

Case study

Canadian Forces Base

Petawawa, Ontario, Canada



Combining military preparedness with energy efficiency

Maintaining a high level of military preparedness and operations efficiency is critical to the mission of the Canadian Forces Base (CFB) in Petawawa. The base supports Canadian troops tasked with peacekeeping missions throughout the world including UN and NATO deployments. Closer to home, its Canadian Mechanized Brigade steps in to help the civilian community with emergency rescue operations and serves as a “safe place” during disaster relief efforts. Through an Energy Savings Performance Contract with Johnson Controls, L.P., CFB Petawawa is guaranteed savings of \$1.45 million in energy costs annually and will be able to operate independently from the electrical utility in the event of a power interruption.

Consider the consequences of an electrical power grid failure on the base during a major emergency or military deployment. The base’s ability to conduct mission-critical activities would be seriously handicapped. For CFB Petawawa it was clear that they needed to reduce their dependency on utility power. Simultaneously, the base was facing major capital costs due to necessary upgrades for equipment throughout its facilities and needed to increase energy conservation and efficiency awareness amongst staff and military personnel.

“Being 100 percent capable of deploying military people all over the world and locally embodies our mission at CFB Petawawa,” indicated John Faello, systems engineer/project manager. “Our increasing energy costs due to rate increases and operations inefficiencies along with dependency on utility power were a challenge to that mission. The Performance Contract allowed us to address needed operations improvements at a time when the Canadian government was curtailing its capital, operating, and maintenance spending.”



Ribbon cutting ceremony for the new cogeneration power system.

Cogeneration powers savings

A key element of the Performance Contract is the installation of an energy-efficient cogeneration power system at the base's central plant, which generates more than \$921,000 of the guaranteed annual savings. The natural gas-driven combustion turbine generates 3.5 megawatts of electricity, enough to power the base's critical loads during utility outages. Since the cogeneration system is dual fueled (natural gas and diesel), it allows the base to operate even if the natural gas supply is interrupted.

The waste heat from the combustion process is used to generate steam through a heat recovery boiler. The steam is essentially a free byproduct used to heat the buildings on the base. The cogeneration power system operates at 80 percent thermal efficiency. As a result, the base's purchased power costs are reduced by as much as 60 percent. By comparison, large utility-run power generation systems average just 30 to 50 percent efficiency.

"The cogeneration system has an added benefit beyond providing independence from utility power and a major source of energy savings," says Faello. "It allows us to greatly reduce greenhouse gas emissions in keeping with Canadian Federal Government initiatives." Since the unit operates primarily on clean-burning natural gas, the emission of nitrous oxide, sulfur dioxide, and carbon dioxide is minimized.

Upgrades and training provide additional savings

The partnership with Johnson Controls has enabled CFB Petawawa to become more energy efficient in a number of other ways. Under the 10-year, \$14.5 million contract, Johnson Controls performed lighting retrofits, installed steam traps, pipe insulation, and HVAC equipment, and upgraded the existing Metasys® building automation system. In total, the Performance Contract impacts 100 of CFB Petawawa's 484 buildings, or about 80 percent of its total floor space.

"As a result, we have generated energy savings, upgraded equipment to current standards, increased operational effectiveness and optimized our energy management systems – all on a fixed budget," says Faello. The resulting energy savings will pay for the improvements themselves.

Providing the means for continued improvements and savings is another key element of the Performance Contract. As part of CFB Petawawa's employee energy awareness program, Johnson Controls developed an extensive training program for the maintenance staff and military personnel. Training brings staff up to date on new technologies and helps them maintain the performance level of the new equipment, resulting in the energy savings flow. New preventive and predictive maintenance programs have been developed, which make optimal use of the base's limited staff resources.

"Through the relationship with Johnson Controls we have become more knowledgeable in terms of energy management, which will allow us to pursue further energy saving measures."

JOHN FAELLO
SYSTEMS ENGINEER/
PROJECT MANAGER
CFB PETAWAWA



CFB main gate.