



Fact Sheet: Ameren's Champaign Microgrid

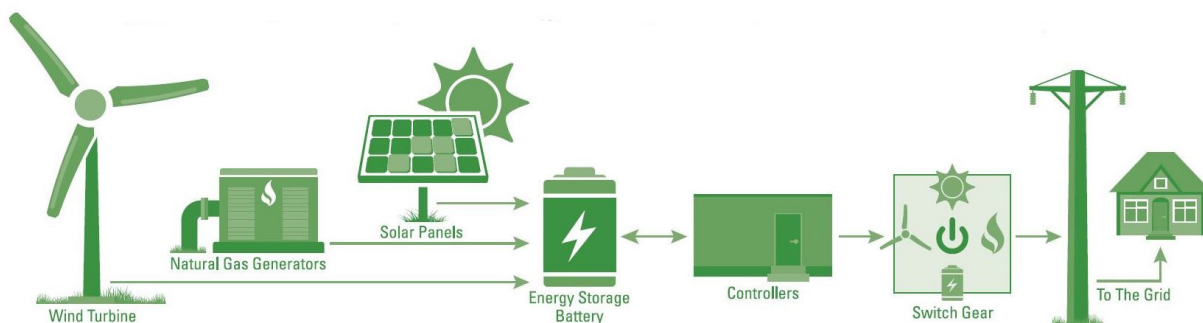
Overview

Next to the University of Illinois campus in Champaign, Ameren has developed one of the most advanced utility-scale microgrids in North America. The microgrid includes a 160-foot wind turbine, solar panels and natural gas generators that can produce enough electricity to power nearly 200 local residential and commercial customers. Ameren built the microgrid facility to test monitoring and control methods for aggregating these clean energy sources with advanced automation and battery storage.

Primary Components

- Wind turbine
- Natural gas generators
- Solar panels
- Energy storage battery
- Controllers
- Switch gear

Visual Representation



Energy generation process

1. The wind turbine, natural gas generators and solar panels generate energy.
2. That energy can be routed directly to local customers, routed to the greater Ameren grid or stored in the microgrid's battery for later use.
3. The microgrid's controllers automatically adjust the facility's operations to the appropriate energy source based on weather, customer demand and the operation of the greater Ameren grid.

Component details

Wind turbine

- The microgrid's wind turbine stands 160 feet tall (roughly half the length of a football field) and harnesses the power of the wind to produce energy. Wind turns the blades, which spin a shaft. The shaft spins a generator, producing electricity.
- The wind turbine can produce 100 kilowatts of electricity.

Natural gas generators

- Ameren Illinois delivers natural gas to more than 800,000 customers in central and southern Illinois. A portion of that natural gas is converted into electricity by the microgrid's two generators.
- Each generator can produce 500 kilowatts of energy.
- The generators can operate in any weather conditions.

Solar panels

- The microgrid's solar panels convert sunlight into energy.
- The solar panels can produce 125 kilowatts of electricity.

Energy storage battery

- Energy produced by the wind turbine, natural gas generators and solar panels can be stored in the microgrid's battery until it is needed.
- The battery can also store power from the greater Ameren grid.
- The battery can supply 250 kilowatts of energy for two hours.

Controllers

- The microgrid's controllers serve as the "brains" of the facility.
- They ensure that the microgrid's components operate safely and efficiently.
- They also enable Ameren to make real-time adjustments to the microgrid.

Switch gear

- The microgrid's switch gear controls the flow of energy produced by the microgrid by allowing the wind turbine, natural gas generators, solar panels and battery to either connect to the Ameren grid or operate independently from the grid.
- The switch gear operates automatically but is remotely controlled and monitored by Ameren.

Construction of the microgrid was completed in December 2016, followed by testing in the first quarter of 2017. The microgrid is one component of Ameren Illinois' innovation campus, located at the Technology Applications Center (TAC) adjacent to the University of Illinois campus. The TAC enables entrepreneurs and innovators to test programs, technologies, business models and other Smart Grid-related activities while connected to a live grid.

