

August 2024

SWIS Engineering Roadmap

AEMO's SWIS Engineering Roadmap outlines actions needed to securely operate the SWIS with high levels of renewable energy, critical to enabling Western Australia's transition to a net zero economy.

Operating the SWIS with increasing levels of WA's abundant wind and solar energy involves more than a straight swap of coal-fired power plant assets to renewables and battery storage.

These technologies interact with the power system in fundamentally different ways to synchronous generation (historically large gas and coal powered generators).

While operating with increasing levels of renewables presents engineering challenges, we are confident these can be addressed through the actions of the Engineering Roadmap to ensure reliable, secure and affordable energy for Western Australians.

A future SWIS

The SWIS Engineering Roadmap sets out the pre-conditions and power system characteristics that must exist to allow increasing levels of renewables contribution, and the engineering studies and capabilities required to achieve these pre-conditions.

This work will enable the SWIS to transition to a future where:



Coal generation and other aging fossil-fuelled generators retire from the SWIS.



Electricity demand significantly increases due to electrification and new industry development.



The majority of electricity demand is served by renewable energy – in particular rooftop solar during daylight times – firmed by storage and backed up by gas-fired generation.



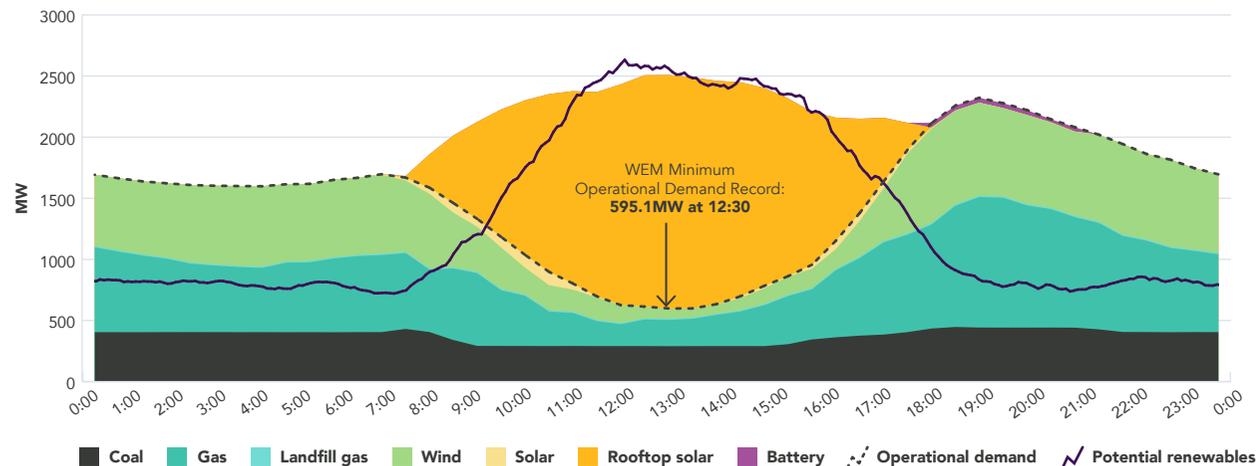
Consumer-owned distributed energy resources (DER) – like rooftop solar, batteries and electric vehicles – are aggregated to operate like virtual power plants in the Wholesale Electricity Market (WEM).

Current operations

At times, there is already enough renewable generation capacity available to meet total demand on the SWIS.

This can be seen in the chart below, which shows there was enough potential renewable energy to meet demand at the time. However, the power system is not yet able to harness the full potential of this renewable energy. WA's transition to renewables is well underway. In FY2024, renewables on the SWIS peaked at 82%, with sufficient renewables available to satisfy total demand.

The SWIS Engineering Roadmap seeks to extend AEMO's ability to operate with even greater renewable contributions. To do this, the power system will need to be able to operate with lower levels of synchronous generation. The engineering actions mapped out in the roadmap provide a pathway to reducing the need for these synchronous generators.



Actions

The SWIS Engineering Roadmap sets out the required actions to unlock the full potential of renewable energy in the SWIS.

These engineering actions will facilitate the technical, operational and planning requirements to advance the grid's capability to operate with higher levels of renewable generation.