

Microgrid powers 'World Green City'

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The Office of Naval Research (ONR), a leader in the exploration of renewable power, played a major role in the development of a new "World Green City" unveiled here on Dec. 12 as a prototype community powered by alternative energy sources.

Keeping in line with Chief of Naval Operations Adm. Jonathan Greenert's recently announced 2013-2017 Navigation Plan—which calls for improving operational [energy efficiency](#) by investing in new technologies—the World Green City boasts the latest in [renewable power](#), including a direct-current (DC) microgrid funded by ONR's [Sea Warfare](#) and Weapons Department.

Dr. Richard T. Carlin, head of the department, spoke to [international leaders](#) and scientists during the opening ceremony of the World Green City and Eco-Product Exhibition 2012.

"The World Green City provides an opportunity to evaluate and understand the implementation of [renewable energy technologies](#) in a real-world microgrid," Carlin said. "Such microgrids make possible sustainable, decentralized [power](#) systems that are applicable to many communities, especially remote communities, as well as forward-deployed naval operational bases. Our partnership with Chiang Mai Rajabhat University will benefit communities in Thailand and ultimately communities across the [Asia Pacific region](#)."

The idea for the microgrid began two years ago when Dr. Wattanapong Rakwichian, executive director of the Asian Development Institute for

Community Economy and Technology (adiCET) at Chiang Mai Rajabhat University, discussed his vision for a "green" campus with ONR officials at a workshop on alternative and renewable energy funded by ONR.

Located on the new Saluang-Keelek campus of Chiang Mai Rajabhat University in Northern Thailand, the World Green City now includes about 20 buildings over 200 acres operating on renewable power from solar cells.

"With support from ONR, we have created a model community that applies [smart technologies](#) and renewable energies into the green living style," said Dr. "Watt," as he is affectionately called. "As a result, we hope that our World Green City will serve as a model for developing the rest of the smart communities in Thailand and other parts of Asia."

The DC system takes power from an array of [solar cells](#) and delivers it to houses, businesses, classrooms and offices on the campus without having to convert to alternating current (AC). This saves money and eliminates the need for DC-to-AC power conversion equipment, and the associated losses of the conversion process. The research also features innovations in the development of smart microgrids, which manage power production, storage and distribution.

Research in this area could lead to smaller, portable DC power plants that can be set up quickly for use during emergencies, without the need for fossil fuels. Such systems could find use in various naval applications.

"It's ideal for a small rural village and also island communities," said Capt. Paul Marshall, interim associate director for Power and Energy for ONR Global and project officer from the ONR Reserve Component. "If you have a community living on an island disconnected from the main

power grid, they need to be able to produce their own power, which can be managed by having a microgrid on the island. In a way, it's analogous to a ship at sea. Some of these technologies being researched could someday be used in naval applications."

Ken Foster, consul general of the U.S. Department of State's Consulate General in Chiang Mai, praised the collaboration between ONR and the local university during his remarks at the opening ceremony for the World Green City.

"As the U.S. Department of State celebrates 180 years of friendship between the United States and Thailand, we are pleased to witness another partnership success story between the U.S. [Office of Naval Research](#) and Chiang Mai Rajabhat University," Foster said. "We congratulate these partners for establishing real-world renewable energy research in northern Thailand, and connecting environmental innovators across sectors and across the globe."

The forum began with an opening speech from Thailand's Vice Minister of the Ministry of Energy, and a ribbon cutting for the World Green City. In addition to the opening ceremony, ONR representatives are attending, presenting and moderating at the third annual Workshop on Alternative and [Renewable Energy](#) for Sustainability and the World Alternative Energy Forum while in Thailand.

Provided by Office of Naval Research

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