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Transitioning from fossil fuels with a sustainable energy solution for all seasons

How cold climate heat pumps are making the move from future tech to modern mainstream.

The Story

In an Ontario village, a community centre's hall, library, seniors' room, and other indoor spaces are treasured gathering points. But the centre had a challenge: how to lessen the facility's reliance on fossil fuels and reduce utility bills, while also ensuring it meets their heating and cooling needs and provides ample comfort year-round.

Located in a rural part of the province with no access to natural gas, the centre relied on two aging oil furnaces and a roof-top unit to provide heat. One option they considered was replacing the units with oil furnaces once again. That would have locked the centre in for decades to old technology that's harmful to the environment.

After painstakingly assessing its options with support from an energy solutions company, the association decided to install two air-source cold climate heat pumps.

It was a visionary choice. Air-source heat pumps use long-proven technology to absorb heat from the outside air – even in cold temperatures – and move it to inside air to provide heat.

The process also works in reverse when interior cooling is needed so there's no need to install a separate air conditioning unit. Because they don't burn fuel like natural gas, oil, and propane furnaces, heat pumps provide a "clean" source of heating and air conditioning for a building.

Traditionally, heat pumps were primarily effective at maintaining comfortable temperatures in moderate climates. Today's cold climate heat pumps can be used in considerably colder conditions and get the heating and cooling job done most days in the year. The community centre recognized, however, that it needed an additional heating source for very cold days that are a reality of Eastern Canadian life. So, they installed an electric backup system that kicks in on those extra cold days to ensure the temperature stays at a comfortable level. By combining cold climate heat pumps with electric backup, the community centre took a balanced approach. This wasn't the cheapest route, but it future-proofed the sustainability of the centre's energy system for many years to come.

More and more organizations and individuals – in both urban and rural settings – are implementing innovative energy solutions such as cold climate heat pumps.

There's a growing urgency to do so. The Government of Canada is committed to achieving net-zero greenhouse gas emissions by 2050. The proposed Canadian Net-Zero Emissions Accountability Act, Bill C-12, will make that commitment legally binding if passed. While net-zero seems far away, it's actually a tight timeline and much more needs to be done to make it a reality.

In Ottawa, another community centre is doing its part to reduce greenhouse gas emissions.

The centre, which offers services ranging from exercise programs to ESL classes, has three natural gas furnaces approaching end-of-life that are oversized for the facility's needs. The community association that runs the centre wants to achieve cost containment and environmental responsibility, so it's moving to a cold climate heat pump system that will be either ground-source (also called geothermal, which extracts heat from the ground) or air-source. The former would be the most energy-efficient and require a larger investment; the latter would rely more heavily on electric backup heat and involve a lower up-front installation cost. With support from the energy solutions company, the centre will carefully weigh the options and decide what works best for them.

These community centres are just two examples of how businesses are using cold climate heat pumps as primary heating and cooling sources with secondary backup systems. The pragmatic choices made in these situations are emblematic of how cold climate heat pumps are never either-or solutions. Instead, much like hybrid vehicles, they function as blended approaches that represent meaningful environmental progress in today's fast-approaching net-zero world.

The energy solutions company that assisted with these projects also issued a call to homeowners to join a unique pilot project. Hundreds of people applied to participate in the two-year study assessing the performance of cold climate heat pumps. The results of the pilot showed that cold climate heat pumps perform well not just in the controlled lab setting but also in a real-world environment. Data from the studies show that heat pumps operate quietly and efficiently, producing approximately three times the heating energy output for every unit of electrical energy needed to run them, which means lower utility bills.

The big revelation: cold climate heat pumps now provide comfortable heat with outside temperatures as low as -25 Celsius! That's a game-changing result that bodes well, not just for home heating, but also for future commercial and industrial applications.

Are you looking at decreasing your reliance on natural gas, oil, or propane and searching for an innovative solution like cold climate heat pumps? Contact Envari Energy Solutions to learn more.

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About Envari Energy Solutions. Envari Energy Solutions Inc. ("Envari") is a member of the Hydro Ottawa group of companies. Our team of specialized designers, engineers, and project managers help governments and businesses find innovative ways to save energy, improve their financial performance and reduce environmental impacts.

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