Demand side participation forecast methodology

August 2020

Estimating existing and future demand side participation in the National Electricity Market

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1. Introduction

Demand side participation (DSP) refers to activities performed by consumers to reduce demand due to various triggers. DSP has been observed in the National Electricity Market (NEM) for many years, although at relatively minor contributions.

In light of trends in the transformation of the power system, with increasingly active consumers and enabling technologies, DSP resources are expected to grow over time, making forecasting DSP increasingly important in balancing supply and demand.

AEMO publishes this document to describe the methodology for calculating DSP for use in its medium- to longer-term reliability and planning studies. It also explains the extent to which, in general terms, DSP information received under rule 3.7D has informed AEMO's development or use of load forecasts for the purposes of the exercise of its functions under the National Electricity Rules (NER).

This document is part of a portfolio of methodology documents set out in AEMO's Interim Reliability Forecast Guidelines that explain AEMO's core methodologies applied in preparing reliability forecasts and will be consulted on with industry at least every four years.

The document is structured into the following sections:

- Section 2 defines DSP in the context of how it is used by AEMO in its studies and AEMO's overall DSP forecasting process.
- Section 3 explains AEMO's methodology for estimating the current level of DSP in the NEM.
- Section 4 outlines AEMO's approach to forecasting future levels of DSP in the NEM.

2. DSP in AEMO's reliability and planning processes

2.1 What is DSP?

Contracted DSP is defined in clause 3.7D(a) of the NER as a contractual arrangement between a Registered Participant and a person, in which they agree to the curtailment of non-scheduled load or the provision of unscheduled generation in specified circumstances. A proposed rule change is expected to also include the provision of wholesale demand response (WDR) by an approved wholesale demand response unit[1] within the definition of contracted DSP.

In addition to contracted DSP, through clause 3.7D(e)(1)(ii), DSP includes curtailment of non-scheduled load or provision of unscheduled generation in response to the demand for, or price of, electricity.

For practical application in electricity supply adequacy and market modelling studies, DSP may include:

- Market-driven responses:
  - This category includes residential, commercial, and industrial responses that are typically triggered in respect to the price of electricity.
  - Examples include industrial facilities that are exposed to the wholesale price and elect to reduce electric load at times of high prices, consumers that agree to let their battery be controlled by a third party or are incentivised to switch off air-conditioners, and small non-scheduled generators that have the ability to produce electricity at these times, offsetting local consumption.
- Reliability event responses:
  - This category includes responses that are called on when power system reliability requires support. They are most common under Lack of Reserve (LOR) conditions, although they often also coincide with high wholesale prices. These responses can be contracted.
  - Examples include load reductions under reserve contracts with AEMO utilising its Reliability and Emergency Reserve Trader (RERT) function[2]. Additionally, network event programs that may be aimed at distribution network demand management are included in the reliability event group; on a set maximum number of days per year, networks may call on agreements to reduce demand or incentivise reductions through temporary increases in electricity costs.

It is important to recognise that DSP is probabilistic in nature. The response of a particular site (or a program of sites as a whole) can vary significantly from time to time, even for similar levels of wholesale prices (if price-driven) or between two otherwise equal LOR events (if reliability-driven). This can be due to a number of reasons, such as:

- A site can only respond if it is operating. Certain loads are intermittent by nature, for example at mining sites or pumping water for irrigation. These can be on or off or operating at various levels depending on other processes on site, or, in the case of irrigation, on recent rainfall. Other sites may be limited in how long they can reduce consumption without damaging equipment, such as metal smelters.
- Where a retailer has both DSP and a generation portfolio, it may:

[1] The criteria for these are defined in NER clause 2.3.6 in the revised rules to be published June 2020 along with the final determination of the WDR rules change.

[2] RERT is a function conferred on AEMO to maintain power system reliability using reserve contracts.

- only operate the DSP when it is short in generation compared to its contracted retail sales (as it would have to source the rest at spot price), OR
- not operate its DSP if its generation portfolio is generating in excess of its retail base, to keep up the price of the surplus generation supplied to the market.

- A site that is price-exposed and typically reducing consumption at higher price levels may at times have contractual obligations to deliver its products that make it more costly to reduce consumption in response to price than to pay penalties for late deliveries of its products.

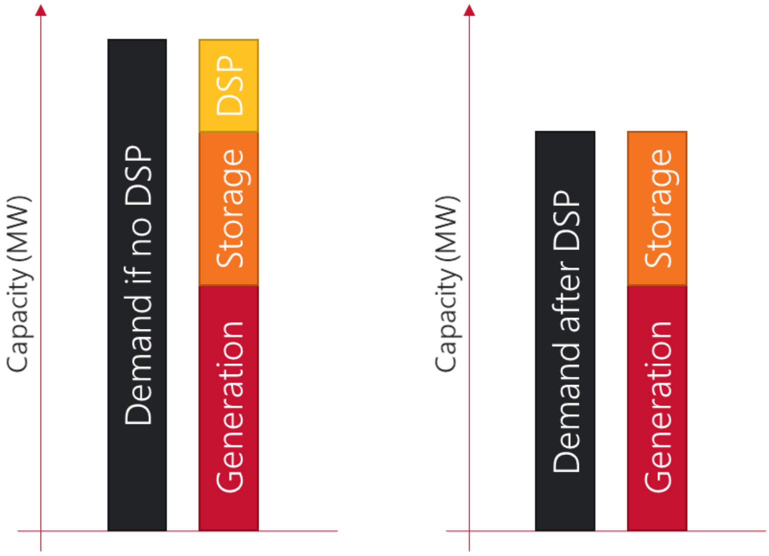
2.2 DSP in AEMO's demand and supply forecasts

In general, AEMO's estimation and forecasts of DSP aim to account for market-driven and reliability event responses by electricity consumers or generators. Because many types of DSP responses are already accounted for in AEMO's demand forecasts or supply models, the definition of DSP in this methodology is restricted to avoid double-counting.

DSP used for regular response (that is ongoing and of a predictable nature) is already included in the demand forecast, whereas this methodology focuses on DSP due to price or reliability triggers.

The forecast DSP is used as a dispatchable resource in AEMO's market modelling for the Electricity Statement of Opportunities (ESOO) and Integrated System Plan (ISP) for the NEM to balance supply and demand, as illustrated to the left in Figure 1. This best captures the functioning of the market and demand in the absence of high prices, as opposed to the illustration to the right, which assumes persistent DSP, which is not always the case as discussed above.

Figure 1 DSP modelled separately compared to including it in the demand forecast



AEMO recognises that price-responsive embedded (or small) generators behave in a similar manner to DSP load reductions. Their generation offsets demand at times of high prices and/or reliability events and thus they are included in the DSP forecast.

AEMO specifically excludes from DSP the customer responses that have been observed to be consistent and routine, and not in response to a price or demand trigger. These consistent and routine demand activities are instead incorporated in the regional demand forecast. They include daily load control (residential water heating, for example) and businesses where demand fluctuations follow a consistent pattern from day to day, for example, in response to time-of-use tariffs.

Responses from loads which were contracted for RERT are excluded from DSP for the duration of the RERT contract, whereas loads which were on the RERT panel (but were not contracted at that time) are included in DSP in those periods. RERT is contracted to ensure that unserved energy does not exceed the limit specified in the rules. AEMO's forecasts of unserved energy (including DSP responses) need to consider supply and demand without the RERT responses, so that any unserved energy in excess of the limit can be detected.

For the purposes of forecasting, AEMO assumes sites most recently contracted for RERT will also be contracted for RERT in the following year, unless better information is available. AEMO also considers special cases, where only part of the potential response at a site is contracted for RERT (see Section 3.3).

More details of specific inclusions and exclusions are provided in Section 3.1.

2.3 AEMO's DSP forecasting and planning processes

2.3.1 Requirements under the National Electricity Rules

AEMO's work in relation to DSP is governed by the NER, in particular clause 3.7D:

- Registered Participants must provide demand side participation information to AEMO in accordance with the demand side participation information guidelines[3].
- AEMO also must publish details, no less than annually, on the extent to which, in general terms, demand side participation information received under rule 3.7D has informed AEMO's development or use of load forecasts for the purposes of the exercise of its functions under the NER.

2.3.2 Including DSP in AEMO's reliability and planning processes

AEMO estimates the current level of, committed changes to, and forecast future growth for DSP.

The current estimated level of DSP (see Section 3.3) plus any committed new DSP (see Section 4.1) will be used in the following AEMO reliability studies for the duration of each assessment period (or until DSP contract expiry if earlier) to ensure supply adequacy includes only existing and already committed sources of supply (including DSP) to meet peak demand:

- ESOO for the NEM.
- Energy Adequacy Assessment Projection (EAAP).
- Medium Term Projected Assessment of System Adequacy (MT PASA).

AEMO's ISP also uses DSP forecasts. The ISP DSP forecasts vary from the estimated DSP for reliability studies, because they include scenario-specific assumptions around year-on-year growth (explained in Section 4.2).

2.3.3 Annual DSP forecasting cycle

AEMO's annual DSP forecasting cycle consists of three key steps, explained below.

Demand Side Participation Information process

Within a calendar year, the starting point of AEMO's DSP forecast is the process of collecting DSP information from market participants through the Demand Side Participation Information Portal (DSP IP). This process runs through April, as set out in the DSPI Guidelines[4], to ensure the data reflects the DSP used in the previous summer.

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[3] At https://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Planning-and-forecasting/Demand-Side-Participation-Information-Guidelines.

[4] Further information on the DSP IP is at https://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Planning-and-forecasting/Demand-Side-Participation-Information-Guidelines.

DSP forecast publication

The collected data is the key input into developing AEMO's DSP forecast, which must be published no later than the ESOO[5] and will from day of publication be included in published ESOO, MT PASA, and EAAP studies (as discussed in Section 2.3.2). The ISP is published every second year and will use the most recent DSP forecast available as a starting point for consultation.

AEMO's DSP forecast publication, which may be appended to the ESOO, will include statistics on DSP as set out in the NER (including network tariff information relevant to DSP and analysis of trends) and explain the use of information received under NER clause 3.7D in creating these forecasts.

DSP forecast accuracy assessment

Following publication of an ESOO, AEMO will assess the accuracy of the different components of the previous year's forecasts. The outcome is presented in AEMO's annual Forecast Accuracy Report (FAR)[6], which will also outline any key improvements identified to AEMO's forecasting processes.

The accuracy of the previous year's DSP forecast is assessed as part of this process, with the approach being explained in the FAR methodology[7].

[5] In accordance with the NER, the NEM ESOO must be published by the end of August each year.

[6] See https://aemo.com.au/en/energy-systems/electricity/national-electricity-market-nem/nem-forecasting-and-planning/forecasting-and-reliability/forecasting-accuracy-reporting.

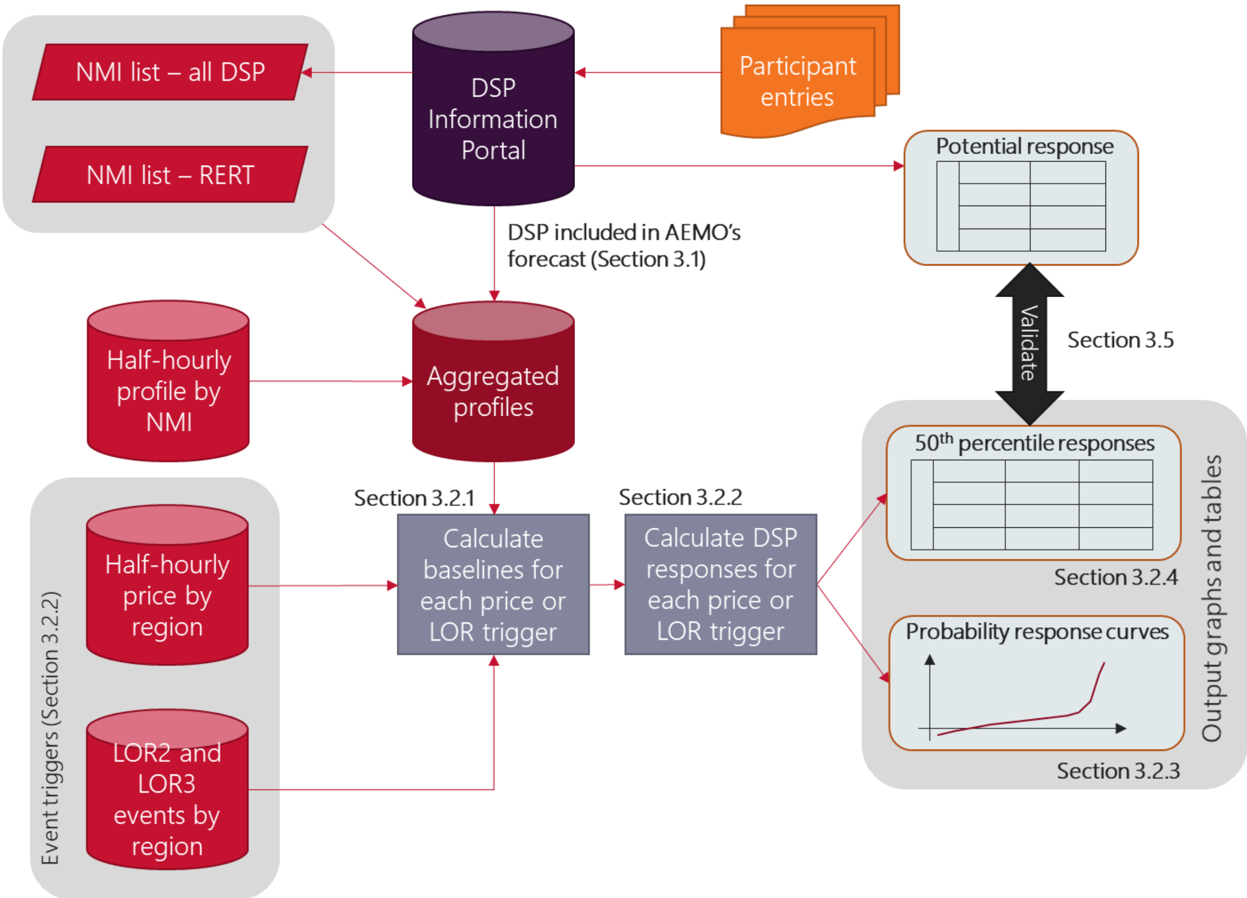
[7] See https://aemo.com.au/consultations/current-and-closed-consultations/forecast-accuracy-report-methodology.

3. Estimating the current level of DSP

Section 3 outlines AEMO's approach to estimating the current level of DSP in the market. This is used as the starting point for the forecast.

Figure 2 summarises the information flow, beginning with Participant Entries to the DSP IP. The flow ends with the estimation of historical market-driven or reliability event responses. The process steps are explained in the following sections.

Figure 2 Overview of DSP forecast process



3.1 Definition of current DSP

As outlined above in Section 2.2, the overarching principle is to ensure DSP resources included in the DSP forecast are:

- Mutually exclusive with any DSP resources already included in demand or supply forecasts, and
- Collectively exhaustive with reference to the demand and supply forecasts – that is, there are no DSP resources that are not taken account of anywhere.

Data sources

AEMO's DSP forecast utilises information submitted through the DSP IP. Key information submitted from market participants to the DSP IP includes National Meter Identifiers (NMIs) for each customer that meet the criteria of the DSP information guidelines, demand response program information, and potential customer response amounts (in megawatts) where relevant. A NMI may belong to one or more demand response programs.

The NMI data is validated against AEMO's own lists of large industrial customers and larger peaking[8] Other Non-Scheduled Generators (ONSG). The large industrial customer list is maintained through AEMO's other forecasting processes, and surveys of network service providers. The ONSG list is sourced from the distributed energy resources (DER) register.

Whole NMI allocation in or out of DSP

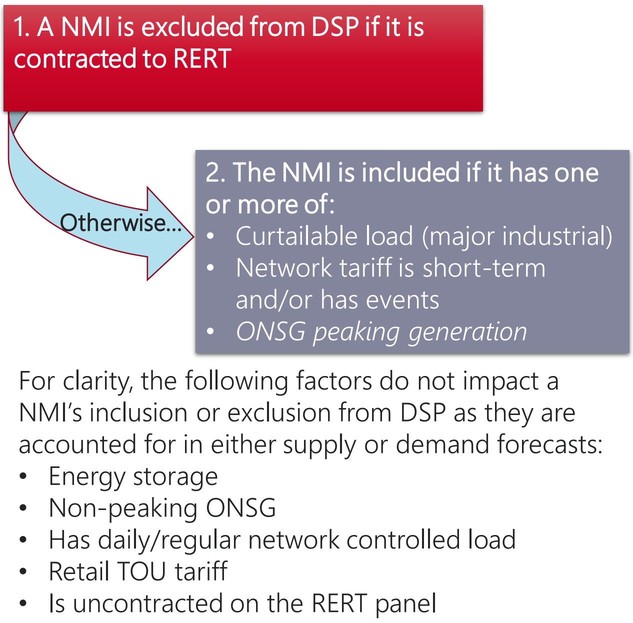
Ideally, every NMI would have its load broken into parts that reflect its underlying load and the effect of each demand response program of which it is a member. However, analytical limitations necessitate AEMO's use of a 'whole NMI' approach – the total DSP resources of a NMI are either wholly in or out of the DSP forecast.

AEMO uses the following logical structure to determine which of the provided NMIs are included in the definition of DSP (note, the specific factors are detailed further below in Figure 3):

- Some factors 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 'inclusion' factors.
- For clarity, other factors that may be associated with a NMI are noted as not being relevant in determining inclusion or exclusion of that NMI from DSP, as NMIs with these factors are already included in either the demand or supply forecasts.

Figure 3 below summarises the allocation of NMI load into DSP.

Figure 3 Allocation of NMI load into DSP



[8] 'Peaking' refers to generators that operate a few hours a year during high price events.

In rare cases, AEMO may need to 'split' a RERT-contracted NMI's load into contracted RERT and DSP eligible components, despite the 'whole NMI' approach (see discussion on additional adjustments in Section 3.3). As an indication, AEMO would only do this for sites with a non-RERT response of at least 10 megawatts (MW).

Rationale

AEMO uses the DSP forecast in its forecast of unserved energy. The forecast of unserved energy helps AEMO to determine whether there is a requirement for RERT (including interim reliability reserves), and therefore needs to calculate DSP that is not contracted as RERT. In terms of RERT status:

- RERT participants that have entered into a RERT contract cannot (see NER 3.20.3(g)-(i)) provide the same capacity to the market in the trading intervals covered by the RERT contract, nor – in the case of scheduled reserves – the 12 months prior to being contracted. They are therefore excluded from the DSP forecast.
- RERT panel members will be included in the DSP forecast if AEMO deems their historical behaviour provides sufficient confidence in their future response, excluding RERT contracted periods in this assessment.

The 'inclusion' factors are included in DSP because their DSP contribution is not already taken into account in demand or generation forecasts.

The other factors are explicitly listed to provide clarity that they have not been overlooked. They are not listed as inclusions because they are already accounted for in either demand or supply forecasts. They are not listed as exclusions because, under the whole NMI approach, the NMI will be included if any of the factors listed in the inclusions apply. In other words, they do not influence inclusion or exclusion of the NMI as a DSP provider in any way.

3.2 Historical time series data

AEMO aggregates the meter data by region according to the two response categories described in Section 2.1. In this process, to avoid double counting, a NMI will only be included once across the categories to ensure these can be summed to a combined estimate of regional DSP response. If a NMI has factors pertaining to both a market-driven response and reliability event driven response, it is included in the market category only.

Typically, a three-year time series is used, because this is short enough to capture recent customer behaviour, yet long enough to capture a useful number of DSP events. AEMO may choose to use a different time period, to ensure sufficient DSP events or to avoid unrepresentative periods.

Time series of wholesale price and periods where LOR events have occurred are also collated and used to identify DSP trigger events.

3.2.1 Calculate the baseline

For each identified trigger event (typically a price event), a baseline is required to estimate the DSP response for the duration of the period the trigger conditions are met. A baseline is an estimate of a consumer's demand in the absence of DSP response. This baseline is consistent with AEMO's demand forecasts (see discussion in Section 2.2), which reflect demand in the absence of DSP and load shedding events.

In contrast to large industrial loads which are stable and easy to calculate baselines for, smaller aggregated loads can vary significantly. This makes baseline calculations challenging, particularly for events of long duration, events with fluctuating prices as a trigger, or combined price and reliability events.

The subtraction of actual observed demand from the baseline results in the estimate of DSP at a given market interval. This calculation is performed at the category level.

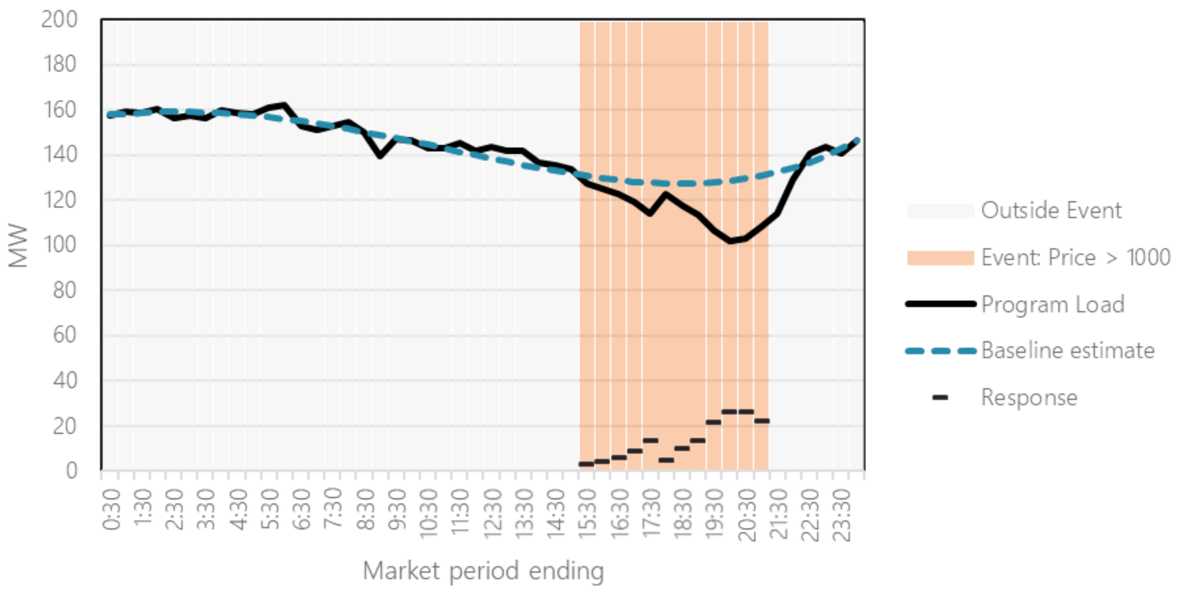
AEMO's approach to calculating baselines from time series of programs or aggregation of DSP programs is to fit one of three models to the time series for each event period[9]:

- A quadratic polynomial, using market period as the explanatory variable, is applied to load aggregates where demand changes smoothly from one period to the next during the day. For example, it is used for residential demand or consumer demand in aggregate. A piecewise polynomial (spline) may be used instead if model verification suggests it fits demand and interpolates across event periods better.
- A constant model (flat demand) is applied when it fits demand better than the polynomial. This is typically useful for individual or smaller groups of industrial facilities, which usually consume a steady rate of energy. Individual site responses are generally only assessed to calculate additional adjustments as outlined in Section 3.3, or to validate the DSP forecast against.
- A model based on historical similar days with DSP events. This is in particularly useful for managing complex consumption patterns, and/or multiple triggers; for example, the combined response from controlled air-conditioners where the majority of the households have coincident electric hot water system response. The similar day model helps separate the air-conditioner response (included in DSP) and hot water system response (excluded from DSP).

For each event day, the half-hourly demand used to fit the model excludes the half-hours of the event period. The 'event day' is permitted to extend over more than one day to ensure enough data is present for fitting the baseline model.

An illustrative example of an estimated baseline using the polynomial model approach, relative to actual demand, is presented in Figure 4. The figure also indicates the 'event period', which is the time range where a DSP trigger is determined to have occurred (outlined in Section 3.2.2).

Figure 4 Example of baseline estimation and calculated response



Any baseline methodology is an approximation and inherently assumes customers follow a particular trend, such as a similar day in the past. In reality, any load (aggregate or individual) will either be over or under this in the absence of any DSP response (with a perfect baseline, the split would be 50/50). This can be seen on Figure 4 above, before the response starting at 15:00.

For any event where a response for some reason does not occur, the observed program load for some half-hours can show as an increase relative to the baseline (negative DSP response). This basically represents

[9] AEMO's approach for estimating baselines was informed by findings reported in Jazaeri, J., Alpcan, T., Gordon, R.L., Brandão, M.F., Hoban, T., and Seeling, C. (2016), "Baseline methodologies for small scale residential demand response". 2016 IEEE Innovative Smart Grid Technologies - Asia (ISGT-Asia), 747-752.

a random drift in consumption around an average baseline at times where there is no response. A similar number of half-hours would see a reduction in consumption (positive DSP response).

The treatment of negative DSP responses is discussed further in Section 3.2.3.

3.2.2 Response by event

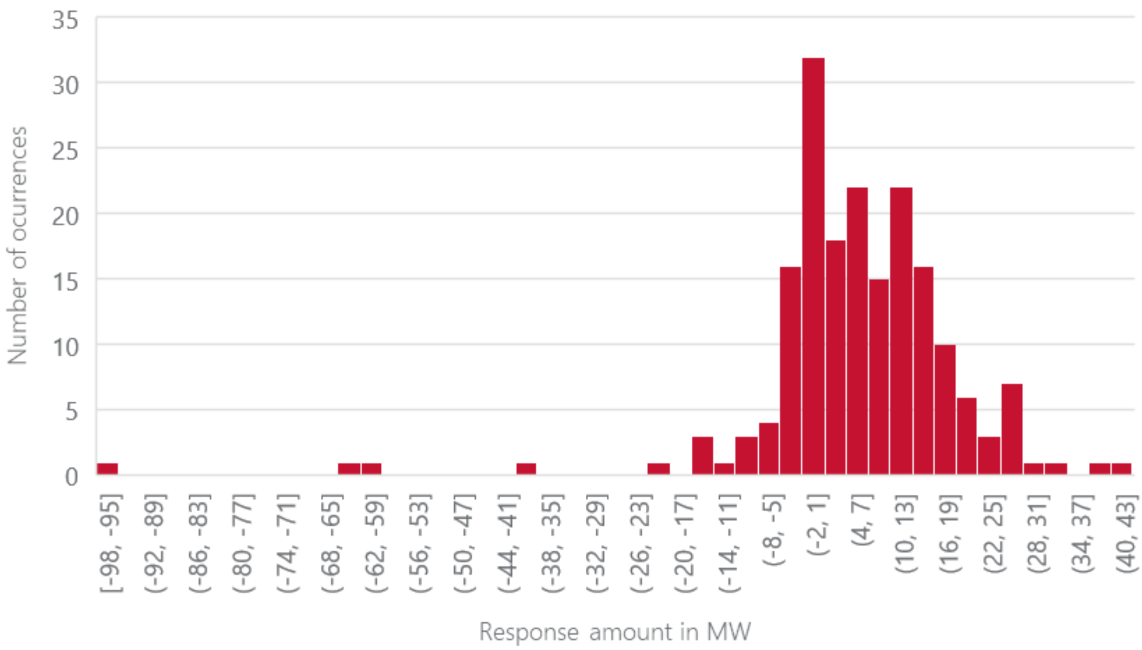
Responses are estimated by subtracting baseline demand (Section 3.2.1) from actual demand, for any period where event trigger conditions are met:

- **Price triggers** – to cover a reasonable range of different DSP initiatives, AEMO estimates DSP wholesale electricity prices exceeding the following levels:
  - $300 per megawatt hour (MWh).
  - $500/MWh.
  - $1,000/MWh.
  - $2,500/MWh.
  - $5,000/MWh.
  - $7,500/MWh to the market price cap (MPC).
- **Reliability triggers** – the responses are estimated for periods with:
  - Actual LOR 2 and LOR 3 events[10].
- **Load-on trigger** – this response measures the estimated increase in demand for periods where prices are less than $0/MWh.

3.2.3 DSP Response probability curve

For a portfolio of DSP resources, responses vary even for the same trigger value, as shown in Figure 5.

Figure 5 Example DSP response distribution as a histogram for a specific trigger



For each trigger and response category, AEMO forms a DSP response probability curve from historical DSP responses.

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[10] See AEMO's reserve level declaration guidelines, at https://www.aemo.com.au/-/media/files/electricity/nem/security_and_reliability/power_system_ops/reserve-level-declaration-guidelines.pdf?la=en&hash=C6BAAC5CFAED22495C92C7C418885F43.

For multiple trigger levels, the data can be presented as a family of probability distribution curves. An example family of derived probability distribution curves is presented in Figure 6.

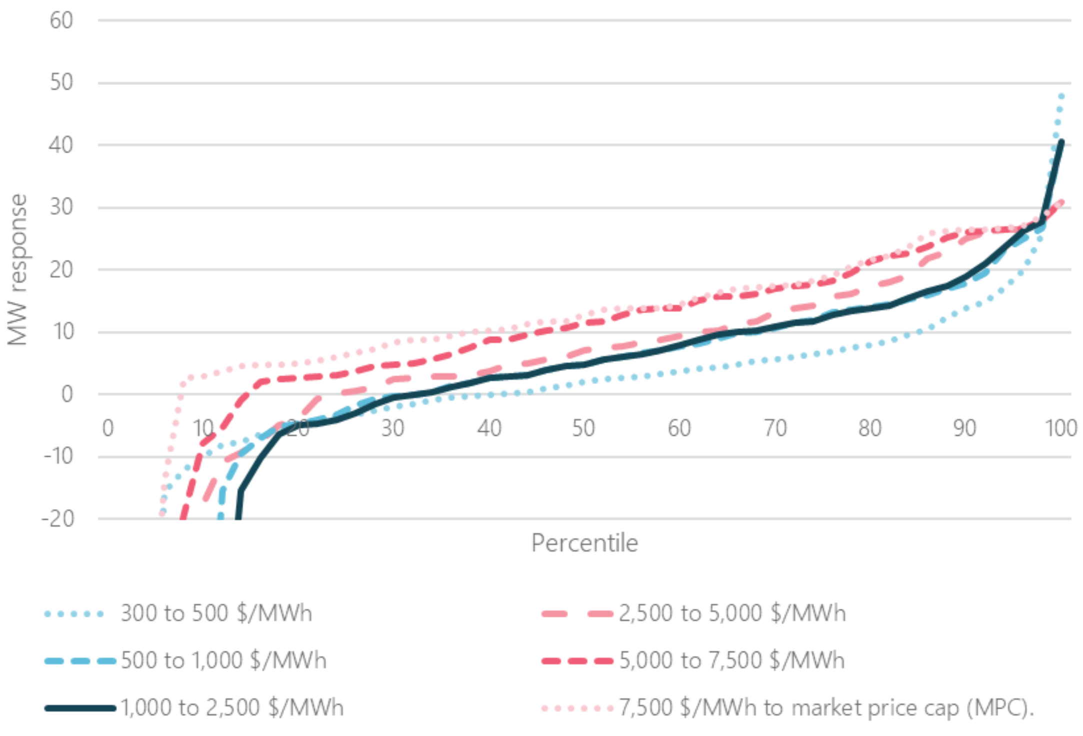
3.2.4 50th percentile response

AEMO uses the 50th percentile of DSP response at each price trigger as the most reasonable estimate of the response distribution for future DSP.

At the extreme ends of the percentile range, response estimates vary widely, due to atypical behaviour of the load and the baseline calculation approach. In particular, the negative values seen in 10-30% of the cases represent random drift in consumption during an event period where there was no response (as discussed in Section 3.2.1). Removing negative values creates a bias towards over-forecasting DSP unless a similar amount of upwards random drift is removed.

As AEMO uses the 50th percentile of responses at each price trigger, any bias will be negligible, and no adjustments are required. AEMO may present additional percentiles for information about the shape of the response probability distribution, but care must be taken to remove the biases from the drift to lower consumption for percentiles lower than 50th and remove the drift towards higher consumption for percentiles higher than 50th.

Figure 6 Response probability distribution by price bands



3.3 DSP during reliability events

LOR 2 and LOR 3 events occur very rarely, so there are very few data points on which to estimate a distribution of DSP response. Consequently, AEMO uses the 50th percentile of responses above $7,500/MWh as an approximation of the likely DSP response. This trigger is only met when at least three 5-minute intervals have reached the MPC over the 30-minute trading period. As an example of how rare such triggers are, during the summer 2019-20, only five of the eight LOR 2 events had half-hourly prices exceeding $7,500/MWh at any point.

At most, only a few regions experience reliability events in any year. Where they do occur, AEMO assesses the forecast accuracy against observed response. Should it be apparent that a different percentile or price level better matches the DSP response during reliability events, AEMO will announce and justify the change in its annual forecast improvement plan.

Network event programs

In addition to the market-driven response at prices exceeding $7,500/MWh, AEMO adds the estimated response from network event programs.

The network event programs can only be called on a limited number of times per year, and they generally reflect loads that would not respond to price when forecast demand is very high.

Such programs generally have a large customer base, making it computationally challenging to use a NMI-level methodology as used for market-driven responses. Accordingly, AEMO has previously used estimated response from organisations running these programs, rather than calculating response itself. Where practicable, and efficient to do so, AEMO will model such programs itself at the NMI level. This will best capture the level and variability of DSP response performance.

As some network event programs are summer only, AEMO generally presents different forecasts for summer and winter seasons.

Additional adjustments

Occasionally, AEMO learns of new loads or changes to consumption patterns that may reasonably result in changed DSP response during reliability events. AEMO may in these cases adjust the combined reliability response with the estimated impact of the change, which will be based on the size of these loads and assumed (for new loads) or observed (for existing loads) response pattern. This may include a limitation of the duration of any response, where relevant.

An example of such an adjustment is where a site has a potential response contracted for RERT, but the remainder of the site remains able to respond to normal price or reliability signals. AEMO can, when it has seen evidence of such behaviour, include an estimate of this response.

Combined reliability response

In total, the combined reliability response assumed is:

Reliability response = market response (>$7,500/MWh) + network event response + adjustment

3.4 Load-on DSP

Similar to load curtailment (or increase of embedded generation) during high prices, DSP in a wider sense can also include load increase (and/or reduction of embedded generation) during low or negative price events. This type of DSP can be an important means to address power system security issues during minimum load conditions. From October 2021, the Wholesale Demand Response rules change[11] specifically changes the definition of DSP from load curtailment to load adjustment.

This type of response is assessed in the same way as other price triggers, using a calculated baseline as reference point, and AEMO will include Load-on DSP as it starts seeing evidence of such behaviour.

3.5 Validation of existing DSP response

Ahead of publishing the final DSP forecasts, both the market response and reliability response projections are verified using the information submitted to the DSP IP and the most recent observed DSP responses to both high price and reliability events.

Draft DSP forecasts will be presented to AEMO's Forecasting Reference Group for feedback. AEMO will, where required based on feedback, update the forecast before publishing as final.

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

4. Forecasting future DSP

Section 4 outlines AEMO's approach to estimating future DSP levels. AEMO's treatment of future DSP developments differs depending on whether the new DSP is committed or prospective.

4.1 Committed DSP

AEMO treats future DSP projects as committed if they are:

- reported through the DSP IP as qualifying contracts under the Retailer Reliability Obligation (RRO), or
- an approved Demand Management Incentive Scheme (DMIS) initiative under the Australian Energy Regulator's (AER's) revenue reset process, or
- other initiatives providing a similar level of certainty of the DSP progressing.

AEMO's reliability forecasting processes, referred to in Section 2.3.2, include an estimate of existing DSP (Section 3.3) and committed changes outlined above.

AEMO also accounts for committed closures of major sites currently providing DSP, reducing the level of DSP accordingly.

Beyond the committed changes, AEMO assumes that the DSP capacity remains static over the forecast horizons for use in reliability forecasts.

4.2 Additional growth in DSP

While AEMO's reliability assessments only assume current and committed DSP, the ISP (and other longer-term studies) use a scenario-based approach to explore DSP evolution across a wide range of plausible scenarios.

Forecast DSP may include increased activities driven by new Rule changes and/or the uptake of new technology; for example, the Australian Energy Market Commission's (AEMC's) Wholesale Demand Response mechanism[12], or the proposal to make a range of appliance types capable of demand response through mandating Australian Standard 4755.2 for these[13].

In keeping with Section 3.1, the forecast still excludes growth from technologies captured elsewhere in AEMO's forecasts. Examples of such technologies includes standalone battery storage, and storage operated in aggregate as virtual power plants (VPPs). These technologies are accounted for in the demand forecast (individually operated systems) and the supply forecast (all systems aggregated as VPPs) respectively.

Long-term DSP forecast approach

For long-term planning studies such as the ISP, DSP levels are interpolated between the current DSP outlook and scenario assumptions of end of period DSP levels. The scenarios are informed by review and analysis of NEM and international DSP potential.

The process involves:

- Establishing the current level of DSP (see Section 3.1) – point A in Figure 7.
- Making assumptions around committed and anticipated future DSP projects in the next five years (point B in Figure 7). Anticipated future DSP projects represent likely DSP that is not yet committed according to Section 4.1.

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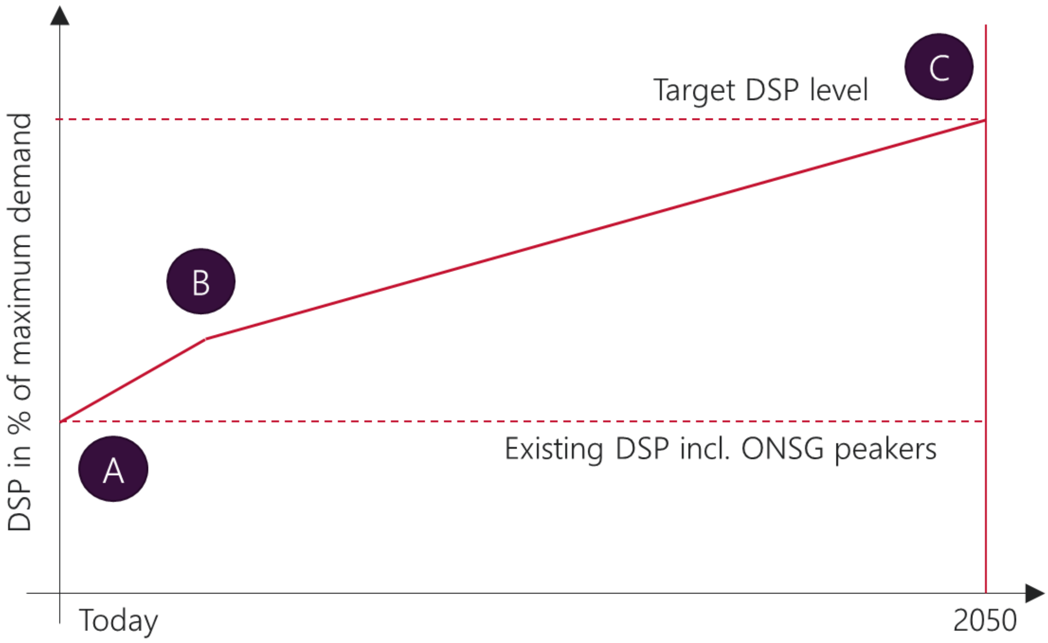
[12] See https://www.aemc.gov.au/rule-changes/wholesale-demand-response-mechanism.

[13] See http://energyrating.gov.au/news/demand-response-update.

- Defining the magnitude of DSP relative to maximum demand at point B in Figure 7 and linearly interpolating the trend from this point to meet the scenario-specific target (point C) at the end of the outlook period.

Price response is obtained by scaling the projected reliability response to trigger levels that maintain the same response proportions as the initial forecast year. For example, if 20% of current DSP is available at the lowest price trigger point, then future lowest price trigger points are estimated so as to preserve a response level of 20% of the total available.

Figure 7 Illustrating how future DSP is forecast



The key driver of future DSP scenarios is the assessed potential of DSP levels as a percentage of regional maximum demand. To inform the assessment, AEMO conducts a literature review of the potential for demand response in international energy markets, primarily the United States and Europe.

The review takes into account DSP response categories, market structures (wholesale price or capacity markets), and DSP policy design.