

Two district energy systems in Markham north of Toronto service a diverse range of public and private buildings, including a condominium, data centres, schools and a hotel.

Pipe Dreams, Markham Realities

Markham had big plans in the 1990s for 1,000 acres of green fields just north of Toronto. The land, then punctuated with little more than a civic centre and hotel, was to become a new urban hub, eventually featuring more than 30 million square feet of residential, commercial and institutional buildings.

But there wouldn't be a boiler, chiller or cooling tower among them.

Instead, the buildings would rely on a central district energy system. Today, Markham District Energy thermally connects 7 million sq.ft. of commercial, institutional and residential space, providing 100% of their heating, cooling and domestic hot water loads. The clients include IBM Canada, Motorola and Honeywell, as well as condominiums by Tridel, Remington and Times, two secondary schools and a Hilton hotel. The YMCA, civic centre and a facility for the Pan Am Games are also tapping into the system. A second district energy system was commissioned last year to support the expanding Markham-Stouffville Hospital, a new community centre and other surrounding buildings.

Boilers and chillers at four natural gas-fueled energy centres feed 25 kilometres of 8" to 20" diameter water-filled pipes buried 1.5 metres below ground. There are four lines in all: a supply and return line for heating and a supply and return line for cooling. Markham District Energy supplies each customer with heat exchangers in their buildings to accept and transfer energy from the district system.

The two Markham systems now boast a combined 14,100 tons of cooling capacity, 48 MW of heating capac-



Left: two of the buildings hooked into the system, Markham Civic Centre (top) and Hilton Suites Hotel (above). Top right: energy transfer station in client building. Above right: Birchmount Energy Centre at Highway 407, one of two plants serving the 7-million sq. ft. system.

ity, 40 MWh of thermal storage, and 15 MW of combined heat and power.

The building owners and developers required some convincing to connect their buildings to the system. And Bruce Ander, P.Eng., president of Markham District Energy, admits that early opponents included consulting engineers who were reluctant to strip million-dollar heating and cooling packages out of individual projects.

"In North America, the competition is the status quo," he says.

Reliability hasn't been a problem. In 12 years there has been only one three-hour outage in the cooling supply, and that was caused by someone digging where they shouldn't.

Ander suggests that district energy systems could help to reinvent Can-

ada's growing suburbs. Heating and cooling account for more than half of an urban centre's energy needs, and he sees centralized systems as a better option than relying on building owners to generate power through rooftop solar arrays or wind turbines. "Building owners are not typically trained to run exotic equipment or even run conventional equipment at peak efficiency.... It's not their core competency," he says.

As well, district energy systems are not limited by a building's specific load profile. When energy is not needed in one location, it can be redirected to the next.

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John G. Smith owns WordSmith Media in Ajax, Ont.