Transgrid

Our plan to keep the grid stable as NSW moves to renewables

Transgrid is working hard to help support the energy transition

The electricity grid needs a strong heartbeat to keep everything running smoothly - from connected generators to the protection systems that operate at a fast speed to keep us safe. For 70 years, coal generators have provided the strong heartbeat as a byproduct of creating electricity. We have all relied on this strong heartbeat. In fact, with the grid built and run on the basis of it, and our large coal generators retiring, we must put in place new ways to keep the heartbeat of our grid strong.

How is the grid changing?

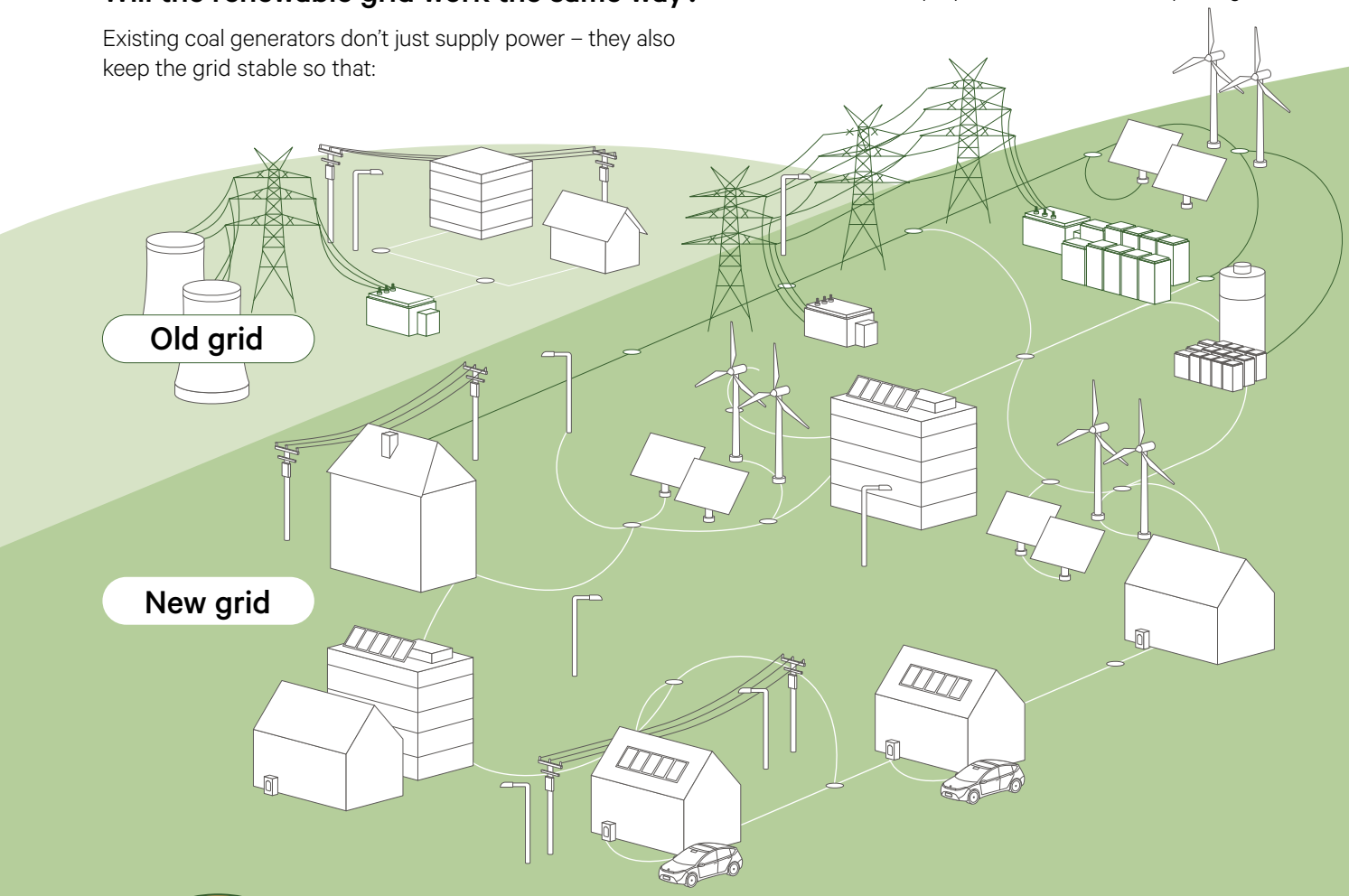
Today, about 40% of the power that keeps our homes and businesses running in NSW and the ACT comes from renewable energy sources, such as hydro, solar and wind. In less than 10 years, with the majority of coal-fired power retired, up to 90% of our power may come from renewable sources.

Will the renewable grid work the same way?

Existing coal generators don't just supply power – they also keep the grid stable so that:

- electricity flows whenever you need it
- faults can be found and fixed faster and more efficiently; and
- the grid can bounce back quickly when unexpected outages happen.

Renewable energy sources supply cleaner power, but they don't keep the grid stable like coal-powered plants have for many decades. So, before each coal-fired generator closes, we must deploy new solutions to keep the grid stable.



Lara is a 38-year-old single mother from Port Macquarie who relies on electricity to power her busy life and small business. Her cafe is the hub of her local community, and many people depend on her, including her 8-year-old son and her elderly father who she cares for. Lara depends on the heartbeat of the grid to keep everything running smoothly.

Who is Transgrid?

For more than 70 years, Transgrid has looked after the high voltage electricity network that every home and business in NSW and the ACT relies on. We have a plan to make sure our lives are supported by safe, reliable and affordable energy supply.

Our plan to keep the heartbeat in NSW's grid strong

Specialist engineers at Transgrid studied more than 100 different solutions from Australia and overseas to find the best ways of keeping the grid strong before coal retires. Their plan has three ways to keep the grid strong - and our lives running smoothly.

1 Synchronous condensers

The plan involves Transgrid investing in ten of these giant machines, which mimic the stabilising role of coal-fired generators. These machines will help the renewables-based grid:

- continue to operate reliably and stably
- easily identify faults and absorb shocks; and
- recover very quickly from any system faults or outages.

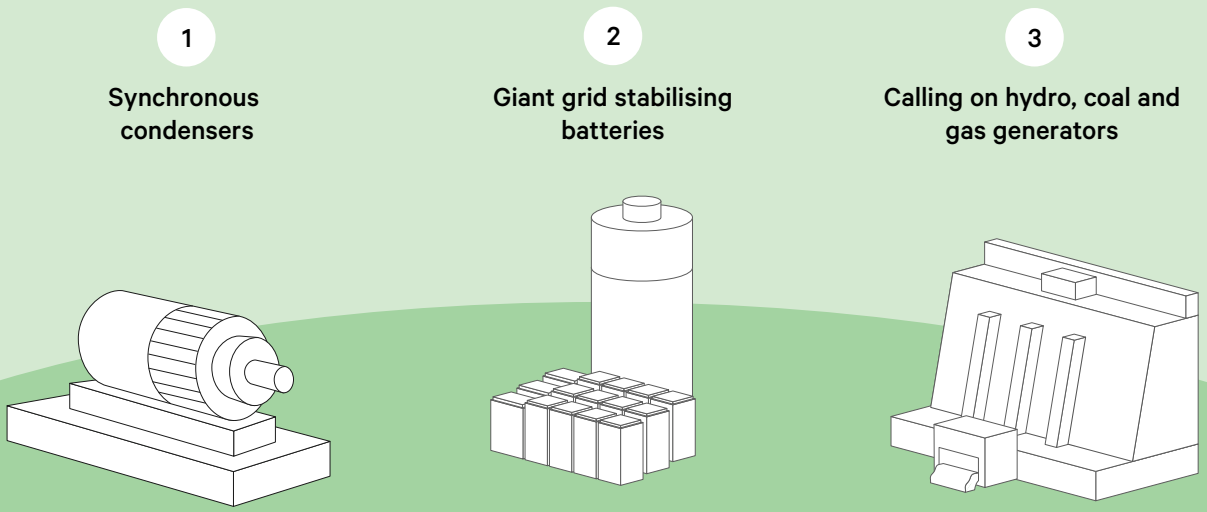
2 Giant grid stabilising batteries

Similar to the batteries in our cars, these massive stores of energy are being connected to the renewable grid and can be set in a special 'grid forming' mode that allows it to automatically act like a giant shock absorber when the grid is impacted unexpectedly. If this occurs, giant grid-forming batteries will help keep renewable generators supplying power and the grid stable. For example, if the high voltage connection to another state is suddenly cut or if there's an unexpected loss of generation.

3 Calling on hydro, coal and gas generators

Over the next few years, we plan to work with hydro, coal and gas plants to help support grid stability until the new ways of keeping the grid stable are ready.

In October 2024, the company that operates Australia's electricity market, AEMO, had to use its emergency powers to call on two hydro plants to run without creating power to boost the grid's 'heart beat'. Running for 7.5 hours, it cost energy consumers $559,000. With the need to stabilise the grid increasing every year, a lower cost solution is urgently needed.



What the plan for NSW's grid means for you

1 For a typical household in NSW, the ten synchronous condensers in the plan would add about $18 a year to power bills over the next four decades.

The NSW Government has announced support for Transgrid to speed up the delivery of the first five synchronous condensers by about two years. Speeding this up is expected to save more than $1 billion for the economy, mainly by avoiding the high costs of large power outages.

2 To avoid passing the full cost of the batteries onto energy consumers, Transgrid will pay the battery owners an annual fee, covering the portfolio of costs to provide system strength services, which will be recouped from an increase to electricity bills.

3 Relying on hydro, coal and gas generators is necessary in the interim because it will take a few years to procure and install the synchronous condensers, which are in high demand today around the world. Because of their very high running cost and their retirement plans, relying on coal and gas generators is not a solution for the long term.

Good to know: Transgrid's plan to keep the renewable grid stable doesn't involve building new high voltage powerlines and substations. We plan to install the synchronous condensers on land we already own at our substations. To help lower the costs of the plan for electricity consumers, Transgrid will not buy or operate the giant grid forming batteries, and instead will contract these services from industry proponents.

Important outcomes at a glance

A reliable grid, avoiding big outages, before coal closes because of old age – at the lowest possible cost

Cheaper, cleaner energy sooner – because renewable generators need a strong grid to connect

An increase in power bills for the new synchronous condensers and grid batteries for when we need to call on existing generators to stabilise the grid

Lower carbon emissions in NSW and the ACT

Without finding new ways to keep a strong heat beat in the grid, we may have to turn off power to parts of NSW to prevent the whole state losing power. Called load shedding, this would mean a significant disruption to the lives of people like Lara, her family, her business and her community.

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