



Press Release

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Hawaii Natural Energy Institute Expands Energy Research With Solar Net Zero Energy Classrooms

Honolulu, HI – As part of ongoing energy efficiency and solar research being conducted by the University of Hawaii's Hawaii Natural Energy Institute (HNEI), six solar photovoltaic (PV) arrays totaling 15 kW in capacity were recently installed in Hawaii. Emerging and innovative technologies are being evaluated and compared against traditional and well-established products in the solar industry.

Three net zero energy (NZE) buildings created by California-based Project Frog Inc. are the most recent experimental platforms used for PV performance research being conducted by HNEI. The three state-of-the-art structures have been located at Hawaii schools, one at Ilima Intermediate School in Ewa Beach, Oahu and two at Kawaikini New Century Public Charter School in Lihue, Kauai. Students will now have the unique opportunity to learn in new classrooms that are truly research and learning platforms in and of themselves.

According to Dr. Richard Rocheleau, HNEI Director, "These installations are part of a larger HNEI research endeavor to evaluate and compare the performance of traditional and emerging PV materials and inverter technologies". On these three Project Frog platforms, three PV materials are being tested: thin film technology, amorphous silicon and traditional monocrystalline silicon arrays, which has led the market since the 1970's.



Project Frog research platform at Ilima Intermediate School. Credit: HNEI/ UH SOEST.

Another variable to be evaluated is the effectiveness and efficiency of the inverters. Inverters convert DC (direct current) power generated by the PV panels into AC (alternating current) in order to feed into the utility grid. Two inverter configurations are being tested, a single string inverter and micro-inverters. String inverters convert energy from multiple panels. Micro-inverters are installed one per panel.

HNEI is leading the research study which will analyze the performance of these experimental buildings and integrated energy systems for potential future Navy applications in the Pacific region. The research from these platforms will help scientists and engineers better understand and characterize performance under various environmental conditions. Each of the solar systems is equipped with a data collection system that allows university researchers to remotely collect data for detailed comparative analysis.

An important aspect of these experimental buildings is the sophisticated instrumentation and monitoring being conducted to compare the performance of virtually identical buildings between the Kauai location and the Oahu location. Small differences in microclimate may have a significant impact on building performance. The structures are outfitted with high-tech energy monitoring instruments providing valuable research data on the

performance of design and material components. Data that tracks energy use as well as building comfort are measured, including temperature, humidity, CO2 levels, and lighting levels for comfort, as well as lighting, air conditioning and fan consumption for energy.

The three 1,200-square foot, state-of-the-art structures installed in Hawaii schools are the first two of three sites selected that will test the effectiveness these energy efficient buildings powered by renewable energy. The Project Frog pre-engineered test platforms incorporate passive design elements to decrease energy demand, thus increasing the effectiveness of its PV systems. The design reduces energy consumption, construction waste and operating expense, while providing spaces that are adaptable for a variety of uses.

"We are excited to play such an integral role in HNEI's research and together advance the science and technology behind new construction throughout the Islands," said Nikki Tankursley, director of marketing for Project Frog.

"Frog component buildings are responsive to the Hawaiian climate," according to Ms. Tankursley. "With a small rooftop photovoltaic array, the classroom at Ilima Intermediate School produces more energy than it consumes."

"This important assignment is part of a larger research program to evaluate energy technologies for the Office of Naval Research that includes a range of efficiency, storage, and renewable generation systems," said Dr. Rocheleau.

The Office of Naval Research is providing funding for the project through a grant to the University of Hawaii at Manoa. This project supports the Department of Navy's energy programs to demonstrate technologies that enable increased implementation of alternative energy sources and promote energy security, made possible by the efforts of the late U.S. Senator Daniel Inouye, to ensure that the Department of Defense has adequate resources to make these critical, cutting-edge investments in energy technology.

The PV systems on both islands were installed by Resource Energy of Honolulu, Hawaii.

Along with HNEI and Project Frog, project partners include State of Hawaii Department of Education, and MK Think.



Two 2.5 kW photovoltaic systems provides the energy needs of the structure.
Credit: HNEI, UH SOEST.

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About Hawai'i Natural Energy Institute

An organized research unit of the University of Hawaii at Manoa's School of Ocean and Earth Science and Technology ; HNEI is a nationally acknowledged leader in energy research with active programs in alternative fuels, energy efficiency, systems integration/energy security, renewable energy generation, and electrochemical power systems. HNEI has undertaken a pivotal role within the State, working closely with DBEDT, the Hawaii Public Utilities Commission , and the utilities to reduce the state's dependence on fossil fuels. HNEI is leading several major public/private partnerships to deploy and demonstrate grid-scale energy systems to address the technical issues associated with high penetration of renewable energy technologies onto the grid. For more information, please visit www.hnei.hawaii.edu/.

About Project Frog

Better. Greener. Faster. Smart. Project Frog is on a mission to revolutionize the way buildings are created by applying technology to overcome the inefficiencies of traditional construction. The result is a structure that is measurably greener and significantly smarter; creating brighter, healthier spaces that inspire better performance from the people who occupy them. Project Frog offers a versatile ecosystem of products that adapt to all kinds of uses including: healthcare, education and retail. The innovative systems are frequent recipients of industry awards for their design and performance. For more information, visit www.projectfrog.com.

About Resource Energy

Resource Energy strongly believes in energy independence and sustainability for Hawaii's residents. As the state's only company offering Japan-made CIS panels that not only use less raw materials but also cost less to produce, Resource Energy's commitment to global carbon reduction starts from the manufacturing plant in Miyazaki Japan to Hawaii's own rooftops. With a passion for renewable energy, Resource Energy believes Hawaii's ideal geographic location gives our island home a competitive advantage as a research center for renewable technologies. Please visit Resource Energy at www.resourceenergy.com/.

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The School of Ocean and Earth Science and Technology at the University of Hawaii at Manoa was established by the Board of Regents of the University of Hawai'i in 1988 in recognition of the need to realign and further strengthen the excellent education and research resources available within the University. SOEST brings together four academic departments, three research institutes, several federal cooperative programs, and support facilities of the highest quality in the nation to meet challenges in the ocean, earth and planetary sciences and technologies.

www.soest.hawaii.edu