

5/30/2018

2017 Carbon Neutral Action Report



Learning that Enriches the Life
of Each Student

School District No. 57 (Prince George)
PROVINCE OF BRITISH COLUMBIA



School District No. 57
(Prince George)

www.sd57.bc.ca

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2016 Carbon Neutral Action Report

School District No. 57 (Prince George)

This Carbon Neutral Action Report for the period January 1st to December 31st 2017 summarizes our emissions profile, the amount of offsets purchased to reach net zero emissions and the actions we have taken in 2017 to reduce our greenhouse gas emissions.

By June 30, 2018, School District No. 57 (Prince George) will again declare itself to be carbon neutral and this Carbon Neutral Action Report will be posted to our website at www.sd57.bc.ca.

Executive Summary

School District No. 57 (Prince George) has been carbon neutral since 2010.

In 2017 we have continued our efforts to reduce our carbon footprint by;

- upgrading inefficient, atmospheric type gas fired boiler systems with high efficient condensing units
- optimizing the use of condensing boilers by installing new low temperature terminal units and coils
- exchanging lighting systems across the district with LED technology
- installing variable frequency drive systems to reduce energy consumption on HVAC fan units
- optimizing the building automations systems to improve operation and reduce energy use

By reducing our gas and electricity consumption we have reduced our carbon footprint. We will return these savings for use on more sustainability projects, which will result in further reductions to our carbon emissions and cost savings to the district.

For the year 2017, our District's total emissions were 5520 tCO₂e.

I am pleased to present the following report outlining our efforts forward, to become carbon neutral.



Barry Bepple
Energy & Sustainable
Conservation Coordinator

Emissions and Offsets Summary Table:

School District No. 57 (Prince George) GHG Emissions and Offsets for 2017 (TCO2E)	
GHG Emissions created in Calendar Year 2017	
Total Emissions (TCO2E)	5520
Total Offsets (TCO2E)	5508
Adjustments to GHG Emissions Reported in Previous Years	
Total Emissions (TCO2E)	89
Total Offsets (TCO2E)	0
Total Emissions for Offset for the 2017 Reporting Year	
Total Offsets (TCO2E)	5597

Retirement of Offsets:

In accordance with the requirements of the Greenhouse Gas Reduction Targets Act and Carbon Neutral Government Regulation, School District No. 57 (the Organization) is responsible for arranging for the retirement of the offsets obligation reported above for the 2017 calendar year, together with any adjustments reported for past calendar years. The Organization hereby agrees that, in exchange for the Ministry of Environment ensuring that these offsets are retired on the Organization's behalf, the Organization will pay the associated invoice to be issued by the Ministry in an amount equal to \$25 per tonne of offsets retired on its behalf plus GST.

Executive sign-off:

M. Marquis-Foster 180528
 Signature Date

Marilyn Marquis-Foster Superintendent.
 Name (Print) Title

2017 Greenhouse Gas Emissions

For the 2017 calendar year, School District No. 57's greenhouse gas emissions (GHG) were 5,520 tonnes of CO₂e.

The following summarizes the greenhouse gas emissions by source:

Out of Scope Emissions

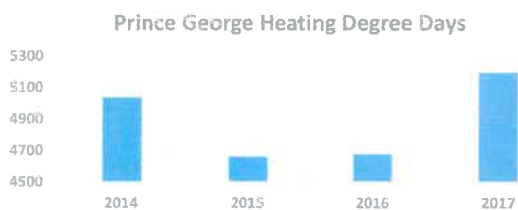
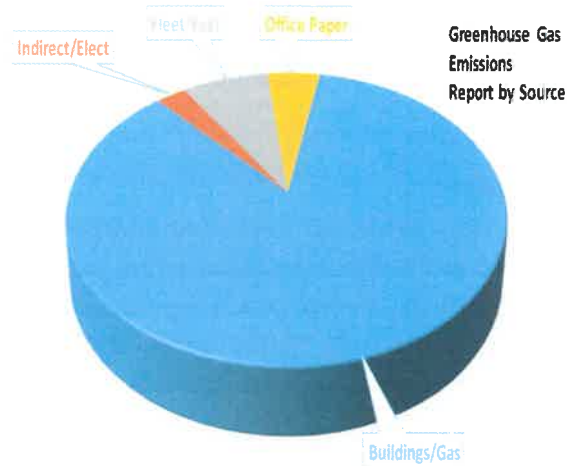
Out-of-Scope Emissions include refrigerants: R-22 (HCFC), R-401a (HCFC), MP-39 (HCFC). Fugitive emissions are estimated to be less than one percent of the District's emissions based on the refrigerant recharge amounts of R-134a and R-404a (HFCs) in the year 2017. Thus, these emissions are deemed to be out of scope and have not been included in the total District's greenhouse gas emissions profile.



Emissions Sources	2015	2016	2017	2017 vs 2016
Buildings	4440	4322	4698	8.7%
Indirect	134	143	147	2.8%
Fleet	388	379	412	8.7%
Office Paper	254	240	251	4.6%
Exemption	-12	-12	-13	
Adjustments	0	0	89	
Total Emissions	5204	5072	5520	8.8%
HDD	4662	4678	5200	+11%

Offsets Applied to Become Carbon Neutral in 2017

The total emissions offset applied to become carbon neutral is 5,597 tCO₂e which includes an offset exemption of 13 tCO₂e for Biomass emissions and 89 tCO₂e for adjustments for previous years. The net offsets purchased costs the District \$146,921.25 including GST.



Annual Heating Degree Days for Prince George—data provided by princegeorgeweatherstats.ca

Heating degree days (HDD) indicate how much energy is required to provide heating compared to another year. Utilizing this information we can normalize weather to find out if our emission reduction projects are working. The data indicates we used 8.8% more energy in 2017 than 2016, while our HDD were 11% greater. Our largest emission source is Natural Gas and Propane Gas, used for heating, which is a reason we emit as much as we do.

Emissions Reduction Programs

2017 emission reduction projects involved the continuation of replacing equipment that was end-of-life, had a high cost to operate, and contributed to our overall greenhouse gas emissions. Much of the work involves removal of hazardous materials, old equipment, and bringing new building management controls and operation online for the new equipment.

Since our largest emissions source is Fossil Fuel heating equipment, our efforts are targeted towards making this equipment the most efficient possible. Utilizing the most modern, available, Building Management Systems (BMS) Direct Digital Controls (DDC), coupled with condensing, or high efficient boilers and furnaces, we aim to reduce our carbon footprint as much as possible. All equipment is able to be controlled remotely through our Wide Area Network (WAN) and will utilize a new style of graphical interface so that the entire BMS operation is subject to scrutiny at a glance, anywhere in the world. Further reporting features enable us to capture and display information over a time period. This enables us to find problems, correct them, and return the equipment back to full operation more efficiently than was previously possible.

New benchmarking standards compare each building through online data collection software called AssetPlanner. By comparing the consumption data, carbon footprint and trends of the building operation over a long period of time, we can find out if the facility is performing as expected. Data from other school districts, across Canada, is analyzed for further use and comparison through the Energy Star Portfolio Manager software.

Heating Ventilation Air Conditioning

McBride Secondary

Continuing on the success of past projects, we replaced the propane fired atmospheric boilers at McBride Secondary with new condensing boilers and DDC systems in the summer of 2017. The existing boiler and storage tank for the domestic hot water was removed and an ultra high-efficient hot water tank installed.

Reducing the amount of propane gas we burn reduces the amount of emissions at the same time, while giving us savings in our utilities budget.

Harwin Elementary

Five atmospheric natural gas boilers were removed and six new condensing boilers were installed to reduce the carbon emissions at this particular elementary school. The old boilers were failing, costing more to repair, so this was a good time to upgrade this particular infrastructure. Further updates to the DDC, BMS ensured that the heating plant will run efficiently for many years.

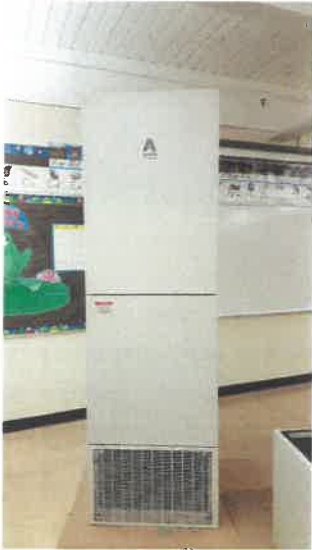


Old atmospheric boilers vs new condensing versions

Heating Ventilation Air Conditioning

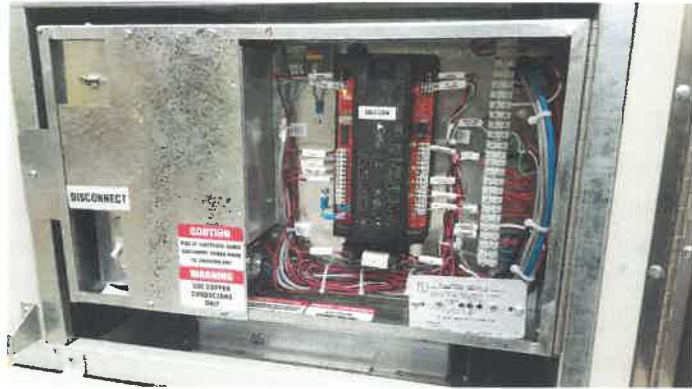
Blackburn Elementary

Replacement of the terminal classroom unit ventilators, hallway force flow fan units and gymnasium air handling unit brought to completion a project started in 2012 which saw the original boilers replaced with high efficient condensing models. We gain more efficiency in the whole system when we can reach condensing temperatures throughout the year. At the same time, we upgraded the DDC system to give us complete optimization of the school operations.

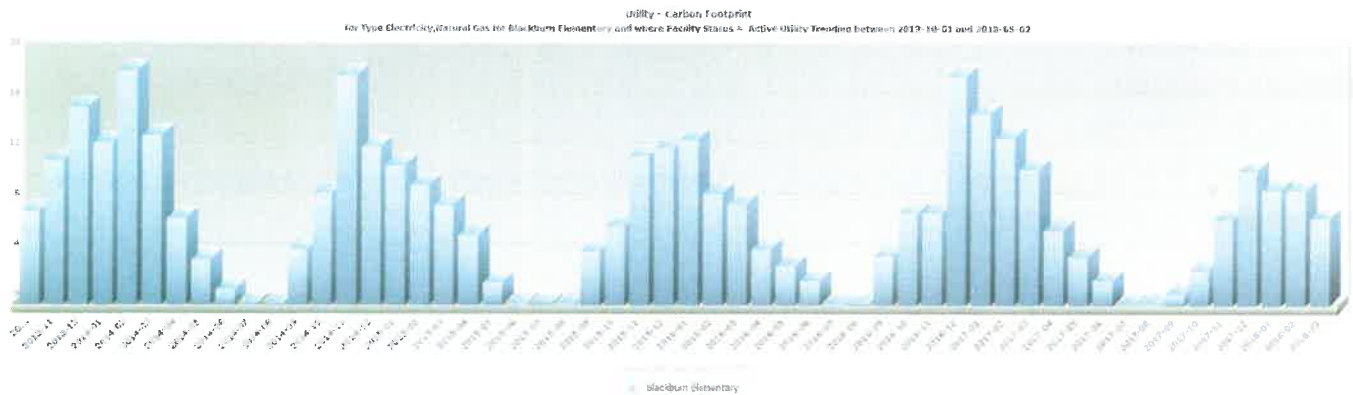


The unit ventilator provides heating and ventilation to the classroom. Here it is ready to be installed.

DDC Control Box— in each unit, is the brains of the system, controlling the fresh air and heat.



Blackburn Elementary—Carbon Footprint



The carbon footprint for Blackburn Elementary has changed significantly over the previous four years, since the implementation of a fully condensing, low temperature heating system. As further information is gathered it will give us a better picture of the building performance.

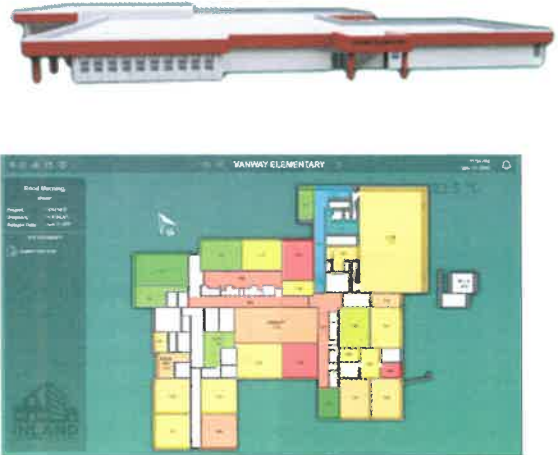
Nusdeh Yoh Elementary

The gymnasium air handling unit and multiple hallway force flow fan coil units were installed to take full advantage of the low temperature condensing boilers. Previously we had to run the boilers at a higher temperature, and thereby lower efficiency, because components of the heating system were not designed to operate at lower temperatures. Operationally, this school performs the same as Blackburn Elementary.

McBride Secondary—Floorplan



Vanway Elementary—Floorplan



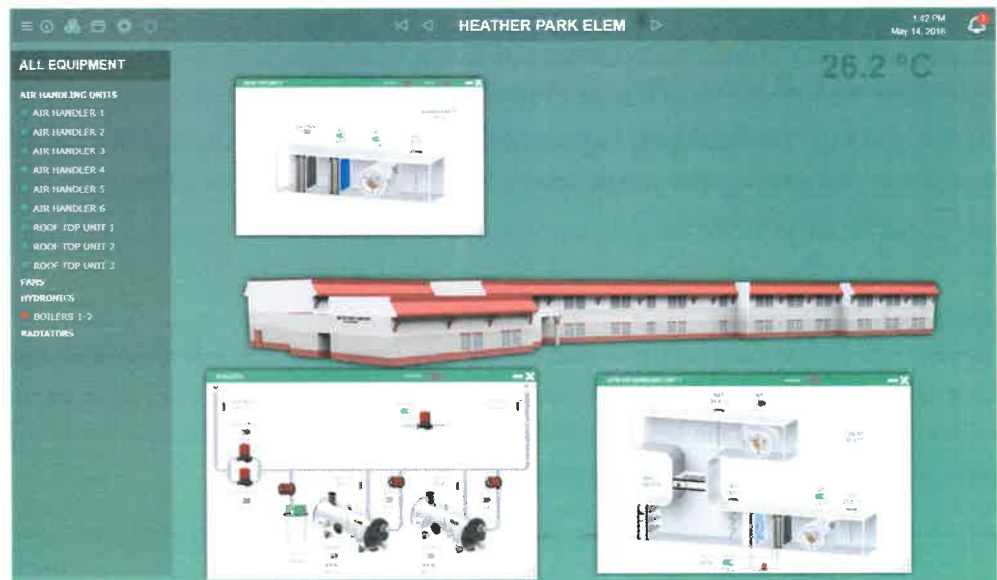
Direct Digital Controls

Building Management System controls were installed in the 1990's to control our temperature, boilers, furnaces and heating / ventilation equipment. These controls were subject to failures due to the age of the capacitors and other electronic components. The software was outdated and we couldn't take advantage of new strategies that we can now. Therefore we started on a campaign to replace all of these systems with the latest designs. We coupled this with new data collection and reporting features available with the new software and have been able to replace the following systems during 2017;

- | | |
|---------------------------|---------------------------|
| College Heights Secondary | Buckhorn Elementary |
| Ron Brent Elementary | McBride Elementary |
| Harwin Elementary | Hart Highlands Elementary |
| Peden Hill Elementary | Nusdeh Yoh Elementary |
| Pineview Elementary | |
| Blackburn Elementary | |
| Nukko Lake Elementary | |

The 'EnteliWEB' project, as we call it, will enable us to further advance our goals to become as efficient as possible, while maintaining good indoor air quality.

Sample of the graphics capability showing one view of Heather Park Elementary School.



In Conclusion

In 2017 we continued to reduce our carbon footprint by installing more efficient heating and lighting systems and then controlling the operation and schedule of them. One more additional boiler project is planned for 2018, along with additional low temperature unit ventilator installations, DDC controls upgrades and improved control strategies. This should continue to substantially reduce our use of fossil fuels.

We continue to strive for the most efficient operation of the facilities and will be engaging our partners in education - the Principals, Staff and Students - to accomplish our goals.

We will look forward to another exciting year as we look back at the accomplishments in 2017.

Sincerely,



Barry Bepple
Energy and Sustainable Conservation Coordinator
School District No. 57, Prince George

* MEASURE * REDUCE * OFFSET * REPORT * PLAN *



Part 1: CNAR Survey

1. General Information

Name: Barry Bepple

Contact Email: bbepple@sd57.bc.ca

Organization Name: School District No. 57

Sector: School District

2. Stationary Sources (eg. Buildings, Power Generators): Fuel Combustion, Electricity use, Fugitive Emissions.

During 2017, did your organization take any of the following actions to support emissions reductions from buildings? (please select all that apply)

Performed energy retrofits of the organization's building(s)

If you selected "*Performed energy retrofits of the organization's building(s)*":

How many buildings were retrofitted?: 3

If you selected "*Built, or are building new LEED Gold or other "Green" buildings*":

How many new "Green" buildings?:

Did your Organization perform any retrofits during 2017? Please describe briefly:

Replaced boiler plants at an elementary and secondary school, along with updating the terminal (unit ventilators) units at another school.

2a. Stationary Sources (eg. Buildings, Power Generators): Fuel Combustion, Electricity use, Fugitive Emissions.

Please briefly describe your organization's plans to continue reducing emissions from its stationary sources:

a) Over the next 1-5 years

Continue replacing outdated an inefficient boiler plants with new condensing boiler systems.

b) Over the following 6-10 years

Replace the piping and terminal systems connected to the boiler systems to take advantage of the condensing boiler systems.

3. Mobile Sources (Vehicles, Off-road/portable Equipment): Fuel Combustion:

During 2017, did your organization take any of the following actions to support emission reductions from its mobile sources? (please select all that apply)

None of the above

If you selected "*Replaced existing vehicles with more fuel efficient vehicles (gas/diesel)*":

How many vehicles?:

If you selected "*Replaced existing vehicles with hybrid or electric vehicles*":

How many vehicles?:

3a. Mobile Sources (Vehicles, Off-road/portable Equipment): Fuel Combustion:

Please briefly describe your organization's plans to continue reducing emissions from its mobile sources:

a) Over the next 1-5 years

We are going to install GPS tracking units into the fleet vehicles for both safety monitoring and to help reduce the amount of idling and time the vehicles are used.

b) Over the following 6-10 years

We will continue to purchase or lease more efficient vehicles.

4. Supplies (Paper): Indicate which actions your PSO took in 2017:

During 2017, did your organization take any of the following actions to support emissions reductions from paper supplies? (please select all the apply)

Had a policy requiring the purchase of recycled content paper

4) Supplies (Paper): Indicate which actions your PSO took in 2017: - Other? Please describe briefly:: Our district has always purchased paper with recycled content.

If you selected "*Had a policy requiring the purchase of recycled content paper*":

State the required recycled content here (30%, 50%, 100%): 30

If you selected "*Had a policy requiring the purchase of alternate source paper (bamboo, hemp, wheat, etc)*", which type of alternate source paper did you use?

Please briefly describe your organization's plans to continue reducing emissions associated with its office paper use in future years.

We are continuing to explore alternative methods of utilizing digital copying and storing of documents. We are working with our suppliers to have them also electronically send us billings and information, rather than by print.

5. Other Sustainability Actions

a) Business Travel

During 2017, did your organization take any of the following actions to support emissions reductions from business travel? (please select all that apply)

None of the above

b) Education/Awareness

During 2017, did your organization have any of the following programs or initiatives to support sustainability education and awareness? (please select all that apply)

Supported or provided education to staff about the science of climate change, conservation of water, energy and/or raw materials

c) Other Sustainability Actions

During 2017, did your organization have any of the following programs or initiatives to support sustainability? (please select all that apply)

5b) Other Sustainability Actions - Other? Please specify:: For 2017 we created a new Policy on Energy and Sustainable Conservation and will be working with stakeholders on procedures and support methodologies.