POWER SAVERS
THE POWER IS IN YOUR HANDS
OECS
Organisation of Eastern Caribbean States

POWER LINES
THE LATEST NEWS IN ENERGY EFFICIENCY | JAN, 2014

NEW CAMPAIGN IN FULL FLIGHT

The Power Savers—The Power is in your Hands energy efficiency public education and awareness campaign was officially launched at the Coco Palm hotel in St. Lucia on 11 Nov., as part of CARICOM Energy Week. The November launch also saw the start of a media campaign of television infomercials and radio public service announcements (PSAs) that will run for four months on television and radio in the Organisation of Eastern Caribbean States member states. The infomercials and radio PSAs are available on the campaign website at **www.powersavers.org** along with current information that helps show how energy savings are within everyone's reach.

Upcoming Events (For further details, contact Leonard Deane, OECS Secretariat, at ldeane@oecs.org.)

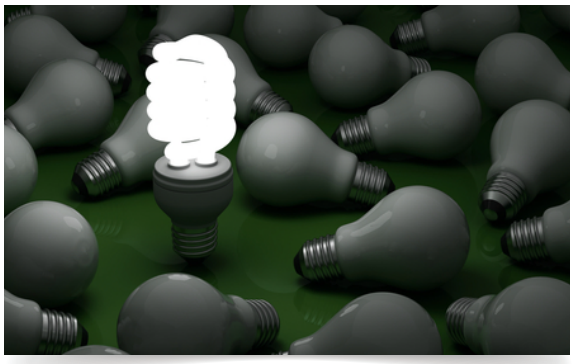
- Renewable Energy and Energy Efficiency Technical Assistance Project Planning Workshop: Guyana; end of January 2014 (date to be announced)
- Sustainable Energy Technical Assistance meeting to discuss final OECS energy sector legislation: video conference, February 2014 (date to be announced)
- Trinidad and Tobago Energy Conference: 3–4 Feb. 2014
- Eastern Caribbean Energy Labelling Project final Project Steering Committee meeting and closing workshop: Antigua; 6–7 Feb. 2014

First Energy Efficiency Webinar Draws Enthusiastic Participants

The first of three planned 1-hour webinars, Energy Performance Assessment, was delivered on 21 Nov. There were 19 participants from 10 organisations. The webinar focused on the following learning objectives:

- Understand the contribution of energy costs to operating costs.
- Develop an end-use inventory for your facility.
- Establish an energy baseline.
- Compare your facility's energy performance to its past performance.
- Report on your facility's progress.

The webinar also highlighted how the Sandals Grande resort in St. Lucia has established best practices in energy and water use performance assessment. For more information, visit **www.powersavers.org** to access the campaign's Power Line newsletter 1 (November 2013) and the webinar's PowerPoint presentation.



In this issue of Power Lines, we'll bring you up-to-date on recent and upcoming events, tell you about our ongoing webinar series and profile an energy efficiency solution which can help you realize savings for many of your facilities.

POWER SAVERS
THE POWER IS IN YOUR HANDS
ECS
Organisation of Eastern Caribbean States

POWER LINES
THE LATEST NEWS IN ENERGY EFFICIENCY | JAN, 2014

Upcoming Webinar

Save the date and join us at 2 p.m. AST (GMT/UTC - 4:00) on 23 Jan., 2014, for the second of three planned webinars: Spot the Energy-Saving Opportunities. We invite building and facility owners, managers and operators, energy managers, energy management service providers and utilities to participate in this 1-hour webinar, which will be delivered through your Internet browser.

The webinar will give you insights to help you identify and prioritize energy- and cost-saving opportunities at your facility. We'll focus on ways to save money on your lighting and air conditioning costs, and we'll look at other opportunities during the discussion with participants.

We are aware that despite the many benefits of energy efficiency projects, it can be difficult to secure the resources to implement them. To address this challenge, we'll wrap up the webinar with guidance on how to develop a business case for your energy efficiency projects that will impress senior management. Please direct any questions about the webinar to Emily Kirke (**Emily.Kirke@icfi.com**).

Save the date and join us at 2 p.m. AST (GMT/UTC - 4:00) on

23 JAN., 2014

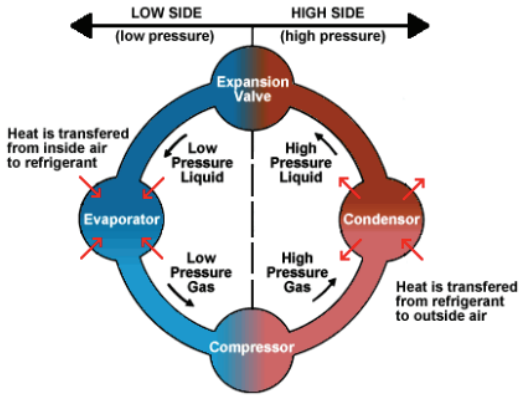
Technology Profile: Air Conditioning Units

During the Energy Performance Assessment webinar, one of the participants asked an excellent question regarding how to determine the energy consumption of a rooftop air conditioning (AC) unit. We've decided to include a short technology profile on AC units to review some basics, discuss how AC efficiency is reported and identify two methods for determining AC energy consumption.

Basics

AC units use the refrigeration cycle to move heat and humidity out of conditioned spaces. As shown in the figure to the right, the primary components of the refrigeration cycle are the compressor, condenser, expansion valve and evaporator. Another key component is the refrigerant, which is used to transfer heat. The refrigerant is used repeatedly in the cycle and enters the compressor as a low-pressure gas. The refrigerant gets compressed and then moves out of the compressor as a high-pressure gas. The gas then flows to the condenser, where it condenses to a liquid by giving off heat to the outside air. Then, the liquid moves to the expansion valve under high pressure and leaves at low pressure. Next, the low-pressure liquid moves to the evaporator, where it absorbs heat from the inside air and changes from a liquid to a gas. Lastly, the refrigerant moves to the compressor as a hot, low-pressure gas, and the cycle repeats.

AC units are sized to meet the cooling needs of the spaces they condition. The size of an air conditioner is expressed in terms of tons of cooling capacity. One ton of cooling capacity is able to remove 12,000 British thermal units (Btu) of heat from a space in one hour. For example, a 5-ton AC unit can remove 60,000 Btu of heat from a



Basic Refrigeration Cycle

Source: Hoffman, P. (2006). "Basic Refrigeration Cycle." Retrieved from https://www.swtc.edu/ag_power/air_conditioning/lecture/basic_cycle.htm

space in one hour. Small commercial AC units typically provide between 1 and 5 tons of cooling, while large commercial units usually provide between 5 and 25 tons of cooling.

Energy Efficiency Rating
A common way to report the efficiency of an AC unit is the Energy Efficiency Ratio (EER). The EER for an AC unit is the ratio of its cooling output in Btu per hour to its electric power input in watts (W) at a given operating point. Accordingly, the higher the EER, the more efficient the AC unit. For example, a 7.5-ton AC unit with an EER of 12.5 draws 7.2 kilowatts (kW) of power, while a 7.5-ton AC unit with an EER of 8 draws 11.25 kW of power.

The efficiency of AC units up to 5 tons is often rated by the Seasonal Energy Efficiency Ratio (SEER). Unlike the EER, which refers to an AC unit's performance at a single operating point, the SEER reflects an AC unit's performance during a typical cooling season. Accordingly, the SEER rating of an AC unit is the ratio of its cooling output in Btu per hour during a typical cooling season to its electric power input in watts during a typical cooling season. As such, the higher the SEER, the more efficient the AC unit.

Energy Consumption and Cost
There are two main ways to determine the energy consumption of an AC unit:
1. Have an electrician hook up a power measurement device to monitor the unit's energy consumption over a week.
2. Calculate the consumption using the energy efficiency rating from the unit's specification sheet.

The advantage of taking measurements on an AC unit is that this provides an accurate picture of how the unit performs over time. If the power measurement device monitors the unit for one week, you can determine the unit's annual energy consumption by multiplying the weekly consumption by 52 weeks/year.

If power measurement is not available, you can calculate the energy consumption for the AC unit using the energy efficiency rating from the unit's specification sheet and by estimating the unit's annual hours of operation. For example, the energy consumption for a 5-ton AC unit with a SEER of 13 and 3,500 annual operating hours is calculated as follows:

Energy consumption
= 5 tons x 12,000 Btu/ton x 3,500 hours / 13 Btu/watt-hour / 1000 W/kW
= 16,154 kilowatt-hours

Calculating the cost to run your AC unit is as simple as multiplying the annual energy consumption by the cost of electricity. Using the example above, if you pay US $0.34 per kilowatt-hour (kWh), then you would pay US $0.34/kWh x 16,154 kWh = US $5,492 each year to run the 5-ton AC unit.