Shaping Tomorrow's Built Environment Today

## Innovative Buildings Recognized By ASHRAE With Technology Awards

Jan 5, 2016

**Contact**: Jodi Scott
Public Relations
678-539-1140
jscott@ashrae.org

**ATLANTA** – Wind turbines, subcooled glycol/water, geothermal wells, reuse of coil condensation water and a central heat pump water heating system are among the innovative measures used in the five buildings receiving ASHRAE Technology Awards.

The awards recognize outstanding achievements by members who have successfully applied innovative building design. Their designs incorporate ASHRAE standards for effective energy management and indoor air quality. Winning projects are selected from entries earning regional awards.

First place awards will be presented at the ASHRAE 2016 Winter Conference, Jan. 23-27, Orlando, Fla.

Following are summaries of the winning projects:

**Walgreens Net Zero Store**

Benjamin A. Skelton, P.E., BEMP, president, Cyclone Energy Group, Chicago, Ill., receives first place in the new commercial buildings category for the Walgreens Net Zero Store, Evanston, Ill. The building is owned by Walgreen Co.

The global retail pharmacy brand set out with a vision to create a scalable retail building design that would serve as a showcase for innovative, sustainable and high performance design to sustainability, architecture, engineering and retail communities. The store is designed to achieve net zero energy use by the National Renewable Energy Laboratory's most stringent definition of "renewable energy generated within the building footprint."

Among its innovative features are:

- 840 roof-mounted solar panels, generating enough energy to power 30 Illinois homes for a year
- two 35-foot-tall wind turbines, using winds from Lake Michigan to generate enough power to offset annual greenhouse gas emissions from 2.2 passenger vehicles
- geo-exchange energy obtained by drilling 550 feet into the ground below the store
- LED lighting and daylight harvesting
- carbon dioxide refrigerant for heating, cooling and refrigeration equipment
- energy efficient building materials

The owner set out with a vision to create a store that would be an innovation laboratory to test products, materials, systems and equipment that could be incorporated into prototype designs and retrofit throughout existing stores. Walgreens also wanted to share the results from the design, construction and ongoing operation of the store with the public, design community and even their competition. The store is designed to facilitate tours, including hosting executives and designers from their retail competition.

**DPR Construction's San Francisco Net Positive Energy Office**

Dylan T. Connelly, associate, Integral Group, Oakland, Calif., receives first place in the existing commercial buildings category for DPR Construction's San Francisco Net Positive Energy Office. DPR Construction occupies the building and has a 10 year lease with an option for 10 more years.

A national construction company, DPR sought to lead by example and transform the building industry with its retrofitted net positive 22,000 square foot San Francisco office. The office

demonstrates the potential of the capabilities of integrated, innovated and replicable design, reducing energy use and improving indoor environmental conditions while being cost effective with today's technologies. The design includes a 118 kw rooftop photovoltaic system, all electric systems, operable skylights, building management system controlled ceiling fans, enhanced daylighting and living walls.

A net positive energy office building was achieved by reducing energy loads through use of efficient HVAC and electrical systems, and by installing photovoltaic and solar thermal systems on the roof to produce more energy than the building consumes. The target energy use index (EUI) was 23.6 kBTU/square foot/year and achieved a first year EU of 20.4, significantly lower than the code baseline of 49 EUI and 20 percent net positive energy. By retrofitting an existing building vs. building new, the project reduced its initial carbon footprint by over 70 percent.

Occupant comfort and health is also a top priority. A dedicated outdoor air system delivers 30 percent more ventilation than required ANSI/ASHRAE Standard 62.1-2010, *Ventilation for Acceptable Indoor Air Quality*. Heat recovery ventilators use MERV 8 pre-filters and MERV 13 final filters to filter out contaminants, increasing the efficiency of filtration and continuing to improve indoor air quality.

Another interesting feature is the use of dynamic elements, such as sunlight and plants, to activate the space, engage users and provide a connection of surroundings. Three living walls in the main lobby improve indoor air quality by absorbing volatile organic compounds while also increasing the overall wellbeing for occupants.

**Anne-Marie Edward Science Building – John Abbott College**

Nicolas Lemire, Ing., HFDP, president/principal, Pageau Morel and Associates, Montreal, Quebec, receives first place in the new educational facilities category for the Anne-Marie Edward Science Building at John Abbott College, Sainte- Sainte-Anne-De-Bellevue, Quebec. The building is owned by the college.

The contemporary six-story facility is named after a victim of a 1989 shooting at Ecole Polytechnique who was a science graduate of John Abbott. Anne-Marie Edward had been pursuing an engineering degree, and the community felt that through engineering, the pavilion demonstrated how humans are essential to environmental sustainability using applied knowledge and technology.

Energy diversification is accomplished with the use of geothermal wells, electrical heating and cooling, natural gas hot water heating and solar preheating. Potable water consumption is reduced with the use of low flow plumbing fixtures and resources are maximized through reuse and recuperation:

- reuse of return air as compensation air in laboratories
- reuse of coil condensation water to humidify exhaust air
- recuperation on both general and laboratory exhausts
- recuperation through heat pump extraction and storage in stratified tanks
- recuperation of rainwater and fan-coil condensation water.

Laboratory ventilation requirements and large glazing surfaces can have devastating effects on energy efficiency. Nonetheless, the building's actual energy use is 45 percent lower than the baseline case and 10 percent lower than the proposed simulation.

**Seattle-Tacoma (Sea-Tac) Airport Pre-Conditioned Air**

Ken Warren, P.E., capital project manager, Port of Seattle (Wash.), receives first place in the new industrial facilities or processes category for the Sea-Tac Airport Pre-Conditioned Air project. The building is owned by the Port of Seattle.

The Port's Century Agenda sets a vision of reducing carbon emissions and air pollutants, increasing energy conservation, being socially and fiscally responsible and exceeding customer expectations. Its Pre-conditioned Air project is an important step in meeting an agenda objective of being the greenest, most energy efficient port in North America.

The system includes a pre-conditioned air plant (PCAP), piping and air handlers to provide cooling and heating for airplanes during boarding and deplaning to reduce costs for airlines, improved air quality, reduced noise and increased energy efficiency. The PCAP delivers sub-cooled glycol/water through 15 miles of piping to each of the 73 airplane gates in the existing facility, to serve the complete airplane HVAC&R needs. The system allows airplanes to shut off their jet-fueled on-board auxiliary power units (APUs), resulting in jet fuel savings and reductions in carbon dioxide and other gas emissions.

The reductions realized through the project include annual savings of:

- An estimated five million gallons in fuel; a $15 million savings in airline fuel costs

- 40,000 metric tons of greenhouse gases, the equivalent of removing 8,000 cars from the road
- 73 tons of nitrogen oxides
- Noise pollution from aircraft parked at the gates operating their APUs

**Stack House Apartments**

Jonathan M. Heller, P.E., principal engineer, Ecotope Inc., Seattle, Wash., receives first place in the residential category for the Stack House Apartments. The building is owned by Stack House Acquisition LLC.

The project includes two new multifamily buildings and one adaptive reuse of a historic building, which helped to retain some of the historical character of the neighborhood. The project covers an entire city block in the South Lake Union neighborhood of Seattle.

Innovative mechanical systems include a central heat pump water heating system in the largest of the two multifamily buildings, ductless heat pumps for 40 percent of the apartment units and common spaces, and rainwater catchment and reuse for urban agriculture on the roof. The historic building was included in the City of Seattle's pilot of an outcome-based energy code; the first program in the nation to predicate energy code compliance on post-occupancy proof of highly efficient operations. The project also participated in a stormwater treatment pilot project with Seattle Public Utilities with two biofiltration swales providing primary treatment to stormwater run-off from the Capitol Hill neighborhood before discharging to Lake Union.

The apartments are among the most energy efficient in the Pacific Northwest with measured EUIs of 19.8 kBtu/square foot/year for the West Building and 27.1 kBtu/square foot/year for the Southeast Building.

ASHRAE, founded in 1894, is a global society advancing human well-being through sustainable technology for the built environment. The Society and its more than 54,000 members worldwide focus on building systems, energy efficiency, indoor air quality, refrigeration and sustainability. Through research, standards writing, publishing, certification and continuing education, ASHRAE shapes tomorrow's built environment today. More information can be found at www.ashrae.org/news.

###