

Rebuild Hawaii

Partnering with Rebuild America



Working together for energy and resource efficiency

Assessing Solar Energy Potential

The University of Hawaii School of Architecture (SoA) Environmental Lab has been developing new and accurate methods to assess the potential solar energy available on roofs of existing buildings. The innovative process involves the use of aerial photos, Geographic Information System (GIS) databases and solar energy calculations. The School received initial funding support from Hawaiian Electric Company, Inc. The research team at the school is developing three distinct functions within the branch of the growing solar program there. They are:

1. The Assessment of Solar Energy on Rooftops of Existing Buildings

This process quantifies the amount of solar energy that can be captured on rooftops in a given locale. The evaluation considers building topography building typology, surrounding reflectances, cloud covers, terrain shading and building self-shading. This process provides policy makers engineers, architects, developers, planners and solar designers with quantifiable data on the amount of potential energy that can be captured on rooftops of buildings in their municipality, district, state or region. This is important information in the formulation of energy policy. *Continued on page 3*

WHEA Completes ESS Program

The County of Hawaii Energy Smart Schools program completed its first year at West Hawaii Explorations Academy (WHEA) in Kona. The program was a success with 5 students participating this year and who will recruit and mentor new students into the program next year. Students started the year learning about energy and electricity then moved on to completing nearly all of the activities on the U.S. Department of Energy's *Get Smart About Energy?* compact disc. The bulk of their year was spent on hands-on projects for which they needed to complete scientific write-ups on.

The students' favorite projects were building motors, testing how changes in inclination affect photovoltaic panels, conducting energy audits at home and school, and building solar hotdog cookers. The solar cookers were a big hit with the students, when they were done with the experiment they ate their hotdogs for lunch.

Next year the ESS students will have the benefit of monitoring the school's new 10-kilowatt photovoltaic system. The PV panels will be installed on the roof of the school pavilion and the system will be net metered. The PV system will also provide visitors to the school with an up-close look at how photovoltaic panels provide the school with electricity.



Over 2,500 people a year visit the school to hear students talk about their projects like the shark tank (left) and the electric car (right).



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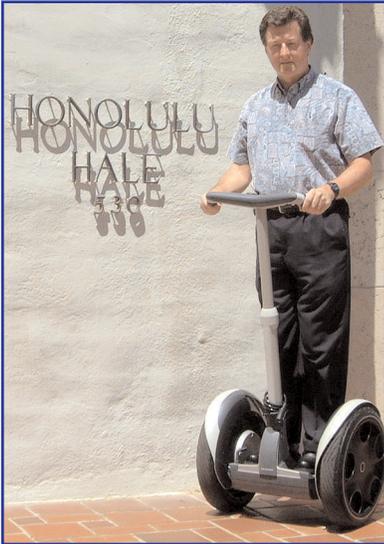
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Ray Carr and Bill Woerner discuss the 10 kW PV system that will be installed on the roof in the background (top). Melina Peebles (pictured on left) and three of the ESS students (bottom).

President's Corner



*Rebuild Hawaii Consortium
President Steve Holmes*

This will be my last column as the Rebuild Hawaii Consortium President. I'd like to take some of my allotted space to thank all of you for your support over the last two years. It was with your support that I got the U.S. Department of Energy's Energy Champion Award for Leadership in 2002. That award came at a good time as I was retiring from the Honolulu City Council and looking for my next great adventure in life. It caught the attention of Mayor Harris who hired me as the City's Energy/Sustainability Coordinator. So, I can thank all of you for keeping me gainfully employed.

Your nominating committee has recommended two new officers, Jim Maskrey who would move up as President, and Steve Golden of Gasco who would take Jim's spot as Vice President. Both are excellent candidates who have a long involvement in Rebuild Hawaii. I urge your support during the election in August for both of our able and willing candidates.

The recent partnership between Hawaiian Electric and the City & County of Honolulu to create a solar loan program for low and moderate income families is a good example of how Rebuild Hawaii is succeeding in its efforts to promote energy efficiency.

Hawaiian Electric has a nationally recognized solar roofs initiative, which recently celebrated its 20,000 installation. As a result, Hawaii leads the nation in per capita solar water installations. The new program reaches out to income-qualified families by offering them 0% and 2% loans in addition to the state tax credits and utility rebates. Details of this program can be found at www.heco.com and www.co.honolulu.hi.us including downloadable application forms.

C&C of Honolulu Vehicles Are Running on Biodiesel



*Examples of
Biodiesel at work:
the Honolulu Zoo
Train (above) and
City & County of
Honolulu refuse
trucks (right).*



If you have a sudden urge for french fries when one of these vehicles passes by don't be surprised—their exhaust smells like the fast food favorite.

The City & County of Honolulu is committed to power all of its diesel-fueled vehicles with a biodiesel blend. The blend does not require making modifications to the engine operating parameters. Referred to as B20, the blend is a mixture of 20% recycled vegetable oil and 80% petroleum diesel. Over 800 vehicles, including 60% of their refuse trucks, have already converted to B20. Since the City began using this fuel in November 2002, they have not experienced any performance problems associated with its use. One obvious result of the switch to B20 is the absence of the black puff of smoke, and sometimes nauseating smell, that is witnessed when a diesel rig accelerates.

The Bus and Handivan will not be switching to biodiesel because they are under Oahu Transit Services, a private contractor. They use 6.5 million gallons of diesel per year and currently there is not enough biodiesel product to

meet that demand. To be able to meet such a demand requires resources beyond recycled vegetable oil, which is the source of biodiesel now. Steve Holmes is working with the State Agricultural Development Division to look at soybean production in order to meet The Bus and Handivan market.

Biodiesel is produced in Hawaii by Pacific Biodiesel, Inc., and is made from recycled cooking oil from hotels and restaurants. Any engine that can run on diesel can run on biodiesel with very few or no modifications to the engine. Vehicles can switch back and forth between diesel and biodiesel or use a blend of the two. There are many benefits to this alternative fuel source, including, reductions in tailpipe emissions and diverting waste from landfills. Biodiesel is also non-toxic, biodegradable and non-flammable, making handling and storage of it safer than conventional petroleum diesel fuel.

Update on SoA Portable Classroom Project



Waianae High School Portable Classrooms. The temperature in one portable reached over 95°F during school hours.

The University of Hawaii School of Architecture (SoA) Portable Classroom project has completed gathering data on eight portable classrooms on the island of Oahu. Island residents are familiar with how hot and uncomfortable portables can get for students and teachers. Some of the Department of Education portables have served up to three K-12 generations of students. While most people agree the classrooms are hot, the SoA research team wanted to find out just how uncomfortable they can get. A grant through the Rebuild Hawaii Consortium, which is administered by Liz Raman at State of Hawaii Department of Business, Economic Development, & Tourism (DBEDT), made this work possible.

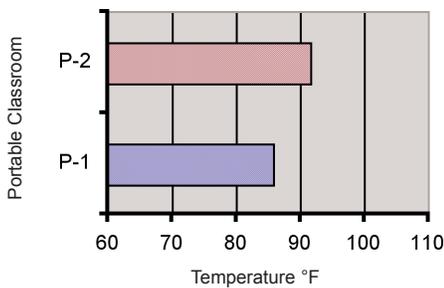
To help the SoA find out, data loggers were installed in portables at three Department of Education campuses; Waianae High, Kaimuki High and Koko Head Elementary. These schools were chosen because they are located in areas that typically experience very warm conditions. Portables were monitored for temperature, humidity, and air movement. Loggers were set to record data every 20 minutes ensuring a good record of environmental conditions in the room.

Data logger results show the highest temperatures at Waianae High School. The tables below show the maximum temperatures recorded in the school's portables during school hours. The temperatures are above the bioclimatic comfort range of 72–85 °F. The high end of 85 °F is an upwardly adjusted figure beyond the typical range of comfortable temperatures. The top temperature is 82 °F but studies have shown

that people in climates like Hawaii's get used to higher temperatures. Therefore the bioclimatic range of comfort has been increased by 3 °F to reflect the acclimated tolerance of people in warmer parts of the world.

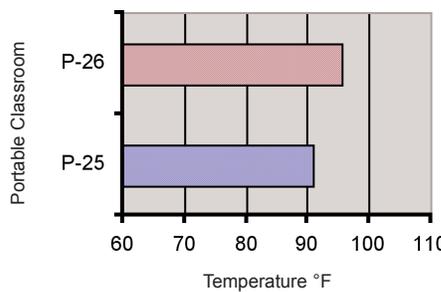
The SoA project ends in August 2003. The research team will provide recommendations for remediating uncomfortable conditions in the portable classrooms. For more information on this project contact Stephen Meder at smeder@hawaii.edu or (808) 956-4906.

Temperature Maxima Comparison Between P-1 & P-2 at 7' High
(data from 1/20/03 - 3/03/03)



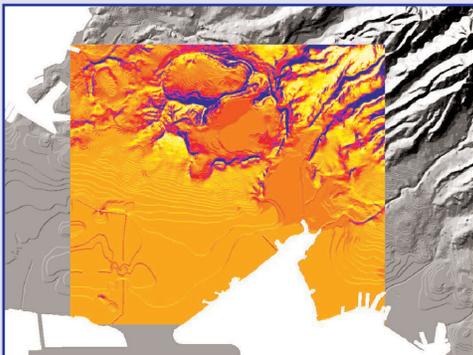
P-1: A portable retrofitted with measures to improve comfort levels.
P-2: Roof is not insulated.

Temperature Maxima Comparison Between P-25 & P-26 at 7' High
(data from 10/25/03 - 12/20/03)



P-25: Roof is insulated but has less cross ventilation.
P-26: Roof is not insulated but has better cross ventilation.

Assessing Solar Energy Potential



SoA is creating maps to identify solar potential in specific areas.

Continued from page 1

2. The Ability to Create New Solar Maps for Hawaii and Other Regions

The process of creating accurate solar maps will assist policy-makers, utilities, the solar industry, engineers, architects and developers to understand the solar potential in a specific area. This is a valuable tool for guiding solar tax credits, utility rebates, and development directions.

3. The Development of Solar Design Guidelines on a Regional and Localized Scale

Solar design guidelines can be generated for specific solar regions. The guideline will provide solar energy quantification for various building orientations and roof slopes for a given locale. This is valuable for energy policy purposes, building code support and as an accurate guideline for individuals to large-scale developers

Rebuild Hawaii

Rebuild Hawaii is a statewide consortium dedicated to promoting efficient energy and resource utilization.

Rebuild Hawaii is working with Rebuild America, a U.S. Department of Energy program, to help community partnerships make profitable investments in existing buildings through energy-efficient technologies.

The partnering of public and private business interests enables Rebuild Hawaii to employ innovative solutions to promote economic growth, lower energy costs, create jobs, and protect the environment.

There is opportunity for anyone to join Rebuild Hawaii. It is a voluntary program with no membership fee.

For more information contact:

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Tourism
Energy, Resources, and
Technology Division
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Visit our web site at:

www.hawaii.gov/dbedt/ert/rebuild/index.html

Rebuild Hawaii Projects

Rebuild Hawaii currently supports the following projects:

- ◆ University of Hawaii School of Architecture Portable Classroom Cooling Design Guidelines
- ◆ Hawaiian Electric Company Energy Smart Schools project to increase awareness of energy efficiency in schools and communities on the islands of Oahu and Maui
- ◆ Hawaii County Energy Smart Schools project at West Hawaii Exploration Academy; Hawaii County Department of Water Supply Energy Conservation project
- ◆ Kauai Lagoons Golf Course Energy Audit
- ◆ A series of four sustainability workshops aimed at the planning, architectural, and engineering communities
- ◆ Greening The Campuses, a project to implement resource efficiency at the community colleges
- ◆ Green Office exhibit and awareness program
- ◆ Workshops and technical seminars
- ◆ Multi-disciplinary programs to teach energy and resource management skills at universities and schools

Consortium Members

Counties

City & County of Honolulu*
County of Hawaii*
County of Kauai*
County of Maui*
Sustainable Honolulu*

State

Department of Business, Economic
Development & Tourism*
Department of Education*
Housing & Community Development
Corporation of Hawaii*
Judiciary
Hawaii Army National Guard
Hawaii Public Library System*
Maui Community College*
University of Hawaii
Community Colleges*
University of Hawaii at Hilo
University of Hawaii at Manoa,
School of Architecture*

Federal

Army
Coast Guard
Hickam Air Force Base
Marine Corps Base Hawaii

Navy Public Works Center Pearl Harbor
Navy Region Hawaii Pearl Harbor
Pacific Division Naval Facilities
Engineering Command
Pearl Harbor Naval Shipyard
Intermediate Maintenance Facility
U.S. Department of Energy, Pacific Liaison
U.S. Department of Housing & Urban
Development

Utilities

The Gas Company/Citizens Energy Service*
Hawaiian Electric Company, Inc.*
Hawaii Electric Light Company, Inc.
Maui Electric Company, Inc.

Private Sector

Chaney, Brooks & Company, Inc.
Eco-Lite
Energy Conservation Hawaii/Pacific
Energy Services Company
Global Energy Partners, LLC
Hawaii Society for Healthcare Engineering
Illuminating Engineering Society
of North America
Maui Montessori School
Pacific Energy Strategies
Scheibert Energy Company
SSFM Engineers International

* Rebuild America Partner

Next Meeting

August 12, 2003
7:30-12:00
HEI Training Room #2, 8th Floor
American Savings Bank Tower (formerly
Pacific Tower)

Previous Meeting

January 2003
David Rezacheck, DBEDT, presented a feasibility analysis of sea-water district cooling for the State of Hawaii. Tom Van Liew, HECO, spoke about energy benchmarking studies in Hawaii. Ellen Watson, University of Hawaii, presented facts about mold and what to do if your building has mold. **For a copy of minutes visit:** <http://www.hawaii.gov/dbedt/ert/rebuild/news.html>
or Email: eraman@dbedt.hawaii.gov