

240 Markland Drive: Achieving Net-Zero with Geothermal Retrofit Webinar

March 11, 2025

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240 Markland Drive is a 10-storey residential building in Etobicoke, Ontario, with a gross floor area of 12,557 m² and 113 units. The building underwent a transformative deep energy retrofit, completed by Carterra in 2022. In collaboration with Geosource Energy Inc., the retrofit incorporated low-carbon geothermal systems for both heating and cooling. These geothermal systems now serve both the original rental building and the new residential development on-site. As a result of the retrofit, 240 Markland Drive achieved Zero Carbon Building certification under the Canada Green Building Council's ZCB-Performance Standard. This webinar featured insights from both Carterra and Geosource Energy Inc. on the key components of the retrofit, the integration of geothermal energy systems, and the steps taken to achieve net-zero operations.

Presenters

- Paulina Barnes, Director of Sales and Marketing, Geosource Energy Inc.
- Christina Basan, Partner, Development, Carterra

Key Findings

- Bill C-59 (2024) offers a tax credit for geothermal systems, reducing upfront costs and providing a financial incentive to adopt renewable technology.
- To promote greater adoption of geothermal systems, municipalities and developers can engage in open dialogue to explore the use of public spaces for drilling boreholes. The concept of long-term leases on municipal land could lower financial barriers for developers while encouraging sustainable practices.
- Municipal funding programs that require applicants to maintain ownership of a property for a specified period of time before renovations can disqualify new owners seeking to implement immediate upgrades, thereby limiting eligibility and potentially hindering geothermal uptake.

Presentation Overview

- Geo-exchange systems operate by utilizing the Earth's consistent underground temperature, which permits efficient heating and cooling of buildings. It can replace conventional heating systems like cooling towers and boilers, thereby contributing to significant reductions in greenhouse gas emissions and aligning with decarbonization goals.
- Geothermal systems are four times more efficient than conventional systems and twice as efficient as air-source heat pumps (ASHP).

- The angled drilling technique, which involves drilling at a slight incline rather than vertically, is the preferred method when retrofitting existing buildings and for implementation in confined spaces.
- Set up costs for angled drilling are higher than conventional processes, however, this is offset due to savings from tie-ins being in confined spaces.
- Angled drilling allows for drilling to occur under existing infrastructure and is able to access ground volumes that are inaccessible through vertical drilling.
- The retrofit timeline for 240 Markland was 2-years, spanning from Carttera purchasing the building in 2020, and completing the deep energy retrofit in 2022.
- The geothermal borefield design for 240 Markland included 113 boreholes (52 vertical, 61 angled) to accommodate the limited available space. Angled drilling allowed for drilling under trees, and therefore no tree removal was required.
- The decision to proceed with the geothermal system rather than ASHP was based on a variety of factors, including sustainability goals, long-term operational savings, and the physical impact of equipment placement.
- During winter months, the geothermal retrofit resulted in approximately 52% to 54% savings on hydro bills compared to the previous system.
- Moving forward, ongoing operational savings ranging from \$10 to \$15 monthly per unit are expected.
- Although ASHPs have lower capital costs than geothermal, the operational expenses and maintenance considerations for geothermal systems are more favorable. Also, the geothermal solution maintained balcony aesthetics.
- The retrofit of 240 Markland prioritized building improvements without displacing residents. 113 units were successfully retrofitted without requiring evictions.
- Carttera targeted some of the MLI Select green targets, leading to financing from Canada Mortgage and Housing Corporation (CMHC). Often, CMHC and other financing programs (i.e., through Canada Infrastructure Bank [CIB]) require significant emissions reductions to access.
- The resilience of geothermal systems is enhanced by their underground installation, providing protection against external environmental conditions. This reduces the frequency of repairs and associated costs.

Additional Resources

- [240 Markland Drive - Canada Green Building Council](#)
- [Zero Carbon Building Performance Standard Version 2 - Canada Green Building Council](#)
- [Government of Canada Launches the First Clean Economy Investment Tax Credits](#)
- [BILL C-59](#)
- [Canada Mortgage and Housing Corporation \(CMHC\) MLI Select](#)

Contact Information

Please reach out to us at any time with questions, input, or for additional information.

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You can view our upcoming events [here](#).