Overview of 2023 Electricity Statement of Opportunities

This fact sheet provides an overview of AEMO's 2023 Electricity Statement of Opportunities, which is a 10-year reliability outlook for the National Electricity Market.

About AEMO and the NEM

As Australia's independent energy markets and power systems operator, AEMO provides critical planning, forecasting, advice and other services to support the delivery of safe, reliable and affordable energy.

Spanning around 40,000 km, the National Electricity Market (NEM) is an electricity grid that connects five regions: Queensland, New South Wales (including the Australian Capital Territory), Victoria, South Australia, and Tasmania, and supplies nine million customers.

What is the ESOO?

Published annually, AEMO's Electricity Statement of Opportunities (ESOO) provides information on future needs of the electricity system to ensure ongoing reliable supply of electricity to Australian homes and businesses.

It is one of several publications that helps governments, industry and consumers to understand where investment is needed across the NEM to meet consumers' future needs.

The ESOO draws on insights from surveys with industrial load operators, energy developers and market participants, transmission information, and analysis of energy limitations, like the potential impact of drought or coal and gas supply shortfalls.

Its goal is to help prepare for and navigate the reliability of our energy future.

Visit AEMO's website for:

ESOO 2023 full report

ESOO Media release

ESOO Infographic

Key takeaways

- The NEM is undergoing its largest transformation since formation, driven by the notified retirement of approximately 20% of today's older coal and gas fleet by 2033.
- This year's ESOO highlights the pace of Australia's energy transition. **Urgent investment is needed to meet people's growing energy needs and continue to deliver reliable, affordable and cleaner energy for consumers.**
- In the next 10 years, Australia's overall electricity demand is forecast to grow. AEMO has found, in certain cases, **larger gaps in reliability (the ability of the system to meet energy demand levels) than forecast in 2022**.
- To ensure consumers continue to have access to reliable electricity supplies, it is critical that planned investments in energy generation, transmission and storage are delivered urgently.
- Transmission projects identified in AEMO's Integrated System Plan (ISP), government initiatives, and orchestrated consumer energy resources* can address many identified risks, if delivered to schedule.
- There is an opportunity for consumers' rooftop solar, batteries and electric vehicles to actively participate in the power system to further reduce reliability risks.
- This summer is forecast to be hotter and drier than previous years and will see an elevated level of reliability risk. The entire industry is focused on managing these conditions, but some risk will remain.

Key factors driving the 10-year outlook

What are some of the challenges and opportunities impacting the 10-year outlook?

Notified retirement of approximately 20% of older coal and gas generators by 2033.

Many new wind, solar, battery and pumped hydro developments have advanced sufficiently to be considered in the 2023 ESOO. This impacts positively on the reliability outlook.

Generator unplanned outage rates (which can have a range of causes, like extreme weather events or equipment faults) are forecast to be higher than previously, reflecting recent performance trends of existing coal and gas generation as they head toward end of life.

Forecasts of energy usage and maximum demand are higher in some NEM regions, driven by varying electrification rates (e.g., moving away from gas cooking and heating), of households and businesses and more industrial facilities.

Delays in the delivery of new infrastructure. AEMO has called for urgent delivery of new investments to ensure reliable electricity supply for consumers.

Solutions which coordinate consumers' energy storage devices (e.g., batteries for solar) to support reliability are coming online at a lower rate than previously assumed.

New and improved weather data and modelling for renewable generation has improved forecasting accuracy.

Development opportunities

While the 2023 ESOO forecasts large reliability gaps in all mainland NEM regions, it only considers energy generation and infrastructure projects with a degree of certainty; meaning they have progressed sufficiently to meet AEMO's commitment criteria.

For example, the 2023 ESOO forecasts an additional 20.8 GW of energy generation and storage developments in operation by the end of 2032-33.

This is only a sub-set of known potential developments, and there are many more still in early stages. This amounts to around 247 GW in proposed generation and storage projects (including battery, pumped hydro, and other technologies) which have the potential to address reliability risks if developed in a timely manner.

Projects that coordinate or orchestrate* consumer energy storage devices (such as batteries and electric vehicles) in energy grids, up to a projected total of 6.6 GW, also offer great potential to reduce the need for utility-scale investments.

Federal, State and Territory Governments have also committed to significant policy mechanisms that are likely to introduce more energy storage and generation into the market.

These developments, if supported by the timely construction of new electricity transmission lines to connect them to the broader energy market and customers, have the potential to manage most of the reliability risks AEMO has identified over the next 10 years.

Reliability forecasts by NEM region

Reliability refers to the ability of the system to provide the required power to customers, at all times, without interruption.

There are two electricity reliability standards* that are used across the industry. Each standard carries a level of risk.

Considering only existing, committed and anticipated projects as per the ESOO's Central Scenario, reliability risks are forecast to exceed the relevant reliability standard in:

South Australia in summer 2023-24 and again from 2028-29.

Victoria from summer 2023-24.

New South Wales from 2025-26.

Queensland from 2029-30.

Tasmania does not exceed the relevant reliability standard in any year.

These are forecasts of risks based on current data.

Transmission projects identified in AEMO's Integrated System Plan (ISP), Federal and State Government initiatives (e.g., mechanisms delivering firming capacity such as the Commonwealth's Capacity Investment Scheme) and orchestrated consumer energy resources (CER)* can address many of the identified risks over most of the 10-year horizon, if delivered to schedule.

If this happens, risks in all NEM regions fall within the reliability standards over the 10-year outlook, except Victoria in 2028-29.

Summer outlook 2023-24

This summer has more risk than the last few years. It is forecast to be hotter and drier.

Electricity demand may be higher than observed in recent years.

AEMO, industry, and governments are well underway with preparation to manage summer conditions, but reliability risks remain.

How AEMO forecasts reliability

AEMO considers the availability of existing, committed and anticipated generation and transmission capacity, from coal, gas, wind, solar, hydro or battery sources, taking into account announced generator retirements (such as coal plants), and compares this against the forecast electricity demand over the next 10 years.

The change in supply, demand, and other factors such as generator outages and the availability of renewable energy resources across the NEM are brought together in what we call the Central Scenario.

AEMO then forecasts the level of risk that is expected over various weather and generator outage conditions, to evaluate whether each NEM region will meet electricity reliability standards* over the next 10 years.

The reliability gaps identified through the Central Scenario form an important part of the electricity planning process, as they provide the signal, and in some cases the obligation, for electricity retailers to contract enough energy from generators ahead of time to meet their customers' expected needs.

* Methodology and terms used in the ESOO

What is reliability?

Reliability refers to the ability of the power system to provide the required power to customers, at all times, without interruption.

What is unserved energy?

Unserved energy (USE) represents energy that cannot be supplied to consumers when demand exceeds supply under certain circumstances, resulting in involuntary load shedding (loss of customer supply) in the absence of out of market intervention.

What is a large USE event?

A USE event can vary in magnitude, depending on the scale of imbalance between supply and demand. A large USE event typically is referred to when the level of expected USE is above the reliability standard, or equivalent to about between 10 and 12% of average regional demand being unserved for a period, say for five to eight hours. This could be in a single event or reflect several outages over multiple days.

Electricity reliability standards have a certain threshold of risk of large USE events. For example, at a frequency of one large USE event in every 10 years, or one in every five years.

What are electricity reliability standards?

The NEM includes two relevant reliability standards that AEMO considers when forecasting reliability:

- The **Interim Reliability Measure** is a measure of expected USE in any region of no more than 0.0006% of energy demanded in any financial year. At 0.0006% USE in a region, associated market settings would deliver sufficient supply apart from about 10% of average regional demand for about five hours once every ten years or other equivalent combinations.
- The **reliability standard** is a measure of expected USE in each region of no more than 0.002% of energy demanded in any financial year. When reliability is forecast consistent with the reliability standard, consumers should expect larger USE events (on average 12% of average regional demand for eight hours) at a frequency of one in every five years.
- For the 2023 ESOO, the IRM applies until 30 June 2025 after which the reliability standard applies.
- In those rare circumstances when USE is forecast, AEMO may use out of market mechanisms available to mitigate these reliability risks.

What are consumer energy resources?

Consumer energy resources are energy resources that consumers own, such as energy generation and storage at the premises (e.g., solar panels, batteries and electric vehicles).

What is orchestration of consumer energy resources?

Orchestration refers to the coordination of distributed consumer storage devices such as batteries and electric vehicles to support reliability of the electricity market. Participation is voluntary in these schemes. An example would be a Virtual Power Plant (VPP).