



La Cité Verte – Québec City, QC

Background

La Cité Verte is the first large-scale, multi-residential project in Quebec comprised of green, intelligent buildings. There are more than 800 housing units – including condos, townhouses, apartments and affordable housing. La Cité Verte currently employs the most advanced biomass district heating system in North America for its space heating and domestic hot water (DHW) needs.

The Viessmann Solution

At the heart of the system is a boiler plant housing four Viessmann Pyrotec KPT-1250 wood-fired boilers (each rated at 1,250 kW) in a 5 MW cascade system. The cascade arrangement provides maximum boiler plant efficiency with high turndown ratio (1:16) that precisely matches load. A 5.2 MW natural gas boiler provides emergency backup for the biomass boilers, and a 650 kW diesel generator will ensure continuous operation of the entire district heating system in the event of an electric power failure.

Installation Details

The boilers heat two 22,000 L buffer water tanks before heated water (90 °C supply/50 °C return) is distributed through a highly efficient, low temperature hydronic heating network for district DHW and space heating.

Pre-insulated underground piping in the 2.2 km system ranges from 8" in diameter exiting the boiler plant to smaller pipes feeding row houses (1" diameter) and other buildings throughout the site.

Substations in each Cité Verte building distribute the appropriate amount of heat and calculate fuel bills for the individual units. Water flow throughout the network is driven by a 25 HP pump in the winter and a 5 HP pump during the summer, when space heating requirements are significantly reduced.

A Viessmann boiler control system integrates seamlessly with Smart Heat Network controls developed by Regulvar and project engineers Génomor and Poly-Énergie. The integrated system monitors the energy consumption data collected from individual units and district substations along with boiler data to optimize efficiency throughout the district.

The Results

The Pyrotec hot water boilers have met their published performance ratings for combustion efficiency (up to 85%) since the biomass heating system went online in October 2011. When completed, La Cité Verte will use 30% less total energy than conventional developments.



Silo holds 450 m³ of wood pellets, a six-week reserve during regular winter use



Wood pellet flow into two independent feeding mechanisms for Pyrotec boilers



Four Pyrotec KPT-1250 wood-fired boilers provide efficient district space heating and DHW

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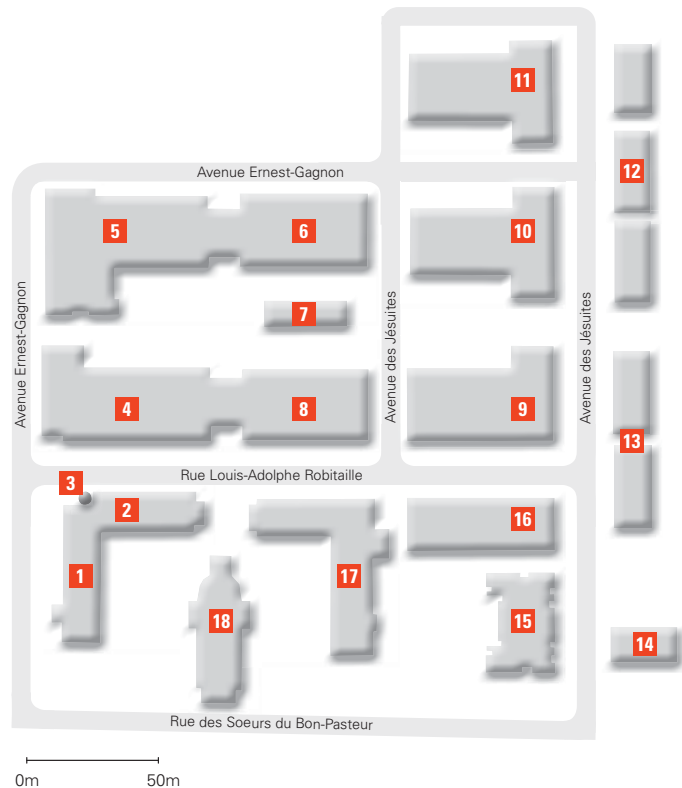
Project Details

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|--------------------------------------|-----------------------------------------------------------|
| Project Year | 2011 |
| Equipment | 4 x Pyrotec KPT-1250 Custom Control System |
| Rated Output | 17060 MBH / 5 MW |
| Architect | Bernard, Mercier, Drouin, Québec, QC |
| Developer Construction Manager | SSQ Immobilier, Québec, QC |
| Renewable Energy Specialist | Poly-Énergie inc., Québec, QC |
| Engineering | Génécor Experts-Conseils Inc., Québec, QC |
| Control Systems | Regulvar, Laval, QC TBC Constructions Inc., Québec, QC |
| Maintenance and Operation | SSQ Immobilier, Québec, QC |



Two screens help illustrate the district heating system to visitors. Right screen: Pyrotec data from Viessmann controls. Left screen: Flue gas and heat exchanger circuits data

- 1,2** Biomass Boiler Plant/Retail/Office Space 24 (units)
- 3** Pellet Silo
- 4** Condo Building (88 units)
- 5** Condo Building (59 units)
- 6** Condo Building (85 units)
- 7** Pool & Recreation Centre
- 8** Condo Building (72 units)
- 9** Condo Building (69 units)
- 10** Condo Building (77 units)
- 11** Condo Building (77 units)
- 12** Townhouse Units (14 units)
- 13** Townhouse Units (10 units)
- 14** Residual Material Collection Terminal
- 15** Affordable Housing
- 16** Condo Building (48 units)
- 17** Retail/Office Space (39 units)
- 18** Retail Space



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