



## MICROGRIDS AT A GLANCE

# Why microgrids are the future of energy management

The traditional power grid provides reliable power – most of the time. But when natural disasters or security breaches threaten the grid, the ensuing blackouts can be catastrophic and costly.

That's why companies and utilities are working together to build resilient, flexible power systems called microgrids. Operating either as part of the traditional grid or independently (or both), microgrids are revolutionizing the way we manage our energy resources.

## Why do microgrids matter?

Microgrids can generate, distribute, and control power in a campus setting, a small community, in critical infrastructures, military institutions, commercial and industrial areas, remote locations, and on islands.



### They're reliable and flexible

Microgrids are designed to provide uninterrupted, 24/7 power and to balance load demands for an organization with changing power needs.

### They can save money

Using sophisticated software, operators can optimize power usage based on demand, utility prices, and other factors.

### They're resilient

Because microgrids aren't dependent on the traditional grid, their stability in bad weather is important for mission-critical structures such as hospitals and military bases.

### They store and incorporate renewable energy

This can save money and reduce carbon-dioxide emissions, as often required by government regulations.

### They're more secure

Their distributed generation (power is generated locally rather than transmitted from one central utility source) and smaller size make microgrids easier to keep safe – both physically and, given the right control system, from cyber threats.

## How do microgrids work?

An advanced control system enables microgrid components to operate in a coordinated, optimized way.

### Energy storage solution

Batteries store the electricity for use, keeping the power always on hand.

### Controllable load

Control solutions (such as the Siemens Desigo CC Building Automation System) optimize energy use within a building, depending on critical need and priorities.

### The utility grid

This interconnected system serves as our primary source of everyday power. Microgrids can be "islanded" or disconnected from the traditional grid during a natural disaster or cyber threat.

### Controllable generation

Nonrenewable, fossil-fuel energy sources may include biogas, fuel cells, or gas turbine engines. They provide stable and necessary levels of voltage and frequency to the system.

### Limited or noncontrollable generation

These intermittent fuel sources fluctuate based on factors such as the weather. Examples include solar or wind power generated by Siemens photovoltaic and Siemens wind turbine products.

Microgrid controller

## Managing microgrids

A comprehensive control system is required to manage the daily operation of microgrids. Siemens provides an advanced control and management system with the following capabilities:



During outages, the microgrid management system coordinates with the utility grid and enables microgrid owners to become, in essence, mini utilities.



The easy-to-use interface doesn't require constant monitoring – a key advantage for smaller operations.



Microgrids take full advantage of renewable energy sources by optimally dispatching stable fossil-fuel generation and/or battery storage to ensure the grid is always operating in a reliable state.



Power can be optimized according to availability, efficiency, and/or cost. If it's windy, the system may switch to wind power. On calm days, natural gas may be more cost-effective.



Microgrids encompass a flexible and scalable system that can adapt as energy infrastructure plans change over time.

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Ultimately, implementing the right microgrid controller solution can provide several hundred thousand dollars of savings per year.

## Conclusion

Companies and communities with an absolute need for dependable energy are looking to the microgrid as an efficient, powerful, and ingenious solution. These reliable, emergency-ready systems can lead to fewer blackouts, greater cost savings, and less dependence on fossil fuels.

A variety of financing options are available. Find out more about Siemens microgrid solutions at [www.siemens.com/microgrids](http://www.siemens.com/microgrids)

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