

UC San Diego

UC San Diego News Center

December 16, 2014 | By Laura Margoni

UC San Diego Receives \$3 Million Award to Help Advance Energy Storage Systems



As home to one of the world's most advanced microgrids, UC San Diego will be able to conduct tests on energy storage technologies in both laboratory and grid-connected conditions.

The University of California, San Diego has been awarded \$3 million by the U.S. Department of Energy's Advanced Research Projects Agency-Energy (ARPA-E) to help move innovative energy storage technologies out of the lab and into the market. UC San Diego will help test and validate the performance of ARPA-E-funded technologies through a program called Cycling Hardware to Analyze and Ready Grid-Scale Electricity Storage (CHARGES).

"We are thrilled to be a partner in this important research effort," said Gary C. Matthews, vice chancellor for Resource Management and Planning at UC San Diego. "Our campus has the largest, most diversified portfolio of energy storage devices of any university in the world, so we are uniquely qualified to help advance this technology."

Often called the "holy grail" of clean energy, energy storage is considered key to modernizing the nation's electric grid. Increased grid storage would improve operating capabilities, enhance reliability and enable the cost-effective integration of increasing amounts of renewable and distributed energy sources.

Energy storage is considered so important that the California Public Utilities Commission decided last year to establish an unprecedented energy storage target: 1.3 gigawatts of energy storage is to be procured and installed by three of the state's investor-owned utilities by 2024.

“Energy storage has the potential to transform the global energy landscape,” said Matthews. “It is a valuable resource that needs to be developed for meeting future energy needs.”

To meet these needs, ARPA-E has invested in a number of potentially transformative grid-storage technologies; however, many are still in early stages of development and require more data on their performance, reliability and safety through extended use under realistic grid conditions. As home to one of the world’s most advanced microgrids, UC San Diego will be able to conduct tests in both laboratory and grid-connected conditions. The university will conduct a complete energy storage evaluation including economics, live testing and commercial viability. UC San Diego will first develop energy storage load profiles and duty cycles then test module battery packs and individual cells in the lab with the goal of assisting ARPA-E-supported technologies to resolve issues and enhance performance under real-world operating conditions. The technologies that perform well in laboratory testing will then be deployed for extended testing on the campus microgrid.

“We plan to provide the most comprehensive evaluation and testing of new energy storage systems ever undertaken,” said William Torre, Energy Storage Systems program director at UC San Diego’s Center for Energy Research and principal investigator of the grant. “As a result, we will be able to determine which energy storage systems have market potential and commercial viability.”

To undertake this project, UC San Diego assembled a team representing a wide span of disciplines in research experience and energy storage, from grid scale research to battery cell design and from data diagnostics and analytics to economic analysis. In addition to Torre, who has many years of experience in energy storage research in industry, co-principal investigators include:

- Shirley Meng, associate professor of NanoEngineering at the Jacobs School of Engineering, who has extensive experience in battery materials design and diagnosis in both industry and academic settings.
- Graham Elliott, professor of Economics in the Division of Social Sciences, who is considered a top expert in economic forecasting and has background in energy storage systems.
- Byron Washom, director of Strategic Energy Initiatives, who is experienced in transitioning research technology to commerciality.

“Tackling issues of energy and environment takes collaboration among all of us,” said Meng. “I hope this project will be the seed for more vigorous programs and intense efforts from UCSD to make an impact on distributed energy storage and generation on the national and global

scale.”

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