

Township of Langley: Geoexchange heating system

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Langley's geoexchange heating system. Source: Township of Langley.

The Project

In May of 2010, the Township of Langley (population, 104,177) began operation of a new geoexchange system. The system uses a pump to draw heat from treated well water that is then used to heat and cool the Aldergrove Water Treatment Plant. The system has an overall ground source heat pump efficiency of 300 per cent, much higher than the 80 per cent efficiency for gas-fired heating units. Prior to this geoexchange retrofit, the plant used natural gas to meet its heating and cooling needs.

The project has proven its utility over time: in 2009, the plant's greenhouse gas (GHG) emissions from natural gas were 91 tonnes. In 2010, when the geoexchange system became

BY THE NUMBERS

Project type: Geo-exchange heating
Year of implementation: 2010
Lifespan of the Project: 20 years
Cost: \$136,000
GHG savings: 80 tonnes of CO₂e per year
Financial Savings: \$6,455 in natural gas costs

operational, this number was reduced to 34.1 tonnes. In 2011 it was 8.5 tonnes.

Project Motivation

The Township of Langley has publicly committed to work towards reducing its GHG emissions through programs such as the Partners for Climate Protection program (joined in 2001), and the Climate Action Charter (signed in 2007). The Township also adopted its own sustainability charter that committed the Township to utilizing local and renewable energy sources. These public commitments to reduce GHG emissions were a significant motivator for the geoexchange project.

The Township also saw an opportunity with the geoexchange system to reduce the amount of natural gas it purchased per year. Langley was spending upwards of \$10,000 per year on natural gas to heat this unoccupied building. With the carbon tax in place, and with a possibility of it increasing in the coming years, the financial case for the project was made. As well, the number of offsets it needed to purchase after installing a less carbon-intensive heating system were reduced.

Overcoming Barriers

Langley reported that there were minimal barriers for this project. Both Township Council and local citizens were supportive of it. Other stakeholders, like the Fraser Health Authority (FHA), were interested in the project because it was extracting water from the ground to treat and distribute it to residents for potable water use. The Township had to make sure the FHA was supportive in order to get the necessary approvals to run the treated water through the heat exchanger prior to sending it out to residents for consumption. They had to demonstrate that there was no interface between glycol and the drinking water, and that there would be no contamination.

Building Community Support for Projects

Prior to adoption of Langley's Sustainability Charter, there was an extensive community engagement program, including a sustainability expert panel, community workshop, and open houses. One environmental goal of the Sustainability Charter is to reduce energy consumption with an associated objective to promote use of local and renewable energy.

In 2010 the Township completed a draft Community Energy and Emissions Plan (CEEP), based on public consultation using focus group meetings and online social media. The geo-exchange project is consistent with the overall intention of the Sustainability Charter and draft CEEP, and both documents were completed after extensive community involvement. Residents of Langley are generally supportive of the new geoexchange system, as it fits well with the Township's long-term goals to reduce its GHGs.

Impact of Provincial Policies, Programs and Grants

Both the carbon tax and the carbon neutral requirements (via the Climate Action Charter) helped Langley make the business case for the geo-exchange system — of the \$12,000 in avoided natural gas costs to the system, an additional \$2,500 was avoided in carbon tax payments (i.e., at \$30/tonne for just under \$1.50/GJ of natural gas). Additionally, it avoided \$2,000 of annual carbon offset purchases.

The Climate Action Revenue Incentive Program (CARIP) grant has been an important piece of the carbon tax policy for Langley as well.

According to Ryan Schmidt, community energy manager for the Township of Langley,

"In our community, we direct that money [CARIP] into future energy efficiency projects and to date, it's paid for some really great stuff including enhancing energy efficiency in new boiler equipment that is being installed in our pools, and it's also going to fund the EV (electric vehicle) charging stations that will be installed this year".

As CARIP has allowed the Township to dedicate those funds to energy efficiency projects, Langley would like to see the continuation of the carbon tax as one policy that can help them achieve their GHG reduction targets, as well as its climate action goals more broadly.

Summary

Overall, the geoexchange heating retrofit has been very positive for the Township of Langley. This project is helping them achieve their goals with respect to the Township of Langley Sustainability Charter, and their commitments under the Climate Action Charter.