

Battery Energy Storage Systems



Frequently Asked Questions.

By 2050, nearly 50% of the electricity fed into the grid will be generated from renewable sources. However, their intermittent nature means that solutions must be found to match electricity production with demand. In this respect, Battery Energy Storage Systems (BESS) are highly effective. They use batteries (mostly lithium-ion) to store energy and then release it as needed.

According to the Australian Renewable Energy Australia (ARENA), batteries are particularly valuable because they provide flexibility. They can respond faster than other energy storage or generation technologies and help maintain grid stability by turning on and off in fractions of a second.

By storing renewable energy, BESS reduces reliance on fossil fuels, leading to lower carbon emissions.

Deploying cost effective battery storage allows greater use of renewable energy, supporting global net zero decarbonisation targets.

What is a Battery Energy Storage System?

A BESS stores electricity using rechargeable batteries. These systems can be used to store electricity from various sources like renewable energy generators or from the electricity grid during times of low demand, and then release it when needed, such as during peak demand periods or power outages.

What do Battery Energy Storage Systems look like?

BESS come in various shapes and sizes; they typically look like shipping containers. They often consist of several lithium battery modules placed side by side. The appearance of a BESS can vary depending on its capacity, the type of batteries used, and its intended application.

BESS projects can be standalone systems, or co-located with solar or wind farms.

How do Battery Energy Storage Systems integrate into the power grid?

BESS can generally be connected to the electricity grid in two different ways. They can store electricity only from the renewable energy plant to which they are connected, or from both the plant and the power grid. In the second case, battery systems also perform a function as regulators of the power grid.

BESS feature inverters that convert the direct current into alternating current for grid transmission. A standard BESS installation encompasses not only transformers and substations but also an operations and control centre. It is equipped with sophisticated management systems that oversee voltage levels, temperature, alarms, and the state of charge. Additionally, these systems include advanced software like Energy Management Systems (EMS), which are responsible for regulating the charging and discharging cycles of the batteries, ensuring optimal performance and longevity.

Why are Battery Energy Storage Systems useful?

They play a crucial role in balancing energy supply and demand, enhancing grid stability, and integrating renewable energy sources into the power grid.

When is the electricity stored in BESS used?

The electricity stored in a BESS is typically used during periods of high demand, also known as peak hours. This helps to stabilise the grid by providing additional power when it's needed most. BESS can also supply electricity when the generation from renewable sources like solar and wind is low, ensuring a consistent energy supply. Additionally, BESS can be utilised for energy arbitrage, which involves storing energy when prices are low and using it when prices are high, ultimately leading to cost savings. Furthermore,

in the event of a power outage or other emergencies, BESS can provide crucial backup power to maintain essential services.

Are storage systems useful for communities?

Yes, BESS are useful for communities. They bring indirect benefits like environmental sustainability since they don't produce pollution and don't need large infrastructures. They reduce reliance on fossil fuels and make the power grid more efficient and stable, guarding against malfunctions and blackouts.

Will the BESS create job opportunities for local residents?

During the construction phase, job opportunities may arise in various fields, including construction, engineering, electrical work, project management, and environmental monitoring. Contractors and subcontractors involved in the construction process often hire local labour whenever practicable, which can contribute to job creation in the community.

Once the BESS is operational, ongoing maintenance, monitoring, and support activities may continue to provide employment opportunities for local residents. These jobs may include technicians responsible for routine maintenance and repairs, as well as administrative staff and support personnel.

How much noise does the BESS generate?

Modern BESS installations are designed to minimise noise emissions through various measures, such as noise-insulating enclosures, vibration mitigation systems, and strategic placement of equipment. Additionally, advancements in battery technology have led to the development of quieter and more efficient battery systems, as well as silencer kits. Similar to other large scale infrastructure projects, BESS installations are generally subject to compliance obligations in relation to noise.

How will the BESS be maintained?

A proactive and systematic approach to maintenance is essential for optimising the performance, reliability, and safety of a battery energy storage system throughout its operational life. Maintenance involves remote monitoring, routine inspections on site, testing and replacement of parts when needs be.

What measures are in place to prevent environmental impact?

A number of measures are typically implemented to prevent or mitigate environmental impacts associated with BESS installations. Some of these include diligent site selection, environmental assessments prior to construction, vegetation management, noise and vibration control, biodiversity controls and emergency protocols. Assessments are undertaken during a project's planning and approvals phase and relevant compliance obligations are subsequently included within a Development Approval.

Are Battery Energy Storage Systems safe?

The BESS units are housed in special containers that are connected to the power grid and equipped with advanced security measures. These enable them to be monitored digitally and remotely, in order to check their operation and to take safe action when maintenance is needed.

Are Battery Energy Storage Systems a fire risk?

While BESS offers significant benefits, safety remains a priority. Manufacturers and operators continually improve safety features to mitigate fire risks and ensure reliable operation.

For example, manufacturers incorporate temperature sensors to monitor cell temperatures and trigger safety protocols if abnormal heating is detected.

Do Battery Energy Storage Systems pollute?

Some materials of the batteries are recyclable. Enel Green Power Australia also has agreements with its suppliers to mandate waste hierarchy principles which include reusing, recycling, and finding new uses for the batteries when they are replaced. The Enel Group is actively engaged in developing circular economy concepts in all its business areas.

What is the lifespan of a BESS?

As technology continues to advance, the lifespan of BESS is expected to improve, providing even more efficient and sustainable energy storage solutions for the future. At present, BESS will typically operate for between 15 to 30 years.

What happens to the batteries once they reach the end of their life?

Once the batteries in BESS reach the end of their life, they are typically reused, recycled or disposed of in an environmentally responsible manner. Battery recycling involves reclaiming valuable materials such as lithium, cobalt, nickel, and other metals, which can then be reused in the production of new batteries or other products.