OREGON ASSOCIATION OF PROFESSIONAL ENERGY MANAGERS

P.O.Box 6764, Portland OR 97228-6764 www.oregonapem.org

Mission Statement: To advance the understanding and practice of sound energy and resource management principles, and to provide a network among business, government, and utilities for information, education, and leadership.

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APEM

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REID HART ENERGY MANAGER OF THE YEAR

On December 7, Reid Hart of Eugene Water and Electric Board (EWEB) received the 2007 Energy Manager of the Year award in the utility category from the Oregon Association of Professional Energy Managers (APEM) for his work with the Western Premium Economizer, teaching in the Lane Community College Energy Management Technician and the NEEI Energy Management Certification programs.

Oregon Governor Ted Kulongoski received the APEM President's Award. Two other Energy Manager of the Year awards were presented in the Government/ Institutional category. One went to the Oregon Department of Energy State Energy Efficient Design (SEED) Program. The other award was presented to Dave Furr of Salem-Keizer Public Schools for his work toward decreasing overall energy costs in the school system by over $450,000 per year.

Jack Callahan, Manager of Energy Efficiency's Engineering Services, who nominated Hart said, "Instituting change was Reid's challenge. Convincing users of the importance of commissioning and training took time. One outcome of Hart's work is that BPA includes his specifications in the Energy Smart Design™ - Office, which incents for energy efficiency."

PLEASE JOIN YOUR FELLOW APEM MEMBERS AT THE OREGON APEM SPRING FORUM: "INNOVATIVE COMMERCIAL HVAC"

Date: April 24, 2008
Time: 8:30 a.m. to 1:00 p.m.

Location: City of McMinnville Water Reclamation Facility
3500 NE Clearwater Dr.
McMinnville, OR 97128

TOPICS AND SPEAKERS:

Effluent Source Heat Pump
Todd Amundson, BPA
Fred Shaub, Environmental & Engineering Services, Inc.
Ernie Straum, Operations Manager, Water Reclamation Facility (WRF)

History of (Innovative) NW Commercial HVAC
Bill Goerlich, McKinstry

Mini-Spit Heat Pump Technology
Tom Sorrenson, Heat Relief, and Jim Benville, Mitsubishi

Catered gourmet lunch

Optional tour of the WRF heat pump project after lunch

Please go to the APEM website for more information & to register to attend.

PRESIDENT'S CORNER – SPRING 2008

The Oregon APEM Board kicked off the new year with the annual retreat at the Oregon 4-H Center in Salem, Oregon. The annual retreat gives the board a chance to welcome the newly elected board members, swear in the new year's officers, review last year's fiscal and forum activities, and to plan the upcoming year's forums. The 2008 year shows to be a promising year with many new faces on the APEM Board bringing with them fresh ideas and new perspectives.

Your 2008 Oregon APEM Officers:

President: Brandon Adams

Vice President: David Christie

Treasurer: Tom White

Secretary: Elin Shepard

2008 Oregon APEM Board Members:

Tom Konicke, Tom White, Karl Friesen, Greg Stiles, Bob Stull, Jake Soto, Matt Daly, Rick Durst, Don Holland

I am excited to announce that Oregon APEM has established a theme for the 2008 forums titled Energy Management for the 21st Century. The energy management field is fast-paced and dynamic. These attributes bring both challenges and opportunities to the energy professional. Now more than ever before energy managers are required to navigate through evolving policies and emerging technologies to meet our client's needs from environmental stewardship, to cost management. The 2008 forums are designed to focus on the resources, tools, and new technologies available to help new generation of energy manager succeed. This year's forums will focus on a range of topics including, but not limited to innovative heating and cooling systems, operations and maintenance best practices, new energy accounting tools and techniques, energy management beyond HVAC and lights, and strategies to achieve net zero.

We are also planning on conducting a free webinar sometime this year to provide a comprehensive informational about the various energy efficiency incentives and programs that are available in Oregon.
The date and time are to be determined.

I hope that you find this year's forum theme and topics as exciting as I do.

Brandon Adams
2008 Oregon APEM President

Don't forget to renew your Oregon APEM membership for 2008. To sign up or renew your membership, go to our website at www.oregonapem.org

GROUND-SOURCE HEAT PUMPS

Ground-source heat pumps (GHP) are similar to conventional DX air conditioners, and air source heat pumps, but they use the ground, or a body of water instead of the ambient outside air as the heat exchange medium. The tempering effect of the ground allows for much more efficient heat injection, or heat extraction than the ambient air.

Assume that we do most of our cooling when the outdoor air 65–95 degrees Fahrenheit (˚F). As the outdoor temperature rises, rejecting building heat to the outdoor air becomes more difficult. The same is true for the heating season when we are trying to gather heat energy from the outside air when the temperatures are cool. As the outdoor air temperature drops the process of gathering the heat energy from the outdoor air becomes more difficult and equipment must work harder to satisfy the building load. Because of the variance in temperatures during the heating and cooling season, equipment must be sized and designed to satisfy the building loads in the most extreme conditions. For our climate zone air source technology must be capable of rejecting heat to the outdoor air when the temperature is as warm as 90–95˚F. These systems must also be capable of extracting heat from the outdoor air when the temperatures are as low as 17˚F. During the heating cycle electric strip heat starts running when the outdoor temperature drops just below freezing thus reducing the efficiency of the system. The stable ground temperature average of about 55˚F all year round yields a much better Seasonal Energy Efficiency Ratio (SEER) than air source technologies and there is no need for electric resistance back-up. The thermal storage of the ground provides ground temperatures as hi as 60˚ during the start of the heating season and 50˚ at the start of the cooling season.

The ground loop heat exchangers for these systems use several mediums for exchanging heat. These include, the soil, ground water, surface water, wastewater streams, or potable water supplies. Ground systems have a heat exchanger that is made up of several long pipes bored vertically into the ground or buried horizontally in trenches. The vertical bores are often 300 to 400 feet deep. Typically 400 ft of pipe is needed for 1 ton of capacity. Horizontal trenches often need 600 to 1000 feet per ton. When using ground exchange technology the soil type must be analyzed to determine the length of bore needed and whether ground loops can be used to satisfy the building loads.

The ground does provide some capacity limitations and may become cost prohibitive to install if the cooling loads are large. Water source systems that employ lake, river, or pond water provide more capacity as a heat exchange medium and may be the preferable system for large building loads. Special considerations must be taken to ensure that the water body is deep enough to maintain a stable temperature with the added heat from the heat exchanger. Overheating a body of water can have adverse consequences on the living organisms and may negatively effect the water's ecosystem health. When using water source systems it is important to re-inject any water pumped from a water body or underground well back into the ground or water body. Be sure to collaborate with your local authorities when considering an open loop system to ensure compliance with local laws and regulations.

Hybrid systems are also an option. These systems use a combination of air source technology and ground-source technology to heat and cool. Another configuration combines ground-source technology with cooling towers. The ground-source part of the system is sized for the heating load and the cooling towers are sized to cover the difference between the heating load and the cooling load. This reduces the length of underground bore needed to satisfy the building loads. Both systems are less expensive to install and are nearly as efficient and reliable as ground-source systems.

This is a tried and true heating and cooling technology. There are one-to-two million GHP operating in the United States today with installations dating back to the 1940's. Approximately 50,000 GHP systems are installed annually. The GHP is used for commercial buildings, multifamily residential, correctional facilities, and water heating for domestic hot water and swimming pools. When coupled with a "desuperheater", the waste energy generated from the building during the cooling cycle can

[1] This year's spring forum will highlight a ground source heat pump project utilizing wastewater as the heat exchange medium.

be used to heat the domestic hot water. This may reduce hot water heating costs by as much as 50%.

According to the EPA, geothermal heat pumps can reduce energy consumption—and corresponding emissions—up to 44% compared to air-source heat pumps and up to 72% compared to electric resistance heating with standard air-conditioning equipment. Consider this with maintenance cost reductions of approximately 50% and a solid case is made for considering this technology when designing a heating and cooling system for a new project.

The main benefit of GHP is the improved operating efficiency. This increased efficiency results in significant cost savings to the building owner or tenant that is paying the utility bills. One environmental benefit is that GHP often use 25% less refrigerant than split system air source heat pumps and air conditioning systems. Due to lower energy use these systems also result in less pollution and emissions than their air source counterparts.

GHP systems take up less room that a typical central plant that requires space for the boilers, chillers, and cooling towers. Maintenance benefits include no need for defrost cycles, or crankcase heaters, and there is almost never a need for freeze protection. These systems are also quieter because there are no outdoor fan units. GHP systems are also installed in climate controlled spaces as opposed to air source technology that is installed outdoors and exposed to the weather conditions. Piping warranties can range from 25–50 years. Well beyond the economic life of the heat pump.

The cost of commercial ground source heat pump's range from $3,800 to $5,200 per ton of capacity. These costs include multiple heat pumps, the ground loop, interconnections, pumps, controls, and ducting. The initial cost of a ground source heat pump is typically 20% higher than an air source system. However, when considering the life cycle cost of the ground source heat pump as compared to an air source technology the ground source system is far superior. The incremental cost is often recovered with in ten years of installation.

Maintenance costs range from five to ten cents per square foot of conditioned space annually. This is merely a range and the actual cost will depend on the size and configuration of the system.

For more information about GHP consider visiting the following links:

DOE EERE:
http://www.eere.energy.gov/consumer/your_home/space_heating_cooling/index.cfm/mytopic=12640

ENERGY STAR:
http://www.energystar.gov/index.cfm?c=geo_heat.pr_geo_heat_pumps

IGSHPA:
http://www.igshpa.okstate.edu/geothermal/geothermal.htm

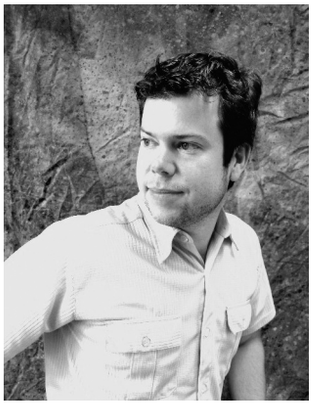
OIT Geo Heat Center:
http://geoheat.oit.edu/

WHAT IS "COMMISSIONING?"

Commissioning is a term that we are hearing more and more in building construction and renovation, but what does it mean? Commissioning is a technical verification process of building systems during the design, construction, and early occupancy of a new or renovated building. Conducted by a third party, commissioning acts as a powerful tool to ensure buildings are designed, built, and operated to the owner's requirements.

BOARD MEMBER BIOS

Brandon has been with the Oregon Department of Energy for 5 years and is currently the Program Manager for Schools and Energy Savings Performance Contracting. Brandon is a Certified Energy Manager (CEM) and a Certified Sustainable Building Advisor (CSBA) and holds an Applied Science degree in Energy Management. Brandon and the schools team develop and deploy programs that help schools fund, design, procure, and manage the installation of energy conservation projects and sustainable design elements for new and existing buildings. Brandon has been on the APEM board for three years, serving as Secretary, Vice President, and now as President.



Greg Stiles has more than 10 years of consulting and research experience in energy efficiency and environmental business strategy. Greg manages the Energy Trust of Oregon's commercial energy efficiency programs. He has an MBA from Rensselaer Polytechnic Institute and a BS from Willamette University. He is a certified energy manager. In his spare time he moonlights as a snowboard coach for a local high school team in Portland. As a member of the Oregon APEM Board of Directors he manages the organization's website.

Elin Shepard is currently serving as the Oregon APEM Secretary. She lives in Salem with her husband and 2-year old son. She's a graduate of Oregon State University with a BA in French, and even lived in France for a year as an exchange student. She began working for the State of Oregon shortly after college and has worked for the Department of Administrative Services for most of her state career. She worked in administrative and managerial roles, but was pleased to become State Recycling Manager in 1999. That led to a successful transition to energy management and resource conservation after attending the Energy Management Certification class through the Northwest Energy Education Institute in 2000. By using what she learned, she was able to save $500K a year for state government and taxpayers for the next four years. Elin served on the Oregon APEM Board as newsletter editor from 2002 – 2004. After a hiatus in management for the last few years, she's happy to be back in the field and delighted the position has expanded to the Statewide Resource and Sustainability Coordinator for DAS. In this new role, she provides staff support to the Oregon Sustainability Board, works with DAS buildings' operations and construction staff, and has brought the program back to its roots of saving money for state government and taxpayers.

WINTER FORUM RECAP:

Measurement and Verification: Measurement and Verification (M&V) is an important part of any energy project and was the focus of the Winter Forum, held at the Hilton in Vancouver Washington, on December 7. Not only does M&V demonstrate pay back for incentives and other efficiency measures, but it can document the success of a project. Both of these point were well demonstrated by experts in the field: Jamie Caplan, Measurement Specialist with Square "D" Company, and Jack Callahan, Mechanical engineer with BPA. Jamie presented on a variety of different applications for measurement and verification while Jack covered several specific instances where he and his colleagues have applied M&V technology to remodels and retrofits. Oregon APEM took the opportunity to present Energy Manager of the Year Awards to: David Furr, Salem-Keizer Schools, the Oregon Dept. of Energy's SEED program, and Reid Hart for his work with EWEB, LCC, and Western Premium Economizers. A President's Award was presented to David Van't Hof, accepting on behalf of Oregon Governor Ted Kulongoski, for his leadership of energy conservation in Oregon and significant contributions towards reducing the impacts of global climate change. Vancouver Mayor Royce Pollard was the lunchtime speaker. His comments were well received and were delivered in a light-humored fashion. While he spent some time extolling the benefits of spending time in Vancouver, energy efficiency and carbon footprint reduction were the main topics of his presentation.

OREGON SUSTAINABILITY BOARD MEETS IN LAKEVIEW, OR

The Oregon Sustainability Board (OSB) met in Oregon's tallest town, Lakeview, for its November meeting. The OSB was tying its meeting to the opening of a new Collins Companies small diameter saw mill and the signing of a 20-year forest stewardship contract between the local communities and U.S. Government (BLM).

Lake County is working to become Oregon's first carbon neutral county and it shows in the progressive thinking that is occurring. The forest stewardship contract allows Collins Companies to sustainably harvest the logs from the BLM tract of land, which guarantees stock for their mill, as well as lowers the fire danger and increases the forest health.

The by-products that they are not using in their final product will be sent next door to the new woody biomass plant that is being constructed. The biomass plant will be heated by geothermal heat from the town station, and will produce electricity to ship to California. The extra steam generated through the biomass plant will heat the kilns at the mill that dry the wood. It's a closed loop, progressive design and thinking. In addition, all of this helps the local economy and ensures stability for the railroad, which is an important part of the picture for shipping the products to their destination.

TIP OF THE MONTH

Check for leaks in kitchens and bathrooms of your buildings. In just one month, a leaking water faucet can waste hundreds of gallons of water.

ASK THE ENERGY PERSON

Dear Energy Person,

We recently undertook a remodeling project and determined to design the building utilizing LEED (Leadership in Energy and Environmental Design) standards. The work is now complete and the building achieved a LEED Silver designation. Lately we have found that, despite the exacting standards, from an energy use standpoint, our building is not running as efficiently as designed. This makes us wonder if LEED was best for us. Any insight you have on this issue would be appreciated.

Signed,
Energy Hog

Dear Energy Hog,

First of all, the Energy Person would like to thank you for defining LEED. The Energy Person has seen this term on numerous occasions and always thought the letters stood for "Licking Every Elevator Door." This did not make sense to the Energy Person. It has also been a source of embarrassment for the Energy Person, as occasionally the doors would open before the Energy Person was done. This is not easy to explain to an elevator load full of people.

Regarding efficiently designed buildings not being efficient, the Energy Person has, unfortunately, seen this on numerous occasions. The problem seems to be less with the design than the responsibilities of the occupant(s) understanding their role(s) in optimizing building efficiency. For example, many efficient designs incorporate occupancy sensors into the lighting systems. Many occupants choose to disable this technology after they tire of hearing the words, "hey idiot, there's someone in the building so leave the lights on!" The Energy Person would recommend ordering the sensors without this feature. It can indeed be annoying. The polite version simply senses the presence of a person in the room and quietly leaves the lights on. It will also simply, and quietly, turn the lights off when the area is unoccupied. In this instance the problem seems to be that occupants will begin to rely on the sensors to control the lights. If the sensor has a 15 minutes delay from the time it senses no occupants, until it shuts the lights off then the lights remain on for 15 minutes unnecessarily. At this point the Energy Person would recommend the feature that announces, "hey idiot, turn off the lights when you leave the room."

"Daylighting" is a feature incorporated into many energy efficient designs. Unfortunately, occasionally occupants close the blinds, and leave them closed, thereby rendering the design useless. For example, someone may need a darkened room for a Powerpoint presentation. However, once the presentation is over, they fail to open the blinds. At this point the Energy Person would recommend the feature that gently reminds people to "open the dang blinds!" when they're through needing a darkened facility.

Another feature that is frequently incorporated into LEED buildings is "passive ventilation." Passive ventilation is a means by which fresh air is brought into a building without mechanical assistance. This is done because having a mechanic bring you fresh air can be expensive. Typically they'll want a tip. This can increase the cost even more. Passive ventilation utilizes openings in the building envelope to provide air to the space. Unfortunately, frequently occupants block these areas, thereby increasing the reliance on the mechanic bringing in the air. At this point the Energy Person would recommend the installation of the "hey idiot, get the stuff away from the vent!" module. While this may increase the initial cost, over time it will offset the cost of the mechanic having to bring the air by (heaven forbid you should ever need air after hours or on weekends!).

The Energy Person thanks you for your question. The Energy Person would have answered in person but is still suffering from a tongue injury. Who knew the doors were frozen?

-The Energy Person

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