

/ CASE STUDY

This is NEXT LEVEL ENERGY

Powering Grid Stability: How Mortlake Is Supporting Australia's Energy Transition

Project at a glance

Location: Mortlake, Victoria

Project owner: Origin Energy

EPC and system integrator: Fluence Energy

Battery capacity: 300 MW / 650 MWh

SMA technology: 116 Sunny Central Storage 3800 UP inverters

Installed inverter capacity: 440.8 MVA

Reactive-power capability: ± 118.5 MVar at plant level

Grid connection: AusNet's 500 kV Mortlake switchyard

Meeting Australia's growing need for grid stability

Australia's electricity system is undergoing a significant transformation. As conventional synchronous generators retire and renewable generation increases, the grid requires new sources of frequency support, voltage control and system stability.

Battery energy storage systems can play an increasingly important role in addressing these challenges. With advanced grid-forming inverter technology, their contribution can extend beyond energy storage and dispatch to supporting the stable operation of the power system.

At Mortlake, SMA's Sunny Central Storage inverters provide the grid-forming capabilities that enable the battery to contribute actively to grid stability and resilience.

What the grid-forming technology enables

1. Synthetic inertia and frequency support

Provides an emulated inertial response to help stabilise system frequency and respond to rapid changes in network conditions.

2. Voltage and reactive-power support

Supports voltage stability through fast reactive-power response, contributing to the plant's documented ± 118.5 MVar reactive-power capability.

3. Voltage waveform stabilisation and fast response to grid disturbances

Responds rapidly to frequency disturbances, voltage variations and sudden changes in grid conditions while supporting voltage waveform stabilisation.

4. Fault ride-through

Supports stable plant operation during electrical disturbances, including three-phase and single-phase fault scenarios assessed through project simulations.

5. Operation under low-system-strength conditions

Supports stable operation in electrically weak and challenging network conditions. The grid-forming configuration was assessed at a short-circuit ratio as low as 1.2—significantly below the approximately 3 considered for the alternative grid-following configuration.

6. Response to the loss of conventional generation

Supports stable power-system behaviour following the simulated loss of synchronous generation across different battery operating conditions.

7. Flexible grid-forming controls

Enables configurable operating modes, including P-Inertia with Q-Droop and P-Droop with Q-Droop, to respond to different grid requirements.

Delivering value beyond energy storage

At Mortlake, SMA's grid-forming technology enables the battery to contribute actively to power-system stability while supporting the project's operational flexibility and long-term commercial value.

By providing synthetic inertia, voltage and reactive-power support, fault ride-through and stable operation under low-system-strength conditions, the technology helps address challenges associated with the transition to a more renewable electricity system.

For project owners and the wider energy system, these capabilities can support:

- Improved grid stability and resilience.
- Reliable operation under challenging network conditions.
- Reduced exposure to system-strength-related costs.
- Greater operational flexibility as grid and market requirements evolve.
- Integration of higher levels of renewable generation.
- Long-term asset performance and commercial value.

Mortlake demonstrates how grid-forming battery storage can deliver system-stability benefits alongside energy storage, operational flexibility and commercial value.

Why SMA?

Proven technology. Global scale. Long-term confidence.

SMA technology supports utility-scale solar, battery storage and hybrid energy projects worldwide, combining high-performance power conversion, grid stability and long-term lifecycle support

Redefining the role of battery storage

From Blackhillock in the United Kingdom to Mortlake in Australia, SMA grid-forming inverters demonstrate how battery storage can deliver critical stability services, perform under challenging network conditions and enable the integration of higher levels of renewable generation.

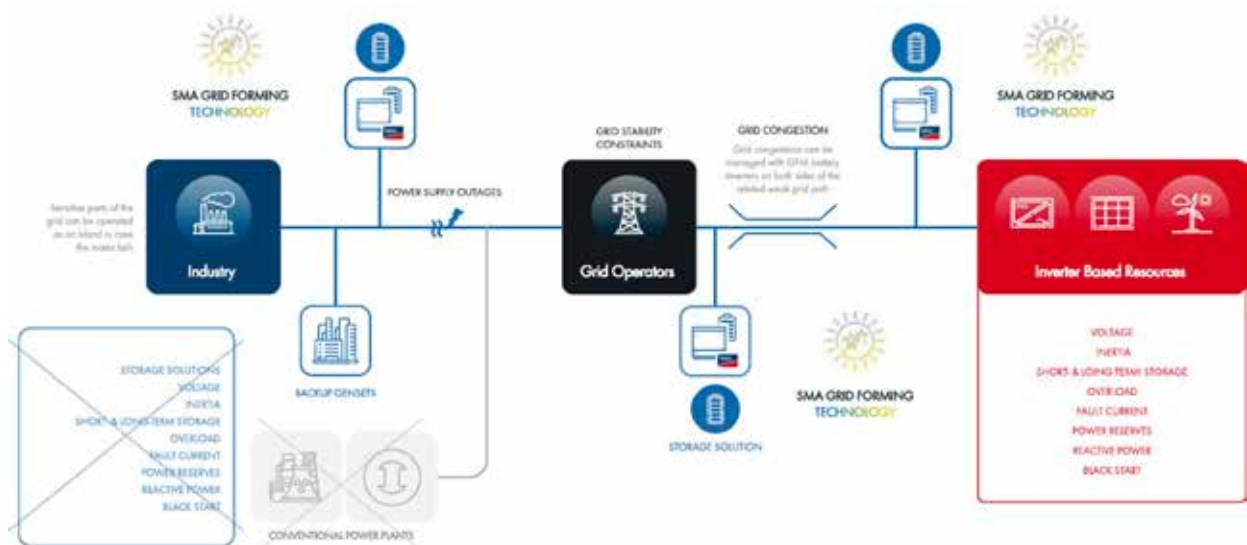
SMA at a glance

156+ GW
Installed worldwide

10+ GW
Installed in Australia

45+ years
Driving energy innovation

Grid Forming based on SMA Inverters provide the same grid stabilisation service as conventional technology, plus much more



Capabilities and applications depend on project configuration, grid requirements and applicable operating conditions.

Hardware-in-the-Loop testing

SMA's Hardware-in-the-Loop testing platform combines real hardware with real-time simulation to validate inverter controls, communications and system behaviour before equipment is energised on site.

HIL testing supports earlier issue identification, model validation, the AEMO R2 process, smoother commissioning and reduced project delivery risk.

Cybersecurity that supports critical infrastructure

SMA participated in the 2026 Australian Energy Sector Cyber Security Framework assessment, achieving independently benchmarked results that ranked SMA first or second across all 11 assessed domains among participating non-market entities. The results demonstrate strong capability across governance, operational security, risk management and resilience.

Local delivery. Long-term support.

SMA supports customers throughout the project lifecycle with engineering support, commissioning, field service, training and ongoing operational support.

"Grid-forming technology is redefining what battery storage can contribute to the power system—combining energy flexibility with the stability needed for a more renewable grid."

Samuel Wiggins
Managing Director, Large Scale Service & Technology,
SMA Australia

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