BOC Bulletin

A Newsletter for BOC Graduates, Enrollees and their Employers

WINTER/SPRING 2014

Targeting Programs for Training Our Returning Veterans

Although there has been some improvement in the U.S. economy, unemployment in many areas of the country still remains at high levels, particularly so for post-9/11 veterans, for whom the transition to civilian life can be challenging. According to the Council of Economic Advisors, in October 2013 the unemployment rate for all veterans was at 6.9 percent. For post- 9/11 veterans though, that figure stood at around 10 percent.

In 2012, BOC Partner MEEA (Midwest Energy Efficiency Alliance) implemented a customized BOC course designed to provide returning veterans with skill enhancement in energy efficient building operations (see page three for more information).

While not all of the skills learned in the military are easily translated to the workforce, many are or are of types that can be readily adapted to career paths in facilities management. Considering that 65 percent of people currently in facilities management are over 50 years old, targeting a younger demographic of returning veterans with the appropriate adaptable skills is a win-win situation: Veterans need good jobs and the industry needs more young building operators.

The program was a success and on the heels of that, the national BOC program began to develop a template program that could facilitate implementation in different parts the country. The result is the BOC Workforce Program for Veterans, which just this past December graduated its first class of veterans in San Diego, California with the sponsorship of San Diego Gas and Electric (SDG&E).

Getting a Team

The BOC program's manager of training, Olga Gazman, of the Northwest Energy Efficiency Council (NEEC), began by determining the components needed: facility manager mentors, a sponsor, a workforce development administrator (WDA) to seek out possible participants, and an area liaison to coordinate participants with area mentors.

The first step was to contact BOC graduates in the San Diego area who would be willing to act as volunteer mentors for the returning veteran trainees, providing them access to their building for completion of project assignments and promoting networking opportunities in the facilities management profession. From those that Gazman reached out to, two appeared to be good matches with the requisite experience and the availability of their building for BOC project use: Building Service Engineer Supervisor Gerard McQuade at California State University San Marcos, and Building Engineer Jeff Feist at CB Richard Ellis.

> *"The GBC course gives hands-on construction skill by working with non-profits such as Habitat for Humanity. BOC training broadens the scope of those skills by giving them the tools for effectively managing existing buildings. It's a perfect match."*
>
> – Santiago Leon

For a WDA, Gazman contacted Enemias Rocha, Local Veterans Employment Representative at the Employment Development Department (EDD) in San Diego. He, in turn, enlisted Santiago Leon, Veterans Advisor and Recruiter at the local Center for Employment Training (CET).

Blair Seibert, Principal of Verde Concepts, Inc. came on board as the BOC course manager and mentor liaison. SDG&E signed on to sponsor the event and the pieces were in place.

Implementation

To foster success for both the pilot program and the participants, a screening process, first through the EDD San Diego office and then further screening by BOC, helped to determine which candidates met the eligibility criteria, such as whether or not a candidate's military duties included transferable skills.

A source for recruitment of qualified trainees was the Green Building Construction Skills program at the Center for Employment Training. "The GBC course gives hands-on construction skills by working with non-profits such as Habitat for Humanity," explains CET's Leon. "BOC training broadens the scope of those skills by giving them the tools for

*(Continued on page 2 see **TRAINING VETERANS**.)*

IN THIS ISSUE

TRAINING VETERANS *(Continued from page 1)*

SGD&E's Jeffrey Liu at the podium, addressing veterans at the pre-training session.

effectively managing existing buildings. It's a perfect match."

Once the target of 15 veteran trainees was reached, program logistics were put in place such as dates, location, instructors, and placing participants with their mentors.

> ***"SDG&E stepped right up to the plate with transportation funding above and beyond their commitment to cover the tuition of the participants."***
>
> *– Blair Seibert*

In addition to the usual BOC training, there was a two-hour "pre-training" where the program was thoroughly explained so that participants knew what they were getting into and what was expected of them. Wayne Harris, President of the San Diego Building Engineers Association (www.sdbea.org) was also in attendance to give input. Harris provided the veteran trainees with a free one-year membership to SDBEA upon completion of the program.

One thing they had not anticipated, however, was that most of the veteran participants did not have cars. It fell to Seibert as mentor liaison to coordinate transportation not only for the training sessions, but also for trips to the mentor field sites so the project work could be completed.

"SDG&E stepped right up to the plate with transportation funding above and beyond their commitment to cover the tuition of the participants," notes Seibert.

CET's Leon says that, "At CET, our training is very hands-on, but BOC is a combination, with day-long classroom sessions that some of the vets hadn't experienced since they got out of school. Seibert really helped them with that transition."

After Training

With the BOC course wrapping up in December 2013, each graduate will have the assistance of both EDD and CET in finding jobs, resume preparation, continued mentoring among a host of other supportive services. EDD's Rocha is optimistic. "The level of interest, at least in this area, is high because the economy is starting to pick up and more companies are hiring again."

NEEC is committed to staying in communication with the participants and tracking their professional progress.

Reactions

Mentor Gerard McQuade of CSU San Marcos remarks that, "I did notice how quickly the veterans that visited our campus were able to pick up on all the different types of systems we have just by taking a few of the BOC classes. BOC I is a good first step to attaining the knowledge and some skills needed to meet the minimum requirements to become a building engineer."

Jeff Feist, mentor from CS Richard Ellis, says that, "These were some very enthusiastic men who were willing to learn and take direction. For me, it was quite rewarding being asked to mentor these men and I'm glad I was able to help."

CET's Santiago Leon believes that the mentors were the "shining stars" and a very big part of the success of the veterans he works with. "They were veterans themselves and could just connect with my guys."

Newly BOC certified, veteran Kevin Bernard Brown notes that, "While I had previous construction building experience, I am so excited about my new skills and knowledge in lighting, HVAC, benchmarking, and planning. I know this will aid me in my job search and my future employment."

Now BOC-certified veteran Derrick D. Kado says that he was fortunate to have participated in the program." I also want to stress that the instructors were professional and very knowledgeable on their topic and took the time to make sure that everyone had a clear understanding of what was being covered in any particular class."

As for program sponsor SDG&E, Christina Rathbun of the Community and Technology Relations Department had this to say: "SDG&E believes strongly in supporting veterans through the Workforce Education & Training at the Energy Innovation Center (EIC). The BOC Workforce Program for Veterans leveraged an existing certification program with job placement partners to help unemployed veterans find jobs in the field of building operation and facility management – an example of how SDG&E hopes to work with our partners to provide more opportunities for veterans to gain employment in the energy industry. Olga Gazman was essential in establishing partnerships with the Employment Development Department (EDD) and the Center for Employment Training (CET). It's through the collaborative efforts with these partners that we were able to recruit the right candidates for the pilot program."

Participants in all roles of the BOC Workforce Program for Veterans seem to have had a very positive experience. With an initial blueprint in

David Patton, Enemias Rocha, and Joe Muniz from the Employment Development Department outside the SDG&E training location

place, the next step is to refine it further to be able to anticipate unforeseen issues, such as transportation, that might arise.

It Has to Come From Somewhere

In an interview during his recent book tour, Robert Gates, former Secretary of Defense during both the Bush and the Obama administrations, expressed his frustration with the way returning veterans have been treated by Veterans Affairs and how micro-managed the federal agency is by a stalemated Congress.

While Gates is discouraged by the federal government's inability to take care of its veterans, he did find encouragement in reaction of the private sector and American society in general, noting that a lot of companies are stepping up to actively hire vets, and that various volunteers and organizations (such as state agencies and non-profits, as we see here) are also aiding the cause.

It has to come from somewhere because veterans deserve it.

Employers seeking to hire veterans can call EDD's Enemias Rocha (619-628-0341) or CET's Santiago Leon (619-527-4895)

Collaboration Yields Results

The BOC Workforce Program for Veterans in San Diego was not the first time BOC training had been offered to veterans. At the June 2012 Clinton Global Initiative (CGI) America Conference in New York, the program was created as part of a Commitment to Action initiative to facilitate the hiring of 500,000 veterans and military spouses. The first training session started later that year in Springfield, Illinois, with another following in January 2013 in Glen Ellyn.

Hector Ayala, 20 year Marine Corp veteran and now a first-line supervisor with ComEd. Photo Courtesy of Chicago Tribune.

The Midwest Energy Efficiency Alliance (MEEA), a long-time BOC partner, took the lead in a partnership with the Illinois Department of Commerce and Economic Opportunity (DCEO), the Illinois Department of Veterans Affairs, and numerous area organizations to develop, promote, and implement the BOC Veterans Pilot Program.

"MEEA brought the veterans workforce development program to Illinois because it was an ideal win-win. We train returning veterans for jobs at home and those jobs will save Illinois businesses energy and money," said Jay Wrobel, former Executive Director of MEEA.

The Illinois BOC workforce pilot program was free for qualified veterans and sponsored by DCEO's State Energy Office. A full list of project partners can be accessed at www.boccentral.org.

The MEEA-led program used the mentoring concept BOC had used previously in its efforts to bring BOC training to the unemployed or underemployed. This gave the participants a not only a physical facility with which to complete their class assignments, but also an industry mentor from whom they could learn the ins and outs of facilities management first hand.

Hector Ayala, BOC certified upon completing the series at Glen Ellyn, had been a 20-year Marine Corps veteran and served as a maintenance supervisor in Iraq, Afghanistan, and Korea. Upon his completion in May, ComEd offered him a position as a first-line supervisor.

MEEA's press release following the second training series followed up with program participant Alex Dawson who, during his service with the Air Force, had been an aircraft electrician. Dawson remarked, "My job on active duty gave me extensive troubleshooting experience. The BOC program helped to close the gap between that and equipment specific to the field."

While Dawson has had job offers since the training, he has not been employed in the field. But that doesn't mean he won't be in the future. He says now that, "the energy and building sciences have peaked my interest so much, I am pursuing higher education in the field. I have already received my EPA 608 certification and a basic vocational in HVAC certifications for working with refrigerants."

Dawson is transferring for his first semester at Northern Illinois University to pursue a bachelors degree in energy & environmental systems technology though their College of Engineering and Engineering Technology. His promises to an exciting career in energy efficiency!

According to MEEA's Program Associate Fredell Campbell, there are four series scheduled in Illinois for 2014, three Level I and a Level II. "Now that we have exited the pilot phase of the program, 2014 will open all Illinois series to military veterans with tuition assistance for a limited amount of trainees. Our goal is to make an impact for the program by having military veterans throughout the state feel welcome to engage in this available resource in the green jobs field throughout the state," asserts Campbell.

BOC Grads Making a Difference

Sustainable Construction Needs Sustainable O&M

Randy McWiliams has been in facilities management since 2002. He first heard of the BOC program while working at The Old Globe Theater in San Diego. "I wanted to take the classes because I was heavily involved in energy efficiency projects and was looking for more information," says McWilliams, noting that he has since sent three other employees to the training and plans to send two more this year.

In late 2012, McWilliams took on the position of facilities manager for a major sustainable building construction at San Diego State University: The Aztec Student Union. The 206,000 square foot facility contains anything students could possibly need: meeting rooms, lounges, Wi-fi throughout indoor and outdoor spaces, dining and retail areas, a fitness center, administrative offices, and other amenities.

Designed with obtaining LEED BD&C (Building Design & Construction) Platinum certification in mind, the building's "mission revival" architecture uses the year-round temperate climate to every possible advantage, with outdoor program areas and courtyards, as well as building design elements to promote the facility's energy efficiency. McWilliams details the various features:

- 130 Kw of photovoltaic solar panels, estimated to save about 40% of total building energy use
- 26,000 square feet of radiant flooring for heating and cooling of offices and dining areas
- rain water collection tanks with capacity of 150,000 gallons for water reuse and to mitigate storm water run-off
- high SRI (solar reflective index) roofing
- a 600 square foot vegetated roof
- a BAS management system with extensive sub-metering for individual spaces measuring electric, water, and gas use
- energy dashboards to make users aware of real-time energy use
- a 60,000 CFM main air handler using VFDs with fan banks to reduce energy use.

McWilliams also notes that 95% of the wood products in the building are FSC (forest sustainability conference) certified and that using fly ash (a by-product of coal burning) concrete throughout the building keeps the by-product out of landfills. Recycled glass countertops were also used in the many dining areas. The service kitchen has a self-cleaning exhaust hood, with an energy-saving variable speed drive.

The café/dining area pictured uses reclaimed wood and recycled glass counters.

The building design also incorporates extensive natural daylighting, as well as operable windows, also in tune with the BAS system, which can sense when someone has opened a window and adjust heating/cooling and ventilation accordingly.

SDSU student-approved fees financed the $104 million project. "The campus also has its own co-gen plant so we make our own electricity," states McWilliams. Although not an electrical customer of the local utility, he indicated that San Diego Gas & Electric had provided incentives for some of the energy-efficient mechanical equipment to aid in the construction.

McWilliams, who finished both BOC levels I and II, is also LEED AP O&M certified and says that, "We expect to get LEED Platinum for BD&C in March of 2014, and will apply for LEED Platinum O&M after our performance period is complete. An interesting part of the project was learning the differences between the LEED rating systems for BD&C and O&M and, of course, understanding how the sustainable elements need to work effectively in a multi-use building."

"The BOC classes that were very helpful for this project were the HVAC controls, electrical distribution, and water efficiency classes," notes McWilliams. It is one thing to have the bells and whistles of an extensive automated building system, but any BOC grad knows that it still has to be constantly monitored and tweaked.

McWilliams took the position just as the foundation and structural steel work was started. The Aztec Student Union had its unofficial opening on January 22 of this year, with an official ribbon cutting ceremony to come in March. It has been an exciting year for McWilliams and for the school.

Among their advantages, vegetated roofs provide insulation and air quality improvement.

Keeping Up With the Big Apple's PlaNYC

Stephen O'Shea started as a mechanic in facilities management almost 25 years ago and has been in the industry ever since, focusing on operations and maintenance in schools throughout NYC. With his expertise and experience, he is now the **Borough Maintenance Planner** in Queens for the **New York City Department of Education** and has 320 schools under his direction, running anywhere from 30,000 to 150,000 square feet in size.

O'Shea first heard about BOC from a memo he received from the DCAS (Department of Citywide Administrative Services) human resources department stating that the training was going to be offered in the area for the first time by the City University of New York (CUNY) Building Performance Lab. He was in that first BOC Level I class in 2009 and later completed Level II.

> *"I'm very proud to be able to say I'm BOC I and II certified because it's a nationally recognized credential and people like that ... I have staff asking me about it all the time and we definitely encourage them to participate."*
>
> – *Stephen O'Shea*

The timing was excellent. In a previous issue, we highlighted New York City's green initiative, PlaNYC, which was announced in 2007. The plan dedicated significant funds to reducing the city's carbon footprint and led by example, committing to reduce greenhouse gas emissions in city-owned buildings by 30 percent by 2017.

This included the city's 1,100+ school buildings.

Because the goal is energy conservation, while there are incentives that the local utilities can and do offer to the city, the O&M staffers do not really have much to do with the cost side of thing or the ROI. They concentrate instead on how they can conserve.

Steven O'Shea
Maintenance Planner

"We have fairly specific mandates we have to meet, for example the schools' facilities boiler systems are being converted initially to #4 fuel oil from #6 by a certain date, and then ultimately we will use #2 oil. The changes are all made with the goal of reducing energy consumption and producing a cleaner, greener environment," explains O'Shea.

With responsibility for 320 schools, O'Shea has directed many projects. One ongoing project is, of course, lighting retrofits, which are by far one of the quickest ways to achieve energy savings. The project began about two year ago and 15 schools have had lighting retrofits, achieving an approximate energy savings of 25%. The retrofits will gradually be done as required throughout the five boroughs' schools.

Other "low-hanging fruit" projects have been undertaken such as motion sensors in hallways, classroom, and bathrooms. Also replacement of older motor equipment in machine rooms with newer, more efficient units. It is a constant progression. O'Shea explains that, "We have to be guided by our long-term goals and BOC training helps us to know how to evaluate the options for a better tomorrow for all New Yorkers.

"I'm very proud to say I'm BOC I and II certified because it's a nationally recognized credential and industries look for this in today's world," says O'Shea. "I have staff inquiring about classes all the time and we definitely encourage them to participate."

New York City has also sent about 1,000 other school facilities personnel through BOC training over the past few years. So, like O'Shea, many K-12 building operators are keeping up with the plan!

Using BOC Principles to See the Stars

Mark Elphick, facility manager at the **LCOGT Facility-Faulkes Telescope North** on the island of Maui, has always loved telescopes and had worked building them in his home country of Australia. About eight years ago, the company he worked for asked him to be part of a team building a telescope in Hawaii.

Elphick had also done some work in small business and residential energy management so he had experience in that field as well. His interest in energy efficiency led him to BOC when the Maui Community College did an outreach to the community for the first-ever BOC training in Hawaii in 2009. "I was fairly new to the island and BOC gave me the opportunity to meet interesting people in the field, many of whom I've kept in close touch with," says Elphick.

Interior base of the 2-meter telescope at Mount Haleakala Maui.

He was offered the position at the Faulkes Telescope North. With his suitable combination of skills and interests, he jumped at the chance.

The observatory is part of the Las Cumbres Observatory Global Telescope Network (LCOGT.net), a relatively new organization with a mission to construct a worldwide network of telescopes. Mount Haleakala houses one of two 2-meter telescopes (the other is in Siding Spring, Australia) that are the part of the global array of telescopes that, at this stage, also includes nine 1-meter telescopes. In the not too distant future this array will blossom to include the two 2-meter, 17 1-meter, and 15-20 40-centimeter telescopes. Researchers can "rent" time to use the telescopes but also, educational institutions, amateur astronomers, and other institutions with science programs can apply for observation time.

The larger telescopes are outfitted for imaging and spectroscopy and thus contain especially sensitive camera equipment that is very susceptible to thermal variations, which can adversely affect image quality. In a way, the telescope is its own worst enemy, using hydraulic oil for cooling and lubrication. The oil is recycled from a scavenge tank beneath the telescope and pumped to a chiller where the oil is cooled and pumped back to the telescope. Although the heated oil beneath the telescope is continually recycled via the chiller, it creates a localized hot spot there. While only a few degrees Celsius higher than the ambient temperature, this heat will rise with every possibility of creating thermals that could cause small disturbances in the air around the telescopes. These disturbances can result in reduced image quality.

*(Continued on page 6 see **BOC GRADS**.)*

National Conferences & Symposiums 2014

National Facilities Management & Technology Conference/Expo
The Baltimore Convention Center
Baltimore, Maryland
March 4-6, 2014
MORE INFO: www.nfmt.com

International Summit on Health Facility Planning, Design & Construction
Orlando, Florida
March 16-19, 2014
MORE INFO: www.ashe.org/PDC/

IFMA Facility Fusion 2014 Conference & Expo
Ottowa, Canada
March 18-19, 2014
MORE INFO: www.ifma.org

National School Plant Management Association Annual Conference
Little Rock, Arkansas
March 29 – April 1, 2014
MORE INFO: www.nspma.org

IFMA Facility Fusion 2014
Ottowa, Canada
March 18-19, 2014

Washington, DC
April 15-17, 2014
MORE INFO: www.infma.org

Association of Energy Engineers (AEE) Conferences & Technology Expos

- **Globalcon 2014**
  Atlantic City, New Jersey
  April 9-10, 2014
- **West Coast Energy Management Congress (EMC)**
  Seattle, Washington
  June 25-26, 2014
- **World Energy Engineering Congress (WEEC)**
  Washington, DC
  October 1-3, 2014
  MORE INFO: www.aeecenter.org/Shows/

American Public Power Association (APPA) National Conference & Public Power Expo
Denver, Colorado
June 13-18, 2014
MORE INFO: www.publicpower.org/National-Conference/

BOMA 2014 International Every Building Conference & Expo
Orlando, Florida
June 22-24, 2014
MORE INFO: www.boma.org

American Society for Healthcare Engineering (ASHE) 51st Annual Conference
Chicago, Illinois
August 3-6, 2014
MORE INFO: www.ashe.org/annual

IFMA World Workplace 2014
New Orleans, Louisiana
September 17-19, 2014
MORE INFO: www.ifma.org/events/

I2SL (formerly Labs21) **2014 Conference**
Orlando, Florida
September 22-24, 2014
MORE INFO: www.i2sl.org

World Energy Engineering Conference 2014
Washington, D.C.
October 1-3, 2014
MORE INFO: www.energycongress.com

Building Operating Management's NFMT Vegas 2014
Las Vegas, Nevada
October 7-8, 2014
MORE INFO: www.nfmt.com/vegas/

GreenBuild International Conference & Expo
New Orleans, Louisiana
October 22-24, 2014
MORE INFO: www.greenbuildexpo.org

BOC GRADS *(Continued from page 5)*

Elphick likens this distortion to a heat rising from a bitumen road that releases heat producing thermal layers and causing mirages during the day.

Instead of using air conditioning to control the environment beneath the telescope, which would also end up being a source of heat, he opted to use large ducts and exhaust fans to drag air adjacent to the telescope into the pit area below it and, via ducting, exhaust it to the exterior of the enclosure. The duct system was a great success. "I did some imaging with an infrared camera before and after the duct and exhaust fan modifications had been made. The thermal layer that had been evident approximately one foot above the floor of the enclosure prior to the venting installation was no longer visible there.

"Mount Haleakala is a wonderful astronomical site and great natural air conditioner," says Elphick. The maximum\minimum temperature range (summer-winter) is approximately 17-0 degrees Celsius, but the daily maximum\minimum range is only about 5-6 degrees. With no air conditioning and the enclosure insulated, they manage to keep the enclosure space a few degrees below the outside ambient temperature during the daytime and therefore, usually only a few degrees above the ambient night time temperature when the enclosure opens at dusk. The telescope and enclosure space only take 30-40 minutes to reach the ambient temperature of the surrounding air. During this period the telescope is observing sky flats, (a sky calibration observation). These observations are not impacted by the minor thermal distortions occurring as the telescope temperature stabilizes.

So the trick was to keep the temperature in the observatory at or close to the outside ambient temperature. "Many of the principles about HVAC and air flow that we used to set up the ducting-exhaust system I learned from BOC," explains Elphick. "We are also in the process of replacing old motors with high performance ones, which will substantially reduce energy consumption and heat produced by the motor. I picked up most of that information from BOC training."

New interface software is also in the offing that will allow the general public to view all telescopes, including the 2-meters, via the internet. Higher quality images produced by the telescope cameras and less energy consumption – clearly a win-win!

Mahalo!

IBOA Now Offering BOC National Certification to Its Members

The International Building Operators Association (IBOA) has partnered with NEEC to offer BOC's nationally recognized training program to its members throughout Idaho, Montana, and Utah.

"BOC is a program that offers significant benefits to IBOA members," says Gary Machen, IBOA board president. "We're excited about the opportunity to work with NEEC to bring a more comprehensive building operator training program to our members."

IBOA is a non-profit membership organization with a history of providing educational opportunities for building operators. IBOA's building operator training program was in need of updating to reflect current technologies and building systems. In looking at alternatives, BOC training emerged as a great option.

Clarence Wieting and co-executive director Selena O'Neal pursued the partnership with NEEC. Wieting notes that while IBOA is a membership-oriented organization, NEEC's focus is on providing full-service building and energy efficiency training programs to its partners. "With this new partnership, IBOA can better serve our members by using NEEC's up-to-date BOC training curriculum, and concentrate our efforts on providing training facilitation, regional representatives, and an annual membership convention, to support a network that our members and BOC graduates rely on," says Wieting.

In 2013, there were four BOC Level I series for IBOA members in Idaho, Montana, and Utah facilitated by the association. "I feel strongly about the level of support I receive from the NEEC office. They keep in close contact to see if there is anything they can do to help promote the training to our members. We have seen new growth in our membership and I believe that the more we get the word out about the training, that trend will continue," states Wieting.

IBOA has several Level I courses scheduled in the area this year. Through the generous support of the regional utilities including Avista, Idaho Power, NorthWestern Energy, and Rocky Mountain Power, customers of those utilities may be eligible to receive discounts. Also, watch for upcoming announcements of IBOA's Tech Talks to be held throughout the region. Tech Talks are brief, one- or two-hour informational sessions on topics of interest to building owners and operators, and may help BOC graduates earn valuable continuing education credits.

IBOA will hold its annual convention in Boise, Idaho this summer on June 12-13th. The annual convention is really the hallmark of IBOA as a membership organization. It brings together a mix of building operators and facility managers from all sectors and provides them an excellent opportunity to network with peers they might not otherwise meet. Registration is open to all, with discounted fees for IBOA members.

For more information about IBOA and their BOC training dates, visit the websites at **www.intlboa.org** and **www.theBOC.info** respectively.

NEEC Joins USDOE's Effort to Improve Workforce Preparedness in O&M

NEEC has accepted an invitation from the U.S. Department of Energy (DOE) to join an effort to improve building performance through a better-prepared workforce. The goal is to advance the skill sets of engineers and other professionals involved in building design, operation, and commissioning.

Under DOE's leadership, a Board of Advisors has been created for the Commercial Workforce Credentialing Council (CWCC). Led by the National Institute of Building Sciences (NIBS) with the participation of NEEC and other credentialing and professional development organizations, this board will work to establish a set of voluntary national guidelines to improve the quality and consistency of commercial building workforce credentials.

The Better Buildings Workforce Guidelines are expected to reduce the confusion and uncertainty around workforce credentialing, lower costs, and support higher quality credentials, better trained workers, and better performing buildings.

Initially, the guidelines will address commercial building workforce training and certification programs for five key energy-related jobs: energy auditor, commissioning professional, building/operations professional, facility manager, and energy manager. They will define an industry-validated Job Task Analysis (JTA) for each job title, as well as certification schemes, blueprints, and learning objectives for training programs.

NEEC's Building Operator Certification program is a part of this initial development.

Once implemented, industry certification programs must then receive accreditation from the American National Standards Institute (ANSI) in order to be recognized by DOE as having met voluntary guidelines for the Better Buildings Workforce. This accreditation provides independent verification that the certifications are developed, maintained, and administered according to the highest standards of the testing industry. NEEC has started the process of seeking ANSI accreditation in anticipation of this requirement.

> *"Participating in the development of the guidelines gives us a voice in establishing our industry's workforce skill standards to ensure that quality services are provided by professionals with recognized certifications. This increases consumer confidence in the service provided and ultimately ensures the quality of our future building stock."*
>
> – Stan Price

"NEEC's involvement in this process is very important," said Stan Price, NEEC's Executive Director. "Participating in the development of the guidelines gives us a voice in establishing our industry's workforce skill standards to ensure that quality services are provided by professionals with recognized certifications. This increases consumer confidence in the service provided and ultimately ensures the quality of our future building stock."

NEEC representatives attended an initial workshop that brought together industry stakeholders. There, they learned the purpose of the CWCC, discussed high-level questions regarding industry issues, and provided input into the composition of the subject matter expert committees. Said Price, "NEEC is strongly encouraging BOC-credentialed operators to participate in the process by sharing their perspective on workforce needs in the commercial building operations industry."

Solid State Lighting (SSL): LED Basics and Effective Uses

Our technical article is from the US Department of Energy's EERE (Energy Efficiency and Renewable Energy) buildings section website. This series of three pieces details exactly what LED lighting is, the most effective current uses, and the outlook for LEDs as an efficient lighting option, from both esthetic and economic considerations.

The first part of each piece is presented here, with a link to the full article given at the end of each section. As usual, to earn continuing education credit towards your annual BOC certification maintenance, after reading the articles, you can go to the BOC website (theBOC.info) and take a short quiz based on the material. A passing grade gives you one hour of credit toward your maintenance.

PART 1: LED Basics

Unlike incandescent and fluorescent lamps, LEDs are not inherently white light sources. Instead, LEDs emit nearly monochromatic light, making them highly efficient for colored light applications such as traffic lights and exit signs. However, to be used as a general light source, white light is needed. White light can be achieved with LEDs in three ways:

- Phosphor conversion, in which a phosphor is used on or near the LED to convert the colored light to white light;
- RGB systems, in which light from multiple monochromatic LEDs (red, green, and blue) is mixed, resulting in white light; and
- A hybrid method, which uses both phosphor-converted and monochromatic LEDs.

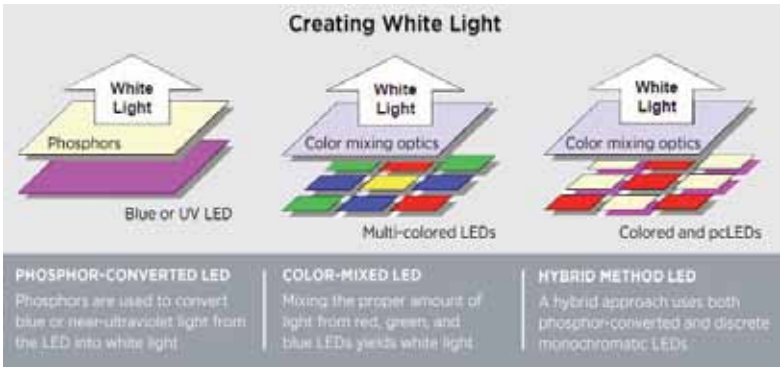
The potential of LED technology to produce high-quality white light with unprecedented energy efficiency is the impetus for the intense level of research and development currently supported by the U.S. Department of Energy.

How is LED lighting different from other energy-efficient lighting technologies?

LEDs offer the potential for cutting general lighting energy use nearly in half by 2030, saving energy dollars and carbon emissions in the process. Their unique characteristics – including compact size, long life and ease of maintenance, resistance to breakage and vibration, good performance in cold temperatures, lack of infrared or ultraviolet emissions, and instant-on performance – are beneficial in many lighting applications. The ability to be dimmed and to provide color control are other benefits of LED lights.

One of the defining features of LEDs is that they emit light in a specific direction. Since directional lighting reduces the need for reflectors and diffusers that can trap light, well-designed LED fixtures can deliver light efficiently to the intended location. In contrast, fluorescent and "bulb" shaped incandescent lamps emit light in all directions; much of the light produced by the lamp is lost within the fixture, reabsorbed by the lamp, or escapes from the fixture in a direction that is not useful for the intended application. For many fixture types, including recessed downlights, troffers, and under-cabinet fixtures, it is not uncommon for 40 to 50% of the total light output of fluorescent and incandescent lamps to be lost before it exits the fixture.

(Please complete this article at: http://www1.eere.energy.gov/buildings/ssl/printable_versions/sslbasics_ledbasics.html)



The number of white light LED products available on the market continues to grow, with new generations of devices becoming available about every four to six months. Some of these products perform very well, but their quality and energy efficiency still vary widely. New standards, test procedures, and ENERGY STAR® criteria have been released – with more in development – that will enable buyers to make informed decisions when evaluating LED lighting.

PART 2: Using LEDs

With their unique design and performance characteristics – such as directional light emission, compact profile, superior optical control, energy efficiency, breakage resistance, reduced maintenance, and long life – LEDs are well suited to a variety of lighting applications. LED products are most competitive in applications where these performance characteristics outweigh their first-cost disadvantages.

In the rapidly changing LED marketplace, "do your homework" remains the watchword. While high-quality LED products are now available for many lighting applications, some manufacturers' claims concerning their LED devices are not borne out in independent laboratory testing by the Department of Energy. Several sources of information are essential to sound buying decisions:

- Standards facilitate "apples to apples" comparisons of LED products as well as evaluation of LEDs versus other lighting options.
- A growing number of LED products are now registered with the LED Lighting Facts® program, which allows buyers to compare lighting options based on objective performance measurements.
- Demonstrations, including those conducted through DOE'S GATEWAY program and Municipal Solid-State Street Lighting Consortium, offer insights on real-world product performance.
- Buyers also are encouraged to review DOE's CALiPER test results for LED products to verify performance levels.

With ongoing research and product development, SSL performance has been increasing steadily. Today, many well-designed SSL products can achieve appropriate light distribution in addition to high efficacy and adequate light output. Market segments where LEDs have made the greatest inroads to date include residential recessed downlights, kitchen

Photo from a GATEWAY demonstration of roadway lighting in Portland, Oregon.

undercabinet lighting, portable desk/task lighting, and outdoor area lighting. On top of their superior efficacy, SSL products can be more controllable than traditional lighting technologies and their lifetimes are not impacted by frequent on-and-off cycling. Adjusting actual usage to better reflect the application's needs – for example, with an occupancy sensor – could result in even greater energy savings.

(Please complete this article at: http://www1.eere.energy.gov/buildings/ssl/printable_versions/sslbasics_usingleds.html)

PART 3: Where Can We Use SSL Today?

Although SSL products overall cannot yet compete on a first-cost basis with their conventional counterparts, they are finding market success in an increasing number of applications, particularly when their directional output, long lifetime, controllability, and other unique features provide comparative benefits and attractive lifecycle returns. Some examples:

Parking lots and structures

Even in CALiPER testing conducted back in late 2009 and early 2010, many LED parking-structure and wallpack fixtures already met or exceeded the light output and efficacy levels of their metal halide, high-pressure sodium, and induction counterparts, while also displaying more uniform light distribution. Evaluated on a lifecycle cost basis, SSL products can be competitive in parking lot applications because of their energy savings, directionality, controllability, aesthetic appeal, and maintenance savings. Nevertheless, selecting LED parking lot

lighting products is a complex process. Specifiers must weigh such factors as installation geometry, local ordinances, and acquisition costs to determine the right solution for each location. Lighting levels also must be carefully considered. Many designers find LED systems can achieve satisfactory lighting levels with significantly fewer lumens than incumbent technology. To learn more, see CALiPER reports and GATEWAY reports on parking garage and parking lot installations, as well as the Better Buildings Alliance High-Efficiency Parking Structure Lighting Specification.

Streetlights

Municipalities across the country are evaluating whether to replace their conventional streetlights with new LED streetlights. The main attractions – energy efficiency, durability, and long life – can add up to significant savings, not to mention cut down on greenhouse gas emissions and add to a city's "green" reputation. But municipalities need to keep several things in mind when considering LED technology. First, there's still a wide range in performance among LED luminaires, and some don't live up to the manufacturers' claims. Second, LED lighting is not a "cut-and-paste" technology that can

simply be substituted for existing lighting without taking its own special requirements into account. Due to differences in lumen output and distribution, it's difficult to find an exact match for existing HID luminaires – and often, those existing HID luminaires are not ideal. In response to the heightened interest in LED street lighting, DOE created the Municipal Solid-State Street Lighting Consortium to share technical information and experiences. See Outdoor Lighting Resources to learn more about using LED streetlights.

Screw-based lamps

Despite a wide range in performance, top-quality LED replacements are emerging for some existing lamp types. The results of a 2010 CALiPER study of LED replacement lamps in retail stores found large disparities between high-and low-performing products, with most of the lamps failing to meet basic performance parameters for use as replacements for incandescent or halogen lamps, and with most retailers carrying at least some very low-quality products. But a follow-up study of LED replacement lamps purchased In November 2011 found that overall performance had improved a great deal, with higher lumen output and efficacy and better color rendering. In addition, there was a significant increase in performance per dollar, although the cost was still higher than incandescent lamps and CFLs.

(Please complete this article at: http://www1.eere.energy.gov/buildings/ssl/printable_versions/where_ssl_today.html)

Check out BOC's Technical Webinar Series!

The BOC web site **(www.theBOC.info)** offers webinars, both live and prerecorded (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 continuing education hours towards maintaining your BOC certification.

LIVE webinars offered in 2014 will be held from 11 AM to noon Pacific Standard Time.

February 12, March 5, April 9, May 15, September 24

Information on fees and registration is available at the BOC web site as above. A link to the webinar details can be accessed on the home page.

New to BOC?

Listen to a FREE Informational BOC Webcast:

BOC Informational Webcasts are for newcomers to the program. Learn about Level I and Level II course topics, schedules and certification requirements in detail. Listen in and find out who benefits by attending BOC training and how graduates are improving their facilities.

Informational webcasts last approximately one hour, starting at :

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

The next live broadcast is scheduled for **February 19, 2014** and more will be scheduled throughout the year (see the BOC website for new dates). Please note that pre-recorded webcasts can be downloaded from the BOC website 24/7.

To sign up go to: **www.theBOC.info**

BOC Certification Maintenance – *New Process!*

As of January 1, 2014, our new process for BOC certification maintenance is in place. The changes?

1) New Expiration Dates

For those BOC certified operators whose certification will expire on March 31, 2014, the maintenance process began in the first week of the year. We sent maintenance application notices via email and US mail to all eligible graduates. The deadline to maintain your certification for 2014 is March 31, 2014. Upon receiving a maintenance notice, complete the application form and return it to your program administrator as instructed. Maintenance fees are $65 for each level.

2) Simplified Application Process & New Level II Requirements

We simplified the application process (both hard copy forms and on-line versions) for the January 2014 maintenance cycle. We set up a HELP Desk with knowledgeable staff to address questions and assist with the maintenance application. We also simplified the Maintaining Certification pages of the BOC website for easier navigation and information gathering. Finally, we revised the maintenance requirements for Level II. Effective January 1, 2014, if your BOC Level II certification is current, your Level I certification will automatically remain current as well. You need only apply to maintain Level II certification. The maintenance points remain the same at ten points per year.

3) More Benefits for BOC Certified Operators

Thanks to all who responded to our survey in July 2013, all current credential-holders receive these additional benefits:

- **DISCOUNTS ON BOC WEBINARS –** *Get a 20% discount on the 2014 Technical Webinar series when you maintain your certification. Use your promotion code to register.*
- **FREE STUFF! –** *Twice a year, current credential-holders may enter a drawing to win merchandise such as diagnostic tools and reference manuals. First drawing for a HOBO® data logger is April 15th.*
  ENTER TO WIN HERE:
  https://www.surveymonkey.com/s/BOCFreeStuff

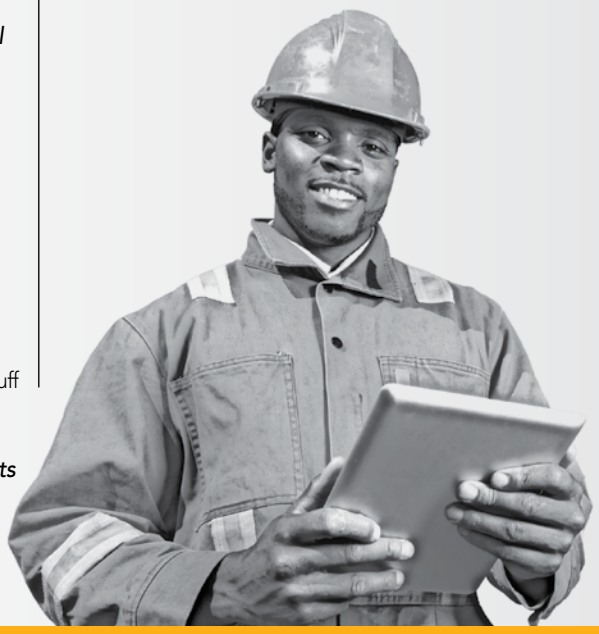
COMING SOON:

- *More recognition of your accomplishments*
- *In-person networking opportunities*
- *and more!*

BOC Certification Maintenance Activities and Points Earned

To maintain BOC certification, graduates must accumulate maintenance points each year following a full calendar year after their certification. Level I maintenance requires five points each year and Level II requires ten. Points may be earned as follows:

- Continued employment in building operations ..... ***2 points/year***
- Continuing education in building operations..... ***1 point per hour of classroom time***
- Energy efficiency projects completed at your facility ..... ***Up to 11 points/year***
- Membership in a building operations association ..... ***1 point/year***
- Offices held in membership associations..... ***2 points/year***
- Awards received for efficient building operations ..... ***2 points/award***
- BOC newsletter tech article quiz (see page 9 for details) ..... ***1 point/passed quiz***
- Completion of an energy consumption benchmark for the previous twelve-month period using ENERGY STAR® Portfolio Manager or alternative energy accounting tool ..... ***3 points/year***
- Enrollment in a BOC webinar and completion of its quiz (See webinar announcement on this page) ..... ***1.5 points/passed quiz***



Find A BOC Training In Your Area

When such a high value is being placed on energy efficiency, knowing how to run your building at its optimal performance is an essential skill set for building operators. Join with the growing number of facilities professionals that are recognizing the value of BOC certification, both for their facilities and for their own career paths.

BOC Level I Certification

The Level I series comprises 74 hours of training and project work in building systems maintenance. In fall of 2012, updated curriculum was developed and made available in select locations. This curriculum is now widely available.

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 and register for a Level I or Level II training in your area, please visit the BOC website at www.theBOC.info.

Training is available from Maine to California, Montana to Texas – and even Hawaii!

BOC Graduate Numbers Continue to Grow!

There are currently over 12,000 BOC graduates throughout the country and now in Canada. That number will continue to grow because the need for educated facilities operations & maintenance personnel is stronger than ever.

Starting out in the Pacific Northwest region in the late nineties, BOC training has expanded and is now offered in over two-thirds of states in the US, as well as in Ontario, Canada. That number continues to grow as well. Graduates hail from Washington to New Mexico, the District of Columbia to Hawaii, and represent companies in education,government, manufacturing, health care and beyond – just about every sector you can name.

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.

APPA:
The Association of Physical Plant Administrators
www.appa.org

BOC:
Building Operator Certification
Live and recorded seminars
www.theBOC.info/m-live-webinars.html

BOMA:
Building Owners & Managers Association
www.boma.org/education/

BOMI:
Building Owners & Managers Institute
www.bomi.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/education

GreenBuild:
US Green Building Council
www.usgbc.org

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

PNNL:
Pacific Northwest National Laboratory
http://retuningtraining.labworks.org/training/lms/

This interactive online class, Building Re-tuning, enables you to learn the initial steps involved in re-tuning a building controlled with a building automation system (BAS). Interactive exercises are included to provide you "hands-on" practice of the re-tuning process within a virtual building. Training takes about six hours to complete but does not have to be done in one sitting, and entitles you to six hours of CE credit.

IFMA:
International Facility Management Association
www.ifma.org

The International Facility Management Association has several regional chapters, all of which can be accessed from the association's main web site address as 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 brings you to a database of state incentives for renewables and efficiencies.

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Partners in the BOC program include: Canadian Institute for Training, Energy Training Foundation (South Africa), Focus on Energy Gwinnett Technical College, International Building Operators Association, Midwest Energy Efficiency Alliance, National Sustainable Structures Center at Pennsylvania College of Technology, New York State Energy Research & Development Authority, North Carolina Community College System, Northwest Energy Education Institute, Northwest Energy Efficiency Council, Pellissippi State College, Sacramento Municipal Utility District, Santa Fe Community College, South Carolina Community College System BOC Consortium, SPEER – South-Central Partnership for Energy Efficiency as a Resource, University of Hawaii – Maui College, and University of Hawaii – Manoa and Wisconsin Focus on Energy.

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