



# Community Information Booklet

NEOEN



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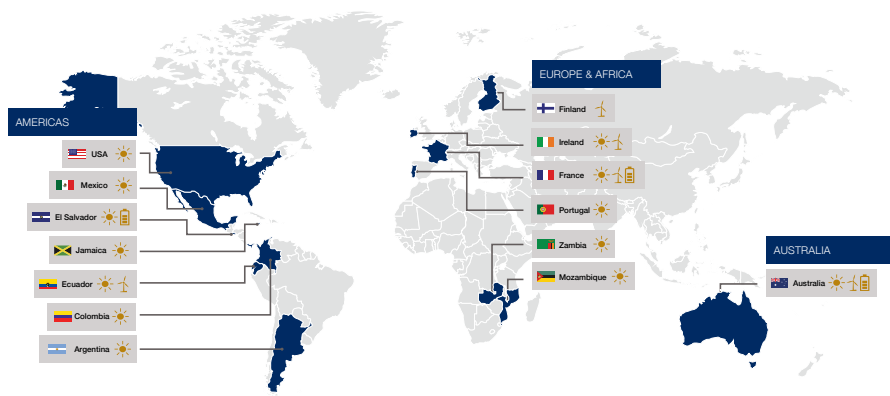


## GLOBALLY

The company is headquartered in Paris, France, and has two Australian offices – in Sydney and Canberra.

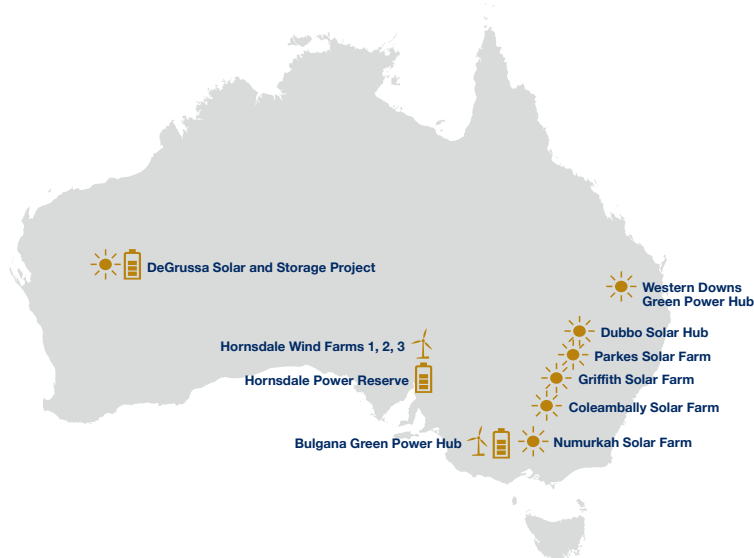
We operate across renewable energy technologies including solar, wind and storage in Europe, Central America, Africa, the Middle East and Australia.

Neoen's total capacity in operation and under construction is currently over 3 GW and we are aiming for more than 5GW by 2021.



## LOCALLY

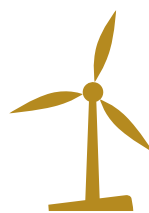
Neoen Australia began operations in 2012. Over the last eight years the company has initiated the development of more than 1.5GW of solar and wind projects through organic growth, local partnerships and strategic acquisitions.



Neoen produce clean electricity from renewable sources such as sunlight and wind using mature, tried and tested technologies. We are also leaders in energy storage.



# WORLD'S FIRST BIG BATTERY HORNSDALE POWER RESERVE



FIRST STAGE  
TOOK LESS THAN  
SIX MONTHS TO  
BUILD

- 150MW Lithium-ion battery located next to Hornsdale Wind Farm
- Owned and operated by Neoen
- Installed and maintained by Tesla

- Provides grid stability services
- Saved SA energy consumers over \$150 million in its first two years
- Now testing grid scale inertia services in a world-first



REDUCES RISK  
OF BLACKOUT  
IN SOUTH  
AUSTRALIA



## DELIVERING CHEAPER ENERGY FOR INDUSTRY



### LAVERTON STEELWORKS VICTORIA

Laverton Steelworks have agreed to take power from Neoen's 128 MW Numurkah Solar Farm under a 15-year deal. GFG Alliance's Executive Chairman Sanjeev Gupta said the deal would help lower energy costs at Laverton.



### DEGRUSSA MINING WESTERN AUSTRALIA

DeGrussa is the largest off-grid solar battery storage project in Australia. It powers a gold and copper mine in remote WA. Commissioned in June 2016, it provides a solar and storage solution to the majority of the mine's daytime electricity requirements, offsetting up to 20% of total diesel consumption annually.



### NECTAR FARMS VICTORIA

Bulgana Green Power Hub, consisting of 196 MW of wind backed by a 20MW battery, is co-located with agri-business Nectar Farms to provide secure and affordable energy. Nectar Farms is using the latest in hydroponic glasshouse and plant technology to create a 10 hectare state of the art facility and over 130 local jobs.



## DELIVERING CHEAPER ENERGY TO RETAILERS



### **ENERGY AUSTRALIA** *COLEAMBALLY SOLAR FARM*

Providing energy output of 100 MW of the 150 MW solar farm for 12 years.



### **SIMPLY ENERGY** *PARKES & GRIFFITH SOLAR FARM*

Providing 100% of the energy output of the two solar farms for 13 years.



### **ACT Government** *HORNSDALE WIND FARM*

Providing 100% of the energy output of the 309 MW wind farm for 20 years, powering ACT's transition to 100% renewables.



## CONTRIBUTION TO THE

Neoen and CIT established the Renewables Skills Centre of Excellence in 2018. The Centre provides practical training in renewables.



### Education & research

TIM

ANU Battery optimisation

CIT Cyber Skills Training

Coleambally/CIT collaboration

GWO training

CIT Renewables Centre of Excellence

Degrussa Solar & Battery Operation

Ne

### Innovation

The Hornsdale Power Reserve (SA's Big Battery) was developed and is managed out of Neoen's Canberra office.



Hydrogen futures

SA Big Battery

100 MW ACT Battery

ANU Grads & placements

Solcast project

Capital Battery

Community co-investment

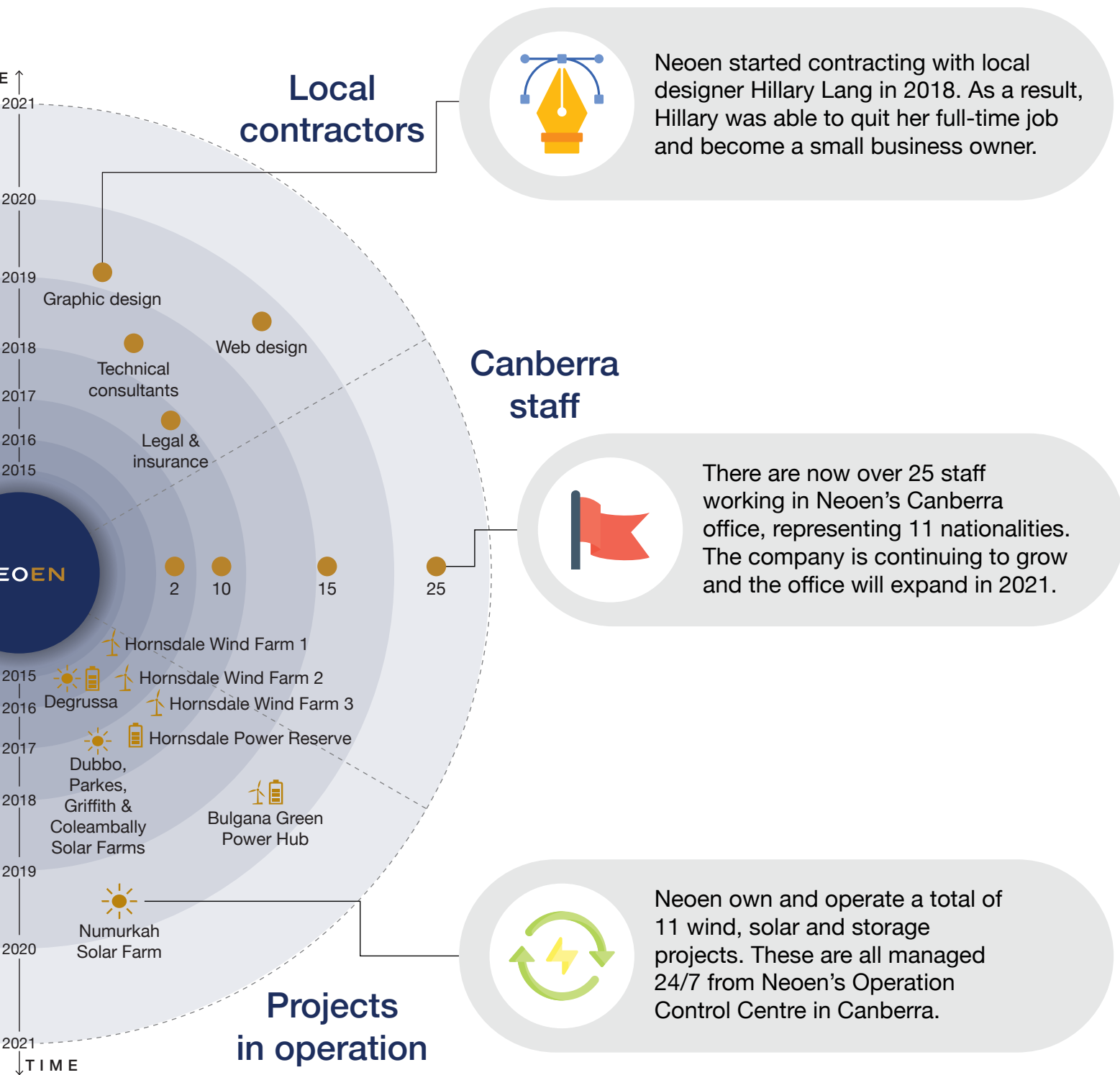
### Renewables ecosystem

Neoen partnered with Canberra based startup, Solcast and ARENA to provide solar forecasting to AEMO.





# CAPITAL SINCE 2015



## WHAT DOES A BIG BATTERY LOOK LIKE?

### HORNSDALE

POWER RESERVE

Our 150MW battery outside Jamestown, SA  
co-located with Hornsdale Wind Farm



### BULGANA

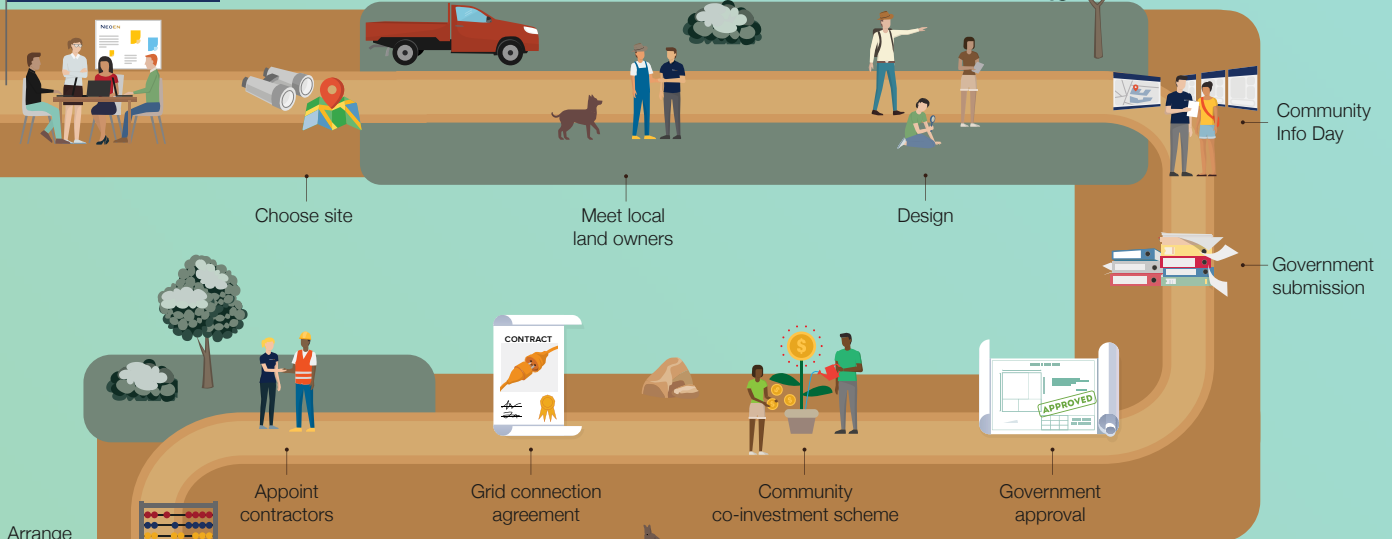
GREEN POWER HUB

Our 20MW battery in Bulgana, Victoria  
located next to the Bulgana substation

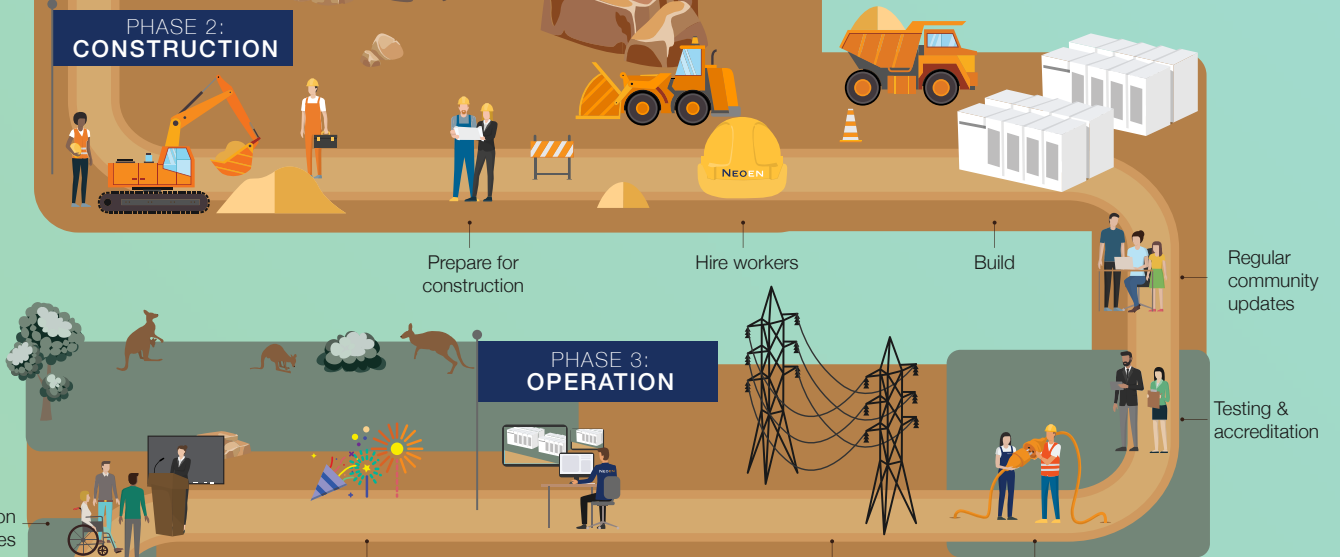


# PROJECT LIFECYCLE

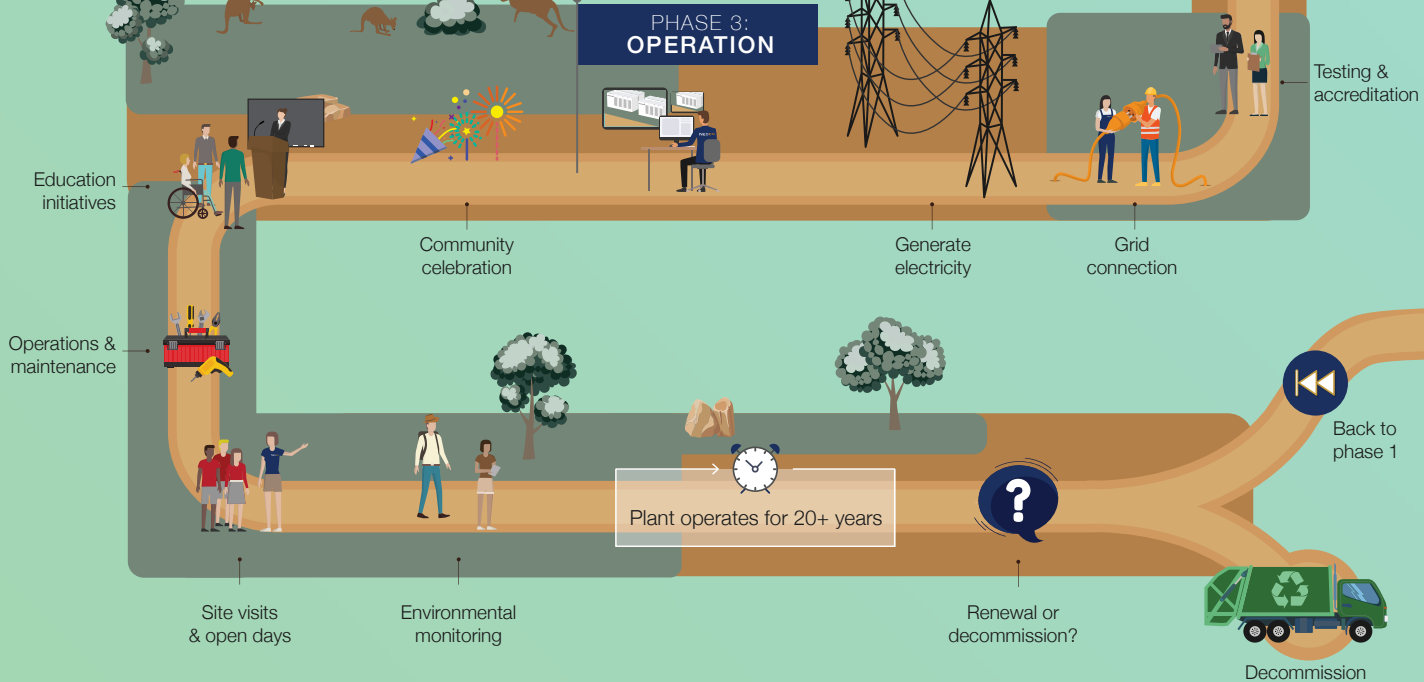
## PHASE 1: DEVELOPMENT



## PHASE 2: CONSTRUCTION

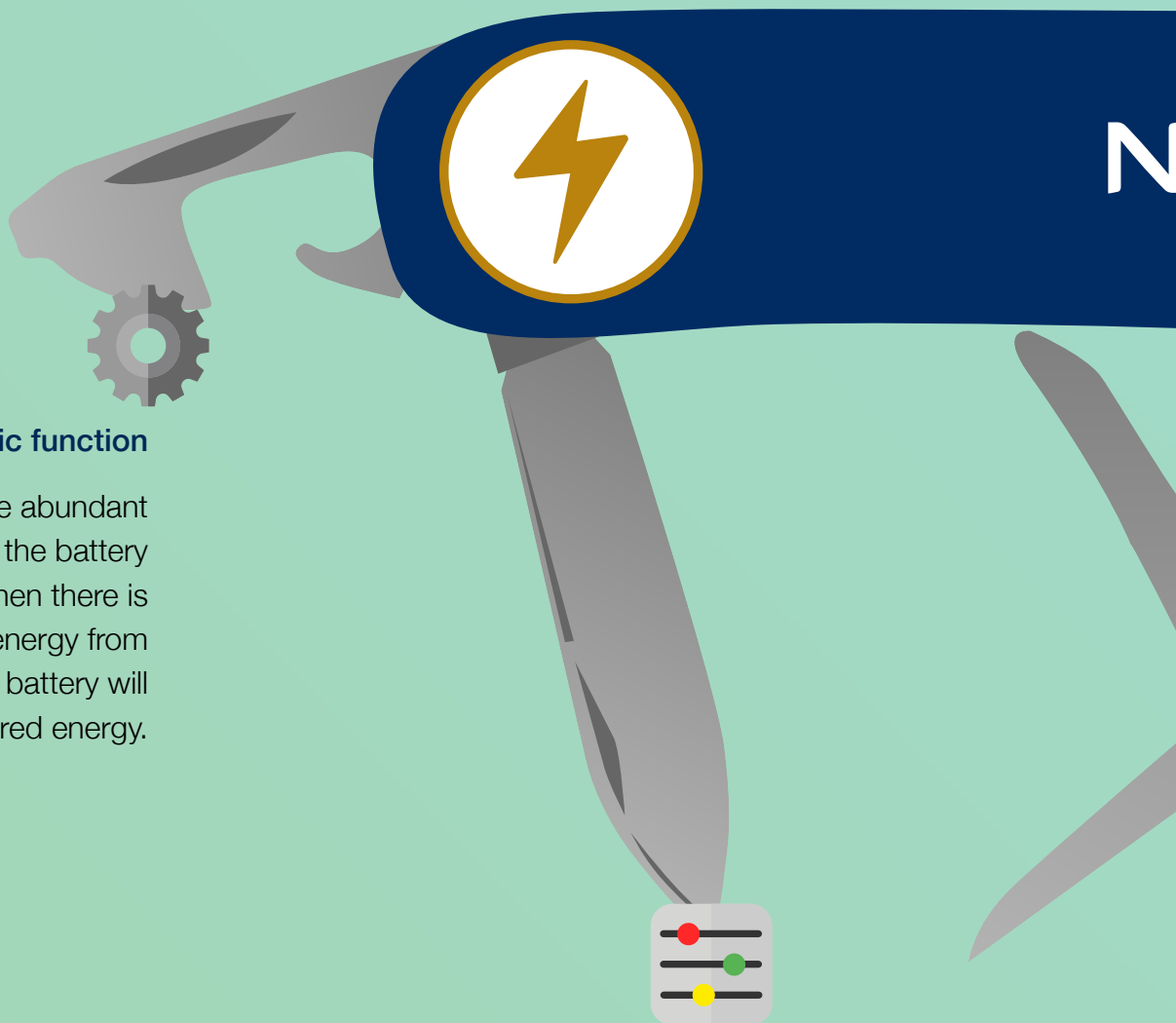


## PHASE 3: OPERATION





## LIKE A SWISS ARMY KNIFE, A BIG



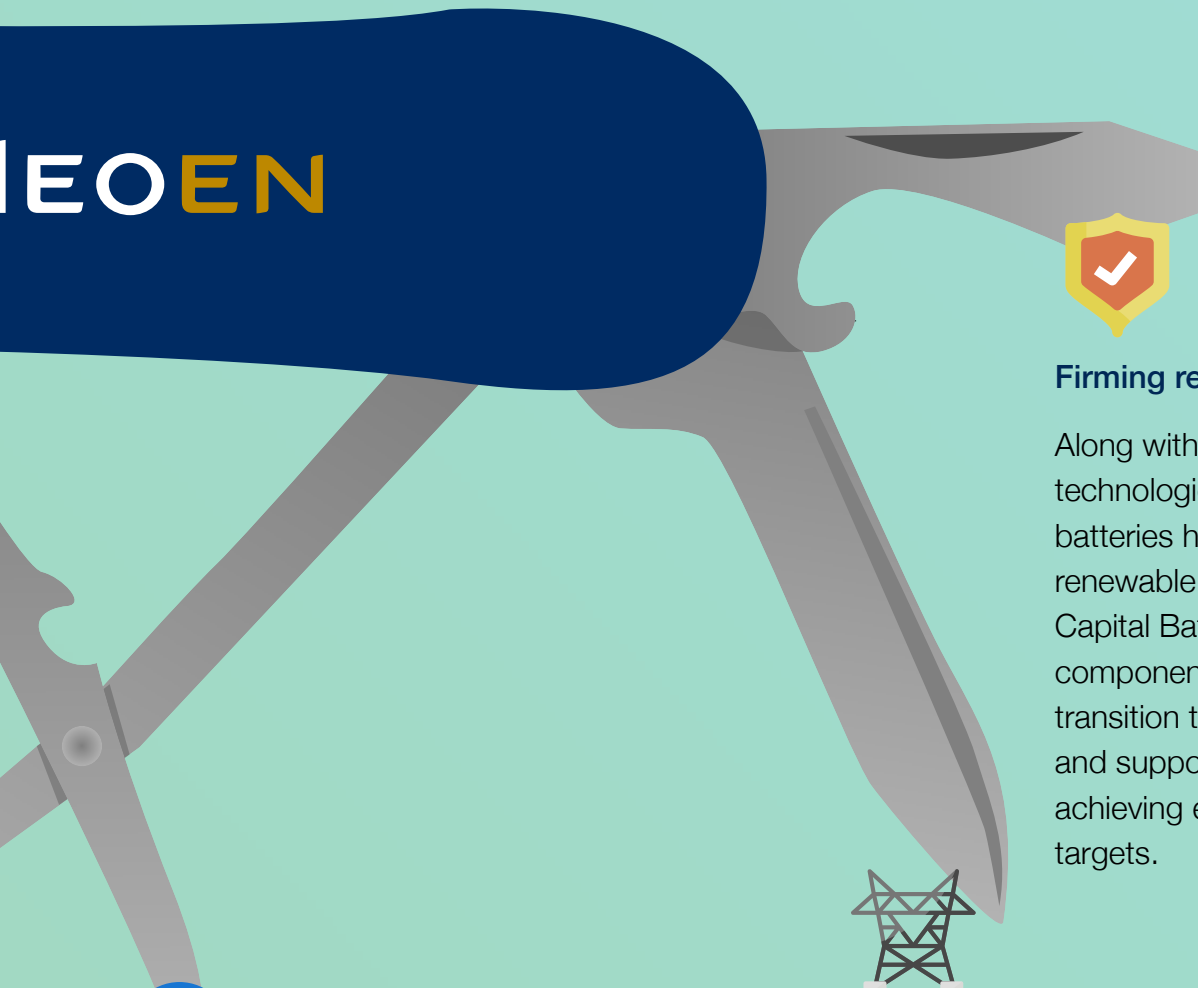
### Basic function

When there are abundant energy sources, the battery will charge up. When there is high demand for energy from the network, the battery will discharge its stored energy.

### Frequency support

To maintain the stability of the electrical system, the national electricity grid operates 8 frequency control markets. The battery will store and inject electricity, so it can participate in the markets and respond to frequency changes to prevent voltage and frequency collapse. The Capital Battery will also add competition to the markets which helps reduce consumer electricity prices.

# BATTERY CAN DO MANY THINGS



## Inertia

As with vehicle suspension on an uneven road, inertia services are essential for stabilising the grid when electricity supply and demand fluctuate. A big battery can enable the advanced power inverters to emulate the existing inertia services being supplied by an ageing fleet of fossil fuel power plants.



## Firming renewables

Along with wind and solar technologies, large-scale batteries help to firm variable renewable energy. The Capital Battery is an essential component in the stable transition to clean electricity and supports the ACT in achieving emissions reduction targets.



## Transmission network support

Grid-scale batteries can provide dynamic warp-speed responses so existing transmission lines can operate at full capacity. Like adding another lane to a freeway, the battery can unlock additional capacity on existing transmission networks – saving customers millions of dollars in expensive transmission line upgrades.

## FACTS & FIGURES

### GRID-SCALE ENERGY STORAGE SYSTEM



**100MW**  
power capacity

50MW for ACT Government contract  
50MW yet to be contracted



**200MWh**  
energy storage

Stores an industrial amount of energy,  
discharges quickly on demand



**14,000 x**  
more capacity than a household battery

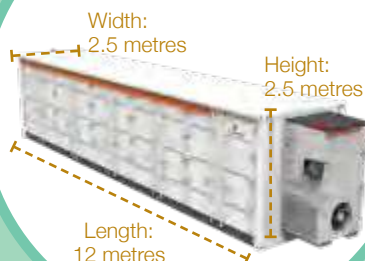
### THE TECHNOLOGY

Battery packs are enclosed in custom designed, dust and waterproof 'cabinets' made of galvanised steel. Cabinet colour is white or light coloured to assist with heat management and each cabinet has its own internal thermal management system.

Will conform to electricity  
industry standards

Will use an industrial inverter  
to convert DC power to AC  
when discharging (vice versa  
when charging)

#### Battery cabinet

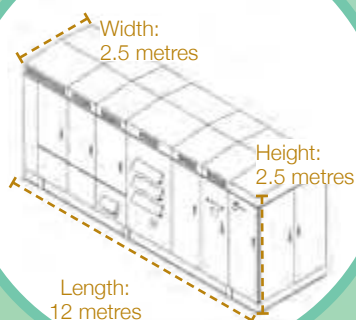


Likely to be lithium-ion  
battery packs enclosed  
in steel cabinets, similar  
to shipping containers

Will meet all safety and  
bushfire risk requirements

Battery brand to be determined

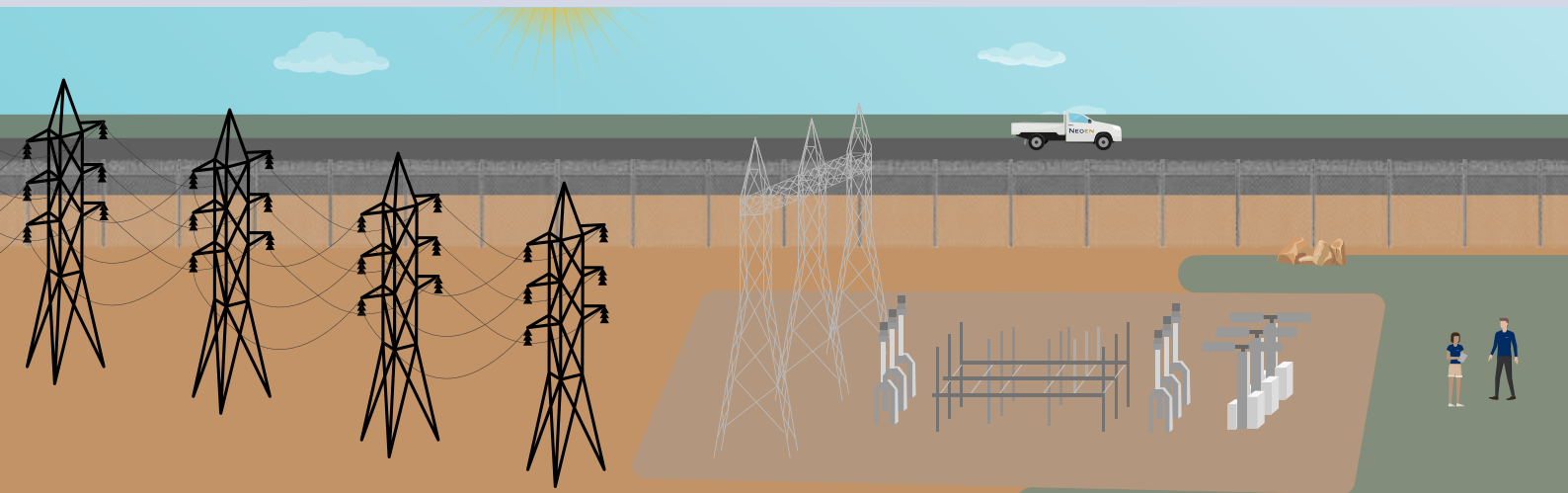
#### Inverter



Inverters are made from galvanised steel, and may  
exist as one single 20ft container or a few outdoor  
cabinets on concrete slabs.



## CHOOSING THE SITE



### 1) Good grid location

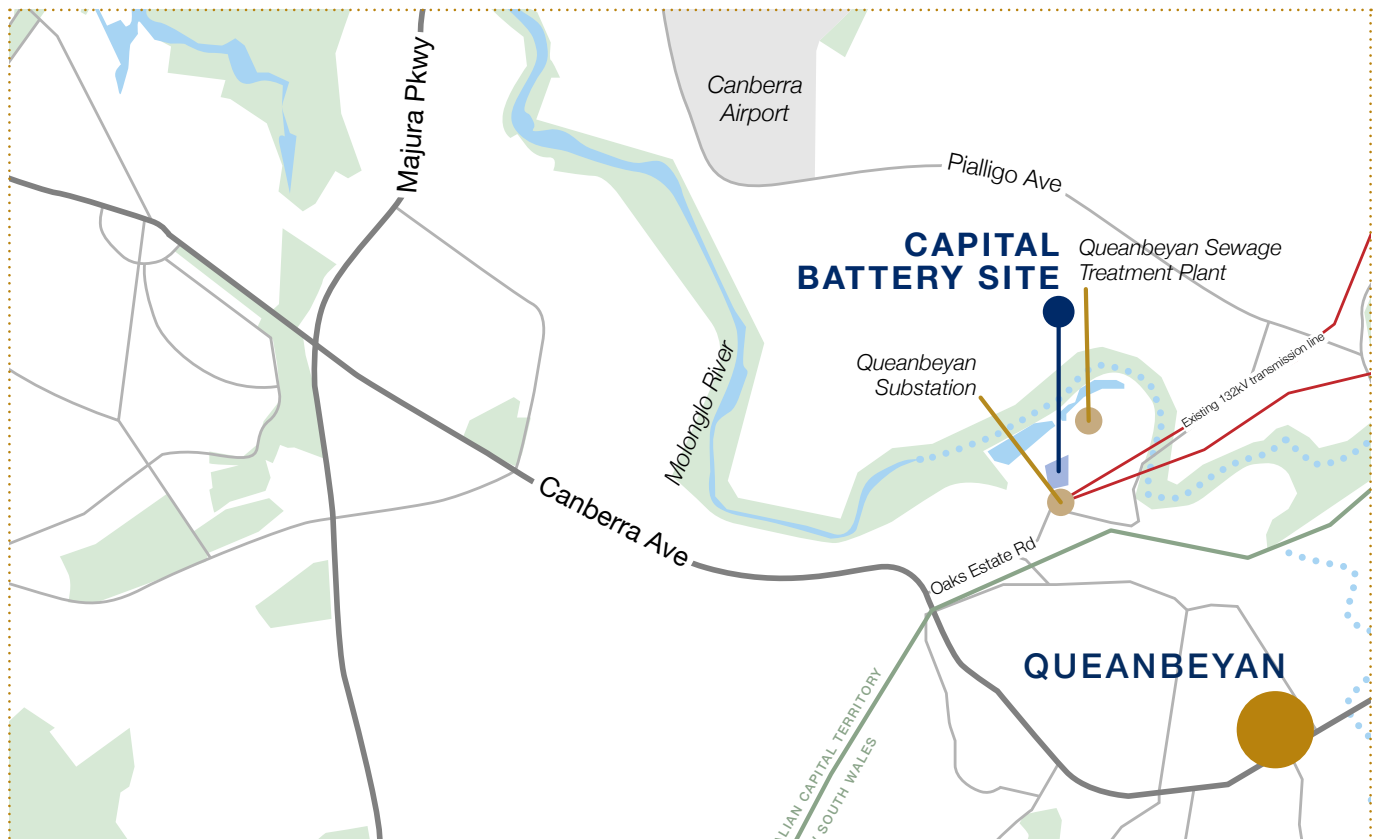
The Capital Battery will be centrally located in the national electricity grid in the ACT, connected to the backbone of the southern-NSW electricity network.

### 2) Proximity to substation

It will connect into the Queanbeyan Substation at 132kv. This minimises voltage losses and the amount of electricity infrastructure (e.g. cabling) required for the project.

### 3) Site history

Studies of the proposed site location have found little to no presence of significant ecology systems and cultural artefacts, reducing the project's disturbance on the local environment and cultural heritage.



## MANAGED & OPERATED IN CANBERRA

### Capital Battery

The Capital Battery will be managed from Neoen's 24/7 Operational Control Centre in the Canberra CBD. This office coordinates with local maintenance contractors for safe, effective and compliant operations of all wind, solar and battery projects across Australia.

### Neoen's Portfolio

Neoen develops renewable energy projects to own and operate them – not on-sell them. With over 1GW of operating projects connected to Australia's National Electricity Market, our asset and operations team play an important role in managing our power plants.



Our Operational Control Centre oversees our interactions with the National Electricity Market: a wholesale electricity market which spans the eastern and south-eastern coast of Australia.

The market works as a pool or spot market, where power supply and demand are instantly matched via a centrally coordinated dispatch process overseen by the Australian Energy Market Operator.

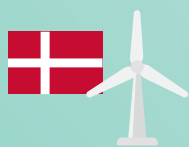
# COMMUNITY CO-INVESTMENT

The Capital Battery will be the second Australian large-scale commercial renewable energy project that the public has the opportunity to directly invest in. As far as we're aware this is the first time this has been proposed for battery storage anywhere in the world!

The Co-Investment Scheme which will be launched in 2021 and will be open to residents of the ACT and broader Capital region.

## What is Community Co-investment?

This is where the community has the opportunity to invest in a commercial renewable energy asset and in return acquires rights to a portion of the earnings of the project, but has no decision-making power or control over the operation of the project.



It is a common method for medium and large scale renewables globally. For example in Denmark it is legislated that every wind project must offer up 20% for local community investment

This is an emerging model in Australia, with Sapphire Wind Farm in NSW being the first commercial project to open up for public investment in 2018. The approach used here was investment through a subordinated debt instrument. Minimum investment was \$1,250 for a term of 9.5 years with a 6% annual rate of return.



## How is this different from Community Ownership or Co-Ownership?

Community ownership is where an entirely community-owned vehicle such as a co-operative or a company owns (or co-owns) and operates a renewable energy asset. This generally applies to small or mid-scale projects and there are now over 100 community-owned renewable energy projects across Australia.

Solar Share's Majura Community Solar Farm is a local project co-owned by 400-600 members of the ACT community. Solar Share raised \$2.36 m for a 1MW solar farm which is currently under construction. Investment amounts ranged from \$500 to \$100,000 with investors receiving shares in the solar farm.

Source: Clean Energy Council's 'Guide to Benefit-sharing Options for Renewable Energy Projects', Oct 2019



### ABOUT STORAGE

#### Q1. What technology is being used for the project?

The Capital Battery will utilise lithium-ion units and associated equipment from leading manufacturers. These manufacturers are selected through a separate competitive tender process.

In principle, the facility will be an orderly arrangement of battery cabinets, inverters and control systems including electrical and data cabling. The battery packs are enclosed in custom designed, dust and waterproof 'cabinets' made of steel. The cabinet colour is white or light coloured to assist with heat management and each cabinet has its own internal thermal management system.

#### Q2. How big will it be?

Once completed, the 100MW battery will cover around 2 hectares of land. It will be no higher than 2.5 metres.

#### Q3. What are the benefits of battery energy storage?

In making the transition from fossil fuels to 'baseload' renewables, the ability to store and dispatch energy will play a key role. Pumped hydro is an example of longer-term storage; that is, suitable for storing energy and releasing it over days or weeks. However, pumped hydro has a relatively slow 'ramping' time and is less suitable for providing rapid-response services to grid contingency events such as outages or heat waves (with high demand created by air-conditioning). Battery storage, such as Tesla's lithium-ion Powerpack technology, fills this key short-term role.

These are some of the functions a grid-scale lithium-ion battery may be expected to perform:

- Network security services including
- Frequency Control Ancillary Services, and Network Loading Control Ancillary Services
- System Restart Ancillary Services

- Arbitrage (spot market trading)
- Peak shaving
- Block/load shifting
- Renewable firming and smoothing
- Virtual inertia

The ACT Government is committed to renewable energy and has set ambitious targets for obtaining power from renewable sources and achieving total carbon neutrality by 2060. The Capital Battery will support the ACT in achieving its renewable vision.

#### Q4. What is the life cycle of the Capital Battery?

Current battery technology comes with an industry-leading 15-year warranty. The batteries still retain most of their capacity at this time, and will be able to operate beyond it depending on market conditions and other factors.

#### Q5. How is the battery reducing costs for consumers?

Battery storage can reduce costs for consumers in 3 ways:

- Supporting more wind and solar, which are now the cheapest forms of power
- Increasing competition in ancillary markets and pushing electricity prices down
- Helping to avoid blackouts and the associated costs

#### Q6. What happens to the batteries when they reach the end of their life?

We make a commitment that all above-ground infrastructure is removed and the site rehabilitated when a project ceases to operate. After removal, most of the material in the batteries is reclaimed or recycled with over 60% recovered for re-use.



## HEALTH & CULTURE

**Q7. Are there any health risks?**

The Capital Battery is using similar technology to the batteries that are increasingly installed in homes, just on a larger scale. There are no known health risks associated with properly maintained large-scale battery installations.

**Q8. Is the project reducing air quality?**

Monitoring of dust levels during construction is a basic requirement of each project. Dust generating activities are assessed during windy conditions and are stopped and rescheduled where adequate control of dust generation cannot be achieved.

Visual observation of machinery is undertaken during site inspections as well as daily pre-start checks which ensure all machinery has appropriate emission control devices, is in good working order, and is maintained correctly.



# CAPITAL BATTERY



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