# City of Vancouver's Kitsilano Community Centre cuts emissions by over 80%

Kitsilano Community Centre is a popular neighborhood recreational facility located in Vancouver. The multiplex facility incorporates a hockey rink, a gymnasium, a fitness centre, multipurpose community rooms, a whirlpool and offices.

The City of Vancouver enlisted Prism Engineering (Prism) to conduct a recommissioning (RCx) investigation study for the Kitsilano Community Center. This revealed control measures to enhance HVAC efficiency, optimize operation, and also identified capital upgrades that had potential to reduce over 80% of the site's emissions.

The centre's HVAC system included the hydronic system from the building's original construction, three over-sized boilers and supplemental gas-fired air handling units that were added during retrofits. While these components "got the job done", they overlapped in terms of heating capacity and service area, which made the HVAC system oversized and inefficient. With major components past their expected useful life, this was an opportunity to upgrade the facility to a single HVAC system, remove excess heating capacity and take advantage of waste heat from the facility's ice rink. With a strong business case, the City presented Prism's findings and received stakeholder buy-in for this deep carbon retrofit.

In 2017, Prism prepared a detailed design and specifications to retrofit the HVAC systems in both the rink and the community centre facilities, with an integrated ice plant heat recovery system connected to a central heating plant serving the two buildings. The project was constructed in 2018 and was fully commissioned in the fall of 2018.

> **Prism Engineering has been an ideal partner in designing an electrification project that can act as a demonstration for others and assisting with the commissioning process to ensure success.**
>
> Craig Edwards, Manager of Energy and Utilities, City of Vancouver

"By replacing old inefficient natural gas fired boilers and other heating equipment with a new heat pump system that uses waste heat from the arena to heat both buildings, the project will help the City in achieving its aggressive goals of lowering the GHG emissions from its portfolio of buildings", says Craig Edwards, Manager of Energy and Utilities, City of Vancouver.

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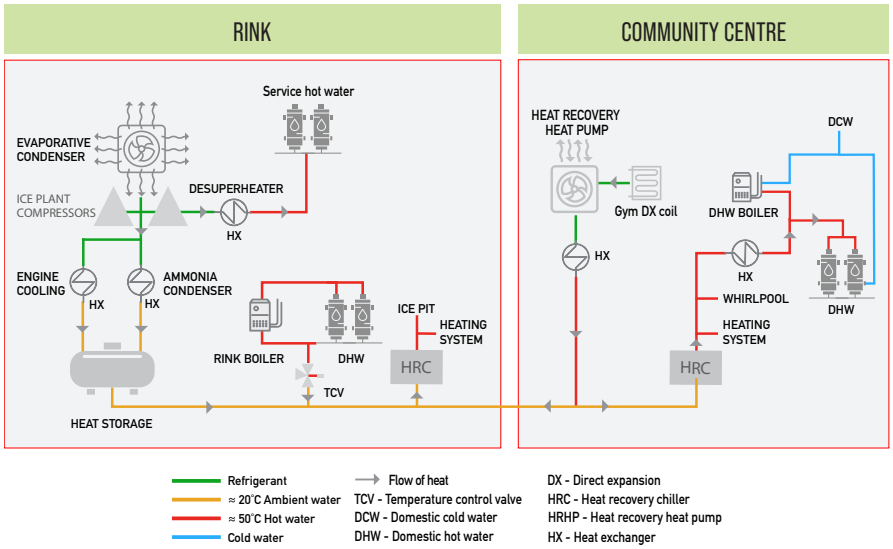
## Innovative Heat Recovery System

To optimize performance, variable flow heat recovery chillers were installed to allow continuous chiller operation at design load as well as partial load.

The new heat recovery system was designed to be the primary heating system for the complex. The existing rink boilers are reconfigured to provide supplementary heat to the source side of the heat recovery system in the event heating load exceeds ice plant heat rejection. In this configuration, the boilers cannot supply heating water to the buildings' heating systems directly, making the heat recovery chillers the primary source of heat. The energy savings will be sustained since the heat pumps cannot be bypassed.




## Optimizing Controls

The greatest challenge for this project was the control integration between the equipment's internal control and the central building automated system. Detailed specifications and coordination of the control systems integration was the key to properly commissioning the system and achieving the expected performance. This included onsite reviews and optimization of specific settings within the equipment controllers.

## Natural Gas Savings

Commissioned in 2018, the project cut natural gas use by over 98% for heating during ice season.

**3,800 GJ/year**
natural gas savings

**82% GHG**
emissions reduction

The remaining natural gas use is from domestic hot water, which is expected to be reduced once the gym heat recovery heat pump is operating.