Minimum operational demand

Australia is leading the world with the installation of rooftop solar photovoltaic (PV), also referred to as Distributed PV or more broadly consumer energy resources (CER).

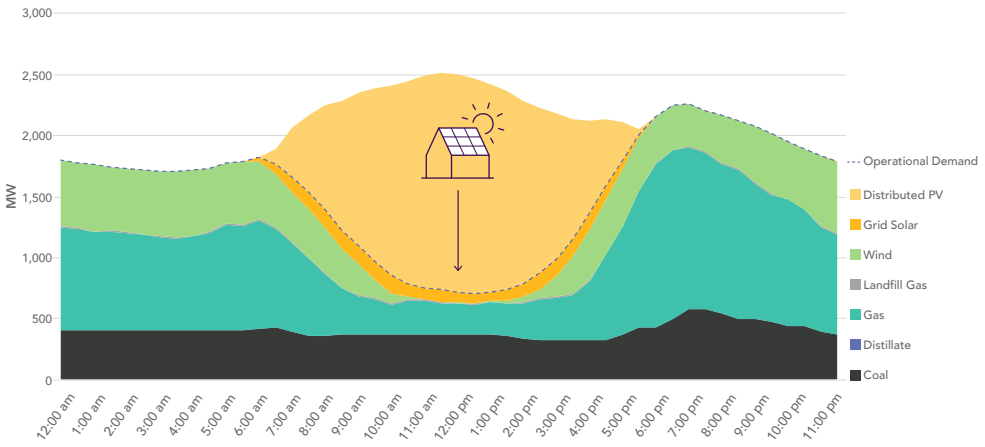
In the 2020-21 financial year, rooftop solar provided 8.5% of total electricity used in the National Electricity Market (NEM) and 13.5% in Western Australia's Wholesale Electricity Market (WEM). Investments in rooftop solar remains popular and AEMO forecasts the installed capacity to more than double over the next decade.

Rooftop solar presents opportunities for consumers and energy service providers, and AEMO needs to make sure the required measures are in place to ensure the continued secure and reliable supply of electricity during periods of very low operational demand.

AEMO
AUSTRALIAN ENERGY MARKET OPERATOR

What is minimum operational demand?

As consumers generate more of their own electricity through devices like rooftop solar, it drives down demand for grid-scale generation like coal and gas, resulting in 'minimum operational demand', as you can see in the graph below.



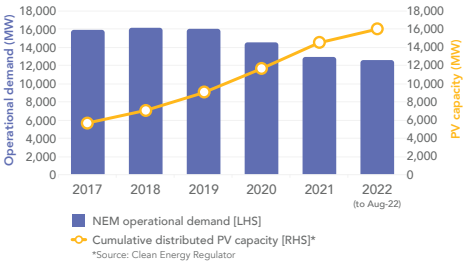
Minimum operational demand is more common on sunny, mild temperature days with high rooftop solar generation combined with lower energy use.

The challenge

When rooftop solar generation is high, the need for grid-scale supply naturally becomes extremely low, which displaces grid generators.

At present, these generators provide a range of essential system services, including frequency control, system strength, voltage management, inertia, and so on. In periods of very low operational demand, these services need to be sourced from elsewhere or, if that isn't possible, AEMO must intervene to keep the grid in a secure operating state.

Minimum operation demand continues to decline as rooftop solar installations increase



The solution

AEMO continues collaborating with industry and jurisdictions to engineer grids and build new consumer focussed rooftop solar markets that can handle 100% instantaneous renewable generation at times by 2025, laying the groundwork for Australia's net zero future.

Mitigation actions are either already in place or being explored by AEMO, together with government and industry, to make sure the grid operates securely and reliably in periods of low operational demand.

SHORT-TERM

When operational demand falls below required thresholds, AEMO will intervene to maintain system security. This can include directing network service providers to return lines or elements to service, or directing generators (or loads) to operate in a certain way or deliver essential services.

State-based solar management programs:

The South Australian, Western Australian, and Queensland governments have each implemented solar management programs that enable some rooftop solar systems to be dialled down, as a last resort when all other options have been exhausted, in extreme conditions to protect grid stability and minimise the likelihood of state-wide blackouts.

When this happens, AEMO will communicate the process and operating framework with industry. Read more on the Contingency and Minimum System Load framework on AEMO's website.

LONG-TERM

In future, where the majority of the power system may be supplied by consumer resources at certain times, it will be necessary for these resources to participate in active market frameworks, to deliver much of the essential services required by the grid.

New consumer-focused markets are being designed to enable consumers to harness the full value of their energy devices, such as rooftop solar. These markets will directly benefit consumers and all energy users with a more reliable, secure and affordable power supply, and enable everyone to continue installing rooftop solar.