

# Wallgrove Grid Battery Project

Developing innovative solutions for the future grid



This will be the first large-scale battery in NSW to provide synthetic inertia and fast frequency response services to the network.

## Why do we need this project?

Transgrid’s Wallgrove Grid Battery project will trial a new large-scale battery to help keep the network stable.

Coal, gas and hydro generators currently provide the power system with inertia through their large spinning turbines. Inertia enables the system to maintain a consistent “speed”, known as frequency, to ride out any disturbances. As we move to a future with more wind and solar generators, and fewer coal generators, alternative sources of inertia will be needed at the grid level.

Older technologies such as synchronous condensers – which are large spinning motors – can be installed into the grid to provide inertia. However, a fast injection of power from batteries is potentially a much cheaper way to provide inertia services and bring electricity frequency back on track.

Also, unlike synchronous condensers, batteries can supply their stored energy into the grid. Iberdrola will control when the battery’s power is dispatched into the wholesale energy market.

## What does the project involve?

Transgrid will install a 50MW/75MWh lithium ion battery at our Wallgrove substation in Western Sydney. The battery will be designed and constructed by Tesla using Tesla Megapacks, and connected directly to Transgrid’s transmission network.

## What are the project benefits?

### Enhanced reliability

The battery will provide a new source of system stability services.

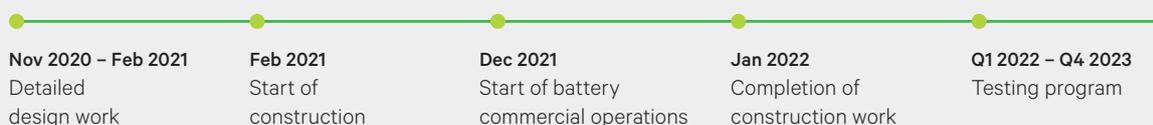
### More affordable power

Finding lowest-cost ways to maintain frequency, while also increasing the supply of dispatchable power to the market, puts downward pressure on energy bills.

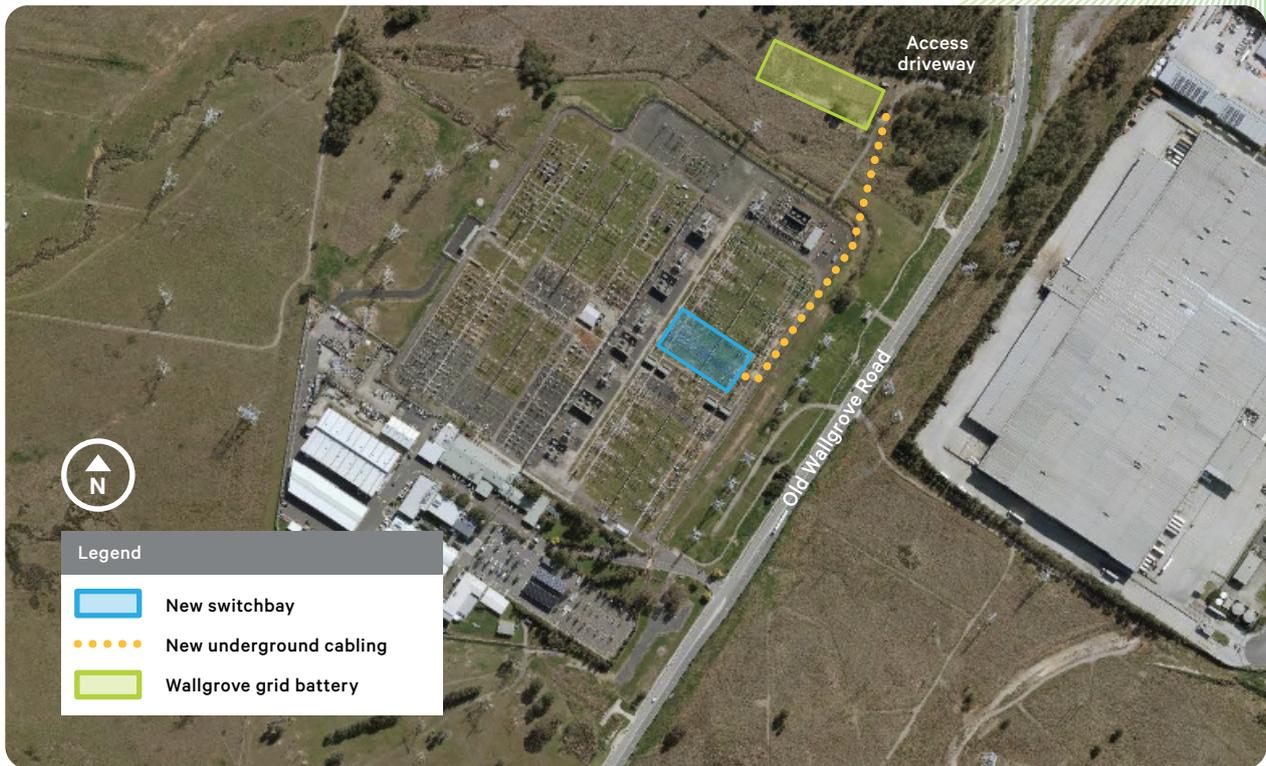
### New knowledge

The trial will provide valuable technical and economic insights which will be shared across the energy industry – helping to identify the lowest cost technologies for future network needs.

## Project timeline



## Location of new battery within Wallgrove substation site



### Key concepts



#### What is system frequency?

Frequency of the electricity system is the speed at which every generator and motor in the grid spins. Stable frequency helps keep the system secure. Frequency changes whenever the supply of power does not exactly match consumer demand. Blackouts can happen if changes in frequency are not properly controlled.



#### What is fast frequency response?

Generators can respond to a change in system frequency by injecting or absorbing power. This helps stabilise the system during disturbances but can take several seconds. Batteries can provide a very rapid injection of power, within one second, called “fast frequency response”. This is much faster than most generators.



#### What is synthetic inertia?

Inertia is the ability of the electricity system to resist changes in frequency. The system needs to have enough inertia to ride through a disturbance. Inertia is currently provided by “synchronous” generation, mostly from coal, gas and hydro power stations with large turbines spinning at the same speed as system frequency. Batteries can be configured to mimic the electrical response of a synchronous generator using software – this is called “synthetic inertia”.

The Wallgrove Grid Battery has received funding from ARENA's Advancing Renewables Program and the NSW Government's Emerging Energy Program.