

Recommissioning of the CIBC Tower

The CIBC Tower, situated on René Lévesque Boulevard in downtown Montréal, is an office building dating back to 1962. With its total area of 67,100 m², the building had an energy intensity of 1.59 GJ/m². To improve on this, it was decided to recommission the Tower's mechanical systems, which reduced its energy intensity by 12%.

Recommissioning: An approach with high potential

As part of its global energy saving project, Johnson Controls Inc. proposed standard measures for replacing and modernizing equipment, as well as a recommissioning (or « RCx ») measure. This measure calls for optimizing existing mechanical equipment. It requires little investment. In fact, recommissioning a building's mechanical systems is characterized by low implementation costs. This is because significant attention and effort are devoted to the initial investigation phase, which aims to identify ways to optimize the building's energy consumption.

As part of the recommissioning project, the operation of the CIBC Tower's systems was closely examined to determine whether they still met users' needs and served the building's purpose. As a result of the building's age and its changes over time, some of the systems no longer worked as well as they had in the past and, with current optimization methods, it was not possible to bring down energy costs without replacing the systems entirely.

During the investigation phase, time was taken to inspect all of the targeted systems' equipment (valves, fresh air dampers, motors, pulleys, canvas, filters, etc.) to determine whether it was still functioning optimally. The following procedures were carried out during the project:

- Examination of the fresh air dampers in the main ventilation systems
- Replacement of ventilation system motors between 5 and 15 hp
- Inspection of 200 induction heating system thermostats and control valves
- Installation of a variable speed drive on the boiler fan
- Addition of an air release valve and vacuum breaker to the induction system's heat exchanger

Lastly, as part of this RCx project, a range of measuring devices were added so the building's energy performance could be monitored in real time.

Five measures implemented

Five measures were implemented during the CIBC Tower recommissioning project.

1. Examination of the fresh air dampers in the main ventilation systems

The CIBC Tower has two main ventilation systems. The first recommissioning measure was to analyze the operation of fresh air dampers in each ventilation system.



The analysis revealed that the dampers were remaining open, resulting in 5% infiltration for the first system and 10% infiltration for the second. Due to the size of these systems, the infiltration was virtually undetectable. This meant that an examination of each system by a certified agent was warranted as part of the recommissioning project.

2. Replacement of ventilation system motors between 5 and 15 hp

The electronic metering of the ventilation systems revealed that the motors between 5 and 15 hp had an 88% efficiency. Because it is now possible for motors to have efficiencies between 93% and 95%, a decision was made to gradually replace the motors. Though intended as an energy-saving measure, this procedure became an asset maintenance measure because it led to the majority of the equipment being replaced to improve its efficiency.

3. Installation of a variable speed drive on the boiler fan

When outside temperatures dropped below -10 °C, the boiler that was already running became insufficient and the larger boiler had to turn on.

Although a micro-modulation system had been installed several years earlier, the boiler was frequently stopping and starting, which meant a loss of efficiency. The boiler turndown ratio was approximately 3:1 and steam generation could not go below 10,000 lbs/h per level of modulation. Installing a variable speed drive on the boiler fan allowed a ratio of 7:1 to be obtained and brought down steam generation to 4,000 lbs/h per level of modulation without cycling.

After the first winter of monitoring, the RCx agent called for an inspection of the system metering equipment because he was certain that the data was incorrect. This installation measure helped increase the heating system's annual efficiency by 3.5% based on a consumption of close to 1.1 Mm³/year.

4. Inspection of 200 induction heating system thermostats and control valves

When it was running, the building's induction heating system was responsible for as much as 70% of the Tower's natural gas bill. By inspecting the system's thermostats and valves, the RCx agent obtained a

representative sample of the condition of the system. It was then possible to calculate the savings that could result from calibrating defective equipment.

After calculating the percent defective, the RCx agent worked with the CIBC Tower Operations Team to implement an annual inspection as a preventative maintenance measure. This will ensure continued savings and occupants' comfort over time.

5. Addition of an air release valve and vacuum breaker to the induction system's heat exchanger

After all of these measures were implemented upstream and downstream of the induction system's heat exchangers, a single problem threatened to undo all of the progress made. When the control valve was less than 20% open, the exchanger filled with water and the heating supply set point could no longer be maintained. The valve therefore had to be opened more than 65%, which was causing unnecessary overheating of the system. Adding an air release valve and a vacuum breaker made it possible to maintain a far more stable system temperature.

Project summary

In the end, the project allowed the CIBC Tower to bring its energy intensity down to 0.37 GJ/m², an improvement of 23% over its initial energy intensity. 12% of this overall decrease was due to the recommissioning of the building's mechanical systems, which has an ROI period of 2.66 years.

1. To carry out this project, the CIBC Tower took part in Énergir's Recommissioning of Building Mechanical Systems Program. The recommissioning process has four main phases: Project planning;
2. Investigation of energy efficiency measures to be implemented;
3. Implementation of the measures selected and knowledge transfer to the building's personnel; and
4. Continuous monitoring of the measures implemented.

Through the program, the CIBC Tower received a \$22,192 grant to save 55,765 m³ of natural gas.

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