

EDIN-USVI Clean Energy Quarterly

Volume 2, Issue 1

June 2012



Contractors replaced 64 tons of inefficient heating, ventilation, and air-conditioning (HVAC) equipment with 48 tons of highly efficient variable-refrigerant-airflow system that will cut the historic Bjerget House buildings' energy use by an estimated 37%. *Photo from Quality Electric Supply Inc., NREL/PIX 20813*

WISE Investments to Cut Historic Buildings' Energy Use, Costs

For the company that owns the historic Bjerget House estate on St. Croix, it's a no-brainer: Saving energy is a worthwhile investment. US Viking LLC's two elegantly restored commercial buildings overlooking Christiansted Harbor and Protestant Cay are beautiful. But with outdated and inefficient lighting and cooling, their projected utility bills were ugly.

Built in the mid-19th century, the 10,000-square-foot Bjerget House estate consists of the main house and an east building. Together, the buildings' estimated average monthly energy usage when occupied was 21,000 kilowatt-hours (kWh). US Viking saw this as unsustainable based on the current average U.S. Virgin Islands (USVI) utility rate of \$0.43/kWh—more than four times the U.S. average.



The Bjerget House received major energy efficiency upgrades through the Southeast Energy Efficiency Alliance (SEEA) Worthwhile Investments Save Energy (WISE) program. Part of the U.S. Department of Energy's (DOE's) Better Buildings Program, WISE works with local governments to educate citizens about energy efficiency building upgrades in their communities. EDIN-USVI clean energy workshop attendees will have an opportunity to tour the Bjerget House and see energy saving upgrades firsthand. *Photo from Quality Electric Supply Inc., NREL/PIX 20812*

USVI Clean Energy Events

- | | |
|------------------|---|
| Nov. 7-10, 2011 | University of the Virgin Islands Community Engagement and Lifelong Learning (UVI-CELL) program trainees perform energy efficiency assessments at the Red Hook Marina Market and the Senate Building, St. Thomas |
| June 11, 2012 | EDIN-USVI Clean Energy Workshop, Bjerget House, St. Croix |
| June 12-13, 2012 | Quality Electric Supply (QES) Renewable Energy and Water Production Conference, VI Cardiac Center at Governor Juan F. Luis Hospital and Medical Center, St. Croix |

When the Virgin Islands Energy Office (VIEO) announced the availability of funding for energy retrofits to commercial buildings through the WISE program last summer, US Viking jumped at the opportunity.

The St. Croix-based software services firm applied for a grant to help defray the up-front costs of a major energy retrofit of the Bjerget House property. After an energy assessment confirmed that cooling, lighting, and building envelope upgrades could cut the buildings' combined energy use by at least 15%, as required by the WISE program, US Viking received an \$80,000 grant, and WISE program contractor QES got down to work.

The retrofits, which include replacing the HVAC system, applying ceramic film to windows to reduce solar heat gain, and replacing more than 400 halogen bulbs with energy-efficient lighting, got under way in March and are slated to be completed by June.

The \$311,000 project is expected to cut the buildings' combined energy use more than 52%, saving US Viking an estimated \$62,000 a year based on current utility rates. At that rate, excluding the \$80,000 grant, the simple payback period is expected to be less than four years. A WISE investment indeed.

Energy Efficiency

Island Traffic Lights Go Green to Save Green

Long-lasting, energy-efficient LED bulbs installed in the traffic signals on St. Thomas and St. Croix in May will save the USVI government millions in energy and maintenance costs, VIEO reports. LEDs, or light emitting diodes, use less than a tenth as much power and last five times longer than incandescent bulbs.

The projected annual energy savings of 733 megawatt-hours (MWh) is expected to save \$450,000 a year. The increased lifecycle of the lights will also reduce fuel and labor costs for replacing bulbs, boosting savings even further.

The American Recovery and Reinvestment Act of 2009 funded the equipment costs of the project, which replaced 2,010 bulbs at a total cost of \$140,000. The Department of Public Works (DPW) covered the installation costs. VIEO administered the Recovery Act grant through its DOE-funded Energy Efficiency & Conservation Block Grant (EECBG) program.

UVI-CELL Trainees Identify Energy Savings Opportunities in Two St. Thomas Buildings

In November 2011, energy managers, building engineers, and facility managers took part in a training exercise that revealed significant opportunities to reduce energy use and costs in two St. Thomas buildings.

(continued on page 3)



DPW workers install energy-efficient LED traffic lights at a Charlotte Amalie intersection, St. Thomas. *Photo from Don Buchanan, VI Energy Office, NREL/PIX 20814*

Vlenergize Partners

Change doesn't happen on its own. It is led by dedicated and passionate people who are committed to changing the status quo. This is a new feature spotlighting EDIN-USVI Vlenergize Partners who are in the trenches working to solve the territory's energy challenges.



Organization: Quality Electric Supply Inc.

EDIN-USVI role: Kimberly McCollum, QES VP of Sales & Marketing, serves as a co-chair of EDIN's Energy Efficiency working group.

Areas of expertise: QES specializes in energy efficiency, with four electrical engineers performing Seven Optimizing Solutions (SOS) energy assessments throughout the territory. In addition, it provides supplies for clean energy technology installations. The company was a 2011 St. Croix Chamber of Commerce Business of the Year and was recently named "Best Engineering Services in USVI" in the *VI Daily News* reader's poll.

Current projects supporting EDIN-USVI and advancing the USVI's clean energy goals:

Performing energy assessments and making energy efficiency improvements to USVI commercial buildings for the WISE program.

(continued from page 2)

Led by DOE's National Renewable Energy Laboratory (NREL) in conjunction with UVI-CELL, the four-day training consisted of hands-on software and energy audit instruction and on-site building audits.

Trainees gathered data and used analytical tools from NREL to assess energy savings opportunities at the Red Hook Marina Market and the Senate Building on St. Thomas. The audits identified energy conservation measures that could reduce the buildings' combined annual energy usage by more than 380,000 kWh and save more than \$200,000 in annual energy costs.

WAPA Forms Business Unit to Assist Customers with Energy Improvements

In April, the Virgin Islands Water and Power Authority (WAPA) moved to establish a new business unit focused on facilitating energy efficiency and renewable energy projects in the territory.

WAPA received a \$600,000 grant from the U.S. Department of the Interior to develop its energy service business unit (ESBU). The new business unit is intended to assist WAPA customers in implementing energy efficiency and renewable energy projects through education, customer support, and funding options.

WAPA Executive Director Hugo V. Hodge Jr. said trained WAPA energy auditors and engineers will go into homes and businesses and perform energy audits to identify ways customers can save money through lighting, air conditioning, and appliance upgrades.

WAPA will draw from a revolving fund to cover the up-front costs of the improvements, eliminating out-of-pocket expenses for customers. The savings in customers' monthly utility bills will be applied toward repaying the cost of the improvements. When those costs are paid off, Hodge explained, the customers will benefit directly from the ongoing savings.

Renewable Energy

Wind to Power St. Croix Reformed Church and Kingshill School

A 10-kilowatt (kW) wind turbine installed in March is now providing power to the St. Croix Reformed Church and Kingshill School. Based on current electric rates, the church and school expect the wind turbine to eliminate their monthly utility bill.

A \$50,000 VIEO grant, which was funded by DOE under the Recovery Act, helped pay for the turbine. An additional \$16,500 from the church covered the full cost of the project, which began taking shape in early 2011. The church and school celebrated the project's completion on March 1 with a dedication and opening ceremony.

The wind turbine is connected to the grid, and through net metering, the power it generates will go directly to WAPA. In months when the turbine generates more power than the church and school use, they will receive an energy credit. If there are months when the turbine does not generate enough power to meet their electricity needs, they can apply the credit toward their utility bill. As long as the turbine spins at least 25% of the time, it will eliminate their future electricity costs, according to the church. The church expects to save between \$126,000 and \$180,000 over the turbine's 15-year lifespan.

New Policies Sought to Clear the Way for Grid Interconnection

According to VIEO, cumbersome interconnection procedures and unclear net-metering policies are among the most common complaints logged by those working to install renewable energy systems in the territory.

In an effort to increase the speed and scale of renewable energy adoption, the EDIN-USVI team turned to Keyes, Fox & Wiedman to review the territory's interconnection procedures and net metering policies and make recommendations. To inform its work, Keyes, Fox & Wiedman worked closely with a subcommittee made up of private citizens, VIEO employees, WAPA employees and board members, and NREL technical advisors.

In April, Keyes, Fox & Wiedman presented the subcommittee with a draft interconnection policy and interconnection agreement along with justification and examples supporting each recommended policy or rule. Keyes, Fox & Wiedman will deliver a final draft of the USVI's model interconnection policy and agreement in mid-June.



The tower of the wind turbine installed at the St. Croix Reformed Church and Kingshill School can be hydraulically raised or lowered depending on weather conditions. *Photo from Don Buchanan, VI Energy Office, NREL/PIX 20816*



A landfill-gas-to-energy conversion system at Bovoni Landfill will bring the territory one step closer to meeting its clean energy goal.

Photo from Don Buchanan, VI Energy Office, NREL/PIX 20817

WMA and VIEO Partner to Generate Electricity from Trash

Instead of polluting the air and contributing to global warming, methane gas collected from the Bovoni Landfill on St. Thomas will soon be put to positive use generating clean electricity.

The VI Waste Management Authority (WMA) launched the landfill-gas-to-energy project last year. Construction began in February after the VI Senate voted to reject a land lease to Alpine Energy Group, effectively killing Alpine's proposal to build a refuse-derived-fuel plant at the landfill.

To offset the up-front costs of the project, VIEO awarded WMA a \$3 million EECBG grant, which was funded by DOE under the Recovery Act. WMA contracted Island Roads Corporation of St. Thomas to build the landfill gas conversion facility, which is part of a plan to close the landfill under an Environmental Protection Agency mandate.

By April, a system for collecting and burning off landfill gas was up and running at Bovoni. A generator that will convert energy from the gas to electricity is slated to be installed at the end of June.

Once WMA finalizes a power purchase agreement with WAPA and interconnects with the grid, the system will

generate an estimated 11,500 MWh annually—enough to power 900 homes.

Initially, the facility will convert the methane gas into fuel to operate an 815-kW generator, according to WMA Chief Engineer James Grum. However, Grum said there is potential to add another generator that would boost power production to 1.6 megawatts, making the Bovoni plant the largest alternative energy project on the islands.

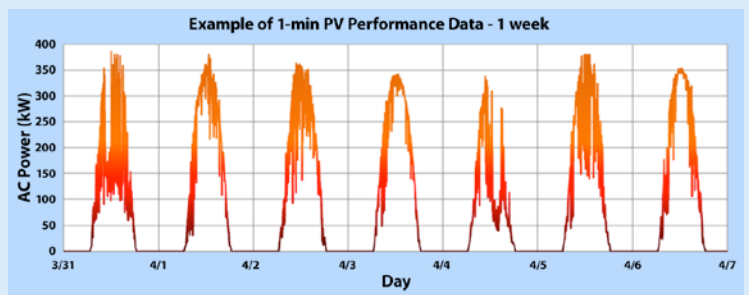
This example of one-minute average performance data collected from the airport PV system demonstrates the minute-to-minute variability of solar power due to variations in cloud cover. During the first

week of April there were days of relatively lower and higher variability levels caused by different cloud conditions. The maximum power produced by the system also varied from day to day, depending on cloud cover during the noon hour. *Illustration by NREL*

Airport Solar System Sheds Light on PV's Potential Grid Impact

In 2011, SolarWorld installed more than 1,800 PV panels along the runway of the Cyril E. King Airport. In April 2012, NREL began analyzing one-minute data from the 451-kW system. Such analysis will enable the USVI to more accurately estimate PV resource adequacy and variability at different time intervals. NREL is working with WAPA to model how this variability will impact the grid.

This analysis will help WAPA keep the lights on as renewables begin providing a larger portion of the territory's electricity supply. Small island grids do not have the advantage of resource geographical diversity, which helps smooth out the variable wind and PV generation output of large, interconnected power systems. So when integrating high levels of renewable generation, island utilities have to make significant operational changes to prevent outages when the wind doesn't blow or the sun doesn't shine. Data such as that being collected from the airport PV system can assist WAPA with incorporating PV power forecasting into its day-ahead planning, which is one solution.



To learn more about the EDIN-USVI energy revolution and how you can be part of the solution, please visit:

edinenergy.org/usvi.html



National Renewable Energy Laboratory

15013 Denver West Parkway, Golden, CO 80401
303-275-3000 • www.nrel.gov

NREL is a national laboratory of the U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, operated by the Alliance for Sustainable Energy, LLC. NREL/NS-7A20-54867 • June 2012

Printed with a renewable-source ink on paper containing at least 50% wastepaper, including 10% post consumer waste.