National Electricity Market

August 2024

Engineering Roadmap

AEMO's Engineering Roadmap outlines actions needed to securely operate the National Electricity Market (NEM) with high levels of renewable energy, critical to enabling Australia's transition to a net zero economy.

The energy transition is well underway, with 90% of today's coal-generation fleet to retire before 2035 and renewables already suppling more than 40% of our energy needs in the NEM.

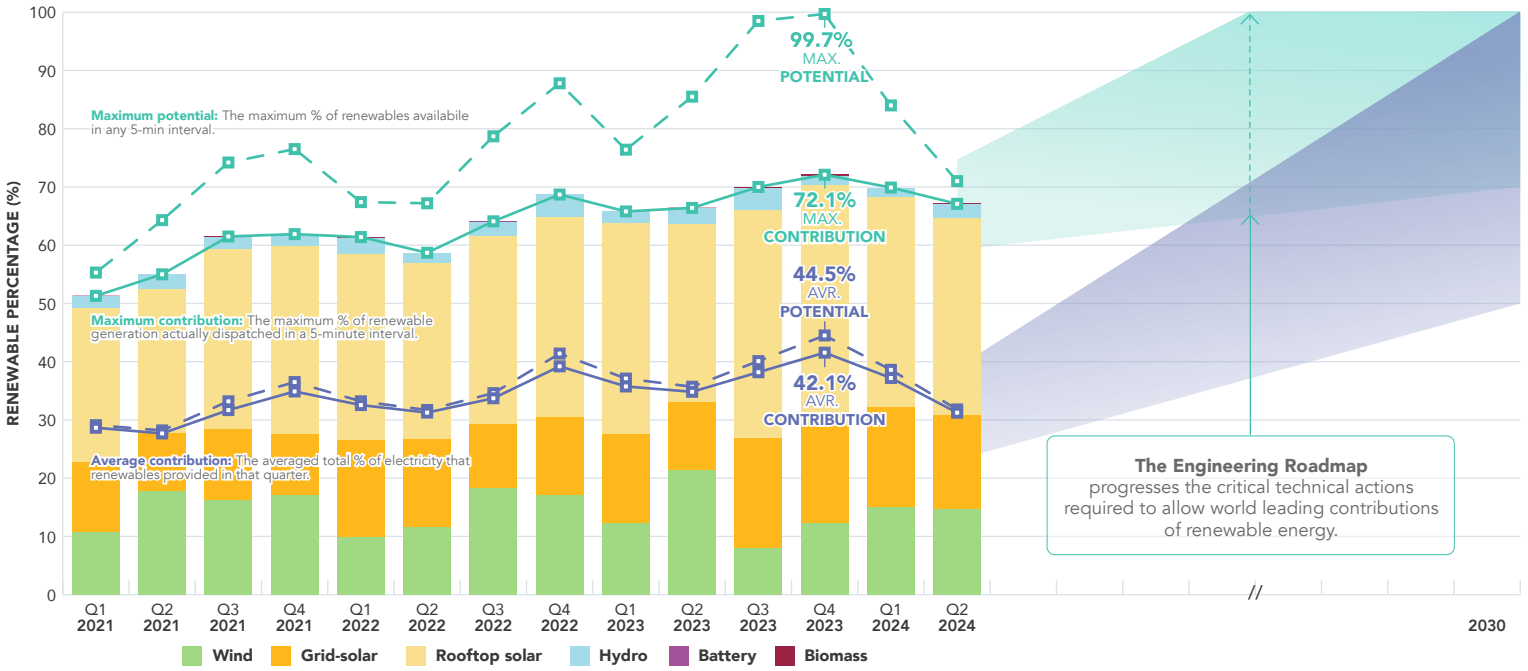
While operating with increasing levels of renewables presents engineering challenges, we are confident these can be addressed through the actions of the Engineering Roadmap to ensure reliable, secure and affordable energy for Australians.

To read the full Engineering Roadmap visit: aemo.com.au

AEMO

Advancing operational capability for times of high renewables

Australia's transition to renewables is well underway. In FY2024, renewables peaked above 72% in the NEM, with renewable potential reaching close to 100% of total demand. This progress was only possible through detailed collaboration with stakeholders across the energy sector. AEMO is continuing this work through the Engineering Roadmap to keep the power system ahead of the engineering challenges of the transition to net zero.



FY2024 achievements

The delivery of 17 priority actions detailed in the report, including publications on:

- The future technical needs of the power system when operating with high levels of renewables, backed by detailed studies and simulations.
- Requirements and specifications of new technologies to support the power system, providing guidance to product designers and project developers.
- Processes to ensure rooftop solar operates in a way that supports secure grid operation, enabling households to contribute record levels of generation into the power system.

Records

NEM reached a record **72.1%** instantaneous renewables contribution.	24 Oct 2023
Renewables potential reached **99.7%** for the first time.	1 Oct 2023
Rooftop solar provided more than **100%** of underlying demand in South Australia for the first time.	31 Dec 2023

FY2025 priority focus areas

	Example actions
Progressing operational readiness Maintaining power system security in realtime operation under world-leading contributions of variable, inverter-based, and distributed resources.	Operational transition planning and procedures
Providing long-range investment visibility Identifying future power system needs that may require investment from one or more parties and providing clarity on the capability of different technologies to meet these needs.	Continued work on grid-forming inverter specifications
Delivering foundational transition enablers Collaborating closely with stakeholders to establish critical foundations for the future power system, including defining roles and responsibilities for new technical matters, and establishing effective processes for future system operation.	Emergency backstop frameworks for world-leading rooftop solar uptake