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Subject: Kitsilano Heat Recovery Heat Pump Electrification Case Study

Attachments: Prism-Kits-Community-Centre-Case-Study.pdf

Good Evening Mayor and Council

I thought you might be interested in our recently installed Kitsilano Community Centre Heat recovery project. It was completed year ago and has reached:

1. almost 100% self-sustained heating (both buildings are heated from the waste heat recovery) AND
2. GHG emission reductions of 82%

Please find attached a case study.

Best

Sadhu

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Pronouns: he, him, his



The City of Vancouver acknowledges that it is situated on the unceded traditional territories of the Musqueam, Squamish, and Tsleil-Waututh peoples.



Kitsilano Community Centre cuts greenhouse gas emissions by over 80%



In 2015, the City of Vancouver (COV) enlisted Prism Engineering Limited (Prism) to conduct recommissioning (RCx) investigation studies for six of their community centres, COV's top greenhouse gas emitters. COV aspired to improve the existing building systems' performance. The RCx study at Kitsilano Community Centre revealed control measures to enhance HVAC efficiency and optimize operation, and also identified capital upgrades that had potential to reduce over 80% of the site's emissions, which aligned with COV's aggressive emission reduction targets.

Kitsilano Community Centre's HVAC system consisted of a combination of original construction hydronic system, three oversized boiler systems and supplemental gas-fired air handling units that had been added in previous retrofits. The systems installed during previous retrofits overlapped with the original system, in terms of service area and heating capacity, making the HVAC system oversized and inefficient. With major components that were past their expected useful life, there was an opportunity to perform a deep retrofit that integrated the whole facility into a single system, removing unnecessary equipment heating capacity, while taking advantage of the ice rink waste heat. With a strong business case, the City was able to present the project's benefits and get stakeholders buy-in.

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 by October 2018.

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.

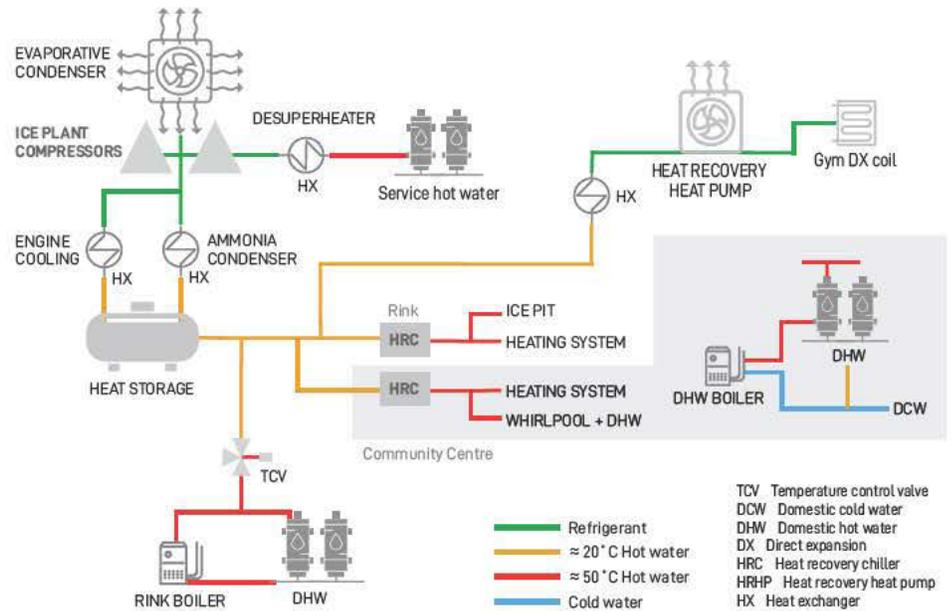
Through the review process, a total of 18 RCx measures and major capital energy conservation measures were identified and analyzed, including:

- HVAC control improvements;
- Boiler plant re-piping to enhance condensing efficiency;
- Ice plant control improvements;
- Heating plants integration with heat recovery chillers (ammonia plant heat recovery), recovering heat to the building HVAC system, DHW and snow pit.

Innovative Heat Recovery System

The new heat recovery system was designed to be the primary heating system, where the existing rink boilers are reconfigured to provide supplementary low-grade 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 can not supply heating water to the buildings' heating systems directly, making the heat recovery chillers the primary source of heat that cannot be abandoned in the future.

Variable flow heat recovery chillers were installed in the building to optimize performance and allow continuous chiller operation at design load, as well as in conditions requiring partial load operation.

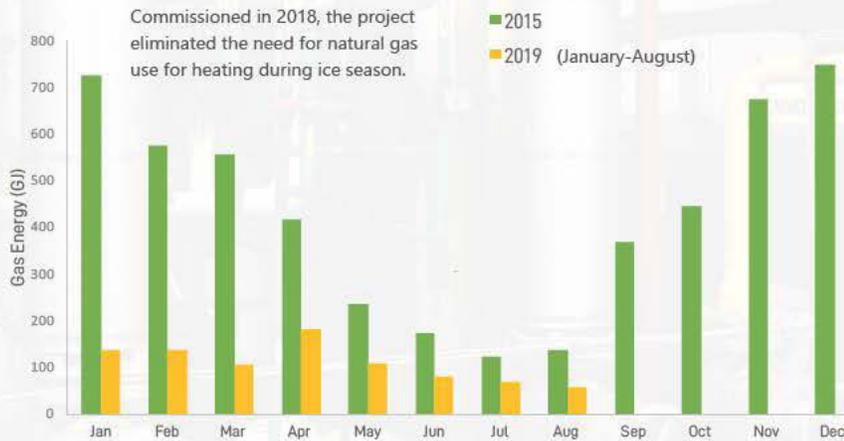


Optimizing Controls

The greatest challenge in projects with a similar configuration is in the control integration between the equipment's manufacturer internal control and the central building automated system.

Detailed specifications and coordination of the control systems integration, including specific settings integrated controllers, was the key to properly commissioning the system and achieving the expected performance.

NATURAL GAS SAVINGS



4,000 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.



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From design to implementation, we provide energy management, electrical and mechanical engineering, utility monitoring and sustainability consulting to help our clients create a greener, more energy efficient world.

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