



# Ground Renewable Expeditionary Energy System (GREENS)

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## At a Glance

### What is it?

- GREENS is a portable hybrid photovoltaic/battery power system developed for the Marine Corps.

### How does it work?

- Stackable 1600-watt solar arrays and rechargeable batteries combine to provide 300 watts of continuous electricity for Marines in remote locations. Additionally, the GREENS toolkit feature allows Marines to enter their expected mission profile and determine which components of the GREENS system they will need to take with them. GREENS can be rapidly deployed and is HMMWV transportable.

### What will it accomplish?

- GREENS will reduce the logistics burden for providing power to remote locations. It will provide AC and DC power needs to charge typical communication, targeting, and computing devices. GREENS will reduce the fuel use otherwise needed for typical generators, and will lessen the need for fuel resupply, reducing the associated threats to vehicle convoys in Afghanistan and Iraq.

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The Ground Renewable Expeditionary Energy System (GREENS) is powered by the sun. It is a 300-watt, photovoltaic/battery power system that provides continuous power to Marines in the field.

The GREENS project took from concept to transition just over a year to complete, culminating in a contract solicitation in fall 2009 to produce and field GREENS for the Marine Corps.

The GREENS project was conceived in fall 2008 when a Universal Needs Statement was submitted from Iraq for an expeditionary renewable power system. Approval for this project was expedited and technical execution took less than six months with the first unit tested in July 2009.

Naval Surface Warfare Center, Carderock Division, Md. provided the development and testing of the prototype systems. The GREENS system underwent continuous power testing at Naval Air Warfare Center, China Lake, CA. Ambient temperatures exceeded 116 degrees Fahrenheit. Even under the extreme temperatures, the system provided 85 percent of the rated energy. Performance exceeded expectations, prompting rapid development and accelerating procurement of the final design by Marine Corps Systems Command.

### Research Challenges and Opportunities:

- Alternative and renewable energy sources for portable power solutions
- Advancements in renewable energy, power generation, storage, distribution & control, and power loads