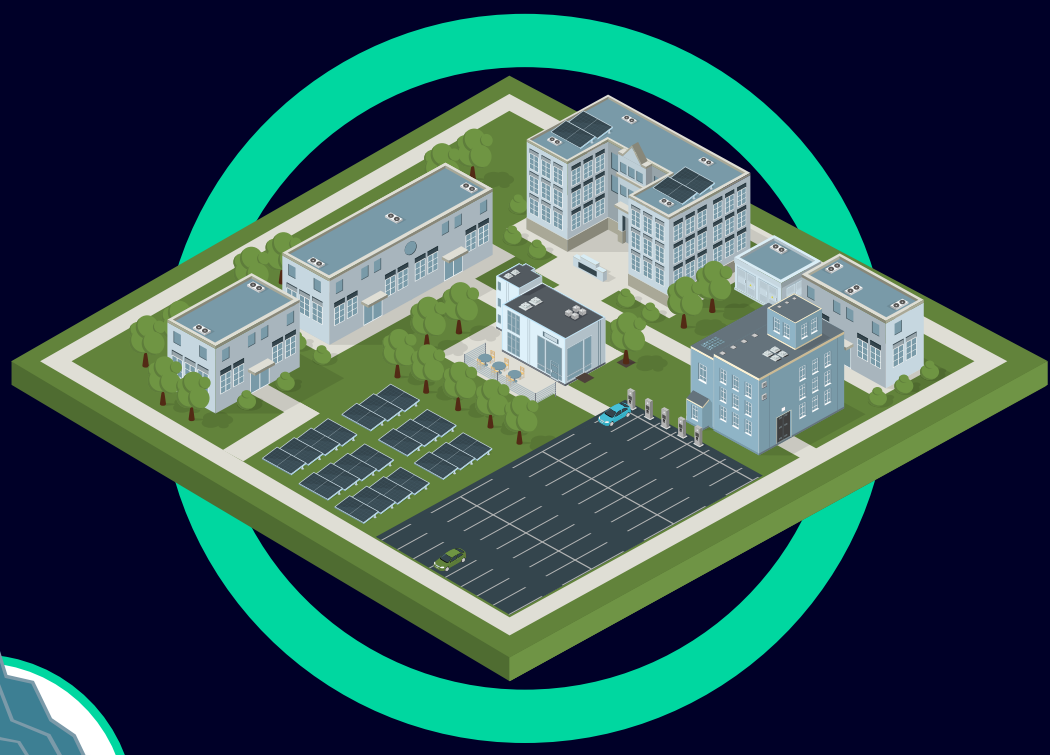
Building an Energy Efficient Microgrid

Addressing microgrid challenges

The Siemens Princeton Microgrid project was designed to address the challenges of decarbonization and distributed energy resilience. Besides increasing energy efficiency of on-campus buildings, the campus has documented reduced CO_2 emissions of 50% until 2020 thanks to the solar-powered microgrid. Overall energy costs were lowered while cost savings increased. Through storms and outages, power remained stable and secure. Even better, it's all scalable. Below are recommendations based on the lessons learned at Princeton Siemens Campus for a phased approach to building an energy efficient microgrid.



1

Energy Strategy

Map out goals, objectives, needs
Analyze existing systems / Identify improvement goals
and objectives

- Simulation Tools
- Siemens MindSphere (data analytics/analysis of IoT)

2

Energy Savings

Improve resilience, drive energy savings

- Microgrid Control – a SICAM application
- OPAL-RT Technologies
- Siemens Amplifier
- Tapas InverterPLUS PV
- 836 kWP photovoltaic system

3

On-site Storage

Leverage excess energy

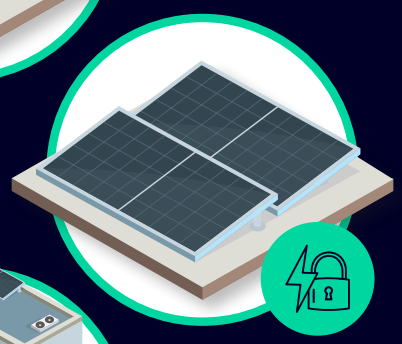
- Energy Storage Solution
- Siemens ESS System
- 1000 kWh energy storage system

4

Power Generation

Ensure power security
for long term operations

- Siemens Engine
- Siemens Generator
- Renewable Sources



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Building Efficiency

Use building automation technology to further reduce greenhouse gas emissions and increase energy efficiencies

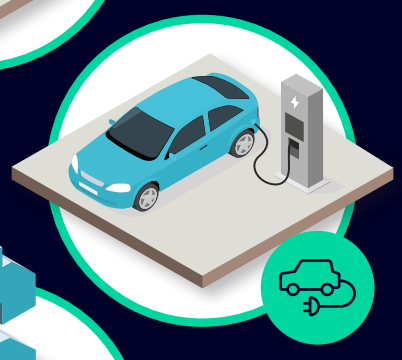
- Building automation/ management software
- Siemens Desigo/Navigator

6

Facilitate EV

Use the microgrid-managed energy to charge electric vehicles on-site

- EV distribution and stations
- Siemens VersiCharger



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Monetize Excess Energy

Generate funding opportunities by selling excess energy back to the grid. Optimize grid control and building energy management

- Siemens Services and Finance
- MindSphere Simulation and Digital Twins

Siemens Grid Innovation

When building microgrids, each implementation is unique. The Siemens Princeton Microgrid is one of the first to combine renewable energy solutions with both building management and energy management solutions. The result is a cost-effective, cyber-secure and resilient solution that serves as a test bed for Siemens customers and partners. And it's even more: a proven business case which is scalable and adaptable.

Learn more at www.siemens.com/princeton