OREGON CONVENTION CENTER

THE CONVENTION CENTER THAT CHALLENGES CONVENTION

by Louisa Gaylord, Communications Director, Glumac (Portland)

Introduction

The Oregon Convention Center (OCC) already stands out among the various venues across the United States. It is the largest convention center in the Pacific Northwest, with approximately a million square feet of meeting rooms, exhibit space and 2 large ballrooms. The OCC was the first convention center in the world to be certified in the Leadership in Energy and Environmental Design (LEED) Existing Buildings 1.0 category, as well as the only to re-certify at a higher level - LEED Silver in LEED EB 2.0. The decision to continuously improve sustainability and minimize their carbon footprint is what sets the Oregon Convention Center apart the most. The facility has been recycling since its completion in 1991, long before it became 'cool' to talk about being green. For the past decade, the OCC has set increasingly impressive sustainability goals to improve the building's energy performance and operational efficiency.

Pre-LEED Sustainability Efforts

Even before the Oregon Convention Center began its pursuit of LEED-EBOM (Existing Building: Operations and Maintenance) recertification in 2008, employees began making a conscious effort to reduce trash and materials generated by events. The OCC's ultimate goal is to divert 100 percent of all possible trash from landfills. Since 2005, the convention center's diversion levels have increased dramatically each fiscal year: 28.77 percent (210 tons) of waste was diverted from landfills in 2005-2006, to 67.29 percent (444 tons) in 2010-2011.

"Zero waste is essentially doing all the things you can do to have the least amount of landfill-bound waste," says OCC Sustainability Coordinator Brittin Witzenburg, "This can be accomplished through waste reduction, donating, recycling – getting to the point where all that's going to the landfill is material that can't go anywhere else."

To achieve this daunting task, the OCC staff started with smaller improvements and worked their way up. The minor adjustments come first, since they are the easiest and don't require any remodeling or construction. 65 recycling bins have been placed around the venue in high-traffic areas, such as the conference rooms and lobbies. Labeled receptacles for mixed recycling, glass and trash help event attendees do much of the waste sorting themselves. In the back of the building, the convention center staff collect and prepare other materials from events. Scrap metal, Styrofoam, and film plastic are sorted, and cardboard is compacted and baled on-site to be transported to a material recovery facility less than 10 miles away (which cuts down on gas emissions).

The convention center has asked its vendors to assist with their goal of 100 percent waste diversion. "One of the things we learned is we all need to work with exhibitors ahead of time to encourage them to think about what really needs to come to the show and what they don't need to bring," Witzenburg says.

Previously, the largest contributor to landfill costs had been food leftovers and other organic material. The facility added staffed Sustainability Stations to select events where visitors bring their waste to be composted and recycled to the fullest extent possible. Exhibitors for food-related events are asked to use compostable plates, napkins and utensils and reduce waste wherever possible. The compost is transported to Nature's Needs in nearby North Plains, Oregon, where it becomes gardening compost just 60 days later. Unused food and materials are donated to local emergency food providers; a single event can generate as much as 10 tons in food donations.

Once the OCC implemented all of the smaller sustainability measures like adding prominently labeled recycling bins and switching to more efficient light bulbs, it turned to the more complex ones such as lighting retrofits, HVAC upgrades, and stormwater filtering to reduce pollutants. In addition, the OCC voluntarily participates in utility offset programs; 40 percent of the facility's electricity is renewable wind power purchased from Pacific Power's Blue Sky Block Program and 100 percent of the natural gas is offset through the Smart Energy program with NW Natural.

Achieving LEED Certification

As part of the LEED-EBOM certification process, the convention center recruited the help of the

Facility Optimization team at Glumac to help retro-commission their new and existing machinery, as required by the LEED EBOM qualifications.

"We have already determined the 'low-hanging fruit,' or the easily identifiable improvements in our facility," says Ryan Thorpe, Director of Operations at the OCC, "We hired Glumac to help analyze the more difficult or hard-to-find energy savings measures."

During the first phase of the project, the team reviewed the building's utility bills and created energy models to simulate existing lighting and equipment loads, to measure where the energy is being used and to provide a baseline to measure future changes in usage. They examined and calibrated heating, cooling and air distribution machinery for temperature, pressure and flow sensors. The Facility Optimization team also checked to ensure that the energy data is being logged correctly, and that the equipment is operating properly with Building Automation Systems (BAS) trending and manual testing.

The second phase of the retro-commissioning project will include detailed energy analysis of mechanical equipment over a full range of load and operating schedules. Because the OCC was able to provide exceptionally detailed and comprehensive records of prior energy use, including separate energy numbers used specifically for heating, Glumac was able to calibrate the energy model to a level of accuracy that is not always available on existing building energy analysis. The team also installed a temporary submeter on the building's cooling system to log real-time data that helps tune the eQuest energy model outputs to the utility bills. This enables Glumac to create baseline energy models with real data instead of general energy equations and formulas.

"It was especially exciting creating these baseline energy models because I had a chance to walk the project site numerous times with the commissioning team," says Lura Griffiths, an energy analyst at Glumac, "They each have over 30 years of commissioning and existing building retrofit experience."

A detailed on-site reevaluation of existing airside systems, including exhaust and supply fans, helped Glumac produce a master list of machinery deficiencies and potential improvements for the project owner to consider.

The Facility Optimization team at Glumac, which combines energy modeling, commissioning and systems design, is skilled at energy audits and analyzing utility bills for existing buildings. They have experience helping project owners reach their energy goals in LEED-EBOM, Green Guide for Heath Care, and US Environmental Protection Agency's (EPA) EnergyStar programs, as well as lower the building's carbon footprint. The group is able to reduce operational costs and overall energy consumption, and improve everything from air quality to equipment reliability.

Increasing Energy Efficiency

Glumac's team was able to find several possible improvements to the convention center that increase the system efficiency dramatically. For example, during the retro-commissioning investigation phase of the project, the team discovered that the convention center's variable air volume (VAV) terminal units were out of calibration due to an accumulation of dust and dirt in the flow sensors. With the assistance of the Facility Optimization group, the OCC maintenance staff installed factory-provided filters to eliminate the particles in the sensors. After a final recalibration, the air systems show

accurate flow readings, and the overall precision of the VAV units has been vastly improved.

Glumac has suggested a list of possible green upgrades for the convention center, including no- and low-cost measures that can be implemented quickly and with little renovation. One suggestion is rebalancing the boilers and heating pump systems to operate with one pump instead of the two it uses currently. The team has also suggested swapping out the current boilers for condensing boilers that recover latent heat at rates of up to 98 percent thermal efficiency to reduce heat loss throughout the building. The Facility Optimization group are conducting a thorough investigation into the building's water systems, such as chillers and cooling towers, during the project's third phase. Glumac's Construction Management staff, who have decades of experience in the mechanical contracting business, developed pricing for the capital improvement projects. The OCC expects to complete its retro-commissioning project and sustainable upgrades in July 2013.

Oregon Convention Center Sustainability Stats	
Total area	840,000 square feet
Average annual events	700 events with 700,000 people
Initial construction	completed 1990
LEED EB 1.0	certified Nov. 2004
LEED EB 2.0 (Silver)	certified Oct. 2008
LEED EBOM v2009	In-progress
2005-2006 Fiscal Year	28.77 percent waste diversion
2006-2007 FY	31.36 percent diversion
2007-2008 FY	43.58 percent diversion
2008-2009 FY	54.67 percent diversion
2009-2010 FY	57.13 percent diversion
2010-2011 FY	67.29 percent diversion
Goal for 2011-2012 FY	75 percent diversion
Renewable wind power	40 percent of electricity

Glumac's Proposed Energy Efficiency Measures (EEM) and Savings
#1 Air Handling Unit (AHU) replacement: convert constant volume AHU's to variable volume
#2 Reduce chilled water system pressure set point
#3 Install 3-way control valves and variable flow pumping on the heating water system
#4 Reprogram and upgrade AHU control sequences to have a larger dead band

EEM	Electric Energy Savings (kWh/yr.)	Electric Cost Savings ($/yr.)	Gas Energy Savings (therms/yr.)	Gas Cost Savings ($/yr.)
#1 AHU replace	23,850	$1,994	14,178	$17,014
#2 ChW Loop	17,569	$1,469		
#3 VFD's re-piping	15,028	$1,256	39,849	$47,819
#4 Control upgrade	164,477	$13,750	14,461	$17,353

EEM	Measure Incremental Cost	Total Potential Incentive if Measure is Cost-Effective	Adjusted Payback before Incentive	Payback Time After Incentive
#1 AHU replace	$231,000	$18,948	12.2 years	11.2 years
#2 ChW Loop	$3,000	$3,000	2.0 years	0.0 years
#3 VFD's re-piping	$289,080	$42,855	5.9 years	5.0 years
#4 Control upgrade	$79,250.00	$47,356	2.5 years	1.0 years

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