



# North Vancouver School District Brooksbank Boiler Upgrade 2013



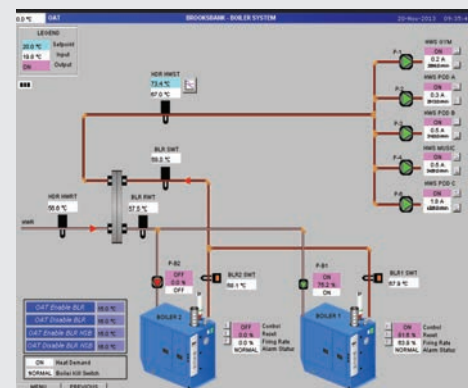
Compared to other elementary and high schools in North Vancouver, Brooksbank Elementary was one of the highest fuel-using schools based on area. North Vancouver School District (SD#44) decided to upgrade the boiler plant, and use this opportunity to reduce future carbon emissions by optimizing the heating system for the school.

## Upgrades as opportunities for energy efficiency

Upon the initial review in the fall of 2012, clear issues with the boiler plant operations were observed, including the system controls, the equipment condition, and the undersized heating capacity. Working with Prism Engineering, the team expedited design and construction in order to capitalize on funding opportunities available through the Carbon Neutral Capital Program. Meeting the funding deadlines required a plant upgrade in the midst of the heating season, requiring detailed construction coordination using a phased approach.

### Technical details:

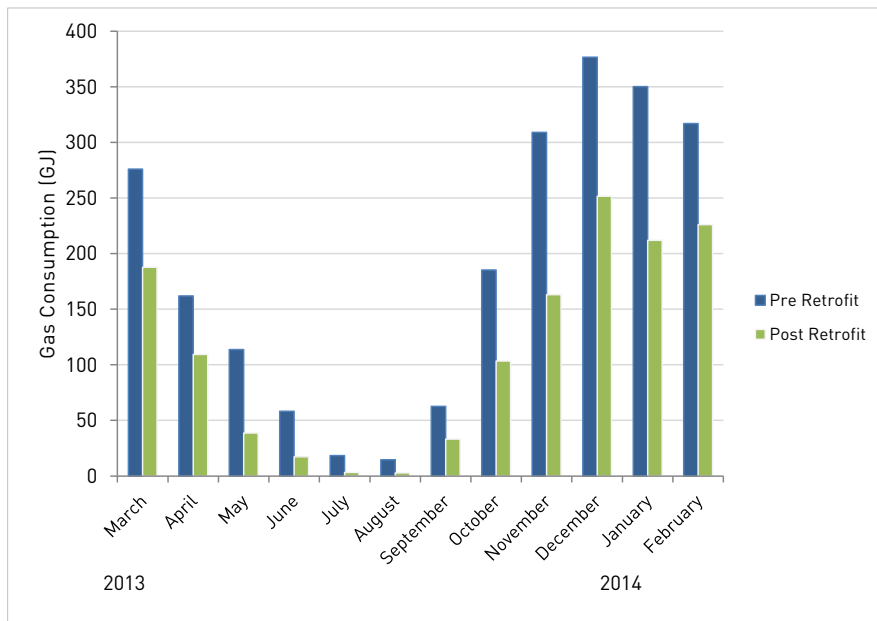
- » A low loss header was installed to ensure independence between the primary and secondary loops of the heating system.
- » Matching the variable flow rates between both loops effectively eliminates mixing between the supply and return, which optimizes the potential for condensing in the variable-flow, low-mass boiler system.
- » The latest technologies were used in the upgrade including condensing boilers and Electronically Commutated Motor (ECM) pumps.



An upgrade to the building's DDC controls allowed for heating demand feedback from each system zone. The critical zones within the school are identified and the system flow and temperature are reset based on the building heating demand. This control strategy drives the supply and return water temperature as low as possible, increasing the condensing boiler efficiency.

## It's all in the numbers

The boiler upgrade concluded in February 2013, and the savings were immediately apparent. The chart shows the pre-retrofit monthly usage (adjusted for weather) (blue bars), where the annual consumption totals 2,244 GJ/year, while the post-retrofit monthly usage (green bars) drops to a total of 1,348 GJ/year—leading to an annual natural gas savings of 896 GJ or 40%. This project also significantly contributes to NVSD's reduction in carbon emissions.



**40% NATURAL GAS SAVINGS** | **45 TONNES OF EQUIVALENT CO<sub>2</sub>** | **\$9K SAVINGS ANNUALLY**

On an annual basis, this boiler upgrade will save an estimated 45 tonnes of eCO<sub>2</sub>, equivalent to \$1,117 in BC carbon charges<sup>1</sup>. In terms of energy cost savings, this project will reduce natural gas payments by approximately \$9,300 annually<sup>2</sup>.

Not only has the boiler upgrade led to significant energy savings, the operational issues initially observed are no longer a concern, and occupant heating complaints have been greatly reduced.



### Partnerships

The boiler upgrade at Brooksbank Elementary was assisted by the funding provided by the Carbon Neutral Capital Program and Fortis' Efficient Boiler Program.



Savings calculations & case study prepared by



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<sup>1</sup> at \$25 per tonne

<sup>2</sup> based on an average of monthly prices from Oct 2013-Feb 2014