

**CASE STUDY:**  
**First Canadian Centre**

**Industry:**  
**Commercial Building**



## Retrofitting Boilers Reduces Emissions and Fuel Usage at First Canadian Centre

Built in 1981, First Canadian Centre (FCC) is a 41-story office tower located in Calgary, Alberta, Canada. In 2010, commercial real estate firm GWL Realty Advisors sought to implement strategies to increase the efficiency and reduce the emissions of the nearly 30-year-old property. Among the areas they evaluated was the boiler plant.

Two low-pressure Cleaver-Brooks boilers provide heat for the offices in the First Canadian Centre tower. With regular maintenance, a boiler can last 20 or 30 years, but over that length of time, a boiler's efficiency declines. Recognizing this, GWL Realty Advisors considered several options, including the anticipated costs and foreseeable challenges of each.

Among the options they considered were:

1. Replace the steam system with hot water boilers. This solution would incur extra costs as it would necessitate replacing the steam boilers' heater exchangers, air handling coils and distribution system with all new equipment.
2. Utilize Calgary's new heating municipal distribution system. This option presented the same challenges and costs as installing a new hot water boiler system.
3. Replace the existing Cleaver-Brooks firetube steam boilers with new steam units. The boiler plant at FCC has a 400-ft. boiler flue, which was a big challenge in adopting new boilers. Accommodating new boilers would be problematic as it would require the demolition and reconstruction of multiple walls, including the main fire-rated stairwells and the building envelope.
4. Retrofit the existing boiler units. Because the boiler pressure vessels at FCC were in good shape, this option was available. By replacing the burners and adding advanced controls to the existing units, the efficiency of the boiler system would match that of a new system at a reduced cost.



### FIRST CANADIAN CENTRE

#### LOCATION

Calgary, Alberta, Canada

#### PROFILE

Increase the efficiency and reduce emissions of a nearly 30-year old property

#### CHALLENGE

Installing new boilers would require demolition and reconstruction of multiple walls, including the main fire-rated stairwells

#### SOLUTION

Replace the burners and add advanced controls to two existing boilers

#### RESULTS

Cut fuel usage by 20% and reduced emissions from uncontrolled to low NOx; won the President's Award for Sustainability from BOMA Calgary

GWL Realty Advisors chose to retrofit the boiler system and sent out a RFP to selected companies. Based on product performance and cost, Tundra Process Solutions, an authorized Cleaver-Brooks representative in Calgary, won the bid and provided tours of local facilities with similar installations.

Tundra recommended and installed the following.

- **High-efficiency Cleaver-Brooks burners.** Increasing the burner turndown rate reduces purge cycles and loss of stored heat through the stack.
- **Cleaver-Brooks Hawk PLC-based boiler control system with oxygen trim and parallel positioning.** Monitors and manages combustion control.
- **Fuel-air characterization.** Increases combustion efficiency by providing precise, repeatable fuel-to-air ratios throughout the boiler's firing range.
- **Variable-speed combustion air-fan control.** Improves air volume and velocity control throughout the firing range.
- **Lead-lag control.** Multiple boiler capacity management to suit load conditions for reduced radiation and purge-cycle losses.



According to GWL, Tundra's Service technicians were instrumental in setting up the boiler efficiencies and integration into the buildings automation system for monitoring and rotation strategy.

As a result of the boiler retrofit, First Canadian Centre decreased its emissions from uncontrolled (130 ppm NOx) to low NOx (30 ppm) and reduced its fuel usage by 20 percent.

The retrofitted boiler system at First Canadian Centre equals the efficiency and emissions performance of a new Cleaver-Brooks CBLE boiler system. In addition to superior performance, the upgraded system at FCC is easy to maintain, has a low lifecycle cost and operates quietly.

As a result of the upgrade, GWL Realty Advisors won the President's Award for Sustainability from the Building Owners and Managers Association (BOMA) Calgary.