



# IN THE LOOP

The latest news and updates from the Ontario Geothermal Association

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## SUSTAINING PARTNERS



**AECON**





## President's Message

Our collective efforts to minimize contact with each other have resulted in some reduction in the number of COVID-19 cases and fatalities. It may be difficult with the good weather beckoning us toward out-of-home events, however, I encourage everyone to maintain or even redouble your efforts to control the spread of this disease. One report indicates that it has mutated in a way that might make it even more contagious, so please be cautious.

### GOVERNMENT POLICY PLANNING

While we have all been indoors, the OGA and HRAI have been working with governments on another crisis of our time, climate change. The report below is a long read, but it is important. It's about our efforts

to meet (virtually) with key government policy personnel and help plan the details of a future that will enable the transition away from fossil fuels, protecting the health of our environment and our families, and also benefitting the geothermal heating and cooling industry.

I've noticed that governments are ready to become extremely active if they can learn about pathways that give them confidence. These developments have given me hope. Perhaps they will do the same for you, and I hope you will all stay safe and healthy.

*—Stanley Reitsma President and OGA Chair*

### GOVERNMENT POLICY PLANNING WEBINAR

During June the OGA and the HRAI, working with federal officials, continued the important detail work of designing a decarbonized construction sector. Natural Resources Canada (NRCAN) hosted a webinar featuring expert presenters that focused on the unique benefits of heating and cooling using ground source heat pump systems to meet energy efficiency and carbon emission reduction plans. In attendance were approximately 40 senior staff from NRCAN's Office of Energy Efficiency, CanMet ENERGY, Environment and Climate Change Canada, Treasury Board Secretariat, Infrastructure Canada and the Privy Council Office.

Highly informative presentations were delivered by OGA President Stan Reitsma and Vice President Jeff Hunter, Bob Wyman, a New York based consultant and advocate, and Martin Luymes, HRAI VP of Government and Stakeholder Relations. The purpose of the webinar was to provide information to key policy and program developers at the federal level about advances in geothermal technology, and to help dispel some historic misconceptions.

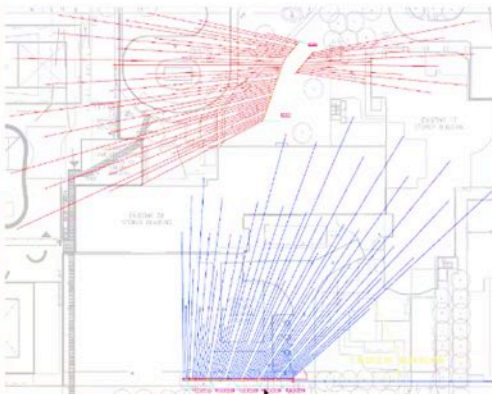


From the government's point of view, now is the time to gain a detailed understanding of the technologies and policies needed to reach greenhouse gas emission reduction targets, without dramatic negative impacts on our electricity system or on consumers and businesses. Bob Wyman pointed out that electricity system design decisions are highly influenced by peak electricity usage on the coldest and hottest days of the year.

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## Policy Planning...

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For this reason Jeff Hunter spent some time describing sets of weather conditions and showing case study data demonstrating the difference in coefficient of performance, or in other words, the efficiencies of ground source, air source and gas systems.

Stan Reitsma presented a study showing how the superior efficiency of geothermal heating and cooling makes a significant difference when converted to electricity consumption on the coldest days. One comparison showed peak usage by air source systems at twice as much as geo, and of course, gas was far higher than that. Said Stan, “Geothermal consumption patterns are more stable as well, because with ground source we can control the temperature of the fluid on the source side, but with air source you cannot, because no one can control the weather.”

### ELECTRICITY SYSTEM IMPACTS

Martin Luymes later addressed successful policies and noted that the efficiency comparisons were on the basis of “with all else being equal,” and that the impact of technology efficiencies on electricity system peaks was an important area for further research. These are the exact focus of studies recently initiated by Dunskey Energy Consulting, a well-known energy research company that advises numerous government entities, with reports expected soon.

Bob Wyman explained how efficiency differences formed the basis for a dramatic policy transition in New York State. Whereas fuel switching away from fossil fuels previously disqualified homeowners and business owners from energy efficiency programs, today it is the goal of such programs.

**Real world examples dispel a gas industry suggestion that widespread adoption of heat pumps will strain the power grid, and Dunskey Energy will soon release a formal research study to inform decarbonization decisions by policy planners.**

Policy planners changed course after finding that to meet decarbonization goals, the state had no choice but to focus on heat pumps, because building science implies that no alternative system is so efficient and capable of protecting both ratepayers and the environment. Bob explained ‘beneficial electrification’ and showed that ground source was particularly relevant, because in widespread adoption scenarios in New York it impacts the need for electricity system expansion the least.



# Policy Planning...

## INVESTMENT

Regarding the cost of systems, Stan explained that the heat pump part of a geo system is not much different in relative cost than air source heat pumps or gas appliances, but that the ground loop created most of the extra investment.

Bob then described the thinking change around cost that took place in New York during rate case presentations. He explained that when a geo user installs a system, the user pays for the loop and the hookup, yet when a gas user installs a system, these infrastructure costs are borne by the local government/utility/ratepayer. Geothermal users who use

When pressed by our OGA lawyer during an important hearing in 2016, Enbridge estimated a gas connection provided free to the user in rural Canada costs our system C\$ 26,500.

the most efficient energy technology are therefore subsidizing those who use less efficient technology, and in the case of gas, a system that damages our environment. He said that free gas hookups in New York cost the state between US\$ 5000 and US\$ 30,000. When pressed by our OGA lawyer during an important hearing in 2016, Enbridge estimated that a gas connection provided free to the user in rural Canada costs our system C\$ 26,500.

During the webinar Bob also noted that utility companies in New York don't make much margin on the gas itself, with ROI on the pipes in the ground being their main source of earnings. If they laid geothermal loop instead of gas service they would still be in a pipes-in-the-ground business. Given that gas lines have a useful life of up to 85 years, and the State has a goal to decarbonize within 30 years, further investment in gas lines would be an investment into assets that would become stranded.

New York utilities are now in the process of investing \$480 million in heat pump programs by 2025. These efforts are expected to save 3.6 trillion BTUs. Hundreds of geothermal systems have been completed in the last two years, including a large proportion that are retrofits. Thousands more are expected to be installed.

## SUCCESS STORIES

Stan also updated officials on technology advancements, the wide applicability of ground source technology and industry growth in the commercial, institutional and multi-family areas. He provided technical drawings of Lillian Park, a very large project in Toronto. Geothermal is serving two large new apartment towers on the project, plus an older existing seniors home. He explained that there was very little surface land to work with, but that modern drilling practice was employed to angle boreholes into a spread formation beneath the buildings. This case example helped policy planners to understand the broadening capability of ground source heating and cooling technology.

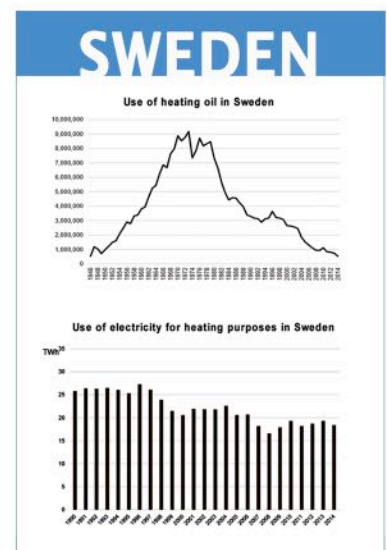
Martin Luymes provided a useful historical case study on how Sweden made the choice to move from fossil fuels to encouraging and supporting widespread adoption of ground source systems. Training and user incentive programs were reinstated more consistently and since 1994 sales of heat pumps have totalled about 40% to 70% of sales.

Currently more than half the homes in the country are heated and cooled by heat pumps.

Martin showed a map of neighbourhoods with many boreholes to dispel the myth that the ground cannot support widespread adoption.

In 1975 the country was using more than 9 million cubic metres of heating oil, and by 2014 this dropped to about one-half million with corresponding reductions in greenhouse gas emissions.

**Nevertheless, electricity use did not increase.** It went down nearly 30%, helped partly by improving heat pump efficiencies. Some the key points are that power grid managers were able to adapt, the country eliminated its dependence on imported oil, and homes and businesses saved a lot of energy cost, which in Europe is significant compared with North America.



## Other News

### MEETING WITH ONTARIO MPPS

The HRAI has been arranging meetings with MPPs in different Ontario regions and inviting HRAI & OGA members to attend them. In addition to their duties in their ridings, MPPs and cabinet ministers serve on Standing Committees that review, proposed legislation and other issues.

Members can volunteer to attend some future meetings, which will include: Min. Doug Downey, MPP Barrie-Springwater-Oro-Medonte; MPP Ghamari Goldie, Carleton, and MPP David Piccini, Northumberland-Peterborough South. If you are interested in participating in these meetings, or with your local MPP, please contact Dorothy McCabe, at [dmccabe@hrai.ca](mailto:dmccabe@hrai.ca), or call 905-602-4700 ext. 274.

### BOSTON UNIVERSITY PROJECT

Boston University's new 19-storey Center for Computing and Data Sciences, designed by KPMB Architects will be carbon neutral and fossil fuel-free, with no gas lines connected to the building. Instead it will be heated and cooled with the help of

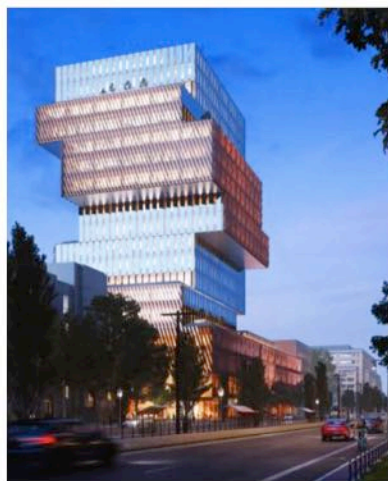


Image: courtesy KPMB Architects

31 geoexchange boreholes, each 1500 feet deep. The project supports the university's goal to bring all of the buildings on its 135 acre footprint to carbon neutrality by 2040. This in turn supports the City of target to meet carbon neutrality by 2050.



### EVOLV1

The Evolv1 project is a great case example that was completed last year in Waterloo, Ontario. The 3-storey, 110,000+ square foot office building's heating and cooling system draws energy from an open loop water source geothermal system. It taps into the

Dundas Valley Aquifer, located more than 350 feet below the surface. An 8-inch supply well and an 8-inch return provide 300 tons of cooling and heating at 360 gallons per minute. A separate 6-inch well was added to monitor the aquifer.

The conditioning water is pumped into a heat exchanger, which supplies two Aermec NXP heat pump chillers, which in turn supply hot water and chilled water to the 55-ton make-up air unit and 5-ton atrium air handler. The Aermec NXPs are multipurpose indoor units operating on R410A refrigerant, designed to provide simultaneous, independent requests for hot and chilled water all year round, which saves energy.

Condenser water is also supplied to nine Mitsubishi VRF heat pumps. Thermal heat is conveyed from condensing units out to 18 fan coil ports which distribute heating and cooling through about 120 variable speed modulating fan coils in sizes ranging from 1.25 tons to 4 tons. There are also Solarwall sections on the south side of the building and mechanical penthouse walls, feeding pre-warmed air into a Haakon make-up air unit. It uses a 6-foot diameter energy recovery wheel to transfer heat to incoming fresh air. The entire mechanical system is controlled by a Carrier I-Vu building automation system.

The building saves water by collecting rainwater in a large cistern and supplying it to toilets for flushing; and with low-flow plumbing fixtures. Windows are triple pane and the LED lighting system dims automatically with the help of occupancy sensors. Instantaneous electric hot water heaters supply domestic hot water to bathroom groups on each floor, and the kitchen.



## Brickworks innovators think geo will grow rapidly

The Don Valley Brick Works dates back to 1889, making bricks for Toronto buildings for about 100 years until the clay was finally depleted. The site is now managed by Evergreen, a non-profit that is responsible for the Future Cities Canada project, a national collaborative working to accelerate innovation in cities. The brick ovens and other elements remain intact, as part of a heritage designation, and Evergreen has developed event space, indoor and outdoor fun areas for families, historical installations, shops, cafes, and one of the biggest farmers' markets in the city.

The heritage designation and inherent characteristics of the buildings created challenges for the design team, says Engineer Ali Anvari, who oversaw improvements. "We decided early that the buildings should become carbon neutral, but we could only get permission for three inches of insulation on the roof." He is talking about the biggest structure (53,000 square feet), which is shaped like a big barn with air stratification challenges.

"We wanted to avoid gas heating. The best option was geo thermal, but we had a small slip of ground area on the east side in which to install a geofield," says Anvari. "We finally found Geosource Energy who did it with vertical angled drilling, under the building. They installed 40 boreholes about 600 feet deep."



"We were excited to work with Evergreen, Ellis Don, and Brookfield Global on this showcase project," says Paul Frith, Sales Director for Geosource Energy. "We brought in a special new rig, that got the job done."

The complex will also be adding 275 solar thermal panels, which will supplement the geothermal plant. This will allow conditioning of more of the Brickworks buildings, especially the second biggest one, which is currently heated by gas boilers.

The team is also looking at solar photovoltaic and electricity storage to further reduce the GHG footprint and operating costs. Says Anvari: "In the near future geothermal and some of the other innovative solutions at the Evergreen Brickworks will be common elements in most of Canada's buildings."

### PROJECT INFORMATION

Customer  
**Evergreen Foundation, Toronto**

Project  
**Evergreen Brickworks in the Don Valley floodplain**

OGA member - Installer  
**Geosource Energy, Caledonia, Ontario**

Tech details  
**Forty boreholes, 600 feet deep  
angle-drilled under the building**

Outcome  
**Greenhouse gas reduction and operating savings.**





# 12 months geo industry branding with SPP

The OGA Sustaining Partner Program (SPP) is an opportunity for geothermal marketing pros to strengthen ties within the built environment community. It offers 12 months of brand promotion for one low annual fee. Sustaining Partners receive unparalleled exposure of their brands to a tightly targeted marketplace.

In addition, Sustaining Partners benefit by supporting the critical activities of the OGA, the industry's main trade group, at a time when we need some help. Your benefits include government advocacy, professional development, industry partnership synergies, special and social events, best practices, standards work, and much more.

## THREE WINS WITH A DISCOUNT!



Top marketers optimize ROI with unified messaging and brand building. You can become an OGA Sustaining Partner, Conference Sponsor and OGA Member, demonstrating exemplary commitment to our industry and to sound marketing savvy. Due to the quality of your involvement from a targeting perspective, your return on investment is tremendous. And we want to boost the value of your triple win even further, so for a limited time, we are offering OGA Members who invest as both Sustaining Partners and Conference Sponsors in the same year, a 10% discount off both! Get more info on our web site or call Paul at 647-287-5554, or Jeff at 519-854-8986.

## Free E-Newsletter Subscription

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## OGA Membership

Take advantage of member benefits such as province and nation-wide recognition on HRAI's online contractor locator, discounted OGA conference rates, exclusive industry deals & HRAI news updates. Learn more [here](#) or get in touch by contacting 1-(800) 267-2231 or [sales@hrai.ca](mailto:sales@hrai.ca).

## New & Current Members

Check out our list of current OGA member companies and brand new member recruits [here](#).

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## More Information

Contact [office@ontariogeothermal.ca](mailto:office@ontariogeothermal.ca) for more information on the Ontario Geothermal Association.

## Association Partner

