

Social Housing Project – Toronto, ON

Background

In 2016, The Atmospheric Fund (TAF), a climate action agency for the Greater Toronto and Hamilton Area, and a social housing provider worked together to energy retrofit seven buildings across three sites, with the work delivered by Ecosystem.

One of these building sites, located in Toronto, consists of three high rise apartment buildings that were heated with two outdated, inefficient and oversized boilers, which resulted in high maintenance and utility bills and poor indoor comfort for residents. The decision was made to replace these boilers with modern, gas-fired condensing boilers that would achieve high operating efficiency and reduce overheating during the winter.

The Viessmann solution

Three Vitocrossal 300, CA3 stainless steel gas-fired condensing commercial boilers, each rated at 4,000 MBH, were brought online in December of 2016, with commissioning and operating performance optimization taking place in January and February of 2017. The boilers were installed in the basement level of one of the buildings where they constitute a central heating plant and serve the space heating loads of all three buildings. Onboard Vitotronic 300 cascade controls modulate input and automatically stage and rotate boilers to precisely match heating loads. In addition, the boilers' high turndown ratio of 10:1 each allows the boilers to fire at very low levels when outdoor conditions are mild to accurately match the building load.

Installation details

Prior to installation, each of the three boilers were disassembled, brought into the mechanical room and re-assembled in place on housekeeping pad.

A primary/secondary piping arrangement was created with VFD boiler loop pumps. A common venting arrangement is used allowing all three boiler vents to be combined into a single stack up to the top of the building.

The Viessmann control package includes a Vitogate 300 BACnet gateway to permit the Building Automation System (BAS) to send a common supply temperature setpoint, in addition to monitoring operational data from all three boilers. Temperature set points to the various heating loops are under control of the BAS and will be modified based on information gathered from TAF's indoor environmental quality monitoring program measuring indoor space heating temperatures.



Viessmann Vitocrossal 300, CA3 condensing boilers (4000 MBH)*

* Project pictures courtesy of TAF and Ecosystem

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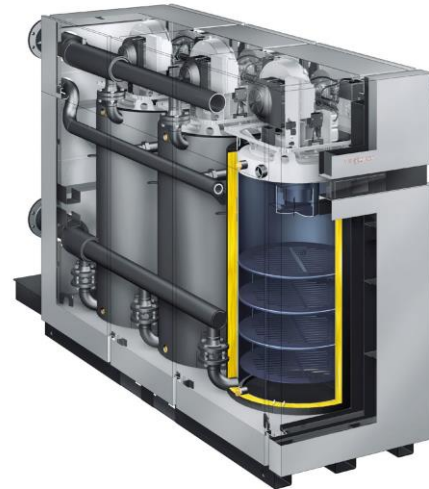
The Results

- The main goals in re-designing the heating system were:
 1. Provide better control of boilers and the heating system to address overheating
 2. Better align building demand with boiler capacity
- Estimated annual fuel savings of 167,000 m³ of natural gas
- Estimated annual fuel cost savings of over \$55,700 (\$0.3319/m³)
- Significantly lower maintenance costs

Note: At time of writing, a complete analysis of overall post-retrofit cost savings was not yet available.

Project Details

Project Year	2016
Equipment	3 x Vitocrossal 300, CA3
Rated Input	4000 MBH each
Client:	Social housing provider supported by The Atmospheric Fund (TAF)
Design-Build Firm:	Ecosystem



Vitocrossal 300, CA3
Gas-fired stainless steel commercial condensing boiler
(2500 to 6000 MBH)



Low-emission, fully-modulating pre-mix cylinder burner