

Operational management of low demand in South Australia

22 October 2020

Record low demand levels are forecast in South Australia in spring 2020. This fact sheet provides advice to stakeholders on the operating strategies AEMO will implement to manage secure power system operation during low demand periods.

Background

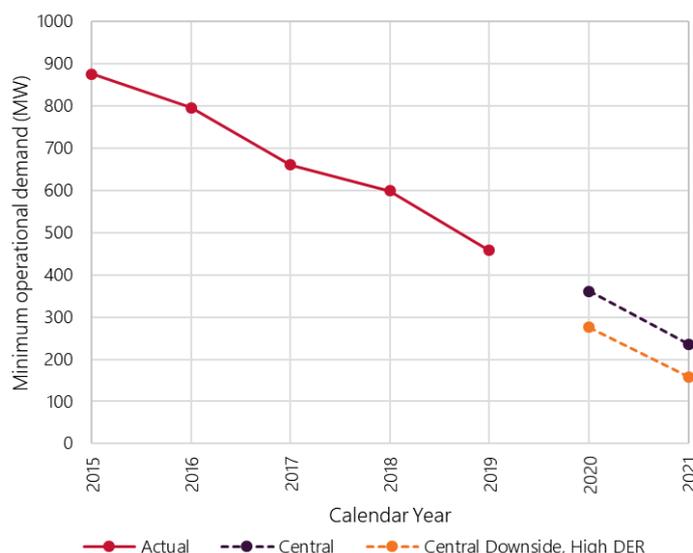
The present record for minimum operational demand in South Australia is 300 MW, which occurred on 11 October 2020 beating the previous record of 458 MW set on 10 November 2019.

AEMO forecasts that due to the continued growth of distributed PV, South Australia will continue to experience reductions in operating demands during the spring and early summer period (from now until the end of 2020), particularly on weekends and public holidays.

AEMO's forecasts¹ indicate that operational demand (electrical load that needs to be supplied by scheduled, semi-scheduled and registered non-scheduled generating units) could reach as low as 276 MW² under some projections.

Historical and projected minimum operational demand levels in South Australia are shown in Figure 1.

Figure 1 Minimum operational demand in South Australia (90% probability of exceedance)³



South Australia is at the forefront of this relatively new phenomena and is approaching the ability for household and distributed PV being able to meet the entire state's demand. Operating a network such as South Australia's, which extends across 200,000 km and powers approximately 800,000 households can prove challenging at times where there is little residual demand.

¹ AEMO (August 2020) 2020 Electricity Statement of Opportunities, at https://aemo.com.au/-/media/files/electricity/nem/planning_and_forecasting/nem_esoo/2020/2020-electricity-statement-of-opportunities.pdf?la=en&hash=85DC43733822F2B03B23518229C6F1B2.

² ES00 Central Downside, High DER scenario, as generated operational demand, 90% probability of exceedance forecast.

³ Forecasts shown are based on 90% probability of exceedance, as generated operational demand.

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AEMO has a program of work to analyse the technical integration of distributed PV in the National Electricity Market (NEM) and South West Interconnected System (SWIS). This program aims to identify and implement suitable measures to maintain power system security in low demand periods with large quantities of distributed PV operating⁴.

AEMO's analysis indicates the need for rapidly introducing new capabilities for distributed PV installations, including improved disturbance ride-through capabilities, and the ability to remotely reduce generation if required^{5,6}.

The intention of these measures is to ensure that AEMO continues to have the ability to manage network issues and maintain a secure and reliable power system, as well as continuing to support ongoing growth in installation of distributed PV⁷.

A reduction in distributed PV generation will only be used as an emergency last resort, when all other measures that can reasonably be used have been exhausted. AEMO's analysis has indicated this could occur during spring 2020 if there are abnormal power system conditions such as unplanned major line outages, or if South Australia separates from the rest of the NEM.

AEMO is collaborating with SA Power Networks, ElectraNet and the South Australian Government to put the necessary capabilities in place. AEMO's operating strategies have been updated to incorporate the growing availability of new capabilities, and to further refine details on when they would be enabled, as outlined below.

Operating strategies

AEMO have developed operating strategies for the following scenarios:

- System intact, when South Australia is connected to Victoria, and there are no network outages that leave South Australia at credible risk of separation.
- When there are conditions that leave South Australia at credible risk of separation.
- When South Australia is operating as an island.

In each of these scenarios, AEMO will follow these steps when necessary to maintain power system security:

1. AEMO will work with Transmission Network Service Providers to manage outages on the transmission network and interconnectors to maintain power system security.
2. Scheduled and semi-scheduled generators will receive targets according to their bids and relevant constraints. This process will automatically reduce their generation to 0 MW or their technical minimum levels if necessary, to maintain the operation of a minimum number of synchronous generating units in South Australia. The minimum number of synchronous units is determined by combinations of synchronous generating units that provide sufficient system strength. These combinations are published in Transfer Limit Advice⁸ on the AEMO website.

⁴ AEMO, DER Operations, <https://aemo.com.au/initiatives/major-programs/nem-distributed-energy-resources-der-program/operations>

⁵ AEMO (August 2020) 2020 Electricity Statement of Opportunities, Chapter 7, at https://aemo.com.au/-/media/files/electricity/nem/planning_and_forecasting/nem_esoo/2020/2020-electricity-statement-of-opportunities.pdf?la=en

⁶ AEMO (May 2020) Minimum operational demand thresholds in South Australia, https://aemo.com.au/-/media/files/electricity/nem/planning_and_forecasting/sa_advisory/2020/minimum-operational-demand-thresholds-in-south-australia-review.pdf?la=en&hash=BBB27149A93B9259C63B47A8ECDB0B6E

⁷ AEMO (June 2020) Managing South Australia's Energy Transition Fact Sheet, at https://www.aemo.com.au/-/media/files/electricity/nem/planning_and_forecasting/sa_advisory/2020/sa-technical-report-factsheet.pdf?la=en

⁸ AEMO (July 2020) Transfer Limit Advice – System Strength, at https://www.aemo.com.au/-/media/files/electricity/nem/security_and_reliability/congestion-information/transfer-limit-advice-system-strength.pdf

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3. If further response is required to maintain minimum synchronous generating units, sufficient security services such as frequency control, and maintaining necessary network limits, then AEMO may issue directions or instructions to registered non-scheduled generation (units larger than 30MW) in South Australia to reduce generation.
4. If further response is required to maintain system security, as a last resort, AEMO may issue instructions to SAPN (via ElectraNet) to take a number of actions which may result in generation from non-registered, non-scheduled distributed PV being reduced, if required. If there is sufficient forewarning of these circumstances, AEMO may release a Market Notice to inform stakeholders that low demand periods have been forecast and actions may be taken to maintain system security.

In periods with system normal conditions, the probability of distributed PV curtailment is extremely low.

Next steps

Further analysis is ongoing, and operating strategies during low demand periods will be updated as necessary to incorporate new insights. AEMO will communicate changes to stakeholders as required.



Where can I find more information?

For any further enquiries, please contact AEMO's Information and Support Hub via

- supporthub@aemo.com.au or
- call 1300 236 600