

**SAN DIEGO REGIONAL ENERGY OFFICE**  
**San Diego Region Energy Leadership Award**

**April 14, 2000**

**Submitted By:**

Navy Region Southwest (NRSW), Environmental Department

**Nominated Organization:**

Navy Environmental Leadership Program (NELP)

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(NELP, <http://nelp.navy.mil> )

**Description of Nominated Organization:**

NELP is an initiative established by the Secretary of the Navy to find new and better ways to manage the day-to-day efforts of the Navy's environmental programs. NELP's mission is to serve as a test bed for new and innovative technologies and to provide focused management to address the full spectrum of environmental issues. NELP implementation at NRSW addresses four key elements of shore station environmental management: cleanup, compliance, natural resources and energy conservation, and pollution prevention. New projects are selected based on innovation, cost effectiveness, positive return on investment, and potential benefit to other Navy activities. The implementation approach establishes partnerships among NRSW personnel, the NELP management team, regulatory agencies, and the community. During the last 2 years, NELP has developed a strong partnership with the Navy Public Works Center (PWC) to leverage resources and expertise to evaluate a series of innovative energy and alternative fuel vehicle projects. For this submittal, NRSW has nominated an energy project that showcases an environmentally responsible means to generate and use energy with no air emissions through the use of photovoltaics (PV) and electric vehicles.

**Description of Energy Project:**

The PWC Utilities and Transportation Departments, Southwest Division - Naval Facilities Engineering Command, NRSW, NELP, and Tetra Tech EM Inc. formed a partnership in January 1999 to pursue a renewable energy project that combines PVs and electric vehicles. A rooftop grid-integrated 21.6-kilowatt PV system was installed by Powerlight Corporation in October 1999 at Naval Air Station (NAS) North Island Command Staff Building 678. The PV system consisted of approximately 200 PowerGuard roof tiles, 116 watts each, and used high

efficiency AstroPower cells. An electrical configuration of 20 tiles in each series string, 10 strings in parallel was used. A high efficiency Trace Technology inverter was used to obtain 480 Vac three-phase power. In addition, a meteorological station along with a data acquisition system was installed.

The PV system was connected to the building electric grid and is being used to offset energy used by five electric vehicle charging stations at Building 678. Currently, two Chrysler Electric EPIC minivans, one Electric Ford Ranger, and one Bombardier Neighborhood Electric Vehicle are stationed at Building 678 (See Photographs on Page 3). Further cost savings will be gained from energy production during peak demand periods. In the first month of operation, the system generated 3,236 kilowatt-hours of energy. Based on current rates paid for electricity, the system will generate more than \$6,000 per year of energy cost savings to the Navy.

In addition to offsetting a portion of the peak energy demand of the building, using the PV system to charge electric vehicles is demonstrating an environmentally responsible means to generate and use energy with little to no air emissions. Over a 25-year period, the PV system is estimated to reduce carbon dioxide (CO<sub>2</sub>) emissions by 754 tons, sulfur dioxide (SO<sub>2</sub>) emissions by 8.15 tons, and nitrogen oxides (NO<sub>x</sub>) emissions by 3.57 tons.

This project also showcases a partnership of Navy and government energy and environmental programs, and the ability to implement a sustainable design project using concepts of pollution prevention. Cost-sharing partnerships were formed with the Chief of Naval Operations, Pollution Prevention Branch; California Energy Commission, Emerging Renewable Buydown Program; and the Utility Photovoltaic Group (UPVG), Team-Up Round 3 Program. This sustainable design project demonstrates how photovoltaics can be used to provide clean electricity to power zero emission vehicles.

**Benefit to the San Diego Region:**

In addition to reducing energy use and associated greenhouse emissions, the PV project used pre-designed, commercially available PV modules, which can be exported to other PV project within the Navy and San Diego Region. Use of these modules provided a cost-effective, easy to install, flexible platform to meet a variety of user needs. Based on the success of this project, a large commercial scale PV system (100 to 500 kWac) is being considered by the Navy. This larger installation would use the modular building blocks demonstrated in this project. In volume, the building block promises to be very cost-effective as lower hardware costs would be realized through higher volume orders and standardized system installations.

This PV project will also be showcased at NAS North Island to provide exposure and education on the application and benefit of PV systems. The concept of using a PV system to recharge electric vehicles is a strong energy and environmental conservation message that the Navy wants to share internally and with the local community. NELP is currently working on developing a PV display in the lobby of Building 678 to highlight the performance and benefits of the PV system and to showcase the Navy's commitment to renewable energy and the environment. The display provides an opportunity not only to educate Navy personnel on the benefits of the PV system, but also to publicize the performance of the system to the general public. The current performance of the PV system can be viewed on the UPVG website at (<http://209.21.219.20/SiteAction.asp?SiteName=UPL13> ) and is linked to the NELP website (<http://nelp.navy.mil>) .



U.S. Navy Project Managers and San Diego Gas & Electric employees inspect 21.6 kW Photovoltaic system installed atop Command Staff Building No. 678, Naval Air Station, North Island, Coronado, CA, December 1999.



Navy sub-contractor configures a conductive electric vehicle battery charging station for one of two Chrysler Electric Powered Interurban Commuter (EPIC) Minivans, Command Staff Building No. 678, Naval Air Station, North Island, Coronado, CA. December 1999.