Advanced Research Projects Agency • ENERGY

GRIDS PROJECT

GENERAL COMPRESSION

FUEL-FREE COMPRESSED-AIR ENERGY STORAGE

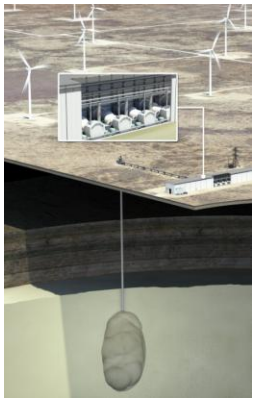
PROJECT TITLE:	Fuel-Free, Ubiquitous Compressed-Air Energy Storage and Power Conditioning		
ORGANIZATION:	General Compression, Inc.	LOCATION:	Newton, MA
PROGRAM:	GRIDS	ARPA-E AWARD:	$750,000
TECH TOPIC:	Energy Storage: Stationary	PROJECT TERM:	9/13/10 – 4/1/11
WEBSITE:	www.generalcompression.com		

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

General Compression has developed a transformative, near-isothermal compressed air energy storage system (GCAES™) that prevents air from heating up during compression and cooling down during expansion. When integrated with renewable generation, such as a wind farm, intermittent energy can be stored in compressed air in salt caverns or pressurized tanks. When electricity is needed, the process is reversed and the compressed air is expanded to produce electricity. Unlike conventional compressed air energy storage (CAES) projects, no gas is burned to convert the stored high-pressure air back into electricity. The result of this breakthrough is an ultra-efficient, fully shapeable, 100% renewable and carbon-free power product. The GCAES™ system can provide high quality electricity and ancillary services by effectively integrating renewables onto the grid at a cost that is competitive with gas, coal and nuclear generation.



IMPACT

General Compression's compressed air energy storage system (GCAES™) can enable large-scale integration of wind and other renewables onto the electric grid at a price, power quality, and grid reliability standard that could compete with or replace fossil fuel-based generation.

- 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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