Guelph, Ontario, Canada

JUNE 2022

Heating in Cold Climates with Cleaner Energy

Background

The West End Community Centre (WECC) is a key community hub that has ice rinks, pools, public library, community rooms, gymnasium and a fire station. During the height of the COVID-19 pandemic, WECC was assigned as a vaccine clinic. WECC functions as a cooling centre during heat warning events. Existing natural gas fired HVAC equipment at the WECC were nearing end of life. Low carbon design was employed to right-size equipment, introduce energy recovery, and replace with air-source heat pumps.

Project description

By further conserving energy and choosing cleaner sources, the City of Guelph is planning to reduce carbon emissions and use 100 per cent renewable energy for all municipal facilities, fleet and operations by 2050. This directly supports the City of Guelph's community net zero carbon target. 17 roof top HVAC units at the West End Community Centre (WECC) were upgraded with new units that were right-sized, recover waste heat, are better insulated, and use air source heat pump technology instead of natural gas to heat and cool the community centre. This significantly reduces the GHG emissions of the community centre while keeping it comfortable inside. The City of Guelph is using this as a template for other municipal buildings within the portfolio and are sharing the findings with other commercial and institutional building owners. This is an application that has far reach across many sectors and is an effective way of reducing building GHG emission.

Fast Facts

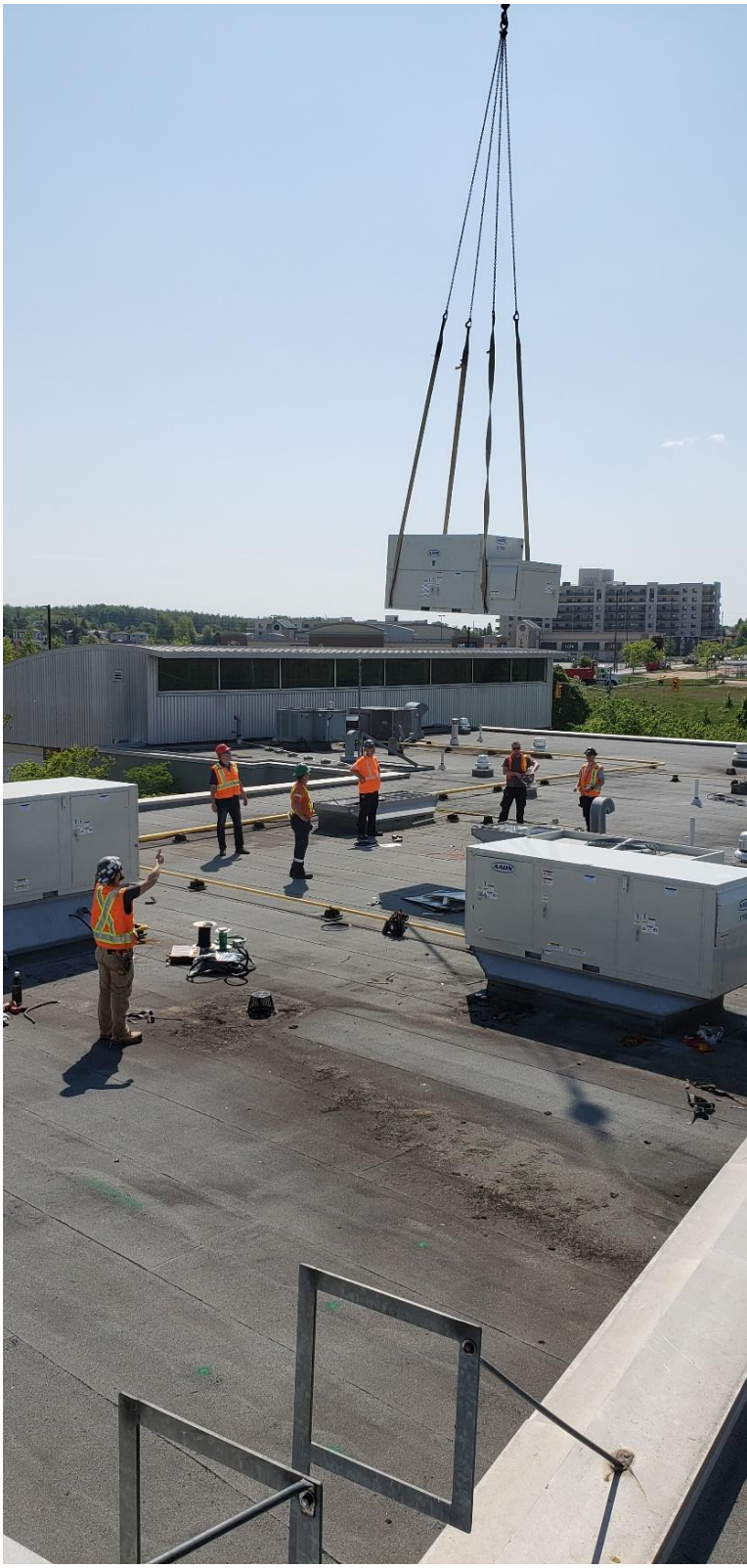
- **Mayor:** Cam Guthrie
- **Population:** 131,800
- **GCoM member since:** 2018
- **Project name:** West End Community Centre Air Source Heat Pumps
- **Project category:** Mitigation and Adaptation
- **Annual GHG saved:** 708 CO2 tonnes/year
- **Year implemented:** 2021/2022
- **Cost:** $1,750,000
- **Finance/funding:** Municipal revenues

IMPLEMENTATION AND FINANCE

The project was led by the City of Guelph's Energy and Climate Change Division, in partnership with the Corporate Building Maintenance and Culture and Recreation teams and support from the Corporate Communications. It cost $1,750,000, financed by municipal revenues.

Preliminary design was focused on the objective to strive for energy efficiency and reduce GHG emissions. External mechanical and structural engineering design services were retained to perform heating and cooling load calculations, assess electrical infrastructure, and perform structural review. Mechanical design and unit selection was informed by the maintenance team of strategies and constraints to reduce maintenance effort and extend equipment lifecycle. High performing units were selected to achieve energy targets. Electrical design required minimal upgrade for the new equipment. Some structural reinforcements were required to resolve past construction deficiency.

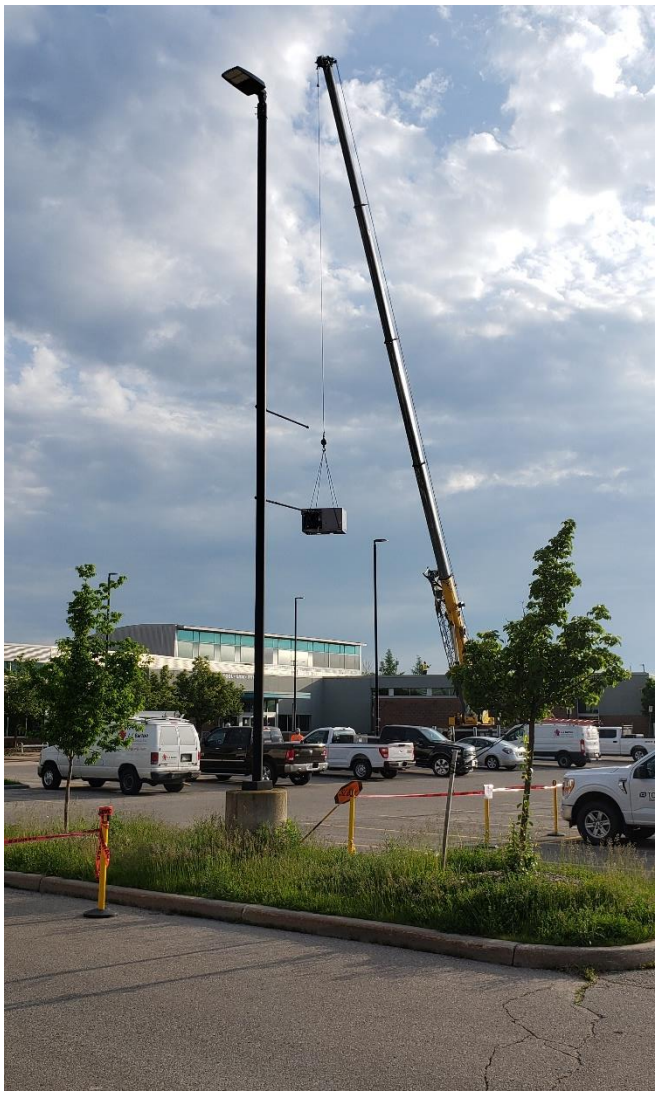
Careful consideration and rigour was employed to select an installation contractor due to the complexity of the project. Given the high community usage of the WECC, interruptions to programming was to be minimized as much as possible and health and safety was paramount. Craning equipment onto the roof posed a significant challenge due to the orientation of the facility and the combination of equipment weight and extended reach for the landing locations. Project construction is also in the midst of the global supply chain slow down, plans and schedules were constantly adapted to uncontrollable delays.



Although not the flashiest initiative, I am amazed at how effective this project was at reducing GHG emissions and how this can be replicated to many other buildings. I'm excited to share our learnings with all other sectors so we can all work together to fight climate change.

- Bryan Ho-Yan Manager Corporate Energy and Climate Change, City of Guelph

RESULTS AND LESSONS LEARNED



MAIN RESULTS

The HVAC equipment has been successfully commissioned. The new equipment reduces natural gas consumption by over 390,000 m^3/year and eliminates over 708 CO2 tonnes/year. Work is currently underway at other facilities to replicate this successful upgrade and further reduce GHG emissions.

KEY LESSONS

- Air source heat pumps are a cost-effective method to reduce building GHG emissions.
- Air source heat pumps are an application that has far reach across many sectors.
- Have strong partnerships in the project team to adapt to challenges from all directions.
- Set GHG emissions reductions at the start and carry them through to the end.
- Communication is key to getting everyone coordinated.

"It's one thing to talk about climate change and set targets, but it's vital to follow through and take action. This project is an example of how Guelph is walking the talk. This community centre is a much-loved and busy place. I'm proud that by using technology, staff implemented a project that is significantly reducing emissions."

-Mayor Cam Guthrie, City of Guelph

Acknowledgements

We would like to thank the City of Guelph and partners for sharing this case study.

At GCoM we like to encourage our signatories to share their climate action. If you have any case studies or interesting project, get in contact with us through email or other channels.

Funded by the European Union

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