

BOC Bulletin

A Newsletter for BOC Graduates, Enrollees and their Employers



SUMMER/FALL 2009

Strategic Energy Management Plans: Blueprints for Energy Savings

Healthcare costs are on everyone's mind these days, with healthcare reform an absolute necessity as costs spiral out of control. The changes that will be made to improve the system and contain the costs cannot be predicted, but what can be known is that healthcare facilities will continue to require a lot of energy to operate effectively.

The last issue of the *BOC Bulletin* highlighted the economic issues facing healthcare facilities managers from an energy perspective. Energy is a huge component of facility operating costs at healthcare centers (usually about 30%), especially at hospitals which, by necessity, run 24/7. Getting a handle on costs can be overwhelming, but there are strategies and tools readily available to help guide the process.

PeaceHealth is a group of seven healthcare facilities with about 1,000 beds serving regions in Alaska, Oregon and Washington state. Back in 1996, PeaceHealth was already concerned about energy conservation and implemented several measures that not only saved about \$1 million annually for group, but also rewarded them with \$1.2 million in rebate incentives from their various electric utility providers.

Up until a few years ago, though operating under the PeaceHealth affiliation, the different hospitals and medical office buildings (MOBs)



St. Joseph's Hospital in Bellingham, Washington.

were run more or less independently of each other. It was then determined that operations could be more efficient if procedures were standardized. This led to the creation of a Facilities Counterpart Group (FCG) comprised of the facilities managers from each of the hospital and MOB centers, as well as the regional vice presidents. The setup encouraged a beneficial exchange of ideas and resulted in establishing standards at all the facilities for everything from nurse-call systems to procurement procedures to a list of approved service contractors.

As noted, PeaceHealth had already completed several successful energy efficiency projects. But as yet, energy management had not been a part of the FCG discussion. FCG sponsor and regional CEO Medrice Coluccio heard about

the Strategic Energy Management Plan (SEMP) from BetterBricks (see sidebar on page 2) and suggested it as a viable option for organizing the energy efficiency component of the PeaceHealth buildings. In addition to great savings, Coluccio felt that "a system-wide plan provides strong focus, synergy and a way to parlay the knowledge of our facilities people across our entire hospital system."

The FCG agreed and set to work developing a SEMF for the PeaceHealth facilities, creating a specific energy efficiency team (FCT) within its group, with specific

"point people" as leads in their respective regions. Ron Tolleason, director of facilities at St. John Medical Center in Longview, Washington and member of the FCG said that, as a team, "We recognized that, regionally, there were a lot of disparities in our company, but it was important to get a cohesive plan of action together for people to understand what they could do in their own areas and how to go about doing it."

BetterBricks' SEMF lists six basic steps on how to get the plan in place:

- **Assess** – What is the current situation and where is there room for improvement?
- **Commit** – Sell the concept to management.
- **Plan** – Organize the process by pinning down details and costs.
- **Secure** – Sell the plan and get financial and resource commitment from management.
- **Implement** – Enact the plan.
- **Recognize** – Monitor progress and reward success.

At each stage, the outline for the SEMF provides suggestions, tips, templates, software tools – everything needed to help facilities managers along in the actualization of improving energy efficiency. With this, PeaceHealth's FCG went to work.

(Continued on page 2.) See *Blueprints*.

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Blueprints (Continued from page 1)

PeaceHealth's SEMP document notes that increased efficiency of operating margins has a dramatic compounding effect on revenue (see chart below). Energy efficiency measures also benefit the company's financial standing in terms of disclosure and reporting requirements of both the Sarbanes-Oxley Act of 2002 and the JCAHO (Joint Commission of the Accreditation of Healthcare Organizations) utility management performance goals.

This graphic below from the BetterBricks SEMP guide site, illustrates the effect that improving operating margins have on revenue by showing the gross revenue (vertical) needed to generate \$50,000 in net dollars at different levels of operating margins (horizontal).

Prior to the establishment of the SEMP guidelines, four of PeaceHealth's facilities were already in the top 25 percent of their hospital peers in terms of efficient energy usage, due to the various energy projects undertaken from 1996 on. There had also been assessments of operational efficiency at two



St. John Hospital in Longview, WA

- reinvestment of energy savings into energy projects,
- a system to recognize PeaceHealth's top energy efficiency performers annually.

Illustrating the positive effect of improved margins is a huge factor in getting "buy-in" from management – selling the concept.

These goals were then put into specific focus by establishing methodologies that all system facilities could use to make decisions, including financial guidelines for project approvals, equipment purchase standards, peer informational exchange opportunities within regions, group purchasing when advantageous, and staff credentialing (with BOC trained staff as an integral part of the efforts).

As Scott Dorough, resource energy manager at PeaceHealth's St. Joseph Hospital in Bellingham, Washington and member of the FCG, puts it, "We started with the most cost-effective

changes first, things like replacing outdated light fixtures, changing filters, cleaning coils, replacing gaskets. The smallest changes really add up, especially if you do them system-wide." This type of building tune-up has a huge impact. They anticipate annual savings of \$450,000 (over half of their initial savings target) from just fine-tuning what is already in-house at the various locations.

Facility directors at all PeaceHealth locations have also worked closely with their utility providers, who offered various rebates and incentives for energy efficiency projects. Among the partnering utilities: Puget Sound Energy, Eugene Water & Electric Board, and Cowlitz PUD.

One of the major goals of the plan was to engage everyone in PeaceHealth's energy efficiency goal. As stated in the SEMP, the energy management vision is to "integrate energy management into our organizational policies, business practices, and institutional culture to ensure the most efficient use of energy in our facilities."

SEMP in hand and personnel in place, the framework is there to continue the search for savings as an ongoing part of the PeaceHealth organizational structure and culture.

While the focus here has been on healthcare, a strategic energy management plan is essential for any facility and is also a cornerstone of the BOC philosophy. **BOC**

Resources Galore

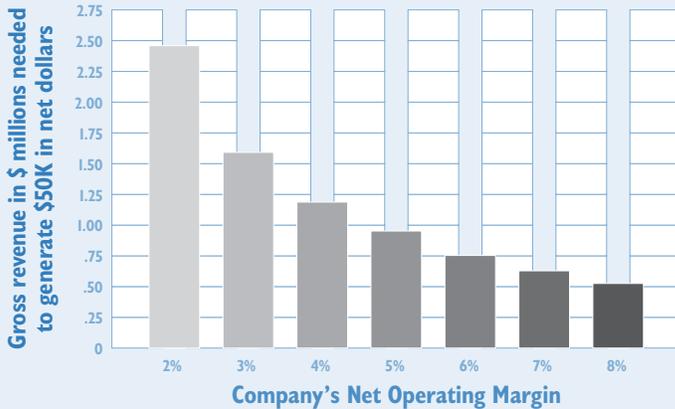
The BetterBricks web site (www.BetterBricks.com) offers a wide range of information for facilities managers to help them plan, implement and maintain operational strategies for running energy efficient buildings – new, old and anything in between. The site is constantly being updated with advice on current energy trends, tips on available resources and free tools to aid O&M personnel. Some of the many resources you will find are:

- data-tracking spreadsheet templates,
- energy practices checklists,
- links to a variety of free programs, such as the EPA Benchmarking Starter Kit,
- SEMP Tools & Resources,
- Energy Star's Portfolio Manager.

Find what you need to get started developing your facility's energy management plan. It's all at your fingertips at [BetterBricks.com!](http://BetterBricks.com)



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representative sites, both to develop a baseline and to determine likely targets for energy efficiency improvements.

PeaceHealth's SEMP introduced several proposals to get the ball rolling:

- energy cost control assessments system-wide,
- a target of 10% reduction in energy consumption,
- consistent financial guidelines for energy management projects,
- a financial commitment to fund cost-effective energy projects throughout the system,

BOC – It's Not Just for O&M Staff Anymore

BOC has been training facilities personnel for several years now. Designed to teach energy conservation techniques and promote the use of energy management resources, the training also provides participants with a forum to exchange ideas and information on how to optimize energy efficiency through O&M at their facilities.

Backed by energy conservation groups and utilities, both public and private, BOC has now certified well over 6,000 men and women and these have returned to their workplaces, energized and making a difference in their companies' bottom lines by implementing strategies learned in the classes.

Nowadays though, it is not just facilities maintenance staff attending BOC training. Increasingly, utilities are sending their customer account representatives through the program, even though they are not directly involved in building management. Utilities have long been strong supporters and sponsors of the BOC program. Because they know how important the exchange of information can be, many have now decided that putting their customer service staff through BOC is an effective way of training them to better understand client needs and where clients and utilities can work together to lower energy costs.

Lori Moen heads up the support team for the resource conservation manager (RCM) program at Puget Sound Energy (PSE). Half of her staff has been through the training. "For some, because of their strong engineering backgrounds, the training would have been redundant, but for those in traditional customer service positions, the training is very useful for them to understand how to serve their client base more knowledgeably," says Moen.

The RCM team focuses on one of BOC's basic tenets – efficient use of existing equipment – and when customers go through PSE's RCM program, they become eligible for BOC training reimbursement funds through a series of incentives. "Adding the payment stipend has really increased the number of companies sending participants," notes Moen.

The certification aspect is important as well. Catherine Bryan of Avista Utilities in Spokane, Washington says that the certifications "bring a level of trust for the customer that we have training and expertise that can help them in areas where they need utility assistance." She notes that the knowledge the staff gains about building systems is value-added in term

of their audit reporting capabilities. "The training is also an opportunity for energy efficiency staff to talk with customers directly and explain our programs."

In Minnesota, Rochester Public Utilities (RPU) is also starting to send its customer account representatives to the training. Sara Gimberline, an account representative who is new to the utility industry, was the first rep in the area to take the training and believes that it gives her a much better background when dealing with customers. "I have a much better idea of what will work for different situations because of the training," says Gimberline. "There was a variety of businesses represented at the trainings, which creates a great informational networking set up."

Stephanie Humphrey is a commercial account representative who is active in setting up the classes for RPU and works with other area utility companies to promote BOC. Like PSE in Washington and many other utilities, RPU has an incentive program for BOC grads. Theirs is tiered, with tuition reimbursements based on what is actually done as a result of the class: a level for successful completion, the next for an energy efficiency project analysis, and a final reimbursement for the implementation and documentation of that project. She notes that, "People can go to class, but it's important to follow up with what they take away and actually do with it."

Moving further east, in upstate New York, National Grid's Energy Efficiency department makes BOC training a requirement for its Key account managers. They have completed trainings in Syracuse and Albany and are beginning one in Buffalo at the end of August. When that series is complete, over sixty of their staff will have been certified. Allison Radcliffe, who helps coordinate the trainings, believes that training for staff, "creates a stronger foundation and puts us on equal footing with our clients in that we better understand their needs when we meet with them." Manager of Energy Efficiency Jim Stapleton elaborates, "Our account managers are already using many of the tips they learned in BOC training. BOC allows us to enhance the skills of our field personnel."

So across the country, the trend is clear. Energy efficiency isn't just for facilities staff anymore. Energy providers (and BOC supporters and sponsors!) know that understanding and data exchange are key to a successful alliance between them and their customers. 

Continuing Education Opportunities for Certification Renewal Credit

Below you will find listings for the web sites of various national organizations that offer continuing education courses that are applicable to annual BOC certification renewal. Check out the Education, Professional Development and Events Calendars at these sites.

BOMA:

Building Owners & Managers Association
www.boma.org/TrainingAndEducation/BEEP/

BOMI:

Building Owners & Managers Institute
www.bomi-edu.org

ENERGY STAR®:

Live web conferences, pre-recorded trainings, self-guided presentations
www.energystar.gov/index.cfm?c=business.bus_internet_presentations

FEMP:

Federal Energy Management Program Workshops & Conferences
www.eere.energy.gov/

GreenBuild:

US Green Building Council
www.usgbc.org

HVACR Education:

On-Line Learning for the HVACR Industry
www.hvacreducation.net/

IFMA:

International Facility Management Association
www.ifma.org

The International Facilities Management Association has several regional chapters, all of which can be accessed from the association's main web site address above. Be sure to check out the site for the variety of learning options available both online and via seminar.

Utility Energy Training Centers:

www.dsireusa.org

Your local utilities may offer energy education events and their sites are sources for training opportunities as well. Regional industry associations also offer a number of options for further education. The link above brings you to a database of state incentives for renewables and efficiencies. 

BOC Grads Making a Difference

Timing is Everything

NOAA's Southeast Fisheries Science Center – Santa Cruz, CA



Dale Chastagner

Dale Chastagner, facility manager for the National Oceanic and Atmospheric Administration's Southeast Fisheries Science Center in Santa Cruz, CA, had an opportunity to attend BOC training. Chastagner was

initially skeptical of just how beneficial it would be to his already-considerable experience of over thirty years in facilities management. But with new technologies constantly emerging, he felt there was always more to learn and also found the energy-saving focus of the program to be intriguing. Little did he realize how timely his training would be.

Chastagner recalls, "I was sitting at my desk doing my BOC homework on ENERGY STAR® benchmarking when I received an email from our headquarters informing me that they were contracting NREL (National Renewable Energy Lab) to conduct an energy audit of our facility. They asked for a list of information about our facility to initiate the audit. The information they requested was exactly what I was working on for homework. I emailed my work to them and immediately got a call to have a discussion about the data I sent, as well as more information about benchmarking and BOC. Headquarters was very excited about my being ahead of the curve. Because of that, I have been an intrinsic part of the process, making suggestions and determining solutions."

While finding money for projects is quite competitive within the government and its various agencies, Chastagner believes that the early and thorough data he'd compiled for his BOC class, serendipitously just what was needed for the initial energy audit, was key in his facility being at the top of the list for funding. He has subsequently attended several government and utility co-sponsored energy seminars/webinars on navigating the funding process, which can be arduous, and found them very useful. Having benchmarking data on hand, as per BOC's teachings, definitely simplifies the work.

"We have since received the completed energy audit from NREL and monies have been committed by the federal government to proceed with most all of the identified energy savings measures, along with a photovoltaic (PV) array. We are now in discussion with PG&E to put in place a UESC (Utility Energy Service Contract) as the vehicle to complete this project. At first look, we are anticipating a savings of 36k/year with 6-7k savings coming from renewables in the form of the PV array. This project should average out to a 4-year payoff on our investment. I anticipate the contract to be executed and the on-site work to begin by September/October," says Chastagner.

"We are now in discussion with PG&E to put in place a UESC (Utility Energy Service Contract) as the vehicle to complete this project."

– Dale Chastagner

In addition to the expenditures on new energy sources at the facility, Chastagner notes that the benchmarking and auditing processes also yielded many no-cost/low-cost changes that saved on energy usage. "Even things as simple as turning down the thermostats on water heaters can affect usage numbers," he states.

Relinquishing his initial skepticism of BOC training, Chastagner has just begun taking the BOC level II series in San

Francisco. The Santa Cruz facility is only about ten years old, but new prospects of improving energy efficiency come up all the time and Chastagner wants to be more than ready to take advantage.

Water and Energy Savings – A Win/Win

L-3 Communications – San Carlos, CA



Ron Chase

BOC graduate **Ron Chase** is the **manager of facilities maintenance** at L-3 Communications in the multi-national company's ISO-9001 certified San Carlos, CA location, L-3 Electronic Devices Division (L-3 EDD). For over fifty

years, the company has designed and manufactured microwave vacuum devices, outputting hundreds of devices monthly for military and commercial systems. Chase is responsible for all maintenance functions, from landscaping to construction projects.

In August of last year, the company saw significant water and energy savings with a

project that combined two plating and cleaning areas into one new space, a state-of-the-art operation that is now zero-discharge for all water used in the cleaning and plating operation so vital to their production. The advantages are both economic and environmental.

Water consumption was reduced by 65%, from an average of 70,890 gallons per day to 25,172. This is an annual reduction of ten million gallons, a savings of \$21,265 in water alone. Since all wastewater in the zero-discharge system is reclaimed and reused, there is no discharge into the city sewer system. Cleaned water stays in a holding tank until needed. Chase explains, "In the past, we had used a "gravity separation" system that would require quantities of chemicals to pH adjust the water and separate the metals from the water. The clean water would enter the sewer and the metals holding sludge would be dewatered and sent somewhere to be incinerated. The leftover metals from incineration would then be harvested. Eight different hazardous chemicals were required to accomplish this process." This also meant cost savings for hazardous waste shipment fees of \$15,000/year and an even more impressive \$60,000 savings annually in the cost of the now unnecessary water treatment chemicals.

"Most of the other water usage is involved in makeup water from evaporation from our 1000-ton cooling tower. We are exploring ways to reduce this number as well," says Chase.

In March of this year the San Carlos Chamber of Commerce recognized L-3 EDD's efforts by bestowing its Green Business of the Year – Large Business award. The California Water Environment Association also gave EDD its Northern California Large Facility Pretreatment, Pollution Prevention and Stormwater Facility of the Year award, out of over two-hundred facilities nominated statewide. In its March newsletter, EDD congratulated its facilities maintenance staff saying that, "guided by Ron Chase, (our facilities maintenance staff) deserves a standing ovation for the long and hard work they have put in on the new facility and the other improvements that have brought us these awards."

But Chase and his staff won't rest on their laurels and have more energy saving projects on tap. "We are currently in the beginning stages of retrofitting two areas for improved efficiency lighting, going from halide lights to T5 high output fluorescents. We are also plan-

ning to install variable speed drives and more efficient motors on ten of our heat exchanger systems to cool process machinery," says Chase. Both lighting and motor changes will yield significant electrical cost savings as well as cost-implementation savings, when factoring in rebates for both projects from utility provider, PG&E.

Chase observes, "The BOC program provided a great overview to capture potential cost savings in the plant. I still use the program module notes to help coordinate efforts to save on electrical, water and HVAC costs."

Environmental Responsibility and Recreation Coexist

The Mill Casino-Hotel & RV Park – North Bend, OR



Duane Place & Richard Rudder

The Mill Casino-Hotel & RV Park in southwestern Oregon has been undergoing a construction and improvement process for the past several years, culminating in the opening in July of 2008 with the new luxury hotel tower overlooking Coos Bay. Throughout the process of both new construction and renovation of existing buildings, close attention was paid to the energy efficiency of the designs, in keeping with the philosophy of community held by the complex owners, the Coquille Indian Tribe: "Community is our relationship with all that surrounds us. The land. The sky. The sea."

As members of the planning and construction team, BOC graduates **Richard Rudder** and **Duane Place**, respectively **director of facilities** and **maintenance manager** at the Mills Casino complex, worked with the designers and the Energy Trust of Oregon to develop an energy efficient operation.

There were two main projects: the casino expansion and the new construction of the hotel tower. The casino redevelopment, at 11 million dollars, entailed adding an entertainment lounge, café, and conference room, as well as an expanded gaming floor and several other additions. Rudder elaborates, "All were built using a combination of CFL's and low voltage lighting. We installed a hydronic heating/cooling system, much more efficient than the wall

units typically found in hotel construction, and converted kitchen equipment and domestic hot water from propane to natural gas."

The hotel tower, a 22 million dollar project, is a seven story, post-tension concrete structure comprised of 92 guest rooms, five conference rooms, a 3,500 square foot banquet hall, a banquet kitchen, a slot shop area, an environmental services (EVS) section and a sales and catering office. "We utilized our two six-million BTU dual-fired boilers, converted from diesel to natural gas, to supply a hydronic heating system and packaged AC units for cooling. Vacancy sensors were installed in all offices and guest rooms, with compact and lineal fluorescents in all spaces including corridors. We also exceeded code requirements with the rooms' insulation and low-e green glazed windows, and installed low-flow shower heads and toilets," says Rudder.

During the construction process, Rudder says that all the woody fiber waste was ground and sent for re-use to a bio-mass facility. Metal waste was recycled and removed concrete was used to build a windbreak for the RV park on the premises. Not content to stop there, when the project was completed, together with the food and beverage department they implemented a more ambitious recycling program. In March alone, 3,039 pounds of plastic and tin was recycled – saving projected landfill fees of almost \$3,000 per year. Food and beverage recycling also includes the conversion of cooking oil to biodiesel fuel that is then used in trucks at the tribe's cranberry operations.

Rudder states, "Since I received the BOC certification, I have been more conscious of – and conscientious about – energy conservation and efficiency. It is always a consideration in design and remodeling in all areas."

Duane Place, Rudder's fellow BOC grad, elaborates on this observation. "I attended BOC training during the construction of our hotel tower. The information I gained was very useful in the commissioning and training of staff on all the

new systems installed in the hotel and in our gaming expansion areas. It helped me to have a better understanding of the design aspects of energy efficient systems, which allowed me to work with the various contractors to get the best bang for our buck.

"Since I received the BOC certification, I have been more conscious of – and conscientious about – energy conservation and efficiency. It is always a consideration in design and remodeling in all areas."

– Richard Rudder

"We also used the information gained in the Energy Conservation Techniques training to determine what our energy savings would be converting our property from propane to natural gas, as well as running out boilers on natural gas versus #2 fuel oil. The HVAC Systems and Controls sessions were very useful, giving us a better understanding of existing systems, as well as what opportunities we should look at for further energy savings."

The Mill Casino also joined Pacific Power's Blue Sky program as a visionary partner, so that it is dedicated to utilizing 11% renewable energy with the program. Efficient and responsible energy conservation is a winning combination for the Mill Casino & Hotel.

Working Towards Efficiency is a Continuous Process

Rush University Medical Center – Chicago, IL



Nicolas Lee

BOC graduate **Nicolas Lee** is a **general foreman** at Rush University Medical Center in Chicago, IL, a campus of over twenty-two varied-use buildings, with three new ones under construction, encompassing an area of about 5.2 million square feet. Modernization projects are ongoing at this type of facility which is also a teaching and research hospital. Projects are huge in scope. Architects and engineers must plan the construction and relocation so that occupant needs are not disrupted. "Healthcare moves at the speed of light and constant changes are required to meet the needs of patient care and education," says Lee.

One of the goals of the hospital's modernization is energy self-sufficiency in order to have greater control over energy costs and reduce the dependency on outside sources. The hospital's facilities and transformation people developed a plan to construct a central energy plant to deliver steam and A/C chilled water to the campus. Construction of the central energy plant required the installation of boilers, chillers, cooling towers, VFD controls, and a variety of equipment. It also necessitated designing plans for both new and existing systems, as well as planning for their subsequent maintenance. "Planned maintenance is also a part of the plant operation," says Lee, "PM ensured the proper operation of the equipment and systems, all of which saves energy and reduces costs."

(Continued on page 6.) See **MAKING A DIFFERENCE**.

MAKING A DIFFERENCE (Continued from page 5)

Plans to relocate the various departments and services were developed first as a prelude to any construction or renovation. Flexibility is a key concept here so that the plans are able to accommodate schedule changes that might possibly occur in areas of reconstruction, with new construction having fewer such constraints. The systems are being phased in gradually, one location at a time. "Once more of the plant is operating, it is expected that the cost of the steam production on campus will meet or be less than the cost of purchasing steam," says Lee.

Condensate returns to surge tanks which will add treated water if needed, then deaerators will remove air. Chillers and boilers are sized and operated to accommodate demand. Plate heat exchangers recover energy from the systems, and roof-top rainwater storage provides the chiller system cooling towers with make-up water (reducing the use of potable water). Any chemical additives needed to protect against corrosion and sediment are OSHA approved and biodegradable. Where possible, areas were designed to provide better access for maintenance, promoting safety, easier monitoring and repair, and which can also result in cost savings on insurance premiums due to the safer conditions.

Lee credits MEEA BOC training with helping in the green process. Building engineers, design engineers and architects are thinking green. "The BOC program I took through MEEA provides information on green design. Forty years ago, ecology was a word that inspired good thoughts, but limited action. I think ecology became green (as in money) when fuel and utility costs increased. Costs affect the design of roofing materials, building siding, insulation, lighting systems, plumbing systems, motor controllers, motors, pumps, fans, chillers and boilers. Duct coils or plate exchangers are now used for recovery of heat or cooling. Rain water, coil condensate, boiler blow down water or treated system blow down water are now valuable commodities. BOC training expands one's thoughts to consider not just the present, but the future. The costs are both financial and ecological. It comes down to logistics: If the planet and atmosphere are not the concern, there is always the thought that there is no law against saving money. The BOC program teaches a building engineer how to look at a job from more than one viewpoint, not just how to repair or construct a project, but to consider the overall effects as well as the costs." 

Congratulations to Energy Star Rating Recipients!

City of Bellevue, WA

In the Summer/Fall 2006 edition of the BOC Bulletin, we highlighted the efforts of BOC grad **Earl Meldahl** and his Civic Services Department, Facilities Division team in the remodeling of and addition to an existing building to create an energy-efficient new city hall for the City of Bellevue in Washington. The result: In November of 2008, the City of Bellevue was awarded the ENERGY STAR® label of energy efficiency, an award which was a goal throughout the project.

The following is an excerpt from the presentation to the mayor and city council that puts the achievement in its impressive perspective.



Buildings which qualify are within the nation's top 25% in terms of energy performance and maintain an indoor environment that conforms to industry standards. A total of 2,200 office buildings have received this award nationwide since the program was started in 1992. ENERGY STAR® is the mark of superior energy performance and identifies our city hall as a highly efficient building. It is one of only seven city halls in the nation and the only city hall of 281 in Washington state that has qualified. Our city hall achieved a rating of 91% which places the facility in the top echelon of high performance buildings nationwide. We were able to achieve this rating because of a green building design and retrofitting with energy efficient equipment and systems. Design cannot do it all; therefore, facilities staff have been proactive in managing building operations and city employees have embraced the ongoing conservation efforts.

By applying for and obtaining the ENERGY STAR®, the City of Bellevue has shown it can operate high performance administrative facilities efficiently and effectively while maintaining the comfort and productivity of the occupants.

Congratulations to the City of Bellevue for their fantastic achievement in energy efficiency!

Mason-Ehrman Building, Portland, OR

In Portland, Oregon, Facilities Supervisor **Bruce Gier**, a BOC graduate of both levels I and II, spent over a year readying the Mason-Ehrman building for ENERGY STAR® recognition and was rewarded with the ENERGY STAR® label this past May.

Built in 1909, the Mason-Ehrman Building, owned by the Kalberer Corporation and operated by the Portland Development Commission, is a brick-and-mortar, post-and-beam construction and is on the National Register of Historic Places. Previously used for light manufacturing and warehousing, in 2000 there was a major overhaul of the structure that basically gutted the interior of the building, effectively bringing it into the 21st century while leaving the charm of its exterior intact. The ENERGY STAR®-labeled building is now a class three, seven story office building in Portland's downtown district.

Application for ENERGY STAR® labeling is a once a year proposal. Gier notes that the application for the designation has to be quite detailed and takes a fair amount of preparation.

State-of-the-art equipment in the newly renovated building made the task easier in that the tools were already there but, while the building finished its renovation in 2000, it was not fully occupied until 2004. The floors are differentiated operationally and each has multiple zones. The complex DDC building controls for HVAC and airflow systems have to be properly calibrated to achieve optimum performance. Setpoints need constant monitoring for accuracy in terms of occupancy and seasonal changes, and equipment maintenance. For historic registry purposes, the original 1909 wood, double-hung sash windows had to stay, which required extensive weather-stripping.

Gier credits his BOC training with putting him in an excellent position to facilitate that preparation. "BOC education – levels I and II – are worth their weight in gold. They set you forward in a motion that allows you to accommodate and understand almost anything in facilities operation," he states.

Recognition as both historic and as energy efficient – yes, the two can go hand-in-hand, as exemplified by the Mason-Ehrman Building. 

Minimizing the Total Costs of Ownership

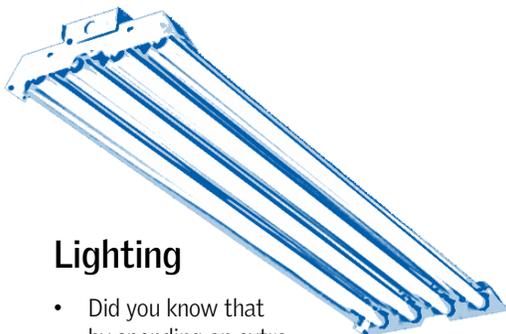
By Don Rainey

Air Filters

Many of us think of air filters as having initial costs and maintenance costs but we don't think much about the energy costs. Many facilities, for \$2, use a 2' x 2' x 2" thick MERV 8 pleated filter that costs up to \$108 to use for a year in a large 24/7 Northwest building. A \$6 2' x 2' x 4" thick MERV 8 extended surface pleated filter will cost \$95/year to use in the same location. Many air handling units can be easily retrofitted to use 4" thick filters where 2" filters are presently used. If you can't install 4" thick filters, at least install "extended surface" 2" thick filters. The cost of using "Final Filters" in a hospital can vary even more dramatically. We were recently able to save one hospital \$67/year/filter by selecting a different final filter. We used the BetterBricks online tool to help compare different air filters and found that hospital can save over \$20,000/year by using different air filters.



Warning – no energy will be saved if fans are not capacity controlled (inlet vanes, VFDs, etc.).

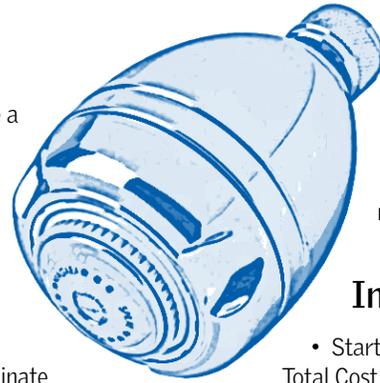


Lighting

- Did you know that by spending an extra 25 cents on a 4' long T8 lamp, it will last 30,000 hours instead of 20,000? You can even purchase a 40,000 hour lamp. Invest perhaps \$3 more on a "super T8 ballast" and save more than \$20 in energy during the life of the ballast.
- LEDs are becoming cost effective in replacing incandescent lamps.

Water

- If a shower is used twice a day, converting to a 1.5 GPM showerhead can pay for itself in less than 6 months.
- Using a \$6 laminar water flow restrictor in faucets instead of a \$2 aerator will virtually eliminate periodic cleaning and replacement.
- Toilets are now available at 1.28 gallons per flush and they work better than many of the "low flow" predecessors. Reliable urinals are now available at 1 pint per flush. Your local water utility may have rebates to help with the cost of replacement.
- There are many low/no cost ways to save water (and energy) in commercial kitchens, hotels, production facilities and hospitals. Your water utility may have programs to help you identify conservation opportunities and even help fund the improvements.



device at higher speed. Many people think this wears out equipment more rapidly but it actually extends equipment life. This is a common opportunity for hospitals.

In Conclusion

- Start thinking about reducing your Total Cost of Ownership (this means all associated costs, such as purchase, maintenance and operational) and review the maintenance materials and practices you use on a regular basis.
- Require that your vendors keep you informed about better products to use. Check with other vendors on a regular basis. Lighting and air filters keep getting better.
- You can be virtually certain that the maintenance materials and operational criteria you inherited with the building are dated and do not minimize the Total Costs of Ownership.
- Enhancing your Operation & Maintenance practices is a cultural change. Try out some of the above suggestions to get yourself started and prove the benefits. Then keep striving to improve O&M practices rather than maintaining the building the way it was originally designed.

HVAC Controls

These improvements may be easy to do but scary for the operators. You'll probably want the assistance of an optimization specialist and the payback can be remarkably quick.

- Reset temperature and pressure setpoints to the minimum needed at the time (often based on outside air temperature). Operators may raise setpoints to compensate for blocked flow and duct leaks but this solution leads to higher energy use (and costs). It's best to fix the real problems and then lower the setpoints.
- Run two or more redundant and parallel variable speed devices (fans, pumps, etc.) at lower equal speed rather than one



Author Don Rainey, of Conservation Catalysts, has been focusing on conservation for over 25 years. He provides consulting services to the Northwest Energy Efficiency Alliance (Better Bricks), Seattle Public Utilities, electric utilities, several consulting firms and works directly with hospitals, municipalities and universities. don@conservationcatalysts.com or 206-618-2750 

Call for Feedback and Projects!

Our publication aims to highlight new technologies, relate success stories of graduates and get the word out about new ideas in the facilities management industry. We are open to suggestions: What would you, as readers, like to hear about?

All readers are encouraged to submit their thoughts on content they would like to see, technologies that spark their interest on which they'd like more information, or their own personnel successes as energy-efficient facilities personnel.



Please, submit your ideas to email address: news@theBOC.info. We'd love to hear from you.

Check out BOC's Technical Webinar Series!

The BOC web site (www.theBOC.info) offers prerecorded webinars, available for viewing at your convenience. Register and receive a link, with log-in and password information. Successful completion of each webinar and its accompanying quiz earns you 1.5 hours of continuing education credit towards maintaining your BOC certification. Current webinars available include: *The IAQ Top Ten Fixes*, *Lighting Retrofits: A Fresh Approach for 2009*, *Demand Control for Ventilation – Using CO2 Sensors for Ventilation Savings*, and *Using Data Loggers to Improve Building Performance*.

FREE BOC WEBCAST

The next webcast for 2009 is:
Thursday, Sept 10th

8:30AM - 9:30AM (PST)
9:30AM - 10:30AM (MST)
10:30AM - 11:30AM (CST)
11:30AM - 12:30PM (EST)

To sign up go to:
www.theBOC.info



If that date is not convenient, the site also provides a prerecorded informational webcast.

National Conferences & Symposiums 2009-10

Labs 21 2009 Conference

Indianapolis Convention Center
Indianapolis, Indiana
September 22-24, 2009

More info: www.labs21century.gov/conf

The annual three-day international conference has dozens of technical sessions highlighting new and innovative products designed to usher in the next generation of laboratories.

IFMA World Workplace 2009 Conference & Expo

Orange County Convention Center
Orlando, Florida
October 7-9, 2009

More info: www.worldworkplace.org

Plan your attendance at World Workplace more efficiently by researching session topics online by track, knowledge level or session time.

GreenBuild International Conference & Expo

Phoenix, Arizona
November 11-13, 2009

More info: www.greenbuildexpo.org

Over a hundred educational sessions are offered and are also eligible as Continuing Education Units (CEUs).



Phoenix Convention Center.

National Facilities Management & Technology Conference/Expo

The Baltimore Convention Center
Baltimore, MD
March 16-18, 2010

More info: www.nfmt.com

This event also includes the Maintenance Solutions Expo, the GreenTech Conference/Expo and the Safe Building Expo.

BOC Graduate Numbers Continue to Grow!

As BOC expands across the country, the graduates multiply. Graduates from this year and last hail from Idaho to Rhode Island, from Michigan to Kansas, and represent fields from education, government, manufacturing, health care and beyond – just about every sector you can name.

To see a listing of recent BOC graduates, please go to the national web site at www.theBOC.info, go to Graduate Profiles & Case Studies and click on the Recent Graduates PDF.

Find A BOC Training In Your Area

There are currently over six thousand BOC graduates throughout the country and that number will continue to grow because the need for educated facilities operations & maintenance personnel is stronger than ever. BOC training is offered in twenty-one states and that number, too, continues to grow.

BOC Level I Certification

The Level I series comprises 74 hours of training and project work in building systems maintenance. Courses include: Building Systems Overview, HVAC Systems and Controls, Facility Electrical Systems, Indoor Air Quality, Operation & Maintenance Practices for Sustainable Buildings, Efficient Lighting Fundamentals and Energy Conservation Techniques.

BOC Level II Certification

Level II has 61 hours of training and project work in equipment troubleshooting and maintenance. Courses include four core classes and two supplemental classes. The four core classes include: Preventive Maintenance & Troubleshooting Principles, Advanced Electrical Diagnostics, HVAC Troubleshooting & Maintenance, HVAC Controls and Optimization. See the website for supplemental class topics.

To find a Level I or Level II training in your area, please visit the BOC website at www.theBOC.info. On the main page, you will see "BOC® Around the USA" and just underneath that is a link to "FIND training near you." Click on the map and you will find detailed listings of course series available, with dates, locations and information on how to register.

**Training is available from
Maine to California!**

RIDE Taps BOC Training as Eligibility Credential

In Rhode Island, the RI Department of Education is giving reimbursements to schools for eligible energy-efficiency projects. If a district is building a new school or addition and has increased energy savings, the school can receive a 2-4% reimbursement for project costs. In order to claim the funds, the school is required to have a staff member track and log utility consumption data. A requirement for the staff position is a facilities certification and RIDE includes BOC as one of its few qualified training credentials.

Our thanks to RI for recognizing the value of BOC for facilities managers!

BOMA & BetterBricks: Coming Together For Energy Education

The BOC level I classes currently running in Renton, WA and Portland, OR are the result of the successful partnership of BOMA (Building Owners & Managers Association) Seattle, BOMA Portland, BetterBricks and the BOC. The group combined to offer discounted tuitions to area facilities personnel. The response has been outstanding and the series is completely sold out.



BETTERBRICKS

Special thanks to BOMA Seattle President Rod Kauffman and BOMA Portland Executive Director Susan Steward for their enthusiastic support and promotion.

NEEC Receives Authorized Provider Status from IACET for BOC Training!



The Northwest Energy Efficiency Council is proud to announce that it has been approved as an Authorized

Provider by the International Association for Continuing Education and Training (IACET) for its Building Operator Certification (BOC) program. In obtaining this approval, BOC administrator NEEC has demonstrated that it complies with the ANSI/IACET 1-2007 Standard which is widely recognized as a standard of good practice internationally. As a result of their Authorized Provider membership status, NEEC is authorized to offer IACET CEUs for its BOC training, which qualifies under the ANSI/IACET 1-2007 Standard.

Eastside Catholic School Receives 100% Building Operator Certification Award

The Northwest Energy Efficiency Council is pleased to recognize the Facilities Department of Eastside Catholic School in North Bend, Washington, for certifying 100% of their operations staff in the BOC program. Companies awarded this honor are noteworthy for their effectiveness and dedication to achieving greater levels of energy efficiency in their facilities through operator training. Accepting the award for the school is IFMA member, Ken Fox, Director of Facilities.

The Eastside Catholic School graduates are facilities technicians, John Wilmart and David Nicholas. They completed 74 hours of classroom training and five independent facility project assignments in electrical and HVAC systems, energy conservation, operations for sustainable buildings, and indoor air quality to earn the BOC credential.

NEEC is happy to add Eastside Catholic School to its growing list of 100% BOC-certified employers.



EASTSIDE CATHOLIC SCHOOL

MEEA Wins Award for BOC Training Program

This past May, (BOC sponsor MEEA) the Midwest Energy Efficiency Alliance's BOC training program won the 2009 Environmental Initiative Award in Green Building & Development from the Minnesota Environmental Initiative.

The judges chose BOC as the best example of a partnership between organizations that works toward environmental improvement in Minnesota's buildings. In bestowing the award, the organization stated that, "BOC is unique because it achieves measurable energy savings by training individuals who are directly responsible for day-to-day operations. Building operators using the procedures learned in the BOC training can cut electricity use by 15% or more."

We congratulate MEEA for this prestigious and well-earned honor and applaud their continued success in promoting BOC training throughout the six-state region.



BOC Certification Renewal

To maintain BOC certification, graduates must accumulate continuing education (CE) hours each year following a full calendar year after their graduation. Level I renewal requires five CE hours each year and Level II, ten. Hours may be earned as follows:

- **Continued employment in building operations**.....2 hours / year
- **Continuing education in building operations**.....Actual hours of classroom time
- **Energy efficiency projects completed at your facility**Up to 11 hours / year
- **Membership in a building operations membership association**.....1 hour / year
- **Offices held in membership associations**.....2 hours / year
- **Awards received for efficient building operations**2 hours / award
- **BOC Newsletter quiz (see page 11)**.....1 hour / passed quiz
- **Completion of an energy consumption benchmark for the previous 12 month period using ENERGY STAR® Portfolio Manager or alternative energy accounting tool**.....3 hours / year
- **Enroll in a BOC webinar and complete its quiz (see webinar announcement on page 8 for details)**1.5 hours / passed quiz

You will be notified by mail when your certification is up for renewal (anniversary date appears on your wallet card). Once you have received a renewal notice, complete the application form and return it to NEEC. The renewal fee is \$55 for Level I or Level II, or \$85 for a "combo" renewal.

DEADLINE REMINDER: 2009 BOC Grads

The 2010 renewal process will begin in the first week of January 2010. You will be sent an application at that time. The deadline for application submission is **March 31, 2010**, by which time you will need Continuing Education credit to renew your level of certification. See above for details of renewal requirements for both Level I and Level II. [BOC](#)

Strategies, Targets, Solutions

This piece summarizes article on the BetterBricks.com web site entitled "Common Opportunities: The Top Four." Questions for the BOC recertification quiz will be derived from its content. A link to the complete article can be found at the bottom of this page.

The concept of energy efficiency as a goal of facilities management seems like a great idea, but getting down to the nitty-gritty of actually developing, implementing and, above all, maintaining a plan, the goal can feel overwhelming. A good start is to target the problems that occur most frequently but that also have the greatest potential for energy savings. These are the top four:

- **Equipment Scheduling: Running when not needed**
- **Sensor Error: Faulty sensor data means inefficient operation**
- **Simultaneous Heating and Cooling: Systems working against each other**
- **Outside Air Usage: Inefficient outside air usage can affect HVAC and indoor air quality**

The best state-of-the-art equipment is no guarantee of optimum operational results. If equipment and systems are not properly calibrated, monitored for needed changes, and maintained, efficiency is lost. Above are the primary targets for potential energy savings. What is needed to attack these targets: Strategy and tools.

Three key practices get the ball rolling:

- **Developing a Building System Operations Map (BSOM)**
- **Using Energy Use Index (EUI) and Benchmarking**
- **Targeting HVAC Systems and Equipment**

Components of a typical BSOM should include operating data on boilers, chillers, cooling towers, fan systems and occupancy information. These components are used to discover how the current system operates and where there is room for improvement, but also include a listing of already-known, ongoing problems in the facility. This could include spaces that can't maintain temperature settings, under- or over-sized equipment, or higher-than-normal failure rate equipment.

Research for developing the building map is extensive, requiring review of utility bills, as-built drawings, and the sequence of operations, with a target of HVAC systems as the likeliest for savings potential. It also means talking with building occupants and interviewing maintenance staff for their observations on the building's environment. *[A listing of essential information to gather is outlined in the online article.]*

The Energy Use Index (EUI) is a measure of the total energy consumed per square foot of a building. It includes electricity consumption and any other fuels used to operate the building such as natural gas, steam, fuel oil, etc. The EUI allows facility operators to compare the building's energy intensity to other peer buildings as well as buildings across a portfolio, giving the building operator a sense of relative energy use and what potential targets for optimum use could be. *[The online article links to a page of Performance Indicators with tools useful for tracking this data.]*

Targeting HVAC systems is a practical step in that many of the fixes can be no-cost/low-cost options, where simple rescheduling, routine preventative maintenance scheduling, and fixing energy-sapping leaks can have a great impact on energy usage.

Once a map has been made and the areas of data collection have been targeted, it is time to get some information. The first target is **energy scheduling**. It is often suggested that one of the best ways of finding out how energy is wasted is to walk through the facility when it is not in use. Some things will be obvious – perhaps lights or printers that should be off – but some may serve a purpose, such as AC running in a server room. This needs to be determined and noted in the building map. Lighting, plug and process loads, fan systems, chillers, boilers and pumps should all be assessed. *[A symptom list of likely waste usage can be accessed by link in the online article.]*

Sensor error is usually caused by uncalibrated sensors, but can also be due to misplaced or failed sensors, or even a sensor initially set up incorrectly. Critical control sensors can affect operations far more drastically than local or space sensors because they may not yield occupancy discomfort and thus there are no complaints. The solution is simple: Regular calibration – get it on a schedule. There are so many varieties of sensors that it is important to know the specifications. Some require periodic replacement while some require recalibration every couple of months. In general, older sensors need more frequent monitoring and calibration, while newer ones can last their lifetime.

Simultaneous heating and cooling happens. It occurs when either air is cooled (mechanically or using outside air economizer) and then heated to provide the correct temperature air to the spaces itself. Many systems inherently require it, such as VAV with reheat or dual duct systems. Sometimes



Is your building eating too much energy?

"reheat" occurs when you have cold air being provided to a space with space heaters or perimeter baseboards. It also happens when air is heated and then cooled to provide the correct temperature air to the space itself. The point is, with the proper control strategy in place, you can minimize energy use. The loss is not just in energy costs, but also includes operational costs and taxing equipment which causes needless wear and tear, thus shortening the life and efficiency of the system components. *[See the online article for a link to Energy Performance Systems for HVAC, which addresses what to look for.]*

And finally, **outside air usage** should be examined. Bringing in outside air is required for proper ventilation and indoor air quality. In hot weather, the intake has to be cooled, in cold weather, warmed. This is costly so, ideally, unless it is a temperate time of year and the air requires no heating or cooling, the minimum outside air intake possible should be the goal, while still meeting occupancy IAQ needs. Here again, proper calibration and maintenance can solve a multitude of problems that may lower efficiency. Dampers could be stuck in one position or sensors have failed. This is a frequently overlooked area because ventilators and economizers for air intake are often on roofs or areas of difficult access. They are likely to be passed over on the maintenance side, with inefficiency being the result.

So the strategy and tools are available, the targets are waiting. Now it's time to find the solutions for your facility.

The full text of this summarized web article, Common Opportunities: The Top Four, can be found at <http://www.betterbricks.com/DetailPage.aspx?ID=486>. The BetterBricks site primarily serves the Pacific Northwest and while some of the information may be specific to that region, the BOC and your local utilities have links that can direct you to similar information and services in your own region. 

Strategies, Targets, Solutions Quiz

Here is an easy way to earn one continuing education hour towards annual BOC re-certification. Read the article on The Top Four Energy Saving Strategies that begins on page 10 and take this short quiz based on that material. As is noted in the article, some of the material needed to answer the questions may be on the web site and not within the newsletter version of the article. Mail or fax your answers to our offices, with your certification renewal application, as directed at the end of the quiz.

With a passing grade, we will apply one credit hour to your record.

CHECK YOUR ANSWER(S) AS APPLICABLE:

- 1) Which of the following are causes of an elevated mixed-air temperature (MAT) problem that causes the cooling system to use more energy?
 - a. Setpoints for supply-air temperature are overridden.
 - b. Damper or actuator has failed.
 - c. Return-air fan is not on or not operation at expected conditions.
 - d. a & c.
 - e. All of the above.

- 2) MAT (mixed-air temperature) tracks RAT (return-air temperature) closely when OSAT (outside-air temperature) is warmer.
 - a. TRUE b. FALSE

- 3) Your building's boiler starts and stops frequently. Possibilities are:
 - a. The flow switch is malfunctioning.
 - b. The water-temperature high-limit is set too low.
 - c. Deadband between on/off is too wide.
 - d. A & B.
 - e. All of the above.

- 4) What is the first step in getting a plan for building energy efficiency together?
 - a. Reading your energy bill.
 - b. Developing a building system operations map.
 - c. Performing an assessment of possible target areas for energy efficiency improvement.
 - d. Polling building occupants on their satisfaction.

- 5) Which of the following scheduling issue is false?
 - a. Increased usage (operating hours) mean that HVAC system components (chillers, fan coils, evaporator coils, etc.) require less cleaning.
 - b. Staging equipment to reduce demand charges can, at times, increase energy costs.
 - c. Energy use increases proportionally to operating hours for most non-modulating equipment (e.g. lights).
 - d. Fan systems with ventilation or exhaust usually use more energy at night because the make-up air is colder.

- 6) Which of the following are problem issues for ventilation systems (check all that apply)?
 - a. Minimum ventilation rate is fixed.
 - b. Temperature sensors used by an economizer are out of calibration.

- c. Individual user office fans are left on at night when there is no occupancy.
- d. A CO2 sensor is improperly located.

7) Which one of the following is not a target factor in a VAV (variable air volume) tune-up?

- a. Economizer dampers.
- b. Calibration of temperature sensor for return air.
- c. Calibration of temperature sensor for outside air.
- d. Individual room temperature settings.

8) The Energy Use Index (EUI) is a measure of the total energy consumed per square foot of a building. It includes electricity consumption and any other fuels used to operate the building such as natural gas, steam, fuel oil, etc.

- a. TRUE b. FALSE

9) Energy benchmarking allows a facilities manager to see how the energy usage in his/her building compares with similar-use facilities throughout the country.

- a. TRUE b. FALSE

10) Simultaneous heating and cooling is always a waste because the systems work against each other.

- a. TRUE b. FALSE

END OF QUIZ

We include a quiz like this in each of our bi-annual newsletters. To submit your completed quiz for re-certification credit (1 credit per quiz passed), please complete the following and either fax it to 206-292-4125, or mail it to: **BOC Quiz, NEEC Office, 605 First Avenue, Suite 401, Seattle, WA 98104. Please remember to send it with your certification renewal application and NOT as a separate item.**

Your Name: _____

Title: _____

Employer: _____

Address: _____

City: _____

State: _____ Zip: _____

Phone: _____

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Building Operator Certification

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