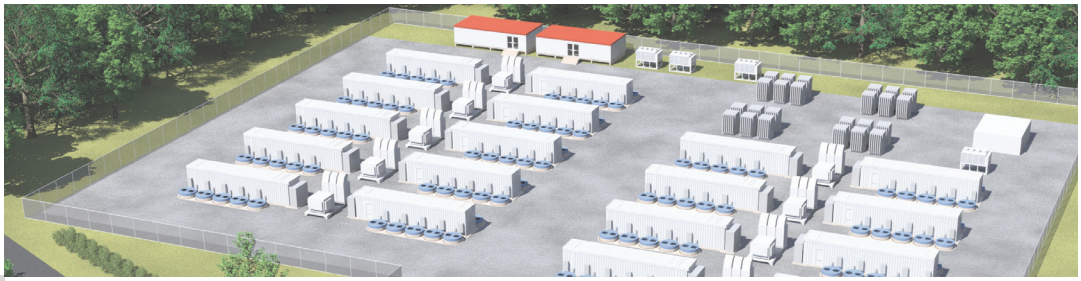
NYSERDA CASE STUDY:
Smart Grid



ENERGY STORAGE SYSTEM

Company Name
Beacon Power, LLC

Location
Stephentown, NY
(Rensselaer County)

Lower Cost Energy and Zero CO_2

Beacon Power installs 20-MW energy storage system

Background

As part of the Smart Grid Program, NYSERDA supported Beacon Power, LLC's deployment of a 20 MW advanced flywheel-based energy storage system in Stephentown, NY. The facility provides the New York Independent System Operator with fast-response frequency regulation to help maintain balance between generation and load on the electric system of New York State.

The Stephentown facility consists of 200 flywheels connected to the grid that can inject or absorb up to 20 MW. Individual flywheels, comprised of carbon fiber composite material and installed in underground concrete housings to mitigate noise and safety risk, can raise or lower frequency as needed in real-time. This technology has highly attractive performance attributes, low variable operating costs, and produces zero direct CO_2 greenhouse gas or other emissions.

Challenge

The electric power delivery system must maintain a frequency of 60 Hz to ensure a high level of reliability. Grid operators accomplish this by requiring generators to increase or decrease power output in response to frequency deviations on the grid. Not all generators can reliably operate in such a variable way, and generators that do so suffer a loss in efficiency and incur higher operating costs due to added fuel consumption and increased maintenance.

Solution

Beacon's 20 MW plant has been designed to provide frequency regulation services by absorbing electricity from the grid when there is too much, and storing it as kinetic energy in a matrix of flywheel systems. When there is not enough power to meet demand, the flywheels inject energy back into the grid, thus helping to maintain proper electricity frequency. An additional benefit of the Beacon flywheel plant is to support the integration of greater amounts of intermittent renewable power resources such as wind and solar.

nyserda.ny.gov
1-866-NYSERDA

NEW YORK STATE OF OPPORTUNITY. | NYSERDA