



Microgrid Control – A SICAM application

[siemens.com/microgridcontrol](https://www.siemens.com/microgridcontrol)

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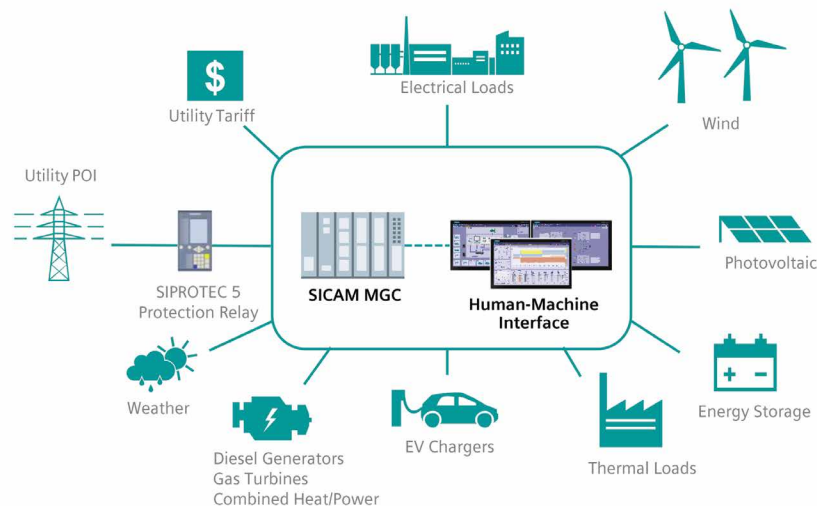
SICAM MGC

Seamless operation. Maximum resiliency.

Benefits at a glance:

- Cost effective solution with straightforward optimization capabilities to minimize energy costs.
- Comprehensive integration of renewable energy to meet climate protection targets that reduce CO₂ emissions.
- Enhances resiliency with automatic island operation.
- Vendor agnostic, compatible with a wide range of distributed energy resources including PV, energy storage, conventional generation, combined cycle generators, fuel cells, wind, and more.
- Integration of microgrid control and substation control into a single platform to reduce complexity and project cost.

Microgrid control – configuration





| **Cost savings**



- Peak shaving.
- Demand charge reduction.
- OPEX optimization.



| **Resiliency & reliability**

- Seamless islanding / reconnect.
- Blackout detection and black start.
- Generation, storage and load control.
- Cybersecurity.
- Redundant live controller option.

| **Sustainability**



- Renewable integration.
- Green footprint.
- Generation and load forecasting.
- Integration with EV infrastructure.

I Microgrid – Functionality

Asset monitoring

- Integration of asset status, measurement, and monitoring devices.
- Automatic derivation of required system response.
- Maintenance monitoring and alarms.
- SMS Alarms.

Blackout detection, black start, and automated-grid modes

- Blackout detection and indications by evaluating related measurements.
- Automatic repowering of the microgrid by execution of black start sequence.
- Automatic re-synchronization to the distribution grid after blackout.
- Control of voltage and frequency to ensure microgrid stability.

Automatic start / shedding of generators

- Protection against short circuits and faults.
- Reduced operating costs by maximizing renewables to conserve fuel for backup generators.

Generation offsetting and balancing

- Automatic starting of generation.
- Load sharing.

Peak Shaving

- Optimal shift or reduction of peak loads.
- Storage of energy during low demand periods.

Integration with EV infrastructure

- Dynamic load management for EV charging units.
- Five load management algorithms for virtually every application.

Load shedding and restoration

- Power-based load shedding for stable island grid.
- Sequence-based load shedding on loss of utility.
- State-of-charge load shedding for extended island operations.

Reserve management

- Stable grid operation through consideration of spinning reserve requirements.
- Balance of fluctuations in renewable generation.
- Shed excess energy in response to voltage / frequency boundary violations.

State-of-charge management

- Storage of energy in case of excess renewable energy.
- Multiple Charge/discharge schedules to match tariff rates.

Load / generation forecasting

- Manual input or import of power and weather forecast.
- Electrical / thermal load and renewable generation forecast based on historical data, when considering weather forecast.

Integration of thermal assets

- Control based on thermal or electrical demand for cogeneration resources.
- Control with thermal targets.

Energy and ancillary services markets

- Automated mechanisms / workflow for market participation.
- Automatic services provisioning.

Microgrid in action: Siemens – Princeton, New Jersey

Components

- SICAM MGC.
- SIPROTEC 5 Relay.
- Desigo CC building automation system.
- DEOP market interface.
- 836 kWp Photovoltaic.
- 500 kW / 1MWh Fluence BESS.
- 6 x 7.2 kW Siemens VersiCharge.



Main functionality

- Peak shaving.
- Demand response program.
- Zero inertia (100% renewables) islanding.
- Research and development.

Efficient, reliable, sustainable

- Operating cost reductions and revenue stream through ancillary services.
- Seamless islanding / seamless reconnect during unexpected utility outages.
- No CO₂ emitting generation and integration of EV chargers to support carbon neutrality goals.



Customer Tours Available! (Virtual or in person)

<https://new.siemens.com/us/en/company/topic-areas/distributed-energy-systems/princeton-resilient-campus.html>

| A solution – to fit all your needs

Why a SICAM MGC?

- A dynamic, cost-effective solution for optimal microgrid control.

Scalable, seamless integration

- SICAM MGC takes a vendor agnostic approach to the integration of renewables through a wide range of supported communication protocols, standard signals, modular hardware platform, and proven algorithms.

Proven technology

- Over 600 MW of generation under control on active microgrids across the globe.

Cyber secure

- Utility grade cyber security built in.



| Offerings

Switchgear / Switchboard with Integrated Microgrid Controls

- Packaged Microgrid Solution.
- EV Integration.
- Ideal for Greenfield / Brownfield Applications.
- Reduced Project Timeline and Site Integration Work.
- Faster and Easier to Deploy.
- Less Expensive than Customized Microgrid Solution.

MGC Services

- Project Engineering / Project Management.
- Specification Development – Sequence of Operations.
- Drawings and Documentation.
- Configuration and Testing.
- Site Integration Testing.
- Homer Modeling – Feasibility Study.

Siemens Energy Performance Services (EPS)

- Turnkey Microgrid Solutions.
- Energy as a Service Performance Contracts.
- Distributed Energy System Planning.
- Demand Side Efficiency.
- Operation, Service and Maintenance.



Siemens Financial Services

- Project Financing.
- Equity Financing.
- Equipment and Technology Financing.



Legal Manufacturer

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