

TUNDRA
EDUCATION CENTRE



CASE STUDY:

First Canadian Centre

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*

Retrofitting Boilers Reduces Emissions and Fuel Usage at First Canadian Centre

By Cleaver Brooks | 

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.

The two boilers providing heat for the offices in the First Canadian Centre tower were older, but their pressure vessels were in good shape. With regular maintenance, a boiler can last 30-plus years, but due to the advances in controls technology, older boilers generally do not operate as efficiently as they should.

In addition, improper venting can reduce fuel efficiency, increase downtime and maintenance costs. The balance between excess air and fuel cannot be achieved without considering the factors of draft.

Recognizing that FCC's boiler system efficiency was declining, the management company 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 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 the office tower 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.





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CSA B149.3 Compliance

- This is a government safety code for fired appliances in Alberta. **Check to see if your insurance company is happy with your existing infrastructure**
- Tundra boilers and packaged boiler upgrades are pre-approved for CSA B149.3 compliance
- Tundra will arrange for the inspection and regulatory compliance of your boiler room
- **Tundra clients have saved over \$400,000 in annual gas costs by upgrading their Burner Management System (BMS).**
- To learn more about Tundra's products and solutions, please visit <https://www.tundrasolutions.ca/>

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The building owner chose to retrofit the boiler system and sent out an RFP to select companies. Based on product performance and cost, Tundra Process Solutions, based in Calgary, won the bid and arranged 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.
- **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.
- **Draft control.** Implemented to maintain adequate and consistent draft resulting in stable combustion.
- **Lead-lag control.** Multiple boiler capacity management to suit load conditions for reduced radiation and purge-cycle losses.

The local boiler company arranged for the delivery of the equipment and set it up, integrating the boilers into the building's 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 the office tower achieves the same efficiency and emissions performance of a new boiler system. In addition to superior performance, the upgraded system 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.

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Click below link to view Cleaver-Brooks products and retrofit product options:
<https://tundrasolutions.ca/ac-catalog-item-tags/cleaver-brooks/>