Battery Energy Storage System (BESS) Facts

March 2026

About OX2

We develop and operate projects within onshore and offshore wind power, solar power, and energy storage. With our extensive experience, strong market position and efficient business model, we are powering the great shift towards a sustainable society, and we are well equipped to further strengthen our position in a growing market. We are present across Europe and in Australia.

We design and build sustainable projects and tailor them to meet our customers' needs. OX2 has a proven business model and in-house expertise at every step of the process – from project inception and financing to engineering and design, permitting, procurement, construction, and technical and commercial management.

Our mission is to accelerate access to renewable energy. We see ourselves becoming the leading provider of renewable energy solutions globally, thereby powering the great shift.

As signatories to the Clean Energy Council's Best Practice Charter, OX2 is dedicated to meaningful, transparent and respectful engagement with the regional communities where we operate. We focus on building enduring relationships, recognising and upholding environmental and cultural values and contributing to positive long-term value for local residents, Traditional Custodians and stakeholders.

What is a BESS facility?

BESS facilities generally use lithium-ion to store the electricity until it is ready to be distributed to the network. BESS facilities allow energy generated from another source (such as a solar farm) to be stored until it is needed. BESS facilities improve grid reliability by storing low-cost electricity when there is an oversupply of electricity or during periods of low demand/high generation so that electricity is available when demand is higher.

In fact, BESS can reduce electricity costs for communities by lowering peak demand charges and providing access to cheaper electricity during off-peak hours. The fast response capability of BESS also offers ancillary services to keep power quality in the grid at a standard level. Additionally, BESS can act as a backup power source during emergencies like bushfires, ensuring that critical infrastructure (hospitals, emergency services, water systems) remains operational even if the grid is disrupted.

BESS facilities contain several key components, including battery units, inverters and transformers. The final composition of a BESS facility will depend on the BESS technology being used, the BESS supplier and the size of the facility. Where possible, BESS facilities are co-located with or near a grid connection point (such as a terminal station), therefore minimising the need for additional connection infrastructure.

Large-scale BESS facilities are expected to have an operational life of approximately 15 to 20 years and are typically monitored remotely, without the requirement for permanent staff on site. Staff are, however, required to access the site from time to time to undertake inspection and maintenance activities.

BESS Lifecycle

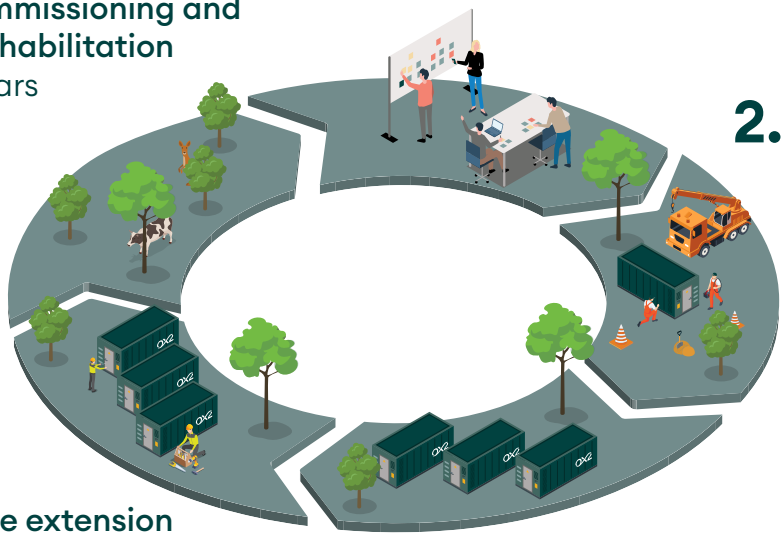
1. Development – assessments and approvals
1–2 years

2. Construction and commissioning
1–1.5 years

3. Operation
15–20 years

4. Lifetime extension
of up to 30 years with a **repowering** after year 15

5. Decommissioning and site rehabilitation
1–2 years



What are the benefits of a BESS?

As the grid of the future is developed in Australia, the Australian energy market has evolved from the previous baseload power system to a more flexible system. Energy storage plays a crucial role in balancing this system. Pumped hydro is an example of long-term storage, ideal for storing energy and releasing it over periods of days or weeks. However, due to its slower 'ramping' time, it is less effective in providing rapid-response services during grid emergencies like outages or heat waves (when air conditioning causes high demand). This critical short-term need is fulfilled by battery storage technology.

What does a BESS facility look like?

BESS facilities are typically a group of containers storing battery systems inside. The number of containers depends on the batteries being used and the space available at the site. However, BESS technology is continuously evolving, with BESS components becoming increasingly more efficient and compact in size.

What does MW and MW/h mean?

When talking about a large-scale battery energy storage system (BESS), you'll often hear the terms megawatts (MW) and megawatt-hours (MWh). While they sound similar, they describe two different things. MW (megawatts) tells us how much power the battery can deliver at any one moment. You can think of this as the speed at which electricity can be supplied. A higher MW rating means the battery can supply more electricity at once. MWh (megawatt-hours) tells us how much energy the battery can store in total. You can think of this as the size of the battery or how long it can keep supplying electricity.

A simple way to understand it is to imagine a water tank:

MW is like the size of the tap – how fast water can flow out. MWh is like the size of the tank – how much water is stored.

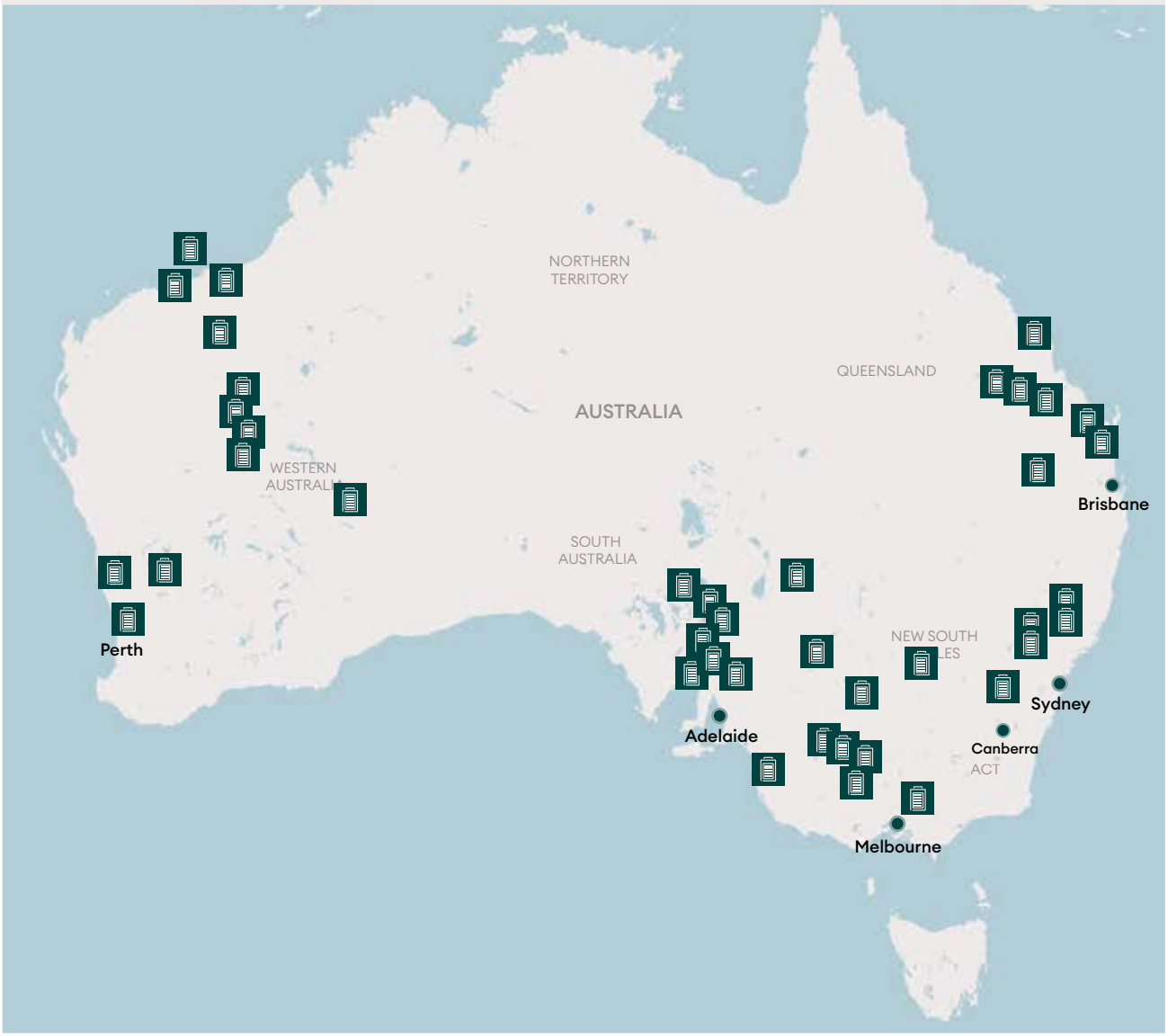
For example, a battery rated at 100 MW / 400 MWh can: supply up to 100 MW of electricity at any moment, and do so for 4 hours (because 100 MW × 4 hours = 400 MWh).

Once the stored energy is used, the battery needs to be recharged before it can supply electricity again. Battery storage systems help support the electricity grid by storing energy when it's plentiful (such as when wind or solar generation is high) and releasing it when it's needed most, helping to improve reliability and stability of the power supply.

Are there existing BESS facilities in Australia?

Yes, there are 49 operating as of Q1 2026.

Further information can be found at
https://reneweconomy.com.au/big-battery-storage-map-of-australia/



Development

Key activities in BESS development include:

- Site identification
- Engagement and agreements with landowners
- Grid connection studies
- Consultation with government, communities and industry
- Planning and environmental studies and approvals
- Detailed design
- Design of road upgrades and transport route planning
- Investment decision and raising equity to fund the project
- Procurement of contractors and turbines

How is a BESS designed?

A BESS design is led by site investigations, environmental assessments, community feedback and planning permit requirements. We consider a range of aspects:

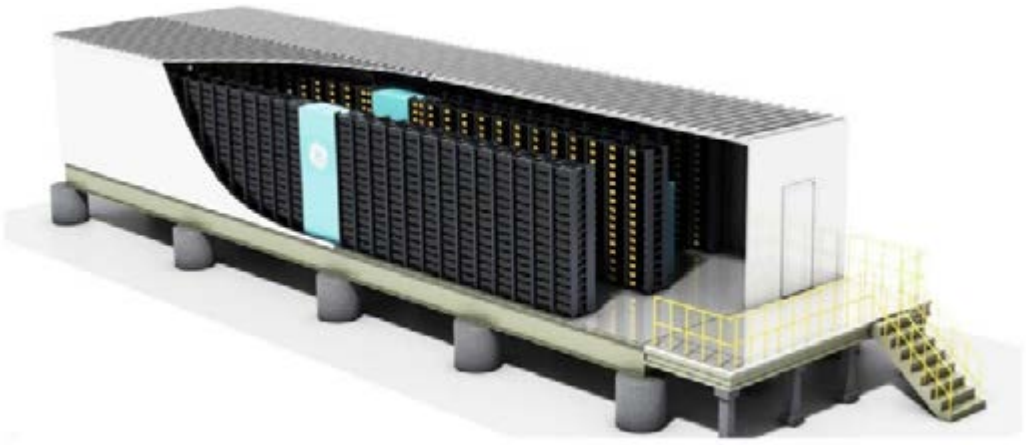
- Local topography
- Geotechnical (ground) conditions
- Proximity and connectivity to the grid
- Safety
- Constructability
- Relevant standards, guidelines and legislation
- Stakeholder and community feedback
- Transport routes and access to the site
- Potential environmental and heritage impacts
- Operations and maintenance requirements
- Project cost and value for money

What is assessed during the planning and approval process?

Technical and environmental studies are undertaken by independent consultants who are experts in their field to identify baseline conditions and possible impacts. We use these studies to inform the project design, planning and construction and ongoing management.

The assessments undertaken for a BESS typically include:

- Biodiversity Assessment
- Cultural Aboriginal and historic Heritage Assessment
- Agricultural Impact Assessment
- Noise Impact Assessment
- Traffic Impact Assessment
- Landscape and Visual Impact Assessment
- Hydrology Assessment
- Bushfire Risk Assessment
- Hazard Assessment
- Social Impact Assessment



Typical BESS container

A BESS is a major project and like any major infrastructure project, construction can be disruptive at certain times. To minimise this, we work with the project landowners, neighbours, contractors, local councils and wider community to plan construction responsibly and manage any impacts effectively and efficiently. Some of the ways we do this include:

- Meeting requirements set out in planning permit conditions, legislation, industry standards and guidelines – this includes preparing and complying with construction environmental management plans and traffic management plans
- Implementing a responsive complaints management procedure
- Developing a workforce accommodation strategy
- Regular communication with neighbours and the community
- Listening to feedback about how impacts could be minimised
- Working during standard construction hours wherever possible
- Scheduling disruptive or noisy work at times when it will have the least impact
- Monitoring and actively managing construction activities
- Using well-maintained equipment and implementing procedures to reduce their noise emissions (for example, avoiding reversing and triggering the reverse alarm where possible)

Each stage of construction can pose different challenges, such as vehicle movements as components are delivered to the site.

Adequate stakeholder engagement and early planning will allow those movements to occur safely for the workforce and the community, with any planned disruptions communicated to relevant stakeholders (including the community).

Depending on the size of the project, construction can take several years. Management Plans are required to outline how potential impacts are managed, and that all management and mitigation measures are understood and followed by the project partners.

What should I be aware of during construction?

Safety

To reduce and manage risk, Health and Safety Management Plans are developed to ensure safe construction practices and potential risks are identified, mitigated and communicated to workers. All staff and contractors undertake mandatory training in safety and emergency procedures before starting work on-site.

Fire Safety

The relevant fire safety authorities are consulted during the development stage of the project to ensure that the design of the BESS meets fire safety requirements, and that management and mitigation measures are accounted for.

Firefighting infrastructure will be made available on-site during the construction and operation of the BESS, and safe access for emergency responders in and around the facility will be provided. The infrastructure will be provided in consultation with the relevant fire safety authorities and to comply with agreed fire safety and emergency response management measures. Vegetation will be managed so as to avoid increased bushfire and grassfire risk.

Fire safety regulations will be complied with during construction. For example, no hot works will be undertaken during total fire ban days.

> **BESS can reduce electricity costs for communities by lowering peak demand charges and providing access to cheaper electricity during off-peak hours.**

Traffic and roads
The construction of a BESS generates traffic when materials, machinery and components are being delivered to the site. Prior to the commencement of construction, a Traffic Management Plan (TMP) is developed in consultation with road authorities and local councils to ensure that construction traffic is appropriately managed and adheres to the use of approved roads only. School bus routes are taken into account.

Local roads may be upgraded before works begin so they are suitable for the loads from trucks and oversize vehicles. We work closely with our contractors and councils to plan deliveries, coordinate with other road users and provide advance notice of any disruption. Any road construction works (including upgrades) required to facilitate the construction of the BESS will be undertaken at our cost.

Working hours
Standard construction hours are outlined by The Environment Protection Authority (EPA) in each state. The hours are approximately 7am to 6pm, Monday to Friday, and 8am to 1pm on Saturdays.

On occasions we may need to work outside these standard hours. If this is required, we will provide as much advance notice as possible and put measures in place to minimise any disruption. Any required approvals to work outside of the standard construction hours would be sought.

Noise
Construction noise limits are regulated by the EPA and, in some cases, local councils. If construction activities on one of our projects are expected to exceed the noise targets at any time, we notify the local Council, and we put mitigation measures in place to limit the impact on local residents as much as possible.

Dust
Spraying water is the most effective way to reduce dust during construction. Water trucks are used to wet down work areas and unsealed roads when required.

Historic and Aboriginal cultural heritage
Prior to the commencement of construction, our contractors will be inducted on any measures required to be complied with to manage and protect historic and Aboriginal cultural heritage. Any culturally significant places will be identified during the development stage of the project and the requirement management measures will be agreed on with the relevant authorities and local Aboriginal groups.

Social and economic
During construction, employees and contractors will be present in the local town and on the roads.

Temporary accommodation such as motels and pubs may be busier than normal. We develop workforce accommodation strategies in consultation with councils and work with local communities and our contractors to reduce any inconvenience caused. We seek to ensure local towns and the local economy benefit from additional spending on accommodation, food and local goods and services. We will seek to create local employment opportunities and advertise them to benefit the local workforce.

Complaints Management Procedure

OX2 will manage and respond to complaints during construction in accordance with our grievance mechanism. The mechanism to submit complaints and follow up on them will be communicated to the local council and the community; it will also be made available on the project website.

Read more about the grievance and complaint investigation process. Your privacy is very important to us, and your personal information will be kept confidential in line with our privacy policy.

These documents are available on the OX2 Australia website www.ox2.com/australia

Fuel, Oil and Spill Management
Strict controls apply to all fuels and oils used during construction:

- Refuelling occurs in designated areas away from water.
- Fuels and chemicals are stored in bunded, sealed containers.
- Spill kits are kept on site at all times.
- Any spill must be contained, cleaned up and reported immediately.

Do BESS projects affect water security and how is water accessed for construction?

We understand that water supply and quality is a key concern for landholders and regional communities.

Water required during construction (e.g., for concrete batching, dust suppression, and workforce needs) will likely be sourced through a combination of approved, off-site supplies. Primary supply will typically come from licensed water suppliers, delivered to site by tanker trucks.

Where feasible and subject to regulatory approval, non-potable/non-drinkable water may also be obtained from permitted surface water sources or temporary abstraction points. Water use managed efficiently, with measures such as water recycling, use of non-potable water for dust control, and scheduling works to minimise demand during dry periods. No long-term groundwater extraction is anticipated, and all water sourcing will comply with relevant permits, environmental regulations, and local water management plans to avoid impacts on existing users or sensitive ecosystems.

How do BESS projects protect waterways from construction run-off?

During construction of wind farms and battery energy projects, strict government approval conditions apply to ensure groundwater, bores and farm dams are protected.

Groundwater and Bores
Wind and battery projects do not involve drilling into aquifers or injecting chemicals underground.

To protect groundwater:

- Excavation depths are limited and assessed in advance.
- Groundwater conditions are investigated before construction.
- Works avoid known bores wherever possible.
- Any unexpected groundwater encounter triggers immediate investigation and management.

These requirements help ensure there is no impact on bore water quality or availability.

Farm Dams and Surface Water
Construction activities are managed to prevent sediment or pollutants entering dams and waterways:

- Buffer distances are maintained around dams, creeks and drainage lines.
- Erosion and sediment controls (such as sediment fences and diversion drains) are installed before earthworks begin.
- Disturbed areas are minimised and stabilised as soon as possible.

These controls prevent muddy runoff from entering dams, particularly after rainfall.

How is biosecurity manged during construction?

Recognising the risk that construction vehicles and equipment can introduce biosecurity threats, including fire ants or other invasive pests, strict biosecurity measures are implemented throughout construction. These include equipment wash-down and inspection procedures, controls on the movement of machinery and materials, and compliance with relevant state biosecurity requirements and planning permit conditions. Contractors and workers are trained to identify and report potential pest or weed incursions so they can be managed promptly.

Detailed management plans are required to clearly outline how potential impacts, including amenity, traffic, biosecurity and environmental risks, will be managed, and to ensure all mitigation measures are clearly understood and consistently applied by project partners.

Monitoring and Compliance

Before construction starts, an Environmental Management Plan will be required to be prepared and approved as a condition of the development approval. This plan requires:

- Regular site inspections and monitoring.
- Trained environmental personnel on site.
- Clear incident reporting and response procedures.
- Compliance audits and regulator oversight where required.

Non-compliance can result in stop-work directions or penalties. Overall, while renewable energy projects are not a significant source of water contamination compared to other infrastructure or industrial activities, these preventative measures ensure that risks to surface water and groundwater are minimised and well managed.

For further information visit: https://cleanenergycouncil.org.au/for-consumers/fact-sheets/environment-and-planning-get-the-facts/soil-and-water-contamination-from-renewable-energy

Construction and Commissioning

1. Site Induction

Contractors undertake health and safety inductions in addition to environmental and cultural management inductions.

2. Site Prep

Access tracks, intersection upgrades, cable trenches. Site offices and on-site amenity are erected to assist construction workers and contractors.

3. Cable trenches

Underground cabling is required to reticulate energy to and from the battery containers, inverts and transformers to get the energy back to the grid and the community.

4. Foundations

To keep the equipment on a stable and level surface for its operational life, engineered foundations are required. There are various types of foundations based on manufacturers requirements.

5. BESS installation

The battery containers along with inverters and various protection equipment are installed onsite and tested to ensure they're operating as intended. A range of communication infrastructure is also installed and tested to ensure the battery can be operated remotely.

6. Electrical connections

Underground or overhead electrical and fibre optic cables are installed to connect the BESS and carry electricity and data to the substation.

7. Commissioning

After the BESS has been tested through a number of stages, called Hold Points, they can begin to supply electricity. Any temporary construction buildings are removed and the ground is rehabilitated.

Operation

BESS has an operational life of approximately 20 years at the beginning. A small team of electrical engineers based on site or at a central point for a number of projects, will undertake regular maintenance and monitoring. At the end of the life of the BESS or at year 15, OX2 may seek to extend the life of the BESS by repowering the facility with newer technologies. Should this be the case, relevant assessments will be undertaken, which need very limited approvals.

Does BESS have a visual impact on landscape amenity?

BESS can have an impact on the visual amenity of the immediate area. We aim to work with communities to ensure that the impact is mitigated as far as possible.

How are views screened?

If required, landscape screening can be a measure taken to reduce the visual impact for residences close by. Vegetation can be planted to screen the view of the BESS from viewpoints. Vegetation screening may be able to be planted on the perimeter of the site should the footprint and fire risk considerations allow.

Who is responsible for the screening?

The site owner is responsible for implementing and maintaining any landscape screening requirements agreed on with the planning authorities.

How are chemicals managed at a BESS facility?

In the unlikely event of a chemical leak, BESS facilities are designed to ensure containment.

Control measures such as bunding, spill trays and chemical absorbents are in place to capture materials on site. Any chemical hazards are identified and addressed by a Hazard Assessment and Emergency Management Plan. This will be a condition of any Development Consent for an approved project.

Are BESS facilities a fire risk?

Fire mitigation is achieved via several pathways. Initially, fire mitigation measures are incorporated into the battery cell design and certification.

Secondly, BESS facilities are equipped with Battery Management Systems (BMS) that monitor the equipment to ensure the safe operation of the BESS. The BMS prevents potential fires by shutting down battery modules/racks if monitored conditions are measured as outside of those permissible for safe operation.

Additionally, the BESS containers are separated to ensure that any fire does not spread from one container to another in the unlikely event that all other systems fail. The entire BESS area is contained within a firebreak and vegetation-free zone.

Different BESS suppliers incorporate different fire monitoring and control systems. However, all BESS facilities must comply with the relevant guidelines, standards and conditions of any issued approval and operate in accordance with the legislation applicable to each BESS facility's jurisdiction. A Risk Management Plan and an Emergency Response Plan are developed in conjunction with the relevant authorities that identify, assess, and outline controls for the management of on-site and off-site risks at the BESS facility and the process to be followed in the unlikely event of an emergency.

What type of fire suppressants do BESS facilities use?

BESS facilities incorporate multiple layers of fire prevention and control, including battery management systems, automatic shutdown, and physical separation of battery containers to prevent fire spread. Fire response strategies prioritise containment and isolation. Where fire suppression systems are installed, they are specified to be PFAS-free and compliant with contemporary Australian standards and regulatory requirements.

Are there any health risks associated with a BESS?

The battery will use similar technology to the batteries that are being increasingly installed in homes, just on a larger scale. These batteries are different to the older and more-conventional lead-acid batteries. There are no known health risks associated with properly maintained large-scale battery installations.

Will I be able to hear a BESS?

Like other utility-scale facilities, BESS facilities have the potential to generate some sound. The main source of the sound is the cooling fans required to regulate the operating temperature of the individual battery cells. The sound they make is similar to an air conditioning unit or a dull whirring noise.

Detailed noise studies are undertaken by specialist consultants who apply authorised environmental noise guidelines to measure noise levels during project development to ensure that the noise generated will be within the applicable noise limits.

Once operating, BESS facilities are required to meet strict noise requirements, which are put in place through the planning process and comply with the relevant noise protocols and/or guidelines. Mitigation measures required by the authorities to reduce noise impacts would be implemented.

Do BESS facilities propose a flood risk?

As part of the development process, a Hydrology Assessment Report will be prepared by a specialist consultant. This involves mapping and avoiding flood-prone areas. Flood modelling and design of the project will ensure that the local flood regime is unchanged and no flood impacts on the wider community will occur as a result of the BESS.

Decommissioning and Rehabilitation

When a BESS is no longer running efficiently, it can be decommissioned, restoring the impacted area to its original condition. To decommission a BESS, it is required to:

- Dismantle the components
- Remove any related infrastructure, such as buildings and overhead power lines
- Rehabilitate the land
- Reinstate and revegetate roads and foundations.

Landowners may request that certain aspects to remain in situ for their continued farming practices, such as certain buildings or access tracks.

The BESS owner is responsible for decommissioning and rehabilitation, and all requirements are outlined in agreements with landowners and as part of the planning approval.

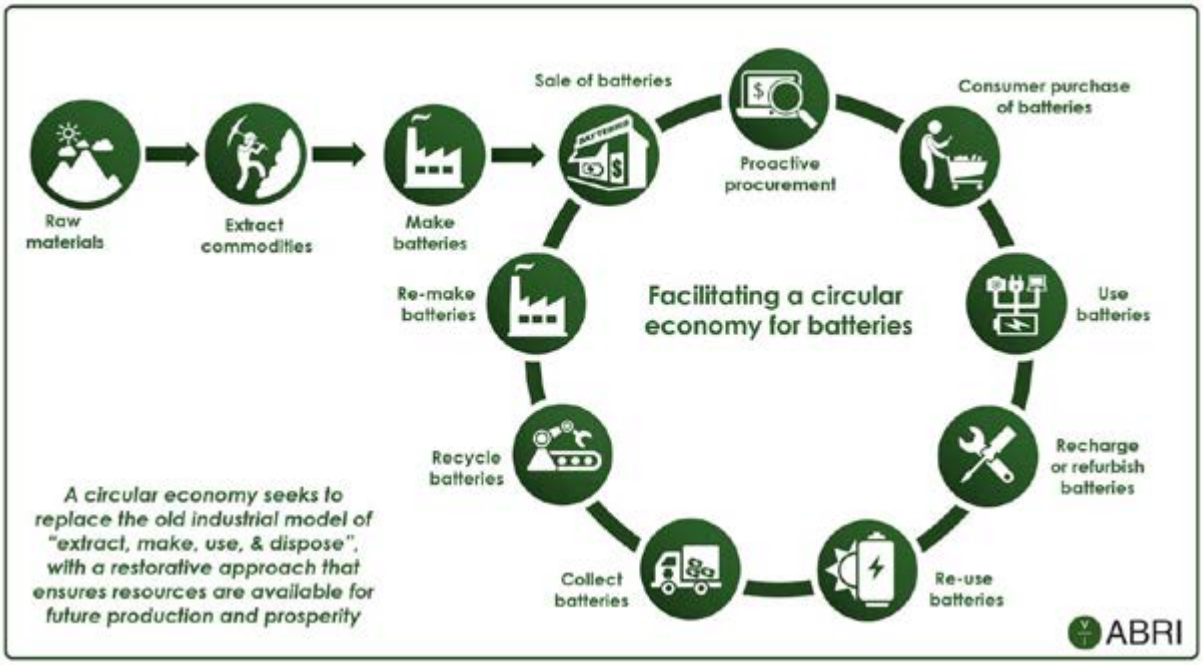
In the unlikely event a project owner ceases to operate an alternative which is occurring currently on some projects overseas is re-powering. This is where the equipment is upgraded and replaced (typically with newer technology) to allow the project to continue to operate. This would require additional environmental assessments and approvals.

Can BESS be recycled?

Batteries are vital for Australia's renewable energy transition. However, the transition will result in waste stock of batteries and their components. Effectively recycling batteries will help Australia avoid environmental impacts and supply chain disruptions and boost the economy.

The Australian Battery Recycling Initiative (ABRI) is a not-for-profit association established in 2008 to promote responsible environmental management of batteries at the end of life.

Batteries contain valuable metals which can be used and reused if they are recovered at the end of their "first" life; Keeping batteries in the circular economy also means that we are reducing hazards in landfills and alternative waste facilities.



The Battery Stewardship Council was established in 2018 as a non for profit to increase momentum and the need for government and industry to work together to find solutions to recycling of batteries.

Supportive Australian Policy Action:

- The Battery Stewardship Council (BSC), formed in 2018 aims to provide the framework to significantly increase battery recycling and collection in Australia. In 2020, under ACCC authorisation, BSC established a national scheme for managing expired batteries through rebates for cost for collecting, sorting and processing expired batteries.

- National Reconstruction Fund. Approximately one-third of the $15 billion National Reconstruction Fund will be available to companies operating in the battery sector, across areas including value-adding in resources, innovation in low-emission technology and support for clean energy component manufacturing.

- National Waste Policy. Implemented in 2018, the National Waste Policy helps to facilitate collective industry, government, and community action by 2030.Encapsulating five overarching principles, including, avoiding waste, improving resource recovery, increasing the use of recycled material and their demand, better management of material flows and improved information support.

- Critical Minerals Strategy. The Critical Minerals Strategy 2023-30 aims to help foster a domestic supply chain for government-declared "critical minerals". This strategy extends to battery recyclers because it encompasses initiatives to develop a sovereign critical mineral circular economy. [1]

In addition, in May 2024, the Federal Government announced the National Battery Strategy.[2] Priority 4 of that Strategy is Sustainability, ESG and circular economy.

The strategy outlines that,

"Australia is already a battery recycler and can seize the opportunity of a circular battery economy. In 2021, Australia recycled 99% of lead-acid batteries, compared to just 10% of lithium-ion batteries (CSIRO 2022). Lithium-ion battery recycling in Australia faces limitations because of a lack of feedstock, safety concerns and costs.

By 2035, Australia could be generating 137,000 tonnes of lithium battery waste annually (McKell 2022). As a result, a domestic recycling industry for lithium batteries could be worth $603 million to $3.1 billion in just over a decade (FBICRC 2021b). Recycling and reusing batteries presents an opportunity to expand Australia's battery industry."

Victorian company Envirostream is a recycling facility in Australia with the capability to collect, sort and shred lithium-ion batteries. Their processes capture precious battery materials such as copper, aluminum, plastic, steel and mixed metal dust through an EPA licensed processing facility.

Mixed metal dust produced from processed lithium-ion batteries is sent to battery manufacturers to produce new batteries. Whilst the metals go to local recyclers.

As the amount of battery stock requiring recycling increases, the industry will expand to meet demand.

[1] Investment Opportunities and Challenges In the Global Lithium Ion Battery Recycling Market, LCC Research, August 2023.
[2] National Battery Strategy | Department of Industry Science and Resources

Employment

Do BESS create employment during construction?

During construction a BESS creates a number of direct jobs. These may include:

- Health and safety officers
- Environmental compliance officers
- Electricians
- Apprentices/ Trades assistants
- Semi skilled labourers
- Unskilled Labourers
- Machine operators
- Transport operators
- Crane operators
- Civil and Electrical Supervisors
- Water truck drivers
- Catering
- Cleaning

In addition, hundreds of jobs may be created in businesses that supply the project. These include:

- Quarry suppliers
- Material suppliers
- Concrete businesses
- Electrical equipment suppliers
- Construction can also provide a boost for regional communities by increasing demand for local goods and services, such as accommodation, hotels, grocers, restaurants and cafes.

Does BESS create employment during operation?

The level of employment depends on the size and location of the BESS. A small team will be based on-site or in the region to manage the site and provide regular maintenance.

How can I find employment or my business benefit from the BESS?

To register your interest in employment on a BESS project or supply local goods and services, please contact us via the project specific website or using the details below. One of our team will be in touch with further information.

Working with communities

It is crucial for us to involve and respect those who live and work where we establish renewable energy projects. Local knowledge of the area's culture and environment is valuable in planning the layout of the BESS.

What benefits can a BESS create for the local community?

Local community benefits can include:

- Boost to the local and regional economy and local businesses
- Jobs during construction and operation
- Training, skills development and education programs
- Creation of community funds for local initiatives including for local Aboriginal communities
- Direct payments to landowners
- Provision of a drought-proof and post-retirement income stream for farmers.

How do you involve and share benefits with local communities?

OX2 has a clear ambition to provide local jobs wherever possible. Maintaining a close dialogue with local communities is therefore important, not just for anchoring the project but also for engaging the services of local businesses for accommodation, catering, cleaning, earthmoving, transportation and haulage and similar activities.

What happens to community commitments if a project changes hands?

If there is a change of owner, any financial or regulatory commitments to the community that are formalised in the development of the project will transfer as obligations to a new project owner. Community Benefit Agreements, Neighbour Agreements, decommissioning and property costs are built into the financial model of a project, meaning these agreements will be maintained irrespective of the project owner.

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