

# Distributed Energy Systems

## Company Core Technology

### Background

The energy landscape is changing from centralized large-scale power generation to a network of a vast number of often independently owned and operated, distributed power producers. The change to decentralization is characterized by the deregulation of markets, a price decrease for renewable energy and rising environmental awareness that goes hand in hand with an increasing departure from the use of carbon-based fuels.

Renewable energy sources will decrease in costs in the next 20 years by more than 40% for PV and offshore wind and more than 20% for onshore wind. Combined with an expected decrease in storage costs by 40% in that timeframe, these cost cuts become a major driver behind the renewable energy trend, especially as fossil fuel costs are expected to rise by more than 10% for gas and more than 30% for coal.

This is reflected in the forecast of new installations, which for centralized power generation will decrease by 1.3% annually to only 33%, while decentralized systems grow 2.5% annually to a 67% share in 2030.

### Importance for Siemens

With many new players joining the established participants, the energy system is transforming into a more heterogeneous setup in which the new market participants in particular are aiming to make use of the new business models offered by this trend. For us at Siemens, this means that there are new customer types with multiple new customer needs to be addressed, such as for energy consumers and producers, aggregators and traders. On the technology side, the increase of efficient and affordable small-scale power generation solutions, including renewable energy, combined heat and power (CHP) and storage solutions in particular, reinforces this shift.

Siemens meets this trend by delivering customer-specific applications and services, addressing customer needs such as energy efficiency, grid fee reduction, autonomy, resilience and reduction of CO<sub>2</sub> emissions. The solution scope ranges from single turnkey projects to completely outsourcing the clients' energy operations.

Advanced business models such as rental and leasing contracts, performance contracting, and own and operate models – resulting in “Energy as a Service” based on a high degree of digitalization – not only help to decrease business risks, but also reduce complexity and integration risks for our customers.

#### Further information

[siemens.com/innovationday](https://www.siemens.com/innovationday)  
[siemens.com/press/inno2017](https://www.siemens.com/press/inno2017)

#### Success stories and research focus

In practice, Siemens has proved its expertise in this area and delivered tangible results in various projects:

- At Algonquin College in Canada, an overall reduction of annual energy costs of 48% was achieved by installing a complete energy supply and data management solution, including renewable generation and storage.
- The island of Ventotene, Italy, gained electrical independence and reduced its carbon footprint by up to 15%. In addition, the integration of renewables with the existing gen-sets led to substantial fuel savings.
- With a low-carbon microgrid that manages and controls diverse renewable energy sources and a battery storage system, the Blue Lake Rancheria in the United States can now draw from seven days of available on-site power independent from the grid.

With an end-to-end cross-divisional approach, Siemens bundled its competencies as an integrated technology company in a dedicated portfolio unit, combining the strengths of distributed energy and digitalization. Profound system expertise and integration competence based on standardization regarding products, solutions and an integrated digital tool chain will drive excellence from pre-sales consulting to installation design, commissioning, operation and optimization of the clients’ economic benefits.

Siemens aims to strengthen its system and integration competence and to standardize and modularize its products, solutions and workflows. A key success factor in this highly distributed, global energy landscape will be to enable Siemens, other suppliers and the users themselves to efficiently and effectively design, commission, operate and maintain the respective facility. Mindsphere, the open, cloud-based IoT operating system from Siemens, will serve as an exchange and delivery platform for asset data, software applications and specific service and operation know-how.

Our goal is to offer transparent, highly standardized and cost-efficient distributed energy solutions and related services – combined with flexible financial models where needed.