

Partners for Climate Protection

Greenhouse Gas Reduction Initiative of the Month

City of Toronto: Exhibition Place's GREENSmart Initiatives



Municipal Profile

Population: 2.5 million

PCP member since: 1993

Background

Exhibition Place (EP) in Toronto, Ontario, is Canada's largest entertainment venue, attracting millions of visitors each year. In the past decade, EP has become a demonstration site for renewable energy technologies – wind, solar, geothermal and trigeneration – as well as numerous energy-efficiency, resource and water conservation initiatives. EP is a 192-acre site and houses a number of buildings, including Direct Energy Centre, Allstream Centre, Horse Palace and the Press Building.

Implementation and Approach

In 2000, some of the heritage buildings at Exhibition Place were not in the best shape, in terms of energy efficiency. Annual heating and cooling costs were adding up. In 2001, EP's Board of Governors¹, with the assistance of the Toronto Atmospheric Fund (TAF), decided to conduct a Green Initiatives study of the entire EP site. The study considered not only energy conservation initiatives, but all aspects of environmental sustainability.

"With this initial study completed, the Board took a direction focused on energy use across the grounds," says Dianne Young, EP's chief executive officer. In 2003, with a grant from TAF, EP engaged a consultant to establish EP's baseline energy use and a framework to develop new technologies and energy-efficient practices. The result was the GREENSmart program, EP's official environmental plan, adopted in 2004.

This article features a sampling of the major green initiatives implemented at Exhibition Place.

Wind energy: A wind turbine was installed in late 2002 and is owned and maintained through a partnership of Toronto Hydro and TREC, a Toronto-based renewable energy cooperative. The turbine is capable of generating one million kilowatt hours (kWh) of power each year annually and can annually remove up to 244 tonnes of CO₂.



The wind turbine greets visitors as they pass through the gates of Exhibition Place. Photo courtesy of Exhibition Place.

¹ Under the provisions of the *City of Toronto Act*, the 13-member Board of Governors reports directly to City of Toronto council. Eleven of its members are appointed by council (three council members, five persons who may but are not required to be council members, and three persons who are nominated by the Canadian National Exhibition Association; the Mayor of the City of Toronto; and the President of the Canadian National Exhibition Association).

Trigeneration: Installed in 2007, a natural gas-fired generator integrates heating, cooling and power systems in one and has the potential to meet about one-third of the energy needs of EP's Direct Energy Centre. This plant is now part of Ontario's Demand Response (DR3) program.

Geothermal: A geothermal plant was installed in EP's Press Building in 2007-2008 to replace the conventional heating and cooling system with a ground source heat pump system. Energy efficiencies have been achieved by using the natural temperatures of the ground, both as a winter heat source and a summer heat sink.



Solar: A 100-kilowatt (kW) photovoltaic (pv) plant was installed on EP's Horse Palace in 2007 (pictured at left. Photo courtesy of Exhibition Place). In 2011, Exhibition Place added 500 kW of PV and plans to continue increasing that to between one and two megawatts. The increased kilowatts would reduce annual CO₂ emissions by 420 tonnes.

Lighting: All EP buildings underwent lighting retrofits in 2006. Lamps and ballasts were replaced with more energy-efficient equipment, and a central control system and motion sensors were installed to regulate the timing of the lights. EP also replaced some of the exterior street and pathway lighting with light-emitting diode (LED) technology. This technology produces the same light intensity as conventional streetlights but uses 50 per cent less electricity and lasts five times longer.

Waste management: EP separates waste into several different streams: glass, paper (including hand towels), wood, plastic and organics. As well, Exhibition Place participates in recycling and safe disposal programs for materials such as batteries, lamps, paint and toner cartridges. EP's exclusive food and beverage supplier, CenterPlate, offers compostable dishware at its retail concession stands. CenterPlate also works with local agencies to donate perishable foods to shelters and food banks.

Water management: Between 2004 and 2006, two green roofs were installed on the Horse Palace and one on the East Annex, to improve site stormwater management and reduce the urban heat island effect. At Allstream Centre, rainwater is captured in a cistern and reused for toilet flushing and landscaping. Low-flow fixtures are standard throughout all EP buildings.

Air quality: All finishes, paints, carpets and adhesives are low volatile organic compound, within the recently renovated Allstream Centre – the first LEED Silver conference centre in Canada. In addition, in 2010, a "living wall" (pictured at right; photo courtesy of Exhibition Place) was installed in Direct Energy Centre. The wall acts as a natural ecosystem to purify indoor air.



Results

When GREENSmart was first adopted, EP set two specific goals for the program: to be net energy neutral (electricity), and to achieve an 80 per cent waste diversion, both by 2010. In the years 2008, 2009 and 2010, electricity use associated with all buildings managed by EP has been reduced from the 2005 base year by more than 23 million kilowatts per hour. Annual energy cost savings exceed \$700,000. Over the same time period, avoided GHG emissions totaled 5,627 tonnes of CO₂, 1,453 kilograms of sulphur oxides and 8,025 kilograms of nitrous oxides.

EP has also achieved an 85 per cent waste diversion, exceeding its original goal. “Achieving more than 85 per cent waste diversion for a property that spans 192 acres is a significant accomplishment,” said Toronto City Councillor Mark Grimes, EP’s Chair of the Board of Governors. “This reinforces the commitment to sustainability and the environment by both Exhibition Place and our 5.3 million annual visitors.”

Additional results:

- The wind turbine has been operating at capacity for the past two years – generating just under one million kWh in 2010, and just over one million kWhs in 2009.
- The trigeneration plant has the potential of reducing Direct Energy Centre’s electrical needs by four million kWh annually.
- The 100 per cent-efficient geothermal plant saves 110,000 kWhs per year of electricity and more than 15,000 cubic metres of natural gas.
- The lighting retrofits have reduced annual electricity use by 2.3 million kWhs.

Lessons Learned

Dianne Young generally advises other municipalities to have a plan, obtain political support, do the baseline study and start with the low-hanging fruit before moving on to more complex initiatives.

However, once you’re ready to install innovative new technologies, “You need to be prepared to have someone to watch over these initiatives,” says EP’s chief executive officer. Young adds that EP has one staff person dedicated to monitoring new technology initiatives. “You will have to tweak some things and do a lot of trial and error to maximize production,” she points out. “So it’s best if you can hire a dedicated person to oversee the projects, with the resulting payback being greater energy production.”

Young says that a major challenge for EP’s GREENSmart initiatives was financing. “We had to find funding and partnerships outside our normal capital fund [provided by the City of Toronto].”

Specific challenges:

- Neighbourhood residents were concerned about how the wind turbine could affect birds. TREC performed a six-month study and found virtually negligible injuries attributable to the turbine.
- Changing regulations under Ontario’s Renewable Energy Standard Offer Program and its Feed-in Tariff program caused some delays with respect to the solar PV installation. “It was a lengthy process,” says Young, “and the roof structures needed to be replaced in advance of installing any solar arrays.”

- The Clean Energy Standard Offer Program was not available for the trigeneration or geothermal initiatives, which had been the basis for the original financial payback for these two projects. However, the projects proceeded because the Press Building's heating system needed replacing, and funding grants had been received to defray some of the trigeneration plant's costs.

Future Direction

Exhibition Place already collects rainwater for reuse in toilet flushing at certain buildings, and is now working on capturing rainwater at its Direct Energy Centre. Stormwater runoff is also an issue across the site. With 10-year storms happening more frequently, the main arterial roads bordering Exhibition Place are flooded more often. "We're looking at our large parking areas and seeing what we can do with permeable paving or other infiltration methods, to alleviate rainwater runoff happening," says Young.

Further Information

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The Partners for Climate Protection (PCP) program is a network of Canadian municipal governments that have committed to reducing greenhouse gases and acting on climate change. PCP is the Canadian component of ICLEI's Cities for Climate Protection (CCP) network, which involves more than 900 communities worldwide. PCP is a partnership between the Federation of Canadian Municipalities (FCM) and ICLEI – Local Governments for Sustainability. PCP receives financial support from FCM's Green Municipal Fund™.