AE Energy

CASE STUDY

Compact BESS

BESS Combined With Foundation Equipments

Project Background

A compact Battery Energy Storage System (BESS) offers a **flexible, high-performance power solution for off-grid, micro-grid, and hybrid construction applications.**

For this project at the Kai Tak construction site, the AEE-500 BESS was used to power an electric air compressor, **significantly reducing the site's reliance on a large diesel generator.** By delivering reliable power for critical foundation work, the solution improved operational efficiency and created a safer, quieter, and cleaner working environment. This project demonstrates how advanced energy storage can support smarter, more sustainable construction practices.

The Challenge

Construction sites often face power access issues, especially when using **heavy-duty equipment** like electric air compressors. For foundational work, a stable power source is essential to ensure the compressor runs continuously at a high load.

The key challenges include:

- **Weak grid connections** that cannot meet the power demands of the compressor.
- The need for a reliable and uninterrupted energy supply during **continuous high-load operation.**
- High fuel and operating costs are associated with the use of diesel generators.
- Noise and air pollution negatively impact worker comfort and site conditions.

AEE Solution

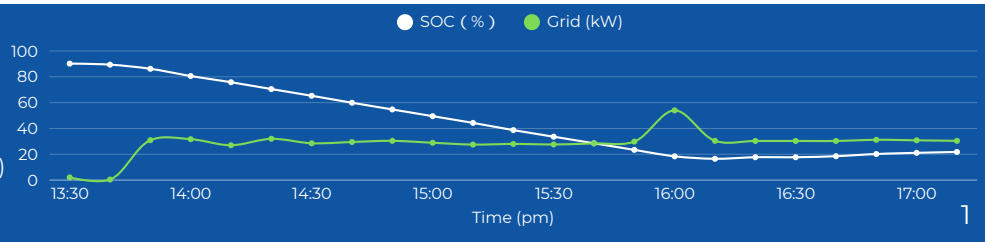
To address these challenges, we deployed our AEE-500 BESS to power the client's electric air compressor on site. With a total energy capacity of 500 kWh, the system was designed to handle both the high power demand and continuous operation required for foundation works.

Grid
Grid Power: 31.23 kW
Grid Current: 69A

AEE-500(Old version)
Capacity: 500 kWh

1 x Electric air compressor
Loading Power: 172.5 kW
Loading Current: 280.5A

- AEE Model: AEE-500 (old version)
- Capacity: 500 kWh
- Grid Input: 70A (30 kW)
- Loading output: 280A
- Operating duration: 2.5 hours (147 mins)



Results and Performance

Using a BESS instead of a diesel generator reduces reliance on diesel, offering a cleaner and more reliable on-site power source. **This decreases exposure to fuel supply issues, price fluctuations, and generator downtime.**

Reliable Power for Heavy Machinery

The AEE-500 supplied stable power for high-output electric air compressor operation during critical foundation work.

Lower Fuel Consumption

Replacing the diesel generator with grid support saves fuel, reduces the need for refueling, and lowers overall operating costs.

Reduced Carbon Footprint

By cutting diesel reliance, the project lowered greenhouse gas emissions and supported broader sustainability goals.

Improved Air Quality

With zero on-site emissions during operation, the BESS helped eliminate pollutants associated with diesel generators, creating a healthier environment for workers.

Significant Noise Reduction

Operating around 50 dB quieter than a conventional diesel generator, the AEE-500 contributed to a more comfortable, safer, and productive site environment.

Greater Operational Stability

With fewer risks related to fuel supply, generator maintenance, and downtime, the BESS enabled more predictable and resilient site operations.

Category	Traditional Diesel Generator	AEE Compact BESS Solution	Result
General Capacity Required	250kVa	Grid support	No Genset required
Runtime (hrs /day)	10 hrs (Genset Operation)	10 hrs (BESS operation)	/
Fuel Consumption (L/day)	350L/day	0	↓100%
Operation Cost ($/day)	Diesel: AUD 696 /day*	Electricity: AUD 335/day*	↓52%
CO2 Emission (kg/day)	940 kg/day	0 kg/day	↓940 kg
Maintenance Cost (monthly)	High (continuous running)	Low	↓80%
Payback Period	/	3.5 years	

*Based on diesel price and electricity price in Hong Kong, with 1 AUD = 5.53 HKD
If we apply the case study to Australia, the operational cost saved per day will be AUD 420, payback period will be 2.5 years.
(Operational cost saved per day: traditional diesel per day AUD 682.5 - electricity price per day AUD 262.5)

Project Significance

This project demonstrates the ability of the AEE-500 BESS to power heavy construction equipment in demanding site conditions. By combining high output, strong energy capacity, and reliable performance, the system supported critical foundation works while delivering clear environmental and operational benefits.

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