

Getting closer to carbon-neutral: District systems share warmth and cooling

WALLACE IMMEN

SPECIAL TO THE GLOBE AND MAIL
PUBLISHED 8 HOURS AGO

← SHARE — A A+ TEXT SIZE 📖 BOOKMARK



A rendering of the Zibi district development in Ottawa. The Zibi Community Utility will be the first in North America to use postindustrial effluent energy recovery in a master-planned community.

HANDOUT

It's one thing to aim to make a building carbon-neutral, but the challenge expands when you look to share the warmth with entire communities. A couple of innovative developments in Canada are getting closer to zero net carbon by getting nature to provide much of the cooling and heating.

District energy has come into sharper focus since Prime Minister Justin Trudeau announced in April that Canada is increasing

TOP STORIES

Two Catholic churches on Indigenous land destroyed in separate fires

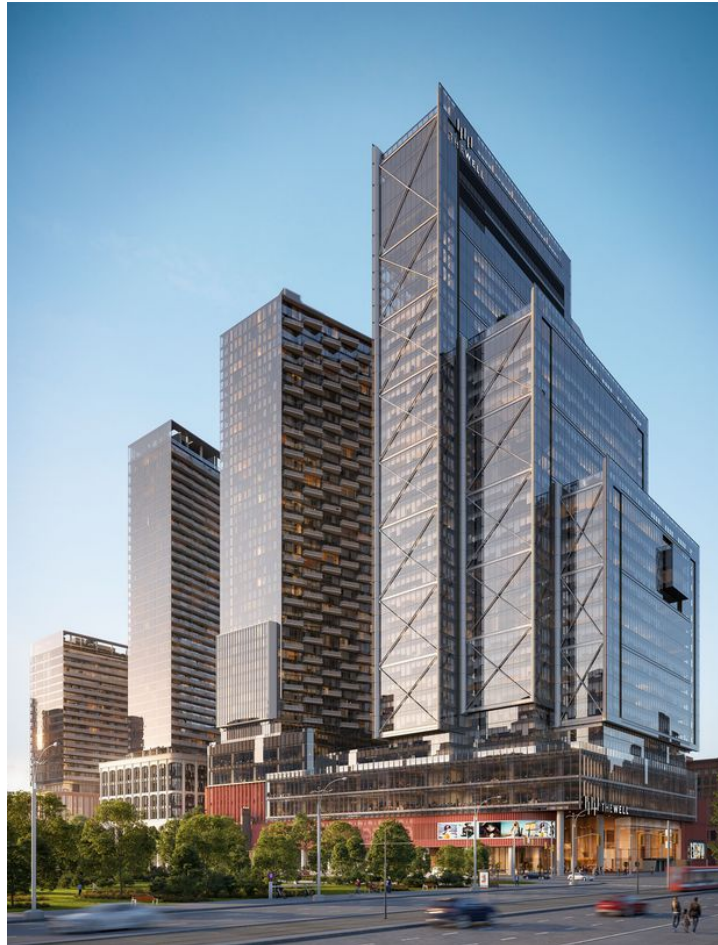
JUNE 21 **UPDATED**



Community Utility will be the first in North America to use postindustrial effluent energy recovery in a master-planned community.

Zibi means “river” in the Algonquin language and the 34-acre brownfield redevelopment will become a riverfront city with 2.5 million square feet of office and commercial space, providing employment for about 6,000 as well as 2,500 residential units.

The utility will recover waste heat from the nearby Kruger Products tissue-making plant for heating, and use the water of the Ottawa River for cooling. It’s an equal partnership between Hydro Ottawa and Zibi, which is itself unique and an example of how federal, provincial and municipal players can co-operate on large-scale energy-saving projects.



The Well development in Toronto includes a reservoir with the ability to store enough thermal energy to heat and cool over 4 million square feet of buildings at peak times.

HANDOUT

Meanwhile, an expansion of the district energy system in downtown Toronto has created a unique thermal battery, a 12-storey-deep concrete-lined tank in the bedrock that’s filled with 8.5 million litres of Lake Ontario water. The reservoir will provide heating and cooling for the Well, the most ambitious mixed-use development in Canada, with the ability to store enough thermal energy to heat and cool more than four million square feet of buildings at peak times. Located at the intersection of Front Street and Spadina Avenue, the Well will serve 16 buildings in the area and there are plans to connect more than 20 in future phases.

TOP STORIES

Two Catholic churches on Indigenous land destroyed in separate fires

JUNE 21 **UPDATED**



The Zibi community in Ottawa is committed to One Planet Living, an international set of sustainability principles that include ensuring that energy needs are satisfied on a net-zero carbon basis. That has become an attraction for tenants, says Justin Robitaille, vice-president of development for Dream Unlimited Corp., developer of the Zibi community and partner in the district energy system.

“At Zibi, our mandate to achieve zero-carbon through the use of our district energy system resonates with many tenants that value environmental stewardship, including the federal government,” Mr. Robitaille says. “We’re delivering modern workspaces that advance Greening Government goals, promote the health of workers and combat climate change through the substantial reduction of carbon emissions.”

The developer recently launched the Dream Impact Management System, a new methodology and measurement system that measures the affordability, inclusivity and environmental sustainability across all of its real estate assets.

The District Thermal connection fees for each building at Zibi are projected to be 50 per cent of the cost of designing and constructing a conventional heating and cooling system, says Tsering Yangki, Dream Unlimited’s vice-president of real estate finance and development.

“The energy costs will also be more stable over time relative to conventional sources,” she adds. “Unlike traditional heating systems that use natural gas, Zibi residents will not be impacted by future escalation of natural gas prices as carbon-based pricing is implemented.”

The unique location of the site, straddling the border of Quebec and Ontario, also allows it to use green hydro-generated electricity, which has been extremely stable in price.

The Zibi project is innovative for the number of players involved, says Mark Fernandes, chief information and technology officer for Hydro Ottawa. “It’s different from the standard model where utilities provide a connection and then walk away. We made an investment in a joint venture partnership to build the district energy system.”

There are two municipalities and two provinces involved and the water pipeline that runs across a bridge is owned by the federal government. The Federation of Canadian Municipalities is providing a \$20-million loan, as well as a \$3-million grant to meet the requirements of energy efficiency and reduction of greenhouse gases. “There is a huge complexity navigating a number of different governments and partners,” Mr. Fernandes says. “But at the same time, everyone is on the same page and they want to see this succeed.”

The technology is off the shelf, but it must be engineered to the specific requirements of each building in the community. “The system, with its sophisticated computerized monitoring systems, would probably have not been feasible 20 years ago, but the technology has advanced by leaps and bounds, and costs have come down,” so payback times are shorter, Mr. Fernandes adds.

“It still takes courage and patience, but there is more and more interest as developers, government and private capital become aware of climate change as an environmental and social issue.”

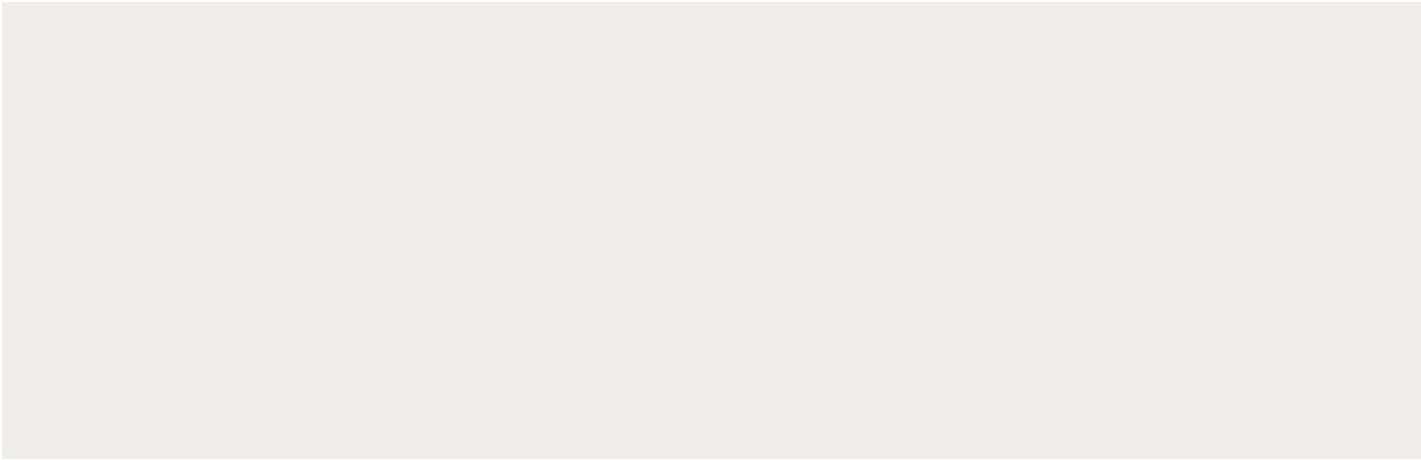
A deep dip into the Well

TOP STORIES

Two Catholic churches on Indigenous land destroyed in separate fires

JUNE 21 **UPDATED**





The top of the Well under construction.

HANDOUT

Thermal storage isn't new, but the sheer size of the water tank at the Well in Toronto is unique.

“There were a lot of questions about putting a two-million-gallon tank in the middle of the city and having it support the weight of buildings,” says Carlyle Coutinho, chief executive officer of Enwave Energy Corp. “But the technology is really just a hole in the ground that holds water. When people saw how it could work, the questions switched to ‘Why haven't we done this before?’”

The water tank is now being filled and tested, and it cools the water to near freezing to provide cooling in the summer. In cold months, the system switches to a hot water mode to recover and store waste heat from buildings on the downtown Toronto district energy system and distribute it through heat exchangers.

Toronto's district energy system is already the world's most extensive, connecting to more than 150 buildings in the core with a system that draws cold water from deep in Lake Ontario. It already displaces 55 MW of energy a year from the grid – equivalent to powering eight hospitals. The 1.5-kilometre extension to the Well will permit the system to continue to grow into the fast-developing commercial and residential zone west of downtown, Mr. Coutinho says.

“What may not be practical for one building becomes cost-effective when you're doing many buildings. So, the tank at the Well isn't just for this project but the whole community. These technologies can become affordable at scale without any intervention from the government,” he adds.

Enwave, jointly owned by IFM Investors and the Ontario Teachers' Pension Plan board, has district energy systems in Toronto, Markham, Ont., Charlottetown, London, Ont., and Windsor.

“We can absolutely aim for net zero. It has to happen to meet the targets for the future,” Mr. Coutinho says. “We will integrate technologies as they come up – and more and more will over time. But what's important is to be able to do them at scale, and that's what district energy is all about.”