

Solar energy powers Marines on battlefield (w/ Video)

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The Office of Naval Research Advanced Power Generation Future Naval Capabilities programs Ground Renewable Expeditionary ENergy System (GREENS) is a 300-watt, photovoltaic/battery system that provides continuous power to Marines in the field. The Naval Surface Warfare Center, Carderock Division, developed and tested the GREENS prototype which has undergone continuous power testing at Naval Air Warfare Center, China Lake, Calif., where ambient temperatures exceeded 116 degrees Fahrenheit. Even under the extreme temperatures, the system provided 85 percent of the rated energy.

Credit: US Navy

A year ago, U.S. Marines operating in the Arabian Desert only viewed the sun as the source of the region's relentless heat. Recently, the Office of Naval Research (ONR) Advanced Power Generation Future Naval Capabilities program introduced technology that allows the Marines to harness some of that sunshine to help power their field equipment.

Fueled by the sun, the Ground Renewable Expeditionary ENergy System (GREENS) is a 300-watt, photovoltaic/[battery](#) system that provides continuous [power](#) to Marines in the field. ONR began exploring the GREENS idea in fall 2008 in response to a Marine Corps requirement from Iraq for an expeditionary renewable power system.

"It's vitally important to have power in the battlefield especially these days in an irregular warfare environment," said Marine Col. Thomas Williams, a senior officer at ONR. "There's a high demand for computing devices, targeting systems and communications devices in the field. Small tactical Marine units are widely dispersed, and they require power and resupply."

By reducing the logistical supply chain for fuel, GREENS, and other projects like it, will help cut fuel use, cost and the associated threats to vehicle resupply convoys in Afghanistan and Iraq.

"There are two pieces to the program," said Dr. Michele Anderson, ONR's program officer responsible for the effort. "One is a hardware demonstrator that is a hybrid photovoltaic battery system to enable the Marine Corps to use [solar energy](#)."

"The other piece is a tool kit," Anderson continued. "In other words, a Marine can enter into the GREENS computer what their expected mission profile is, and it will tell them which components of the GREENS system to pull out and take with them in order to provide their renewable power needs."

Approval for the GREENS project was expedited through the ONR Future Naval Capability [[link to FNC page](#)] process and technical execution took less than six months, resulting in test of the first unit in July 2009. The entire project, from concept to transition, took just over a year, culminating in a contract solicitation announcement to industry to

produce and field GREENS for the Marine Corps.

Justin Govar, a chemical engineer for the Expeditionary Power Systems Office at Marine Corps Systems Command, agreed. "Within the Marine Corps, we are fighting in areas that are remote, and require very difficult logistical convoys to get to," Govar said. "And there is a lot of fuel and other types of batteries and power systems that have a heavy logistical burden."

The Naval Surface Warfare Center, Carderock Division (NSWCCD), developed and tested the GREENS prototype. "Providing reliable AC and DC power to remote outposts is what GREENS is all about," said Eric Shields, a mechanical engineer for the Battery Technology Group at NSWCCD. "Marines will not have to rely on fuel resupplies as much for generators to ensure their radio equipment and batteries have power."

The GREENS system has undergone continuous power testing at Naval Air Warfare Center, China Lake, Calif., where ambient temperatures exceeded 116 degrees Fahrenheit. Even under the extreme temperatures, the system provided 85 percent of the rated energy. This performance exceeded expectations, prompting rapid development and accelerating procurement of the final design.

GREENS was a featured program at the ONR-sponsored Naval Energy Forum [[link to NEF page](#)], and is just one of the many innovative ways the future battlefield will be powered. The deployment of this technology will equip the Marine Corps with new capability and knowledge of how renewable energy can make a difference.

Source: Office of Naval Research

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