



Fact sheet

Power system security

System security deals with the technical parameters of the power system such as voltage and frequency; the rate at which these parameters might change and the ability of the system to withstand faults.

Recent event

During the day of 28 September 2016 there were severe storms in South Australia including many lightning strikes. At 16.18 hours (15.48 South Australian time) the South Australian network separated from Victoria and the remainder of the mainland power system. All generation and supply to consumers in South Australia was lost.

What happens in a black system event?

Black system events are extremely rare. The last one was in northern Queensland in 2009 and before that New South Wales in 1964.

The sudden, unexpected loss of a major source of supply can cause very rapid changes in system frequency which undermines the security of the electrical system.

Networks and generators will automatically disconnect or “trip” when there is a very rapid change in frequency in order to protect equipment and personnel from harm.

Who are the electricity market bodies?

The National Electricity Market is operated by AEMO in real time - it balances electricity supply and demand on a continuous basis.

The AEMC is the decision maker on market rule change requests and advises governments on long term market settings and design.

The AEMC’s Reliability Panel defines power system security and reliability standards necessary to provide a reliable and secure electricity market - against which AEMO and network businesses operate the system.

Who does what in a black system event?

AEMO has overall responsibility for coordinating the restart and restoration process; and determining the fastest way to reconnect the system.

Transmission network companies (in the South Australian case, Electranet) work with the distribution network providers (in South Australia SAPN) to prepare blocks of load to be reconnected progressively.

The distribution network provider has responsibility for ensuring the local network is ready to have power restored and coordinates reconnection with the transmission business.

AEMO liaises with nominated parties in a jurisdiction to coordinate the restoration process and if necessary the exercise of emergency services powers.

Maintaining system security

AEMO maintains power system security. Security events are caused by sudden equipment failure – in South Australia’s case because of an extreme weather event. The sudden, unexpected loss of a major source of supply can cause very rapid changes in system frequency which places at risk the security of the electrical system. Elements of the system such as networks and generators across the state automatically disconnect or “trip” when there is a very rapid change in frequency.

The AEMC has recently initiated a review of system security

Our power system security review is complementing the detailed technical work being done by AEMO as part of its Future Power System Security Program. The AEMC is considering the best ways for market and regulatory frameworks to address power system stability as the generation mix changes.

We are in close collaboration with AEMO on this review - looking at a range of options to contribute to stability and how market regulatory frameworks can do this at the most efficient cost.

Black start system procedures

All generators and network service providers (distribution and transmission) prepare and maintain the local black system procedures which must be approved by AEMO. These procedures outline the actions that would be taken in the event of a major supply disruption. Information within the procedures allows AEMO to effectively coordinate the safe implementation of the system restoration plan. This plan is prepared by AEMO for the purpose of managing and coordinating system restoration activities during any major supply disruption.

System Restart Standard

The System Restart Standard is set by the AEMC's Reliability Panel.

The standard specifies the time frame and generation supply capability to be restored following a major supply disruption. As such the standard provides a target for AEMO for the procurement of system restart ancillary services (SRAS) from generators.

The System Restart Standard is a procurement standard under which AEMO contracts System Restart Ancillary Services (SRAS) from generators.

After a power outage most generators need to get energy from the grid to start generating electricity again. If supply from the system is lost, most generators are not capable of independently restarting in the event of tripping off.

Some generators have specialised equipment that allows them to restart without external support. These generators are a backup providing dependable restart capability. In the event of a major supply disruption, contracted SRAS and any other available resources may be called on by AEMO to supply energy to restart power stations; and begin the process of restoring the power system.

As part of a review of the rules framework for SRAS the AEMC asked the Reliability Panel to review the System Restart Standard. This work is underway and due to report by December this year.

Reporting on what happened this week

Under the National Electricity Rules, AEMO is required to investigate and report publically on any severe system security incident such as the one that has occurred in South Australia this week. The AEMO review is to report on the adequacy of the performance of facilities and the actions to maintain power system security.

The Australian Energy Regulator is given powers under the National Electricity Law to investigate compliance with the law and the rules.

For information contact:

AEMC Chairman, **John Pierce** (02) 8296 7800

Media: Communication Director, Prudence Anderson 0404 821 935 or (02) 8296 7817

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