Advanced Research Projects Agency • ENERGY

GRIDS PROJECT

ABB

MAGNETIC ENERGY STORAGE SYSTEM

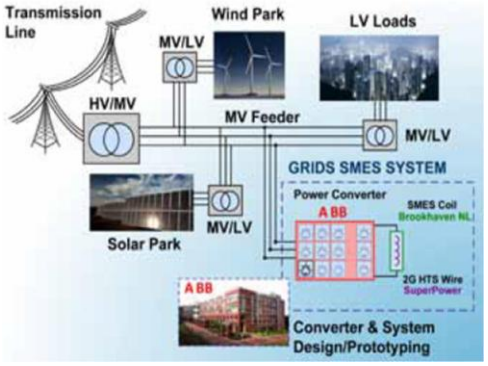
PROJECT TITLE:	Superconducting Magnet Energy Storage System with Direct Power Electronics Interface		
ORGANIZATION:	ABB, Inc.	LOCATION:	Cary, NC
PROGRAM:	GRIDS	ARPA-E AWARD:	$4,200,020
TECH TOPIC:	Energy Storage: Stationary	PROJECT TERM:	10/1/10 – 9/30/13
WEBSITE:	www.abb.com		

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 make them incapable of delivering the power on-demand necessary to operate today's grid. The U.S. needs technologies that can cost-effectively 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

ABB is developing an advanced energy storage system using superconducting magnets that could store significantly more energy than today's best magnetic storage technologies at a fraction of the cost. This system could provide enough storage capacity to encourage more widespread use of renewable power like wind and solar. Superconducting magnetic energy storage systems have been in development for almost 3 decades; however, past devices were designed to supply power only for short durations—generally less than a few minutes. ABB's system would deliver the stored energy at very low cost, making it ideal for eventual use in the electricity grid as a cost-effective competitor to batteries and other energy storage technologies. The device could potentially cost even less, on a per kilowatt basis, than traditional lead-acid batteries.



IMPACT

If successful, ABB's superconducting magnetic energy storage system could eventually provide the large-scale storage capacity required to support the use of renewable power throughout the grid.

- 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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