**MAXIMUM SECURITY IN OPERATING MICROGRIDS**

# **Microgrid Control** – Revolutionizing Energy in the Chemical Industry
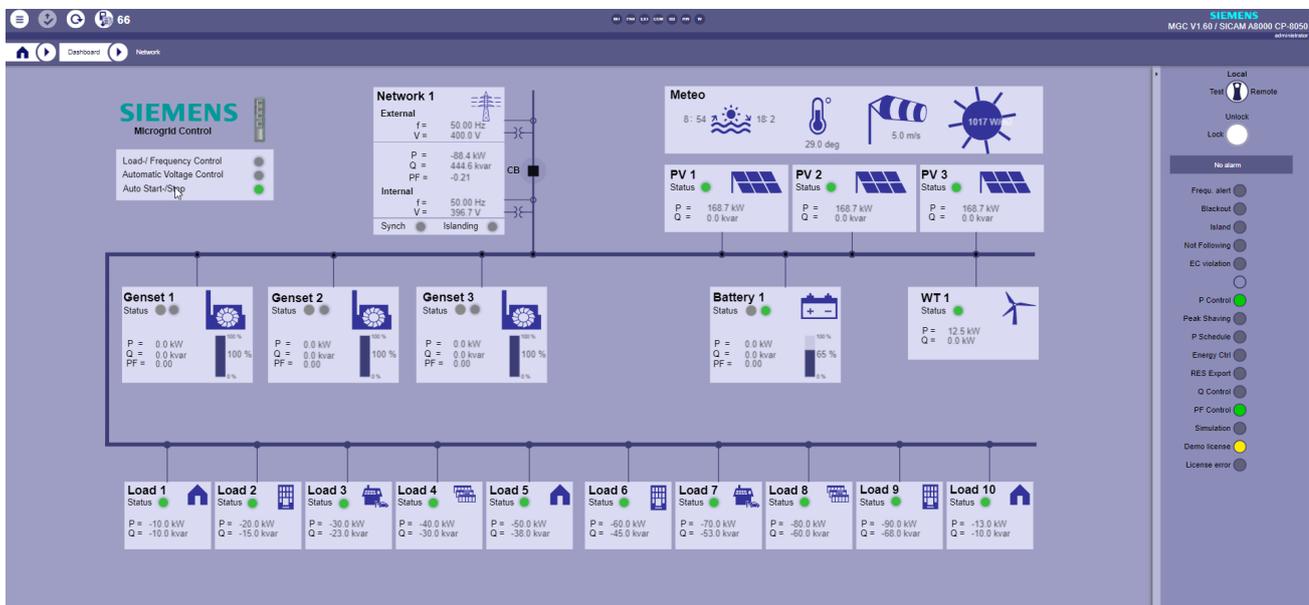
siemens.com/microgridcontrol

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# Greenhouse gas reduction and energy neutrality

## Chemical plants require substantial energy, often making energy management a critical aspect of operational efficiency

- Transition to Renewable Energy: The integration of renewable energy into existing operations is paramount. In this context, microgrids emerge as an indispensable solution to reduce carbon emissions.

- The transparency of energy consumption in the production process allows for the identification and improvement of energy-intensive operations.

- Utilizing energy more efficiently helps reduce operational costs and reduce their environmental impact.

- Using renewable energy sources like solar panels can help the plant move towards greater energy independence.
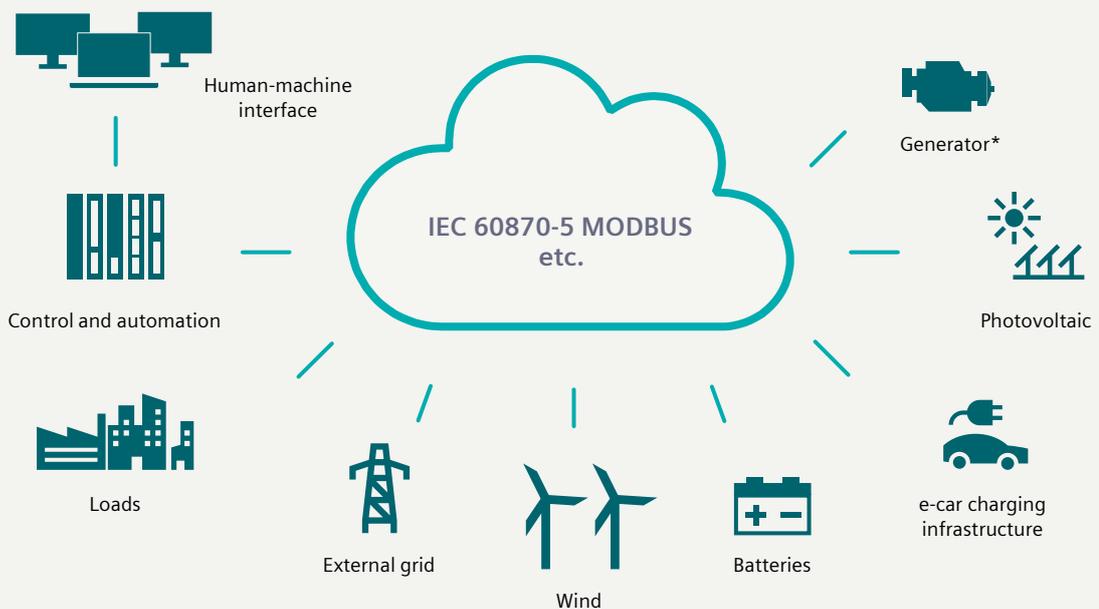


**Ensure chemical plant reliability and security with the energy neutrality of SICAM Microgrid Control**

# Minimize OPEX.
# Maximize security.

**Benefits at a glance**

- Optimal efficiency is realized via a robust power system utilizing renewable sources.

- Excellent grid quality meets the stringent requirements of autonomous grid operation.

- Straightforward optimization capabilities enable cost-effective operation.

- Adoption of renewable energies advances climate goals by facilitating $CO_2$ reduction.

- Resource-efficient energy use protects the environment and minimizes costs.

## **Microgrid Control** – Configuration



Human-machine interface

Generator*

IEC 60870-5 MODBUS etc.

Control and automation

Photovoltaic

Loads

External grid

Wind

Batteries

e-car charging infrastructure

*diesel generator, CHP, gas turbine

# A microgrid you can rely on

## Asset monitoring

- Integration of asset status, measurement, and monitoring devices
- Automatic derivation of required system responses

## Blackout detection, black start, and automated grid modes

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

## Reserve management

- Stable grid operation by including spinning reserve requirements
- Balance of fluctuations in renewable generation
- Shedding of excess energy in response to voltage / frequency boundary violations

## Automatic start of backup generators

- Protection against short circuits and faults
- Reduced operating costs by using diesel generators mainly as backup
- Generation offsetting and balancing
- Minimized fuel costs and challenges linked to fossil fuel supply
- Improved generator performance
- Optimized generator efficiency

## Peak shaving

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

## Integration of infrastructure for electric vehicles

- Dynamic load management for charging units

## State-of-charge management

- Storage of energy in case of excess renewable energy
- Ensuring minimum energy content
- Charge / discharge schedules

## Load and renewable 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

## Economic and environmental indices

- Reduced $CO_2$ emissions
- Fuel-cost savings

## Integration of thermal assets

- Control based on thermal grid pressure
- Control with thermal targets

## Energy and ancillary services markets

- Automated mechanisms / workflows for market participation
- Automatic services provisioning

**Algorithms meet the IEC 62898-2 standard**

# SICAM Microgrid Control benefits

- SICAM Microgrid Control can be seamlessly integrated into the SIMATIC PCS 7 process control system.

- Enables versatile communication through multiple protocols and media, meeting various connectivity requirements.

- A scalable solution that guarantees uninterrupted service and adaptability to growing demands.

- Intuitive operation through SICAM WEB and SIMATIC PCS 7, simplifying user interaction.

- Interdisciplinary engineering by standardized configuration.

- A high level of protection through comprehensive security protocols, safeguarding system integrity.