

# How Spinning Steel Is Turbocharging the Green Energy Transition in Australia

## Editor

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One of the key challenges of the energy transition is ensuring a reliable and consistent supply of electricity. Several new schemes underway in Australia involving spinning steel are helping to solve this problem.

Typically, fossil-fuel-powered energy grids have been stabilized through the inertia delivered by spinning coal and gas turbines. With energy grids in Australia increasingly moving over to wind and solar power, they needed to also find a greener way to stabilize and balance their systems. Synchronous condensers, referred to as syncons, which rely on spinning steel, are one solution.

The spinning steel syncon provides an innovative zero-emission alternative for green-energy-powered grids, allowing them to maintain a steady frequency. Syncons regulate the voltage and stabilize the power system in the event of unexpected faults and sudden changes in power demand, such as unforeseen outages.

Transgrid operates the high-voltage electricity network throughout New South Wales and the Australian Capital Territory, with connections to Queensland, Victoria and South Australia. “We connected the first synchronous condensers to our network as part of EnergyConnect, Australia’s largest electricity transmission project, which is now 97.5% complete and on schedule to be finished this year,” explains James Atkinson, Transgrid’s media and communications senior advisor for corporate affairs, stakeholder engagement and environment.

“We have installed four 120MVar ANDRITZ synchronous condensers at the heart of EnergyConnect – a new interconnector between New South Wales, South Australia and

Victoria — to help maintain voltage on the transmission network and provide system resilience services, such as inertia. Separately, Transgrid is sourcing ten synchronous condensers from GE Vernova to be deployed at five strategic sites on the New South Wales transmission network. These units are an important component of our System Strength Plan, a portfolio of solutions designed to bolster the strength or ‘heartbeat’ of the New South Wales power system.”

Meanwhile, Australian Energy Operations began construction in November 2024 on a syncon in Ararat, Victoria. Housed in a building next to Ararat’s existing terminal station facility, which connects 75 wind turbines to the national electricity grid, the new syncon will be the country’s largest. It will use a motor to rotate 150 metric tons of steel at 750 revolutions a minute. This will then be lifted off its frame by air pressure to limit friction.

Upon completion, the spinning steel syncon, manufactured by the Austrian company, ANDRITZ, will unlock up to 600 megawatts of renewable energy generation, helping Victoria to transition to 95% renewable energy generation by 2035. And the added bonus is that syncons require a relatively low amount of electricity to run.

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ASSOCIATION

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## Spinning Steel Could Soon Become an Essential Component in Green Energy Infrastructure

“The Ararat syncon is critical infrastructure that will deliver energy security to homes and businesses in the western region where there is an abundance of wind and solar power,” said Minister for Energy and Resources, Lily D’Ambrosio.

Australian Energy Operations’ chief executive officer, Glen Thomson, added: “Syncons could be described as the unsung hero of the energy transition, they don’t get the same headlines as batteries, wind or solar, but they will play an equally crucial role in keeping the lights on for Victorian homes and businesses.”

The technology behind the syncon spinning steel system has been in use for decades, but it has only recently been applied to green energy systems. Its role in the green energy transition is now likely to become more widespread as solar and wind energy become more popular worldwide.

Atkinson at Transgrid concludes: “Synchronous condensers will be integral to the New South Wales grid as it becomes powered by increasing amounts of wind and solar energy. The grid has traditionally relied upon coal generators to provide system strength as a byproduct of their typical operation. The impending retirement of 80% of New South Wales’s coal capacity over the next decade requires new sources of system strength. Synchronous condensers mimic the grid-stabilizing role of coal generators, enabling the New South Wales power system to more rapidly accommodate renewable energy generation, helping deliver cleaner and cheaper electricity to consumers.” ♦