

NREL's work for the US Navy illuminates energy and cost savings

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Field demonstrations of newly proven energy efficient technologies are yielding valuable results for the U.S. Navy, helping it meet energy goals. In partnership with the Energy Department's National Renewable Energy Laboratory (NREL), the Naval Facilities Engineering Command (NAVFAC) recently demonstrated eight technologies at installations in Hawaii and Guam, and the initial results have encouraged the Navy to move forward with broader implementation of several of the energy efficiency technologies.

In one instance, NREL identified advanced plug load controls and whole-building [energy efficiency](#) retrofits as good investments for the Navy. "Not only did this project validate performance of [energy](#) improvement technologies, it also encouraged them to replicate the successful technologies more broadly, substantially reducing energy costs and assisting the Navy in meeting energy efficiency goals," NREL's Department of Defense (DOD) Energy Program Director Steve Gorin said.

Advanced power strips, a plug load control technology that cuts power to devices plugged into electrical outlets when they are not in use, were installed in 30 residences and an office building with capacity for roughly 100 staff. While plug load savings depend on what can be turned off and for how long, the demonstration identified measurable savings. In the office setting, the elimination of unnecessary nighttime and weekend plug loads reduced overall plug load use by 28% and lowered the entire building's energy consumption by 8%, saving the Navy 15

megawatt-hours/year. Given the small investment required, this office application will pay for itself in less than two years.

Considerable savings also were achieved by implementing energy efficiency retrofits in eight demonstration homes. The residential retrofits, such as more efficient hot water heaters and air conditioners coupled with programmable thermostats and low-flow shower heads, saved an average of 4,000 kilowatt-hours in air-conditioning use and 1,400 kilowatt-hours in water heating use per home. These projected energy savings are expected to repay the incrementally higher initial investment of the high efficiency equipment in less than three years.

"Thanks to the technical expertise provided by the NREL team, NAVFAC Pacific, NAVFAC Atlantic's Engineering Criteria Office, and the component commands of NAVFAC Hawaii and NAVFAC Marianas, we are already in the process of transitioning the high-impact cost-saving energy technologies that were identified in this pilot program into our facilities where it makes sense," Kevin Hurley, project engineer for the NAVFAC Chief Engineer's Office-Energy, said.

The NREL-Navy collaboration began in August 2011 as part of a project focused on identifying underutilized commercial technologies that could help meet the Navy's ambitious energy goals of producing at least 50% of shore-based energy from alternative sources and ensuring that 50% of Navy and Marine Corps installations will be net-zero energy. In addition, reducing energy costs, decreasing reliance on foreign oil and increasing energy security is part of the DOD mission.

"DOD is the biggest energy user in the United States—the agency accounts for 80% of federal energy use, spending \$19.4 billion on energy in 2011," said Gorin. "And the cost of energy has been a huge variable they can't predict. This is particularly true in Hawaii and Guam, where the predominant source of electricity is imported petroleum that is

traded in volatile world markets."

The plug load and building retrofits were one component of the larger project that also addressed other efficiency measures, renewable energy generation, and energy systems integration. A coordinated effort by the NAVFAC-NREL integrated project team was key to successful technology demonstrations that met stringent Navy requirements, while providing credible performance data to help guide energy-related decisions.

"Through the plug load and retrofit projects, NREL assisted the Navy in identifying relatively small investments that will yield large energy savings over the years to come. Energy technology demonstrations at Navy installations managed by the NAVFAC-NREL integrated project team reduced risk in adopting new technologies and will help the Navy meet energy goals through replication of technologies that save energy, reduce costs, and improve energy security," Gorin said.

Provided by National Renewable Energy Laboratory

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