Advanced Research Projects Agency • ENERGY

HEATS PROJECT

UNIVERSITY OF UTAH

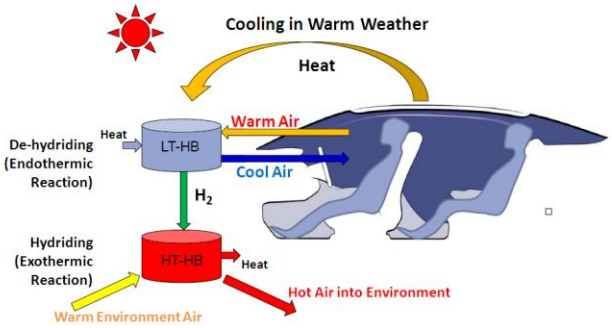
ADVANCED METAL-HYDRIDES-BASED THERMAL BATTERY

PROJECT TITLE:	A New Generation of High Density Thermal Battery Based on Advanced Metal Hydrides		
ORGANIZATION:	University of Utah	LOCATION:	Salt Lake City, UT
PROGRAM:	HEATS	ARPA-E AWARD:	$2,677,667
TECH TOPIC:	Electric Vehicles	PROJECT TERM:	12/1/11 – 11/30/14
WEBSITE:	www.arpa-e.energy.gov/ProgramsProjects/HEATS.aspx		

CRITICAL NEED

The transportation sector is the dominant source of U.S. dependence on foreign oil and a major contributor of greenhouse gas emissions. Enabling more widespread use of electric vehicles (EVs) would reduce both our dependence on foreign oil and our harm to the environment. Inefficient heating and cooling systems can limit the driving range of EVs by acting as a drain on their batteries. More efficient technologies are needed to provide heating and cooling to EVs without draining the on-board battery packs, in effect extending the driving range of EVs per electric charge. These efficient technologies may also enable thermal management of internal-combustion engine vehicles.

PROJECT INNOVATION + ADVANTAGES



The University of Utah is developing a compact hot-and-cold thermal battery using advanced metal hydrides that could offer efficient climate control system for EVs. The team's innovative designs of heating and cooling systems for EVs with high energy density, low-cost thermal batteries could significantly reduce the weight and eliminate the space constraint in automobiles. The thermal battery can be charged by plugging it into an electrical outlet while charging the electric battery and it produces heat and cold through a heat exchanger when discharging. The ultimate goal of the project is a climate-controlling thermal battery that can last up to 5,000 charge and discharge cycles while substantially increasing the driving range of EVs, thus reducing the drain on electric batteries.

IMPACT

If successful, the University of Utah's thermal battery would provide a low-cost, efficient cabin climate control system that helps optimize the driving range of EVs—reducing the size and cost of EVs.

- SECURITY: Increased use of EVs would decrease U.S. dependence on foreign oil – the transportation sector is the dominant source of this dependence.
- ENVIRONMENT: Greater use of EVs would reduce greenhouse gas emissions, 28% of which come from the transportation sector.
- ECONOMY: This technology would increase the marketability of EVs—helping spur growth in the automobile industry.
- JOBS: Increased use of EVs could create new manufacturing and engineering jobs in the automobile industry.

CONTACTS

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