Advanced Research Projects Agency • ENERGY

GRIDS PROJECT

BOEING

ADVANCED FLYWHEEL COMPOSITE ROTORS

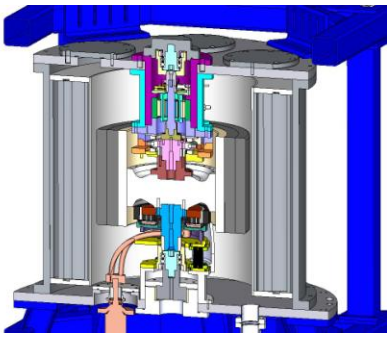
PROJECT TITLE:	Low-Cost, High-Energy Density Flywheel Storage Grid Demonstration		
ORGANIZATION:	Boeing Research & Technology	LOCATION:	Seattle, WA
PROGRAM:	GRIDS	ARPA-E AWARD:	$2,264,090
TECH TOPIC:	Energy Storage: Stationary	PROJECT TERM:	10/1/10 – 9/30/13
WEBSITE:	www.boeing.com		

CRITICAL NEED

Our national electric grid has limited ability to store excess energy, so electricity must constantly be generated to perfectly match demand. Though wind and solar power are promising clean alternatives to fossil fuels, their natural unpredictability and intermittency present major challenges to delivery of the consistent power that is necessary to operate today's grid. The U.S. needs technologies that can store renewable energy for future grid-use at any location. Flexible, large-scale storage would create a stronger and more robust electric grid by enabling renewables to contribute to reliable power generation.

PROJECT INNOVATION + ADVANTAGES

Boeing is developing a new material for use in the rotor of a low-cost, high-energy flywheel storage technology. Flywheels store energy by increasing the speed of an internal rotor —slowing the rotor releases the energy back to the grid when needed. The faster the rotor spins, the more energy it can store. Boeing's new material could drastically improve the energy stored in the rotor. The team will work to improve the storage capacity of their flywheels and increase the duration over which they store energy. The ultimate goal of this project is to create a flywheel system that can be scaled up for use by electric utility companies and produce power for a full hour at a cost of $100 per kilowatt hour.



IMPACT

If successful, Boeing's new material could allow their flywheel rotors to spin faster, producing more energy for grid-scale storage at a cost competitive with today's best energy storage systems.

- SECURITY: A more efficient and reliable grid would be more resilient to potential disruptions.
- ENVIRONMENT: Electricity generation accounts for over 40% of U.S. carbon dioxide (CO_2) emissions. Enabling large-scale contributions of wind and solar power for our electricity generation would result in a substantial decrease in CO_2 emissions.
- ECONOMY: Increases in the availability of wind and solar power would reduce fossil fuel demand, resulting in reduced fuel prices and more stable electricity rates.
- JOBS: Advances in energy storage would result in new high-paying jobs in supporting sectors such as manufacturing, engineering, construction, transportation, and finance.

CONTACTS

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