



## Hazle Spindle, LLC Beacon Power 20 MW Flywheel Frequency Regulation Plant

### Project Description

Beacon Power will design, build, and operate a utility-scale 20MW flywheel plant at the Humboldt Industrial Park in Hazle Township, Pennsylvania for the plant owner/operator, Hazle Spindle LLC. The plant will provide frequency regulation services to grid operator PJM Interconnection. The Beacon Power technology uses flywheels to recycle energy from the grid in response to changes in demand and grid frequency. When generated power exceeds load, the flywheels store the excess energy. When load increases, the flywheels return the energy to the grid. The flywheel system can respond nearly instantaneously to an independent system operator's control signal at a rate 100 times faster than traditional generation resources. The system does not burn fuel and has zero direct emissions. The Beacon Gen4 flywheel is designed to provide 100 kW of output and store 25 kWh of energy. Two hundred flywheels will be connected in parallel to provide 20 MW in capacity and can fully respond in less than 4 seconds. The plant can operate at 100% Depth of Discharge with no energy degradation over time and provide unlimited cycles for most applications. The flywheels are built to last 20 years or more. Virtually no maintenance is required in the mechanical portion of the flywheel system. Flywheel technology has been successfully tested on live grids at scale power in New York and California. The technology achieved system availability of over 97 percent, higher than the average for conventional generators performing frequency regulation. It is currently deployed at a megawatt scale under New England's Alternative Technologies pilot program, and a 20 MW plant in New York Independent System Operator (ISO) territory in Stephentown NY.

### Goals/Objectives

- Demonstrate and speed the deployment of fast response flywheel-based frequency regulation
- Stimulate the international market demand for flywheel energy storage
- Quantify and verify the commercial viability and scalability of this Smart Grid energy storage technology
- Increase transmission capacity and reduce congestion

### Key Milestones

- Site construction begins (December 2012)
- Plant commences operation (September 2013)
- Site construction complete (November 2013)
- Plant reaches full capacity (final flywheels installed) (June 2014)

### Benefits

- Job creation
- Grid reliability improved
- Wind and solar power use increased
- Greenhouse gas emissions reduced
- Dependence on fossil fuel decreased
- Increase transmission capacity and reduce congestion



### CONTACTS

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### PARTNERS

Beacon Power LLC  
PJM Interconnection  
PPL Electric Utilities  
George J Hayden Inc.

### PROJECT DURATION

1/1/2010–9/30/2015

### BUDGET

**Total Project Value**  
\$52,415,000

**DOE/Non-DOE Share**  
\$24,063,978/\$28,351,022

### EQUIPMENT

Beacon Gen4 flywheels  
Power electronics  
Chillers/coolers  
Transformers  
Switchgear

### DEMONSTRATION STATES

Pennsylvania

CID: OE0000200

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