



Place du Portage IV: PSPC benefits from the flexibility of energy performance contracting

Public Works and Government Services Canada – now called Public Services and Procurement Canada (PSPC) – was an early adopter of energy performance contracting (EPC). This low-risk, alternative form of financing is available for energy retrofit projects that operate through Natural Resources Canada’s Federal Buildings Initiative (FBI) and enables an organization to carry out major retrofit projects without the upfront costs.

EPC projects are flexible – and that is one of the main ways in which this project benefitted PSPC. As the project manager explains, “Using EPC, we can adjust the project to a degree and respond to additional energy savings and related capital renewal opportunities as they present themselves.” In this case, the team was able to modify the scope midway through the project to respond to changing conditions.

Place du Portage Phase IV: in need of a major retrofit

Place du Portage is a large government office complex in downtown Gatineau, Quebec, facing the Ottawa River. The complex’s four buildings, which contain offices, retail stores, restaurants and parking, were built in four stages during the 1970s. About 10,000 federal employees work at Place du Portage.

Place du Portage Phase IV, built in 1979, was the final phase of the complex and has a floor area of more than 86,200 square metres (m²). Before the energy retrofit, it had unusually high energy consumption for an office building of its size, prompting PSPC to implement an EPC project. After a competitive bidding process, the contract was awarded to Ameresco Inc., an energy service company (ESCO) qualified under the FBI’s [qualified bidders list](#).

Project highlights

Project start date:
September 2010

Project completion date:
December 2012

Investment:
\$8.5 million

Annual savings (\$):
\$990,000

Annual consumption savings:
56,000 GJ

Annual greenhouse gas
emissions reduction:
3,400 tonnes

Initial project scope

The initial scope included modifications to the heating, ventilating and air conditioning (HVAC) system, control system upgrades, lighting retrofits, an upgrade and refurbishment of the cooling towers, and replacement of one of the facility's three chillers with a modern, efficient machine.

HVAC overhaul

Portage IV was built with constant volume, dual duct HVAC systems throughout the building. These systems are inherently inefficient because the volume of air delivered to the space remains constant and often requires simultaneous heating and cooling to maintain the space temperature. To address this issue, the entire system was converted from constant volume to variable air volume (VAV) by installing variable frequency drives on the supply and return fans and individual VAV box controls. The system now varies the volume of air to maintain zone temperature, which reduces electrical power requirements and eliminates simultaneous heating and cooling.

Automation refurbishment

The building automation system (BAS) was upgraded with a new, more efficient control system. The system's functionality was expanded, including extending BAS control to the individual VAV box level and control upgrades to better utilize the facility's existing electric boilers. The new automation system also includes a fully integrated building lighting control system. In addition, the project team installed occupancy sensors and countdown timers in mechanical and electrical rooms to ensure that lighting is switched off when these areas are not in use.

Lighting upgrades

Lighting retrofits achieved savings by decreasing the number of lamps and fixtures and by improving fixture design and technology. For example, corridor spaces had ample light fixtures, but the light distribution was uneven, and much of the corridor space was not well lit. All the fixtures were replaced with modern fixtures that optimize light dispersion. This measure decreased the number of light fixtures while simultaneously providing improved, uniform lighting levels throughout these areas.

Flexibility allows for expanded scope – and savings

The FBI program requires ESCOs to tender competitive bids for materials and components used in the project. As the Portage IV project proceeded, actual costs were lower than those tendered because of the economic conditions of the time. This led to a highly competitive bidding environment. According to Ameresco's Dave Seymour, "Prices were down when this project started. We realized budget savings during tendering that could be reinvested into further energy-saving measures."

The savings enabled the ESCO to expand the project, replacing two of the building's three chillers rather than just one, as originally planned. The two new energy-efficient chillers have sufficient capacity to cool the entire building. Even during the hottest summer days, the new chillers can handle the peak cooling load while operating at 80 percent capacity. The third chiller has been relegated strictly for use as an emergency backup system.

In an EPC, an organization partners with an energy service company (ESCO) to do a comprehensive energy retrofit project. The ESCO pays the full cost of implementation up front, recovering its expenses by repaying itself through the building's monthly energy savings. The company also provides turnkey service, managing the energy retrofit project from start to finish.

Optimized use of electric boilers provides additional savings

In addition to reducing energy consumption, the EPC project provided PSPC building operators with a better understanding of how their building systems and related practices could be optimized to significantly reduce operating costs. Before the retrofit project, heat and hot water for Portage IV was supplied exclusively through steam generated by two gas-fired boilers at the nearby Portage III complex, even though there were two electric boilers in Portage IV. These boilers had been initially intended to provide heat and hot water during colder seasons so that steam from Portage III would not be required, but in practice the electric boilers were idle throughout the year.

The initial scope of the EPC project included making use of these idle electric boilers to take advantage of low-cost electricity rates available in Quebec – particularly during off-peak periods. The control systems for the electric boilers were upgraded so that the boilers would automatically switch on during off-peak periods (when consumption billing rates are lower) or when the total electrical demand was below the facility's peak demand level.

After the retrofit project, the project team determined that it was almost always economically beneficial to operate Portage IV's electric boilers, including during peak periods in some instances. Furthermore, the boilers had sufficient capacity to provide heating to the entire facility throughout the year. Consequently, year-round heating and hot water for Portage IV is now supplied almost entirely by its internal electric boilers, and steam from Portage III is now used strictly for humidification purposes.

An indirect benefit: facility renewal

In addition to saving energy, the EPC project allowed PSPC to complete some needed facility renewal measures within the scope of the energy retrofit project. The chillers being used at Portage IV before the EPC project used refrigerants that were being phased out under the [Montreal Protocol](#) because of their ozone-depletion potential. This issue was dealt with by replacing the chillers with equipment that conforms to current regulations.

Similarly, the control system that existed before the EPC retrofit project was becoming obsolete. Parts for the system were difficult to source, and the system's reporting and monitoring capabilities were somewhat limited.

The new control systems now not only allow for more precise control of HVAC and lighting systems, but also have enhanced reporting and monitoring capabilities that enable building operators to anticipate and troubleshoot problems more effectively.

EPC provides multiple benefits

Using an EPC enabled PSPC to carry out the much-needed retrofit project at Portage IV with limited upfront cost. As the project cost less than anticipated, the EPC's built-in flexibility allowed the scope of the project to be expanded to include:

- additional overall project savings
- elimination of ozone-depleting refrigerants
- various system upgrades

With the system upgrades, the facility managers can now optimize building operations.

Natural Resources Canada's Federal Buildings Initiative

Natural Resources Canada's Federal Buildings Initiative (FBI) enables federal real-property managers and decision makers to lead by example, undertake retrofits with no upfront capital costs and take advantage of private-sector funding.

By using energy performance contracting (EPC), a federal department or agency contracts an energy service company (ESCO) to implement and finance the retrofit project. The ESCO pays for the work, the capital cost of new equipment and service charges with the energy savings that the project generates.

Many federal organizations have used the FBI program to help them implement EPCs and reduce their energy and operating costs as well as greenhouse gas emissions.

For more information on how the FBI can help your organization plan an energy efficiency project, contact:

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