in which the DSP forecast methodology categorises DSP and explains what is included in, and excluded from, AEMO's DSP forecasts:

- EQ agreed with AEMO's 'market-driven' and 'reliability-driven' categories as the two principal drivers of DSP, but noted that inclusions and exclusions could be better defined to eliminate the risk of double-counting the DSP response.
- QEUN suggested that a potential third driver of DSP was the response by customers to public statements or requests from government or market bodies to reduce electricity consumption on forecast extreme demand days.
- EUAA did not consider that AEMO's DSP forecast methodology adequately explained the inclusions and exclusions in the DSP forecast. EUAA argued that there should be no exclusions from AEMO's DSP forecasts and that any components of DSP currently included within other forecasting processes should instead be removed. EUAA contended that the current methodology of inclusions and exclusions did not present the "true" DSP requirement and therefore did not provide adequate signals to customers.
- Shell Energy agreed with AEMO's methodology of inclusions and exclusions, but called for AEMO to explicitly show the impact of virtual power plants (VPP) and vehicle-to-grid (V2G) in its supply side forecasts.

4.1.2. AEMO's assessment

AEMO has noted the concerns of some stakeholders that the inclusions and exclusions in the DSP forecast methodology are not as clear as they could be and has amended the section of the methodology that explains these inclusions and exclusions, as well as the rationale for doing so.

Regarding EUAA's recommendation to consolidate all DSP into the one forecast, AEMO agrees with the conceptual advantage in having all sources of DSP within the one forecast, which provides stakeholders with a holistic view of the total DSP availability. Practically, however, there are challenges involved in removing consumer demand response embedded within existing demand and supply forecasts. Examples that illustrate these challenges include:

- Customers on time-of-use tariffs (TOU, such as peak/off-peak) are likely to adjust their demand in response to the price of electricity. However, estimating the magnitude of the customer response to TOU tariffs based on the available data is not currently practical and therefore the response is embedded in the data used to train the forecast models and, by extension, in the forecasts produced by those models. Attempting to estimate the 'TOU impact' at this time is not expected to be accurate and would therefore potentially introduce errors in both the demand forecast (were it to be removed) and the DSP forecast (were it to be added).
- The contributions to supply from VPP and V2G resources are currently optimised in AEMO's supply dispatch modelling, together with other supply sources. Removing VPP and V2G from the supply models and including it in the DSP forecast would only be prudent if AEMO could develop a forecast methodology for VPP and V2G that was superior to the integrated supply dispatch modelling. Due to the sophistication of AEMO's supply dispatch models, it is considered unlikely that a standalone VPP and V2G DSP forecast would produce a better outcome than including those two sources of supply in an integrated model that is already well established. The operation of VPP and V2G resources

also may not reasonably operate only at the pricing or reliability risk periods that influence DSP utilisation. Therefore, it is AEMO's opinion that the practical advantage of including VPP and V2G in supply side forecasts outweighs the conceptual advantage of a more holistic DSP forecast.

On the matter of calls by government or market bodies for customers to reduce demand on projected extreme demand days, AEMO does not consider that this warrants a third category of DSP. Public statements by such bodies cannot be reliably built into a forecast, as they occur rarely and without any firm, guiding principles about when such statements will occur. In the past, when public requests of this nature have been made, AEMO has provided analysis of the potential impact of any associated response in its annual Forecast Accuracy Report (FAR)⁵. AEMO will continue to use the FAR as the publication in which it will analyse the potential impact of customers responding to public calls to curtail demand, should sufficient data be available.

Regarding Shell's request for AEMO to explicitly show the impact of VPP and V2G in its supply side forecast, AEMO notes that it is already doing this. For example, Figures 15, 16 and 41 of the 2023 ESOO present AEMO's forecasts of VPP and V2G⁶.

4.1.3. AEMO's conclusion

While cognisant that having an all-encompassing DSP forecast could have the benefits described by EUAA, the practical issues associated with doing so have led AEMO to conclude that the DSP inclusions and exclusions are still appropriate. To reflect stakeholder feedback on improving the explanation of the need for these inclusions and exclusions, AEMO has revised the DSP forecast methodology to better explain how DSP is categorised and what is included in and excluded from the DSP forecast and why. The two primary DSP categories (market-driven and reliability-driven) have also been retained.

4.2. DSP forecasting cycle

4.2.1. Issue summary and submissions

AEMO proposed not to change the existing DSP forecasting cycle. However, in the consultation paper, AEMO drew stakeholders' attention to a question being posed in the concurrent consultation on the DSP Information Guidelines, regarding the period of time that the DSP information portal was open. Stakeholder feedback on that proposal from EQ, EQUAA and Shell Energy is discussed in the DSP Information Guidelines Draft Report.⁷

4.2.2. AEMO's assessment

With the exception of the data collection period, AEMO received no submissions regarding AEMO's proposal to retain the existing DSP forecasting cycle. In the DSP Information Guidelines Draft Report, AEMO confirmed its intention to retain the existing window for DSP data submissions (ending April each year), but leave the DSP portal open all year in the event that updates to DSP data are required.

4.2.3. AEMO's conclusion

AEMO has made minor changes to the section in the DSP forecast methodology that describes the DSP forecasting cycle to reflect the decision to keep the DSP information portal

⁵ For example, see pp.37-38 of the 2019 Forecast Accuracy Report, https://aemo.com.au/-/media/files/electricity/nem/planning_and_forecasting/accuracy-report/2019-summer-forecast-accuracy-update.pdf

⁶ https://aemo.com.au/-/media/files/electricity/nem/planning_and_forecasting/nem_esoo/2023/2023-electricity-statement-of-opportunities.pdf

⁷ Available at: <https://aemo.com.au/consultations/current-and-closed-consultations/demand-side-participation-forecasting-methodology-and-dsp-information-guidelines-consultation>

open for material changes to DSP information. The timing for the publication of the DSP forecast and the accuracy assessment of the forecast have not been changed.

4.3. Estimating current levels of DSP

4.3.1. Issue summary and submissions

AEMO received general support for the methodology it employs to estimate current levels of DSP. Specific areas that stakeholders provided feedback on included:

- EUAA supported a number of elements of AEMO’s current or proposed methodology, including:
 - The use of a three year time series to estimate DSP.
 - AEMO’s proposed price trigger bands.
 - The inclusion of DSP from programs managed by network service providers.
 - ‘Load-on’ DSP (where load is increased due to low or negative pricing) being included in DSP forecasts.
 - The methodologies to estimate DSP response probability curves in each of the trigger-price bands and the DSP response curves during lack of reserve (LOR) 2 and LOR 3 reliability events.
- Shell Energy provided feedback on two elements of AEMO’s methodology for assessing current DSP:
 - Shell Energy cautioned against using a three-year period to estimate DSP in cases where that period coincided with low demand and/or prices and suggested surveying larger customers about whether future demand response is likely to change relative to historical responses
 - While supportive of using the modelled 50th percentile of DSP response in market-driven DSP, Shell Energy argued that “repeated, specific behaviour” of specific National Metering Identifiers (NMIs) during reliability events should be included in the reliability-driven DSP forecast, even if this equated to a greater than 50th percentile response overall.

In the consultation paper on the DSP forecast methodology, AEMO noted that in the concurrent consultation on DSP Information Guidelines, AEMO was consulting on broadening the DSP Information Guidelines to ask market participants to indicate the potential duration of a DSP response. Should this information be provided, it may allow AEMO to incorporate a potential duration of DSP response in its DSP forecasts. Shell Energy, EUAA and QEUN all supported the potential for including DSP duration in future forecasts.

The one new element of the proposed DSP forecast methodology, relating to the methodology used to assess the level of wholesale demand response, did not receive any feedback from stakeholders.

4.3.2. AEMO’s assessment

AEMO notes that the feedback received by stakeholders generally supported the proposed methodology for assessing current DSP. Of the two substantive changes in the proposed methodology, the revised price triggers received support from one stakeholder and no objections from others, and the proposed methodology for wholesale demand response received no feedback.

Regarding Shell Energy’s concerns about using an unrepresentative three-year period, AEMO agrees with this and notes that the DSP forecast methodology allows for another period to be analysed where the three-year period is considered unrepresentative. AEMO also notes that the DSP forecast methodology does not bind AEMO to using the 50th percentile response if a different percentile or price level better matches the DSP response during reliability events.

AEMO will add to these sections of the methodology to more clearly address issues such as those raised by Shell Energy.

On the topic of the duration of DSP response, AEMO received mixed views on the inclusion of duration-related questions in its DSP Information Guidelines consultation. Recognising the inherent uncertainty of providing this data, AEMO has proposed to include an optional question on DSP duration in the DSP IP. This information may be used in conjunction with other data sources to inform AEMO's view on the duration of future DSP.

The proposed methodology for wholesale demand response will be incorporated into the revised DSP methodology.

4.3.3. AEMO's conclusion

AEMO has amended the DSP methodology to reflect:

- the new price trigger bands (including for 'load-on' DSP)
- the analysis of DSP duration, including reference to the optional duration question in the DSP Information Guidelines
- the wholesale demand response methodology
- other revisions to the methodology to more clearly articulate the elements raised in Shell Energy's feedback, as discussed above.

4.4. Forecasting DSP

4.4.1. Issue summary and submissions

On the topic of how DSP forecasts are prepared for the ESOO, EUAA agreed that only existing and committed changes to DSP should be included in the ESOO's Central scenario reliability forecast. Shell Energy questioned whether this meant that only DSP registered within a Retailer Reliability Obligation (RRO) nominated contract was included in the ESOO, which it suggested was an unnecessarily strict criterion.

Regarding DSP forecasts for longer-term planning reports such as the ISP, both EUAA and Shell Energy cautioned against basing forecasts on international case studies, which may not be relevant in an Australian context. EUAA believed that only Australian data should be used to prepare the forecasts.

4.4.2. AEMO's assessment

AEMO notes EUAA's support for the continued use of existing and committed DSP in the ESOO reliability and indicative reliability forecasts. Regarding Shell Energy's feedback, AEMO notes that the RRO criterion is one of three criteria for a 'committed' DSP program, the third of which allows for programs with a "similar level of certainty" to the first criterion of an RRO contract or the second criterion of an approved Demand Management Incentive Scheme (DMIS) initiative under the AER's revenue reset process. AEMO considers that this level of certainty is appropriate for, and consistent with other component forecasts in the ESOO. Regarding the use of international data for forecasting DSP, AEMO recognises that caution should be applied when considering the findings from international energy markets and applying these to produce a DSP forecast suitable for the NEM. The DSP forecast methodology notes that AEMO takes into account DSP response categories, market structures (wholesale price or capacity markets), and DSP policy design when undertaking its review of the available data sets for forecasting long-term DSP.

Due to the lack of Australian data on long-term DSP trends, AEMO continues to be of the view that international data can play a role in informing the long-term DSP forecasts, however it will continue to analyse Australian DSP data, with a view to it becoming a more prominent consideration for its forecasts. Given the uncertainty in estimating future DSP, AEMO does

vary the assumptions across its IASR scenarios to explore the impacts of different levels of DSP being achieved.

4.4.3. AEMO's conclusion

AEMO has revised the section in the DSP forecast methodology that discusses the use of international data for forecasting long-term DSP to be clearer that international case studies may be used to inform the forecasts if they are relevant to the Australian NEM context, but are not the sole source of data for long-term DSP forecasts.

4.5. Validating DSP

4.5.1. Issue summary and submissions

Shell Energy and EUAA both provided comments on the FAR, which is one of the ways in which AEMO validates its DSP forecast:

- EUAA argued that the assessment of the accuracy of DSP in the current FAR is inadequate and does not compare the forecast data against the actual dispatch outcomes of electricity and system security. EUAA reiterated its stance (which has been made in several submissions to previous AEMO consultations) that AEMO's forecasting (not just for DSP) is currently regularly overstated. To address this concern, EUAA advocated for a change to the NER to include a requirement for more regular FARs (monthly or quarterly) against actual five-minute dispatch outcomes, and encouraged AEMO to consider how such a report could be prepared by an independent market body.
- Shell Energy recommended that the analysis of DSP in the FAR should be consistent with other AEMO reports that comment on DSP availability, for example, Reliability and Emergency Reserve Trader (RERT) reports.

4.5.2. AEMO's assessment

AEMO notes that the DSP forecast methodology itself is not the document in which the methodology for assessing the accuracy of the DSP forecast is described. AEMO's FAR methodology sets out the manner in which AEMO will assess the accuracy of its forecasts in the FAR. The DSP forecast methodology simply notes that the FAR (using its approved methodology) is one of the ways in which AEMO can validate its DSP forecasts.

AEMO will be conducting a two-stage consultation process on its FAR methodology in 2024. The issues raised by EUAA and Shell Energy in regards to how DSP forecast accuracy is assessed will be considered by AEMO during that consultation (with the endorsement by each stakeholder), as well as any other feedback that stakeholders have on how AEMO's assessment of the accuracy of its forecasts may be improved.

4.5.3. AEMO's conclusion

The DSP forecast methodology is not the document that sets out *how* DSP forecasts are assessed, rather it notes that an assessment (using the FAR) will take place annually. Therefore, AEMO has not made any changes to the existing DSP methodology, however the issues raised by EUAA and Shell Energy will be considered during the next consultation on the FAR methodology.

5. Draft determination on proposal

AEMO has proposed a draft version of the DSP forecast methodology, which is published alongside this draft report. The draft version has been published in ‘track changes’ mode, to make it easier for stakeholders to identify the changes that AEMO is proposing.