3/24/2017

2016 Carbon Neutral Action Report

Valemount Secondary

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

Contents

2016 Carbon Neutral Action Report

School District No. 57 (Prince George)

This Carbon Neutral Action Report for the period January 1st to December 31st 2016 summarizes our emissions profile, the amount of offsets purchased to reach net zero emissions and the actions we have taken in 2016 to reduce our green-house gas emissions.

By June 30, 2017, 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 2016 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 occupancy sensors in classrooms and storage areas to reduce electricity consumption
- 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 2016, our District's total emissions were 5096 tCO^2e.

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 2016 (TCO2E)	
GHG Emissions created in Calendar Year 2016	
Total Emissions (TCO2E)	*5096*
Total Offsets (TCO2E)	*5084*
Adjustments to GHG Emissions Reported in Previous Years	
Total Emissions (TCO2E)	*0*
Total Offsets (TCO2E)	*0*
Total Emissions for Offset for the 2016 Reporting Year	
Total Offsets (TCO2E)	*5084*

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 2016 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-Forster — 17 05 29

Signature — Date

M. Marquis-Forster — Superintendent

Name (Print) — Title

2016 Greenhouse Gas Emissions

For the 2016 calendar year, School District No. 57's greenhouse gas emissions (GHG) were 5,096 tonnes of CO^2e.

The following summarizes the greenhouse gas emissions by source:

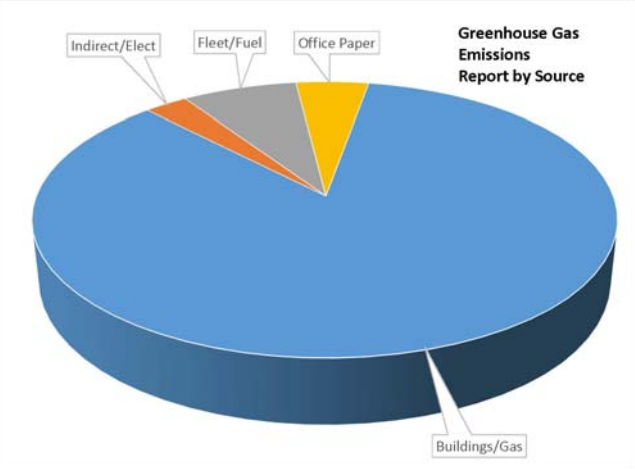
Out of Scope Emissions

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 2016. 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	2014	2015	2016	2016 vs 2015
Buildings	5369	4440	4322	-2.6%
Indirect	140	134	143	+6.7%
Fleet	351	388	379	-2.3%
Office Paper	225	254	240	-5.5%
Exemption Adjustments	-11	-12	-12	
Total Emissions	6074	5204	5072	-2.54%

Offsets Applied to Become Carbon Neutral in 2016

The total emissions offset applied to become carbon neutral is 5,084 tCO^2e which includes an offset exemption of 12 tCO^2e for Biomass emissions. The net offsets purchased costs the District $133,455 including GST.



Annual Heating Degree Days for Prince George

2016	4677.5
2015	4661.6
2014	5041.3
2013	4899.7

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. 2015 indicated we had 8.2% less HDD than 2014 and 7.3% less than 2013, while 2016 was almost the same as 2015. The data also indicates we used –2.54% less energy in 2016 than 2015, while our HDD were slightly more. We are on the right track! 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

2016 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 Natural Gas heating equipment, our efforts are targeted towards making this equipment the most efficient possible. Utilizing the most modern, available, Building Management Systems (BMS) controls, 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.

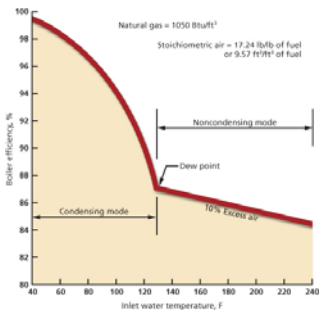
Heating Ventilation Air Conditioning

Quinson Elementary

Continuing on the success of past projects, we replaced the atmospheric boilers at Quinson Elementary with new condensing boilers and consolidated two other mid-efficient boiler/mechanical rooms into one. Additional hot water ventilators were also replaced with high efficient, low-temperature unit ventilators, to take advantage of the new condensing boiler design. The gymnasium also received a new ventilation unit. As we stage the replacement of the older hot water systems in the school, we can then take advantage of lowering the water temperatures and gaining efficiency in the boiler plant. Reducing the amount of natural gas we burn reduces the amount of emissions at the same time.

Nusdeh Yoh Elementary
Ecole Lac des Bois Elementary

Further work, in multiple stages, were conducted at these schools to build upon the infrastructure improvements completed in previous years. Low-temperature unit ventilators were installed in these facilities to allow us to utilize the condensing design of the boilers and gain efficiency. These individual units also improved upon the client comfort controls in each room for temperature and CO2 demand based ventilation. Ecole Lac des Bois also received a new gym ventilation unit for improved energy efficiency. The Building Management System (BMS) was also upgraded with the latest hardware designs available, which are being standardized across the entire district.



This ASHRAE 2008 Boiler Efficiency chart shows that as inlet water temperatures drop, the efficiency of these boiler designs improve. Without lower water inlet temperatures, you lose the efficiency gains possible. The X-axis shows temperatures increasing, while the Y-axis shows efficiency gains.

Lighting

Hixon Elementary
Polaris Montessori Elementary

Both of these schools received new energy efficient interior and exterior light fixtures and occupancy controls throughout. Hixon Elementary received new LED fixtures, while Polaris Montessori utilized traditional T-8 fluorescent fixtures. Although electricity does not have very high carbon emissions, it still contributes to the overall totals.

College Heights Secondary
D.P. Todd Secondary
John McInnis Resource Centre
Mackenzie Secondary
McBride Centennial Elementary
McBride Secondary
Morfee Elementary
Nukko Lake Elementary

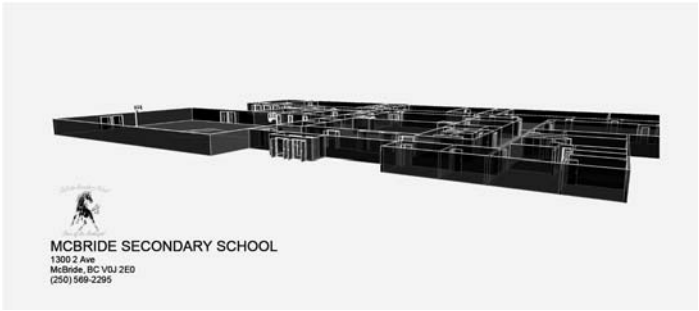
All of these schools received new LED interior gymnasium lighting. Again, this reduces our electricity consumption and to some extent, some emissions as well.

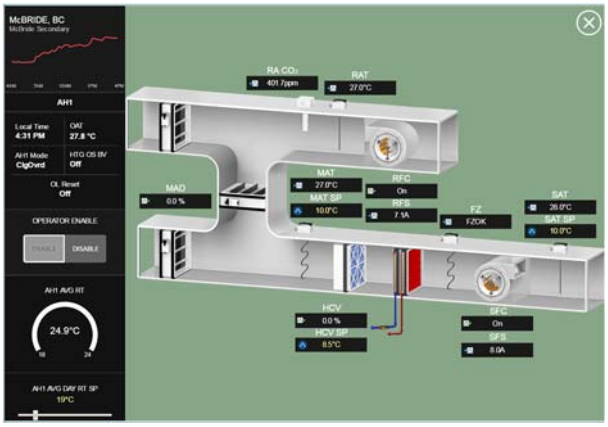
Direct Digital Controls

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 and data collection 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 2016;

Prince George Senior Secondary
McBride Secondary
Edgewood Elementary
Foothills Elementary

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





In Conclusion

In 2016 we continued to reduce our carbon footprint by installing more efficient heating systems and more efficient lighting systems. Two additional boiler projects are planned for 2017, 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.

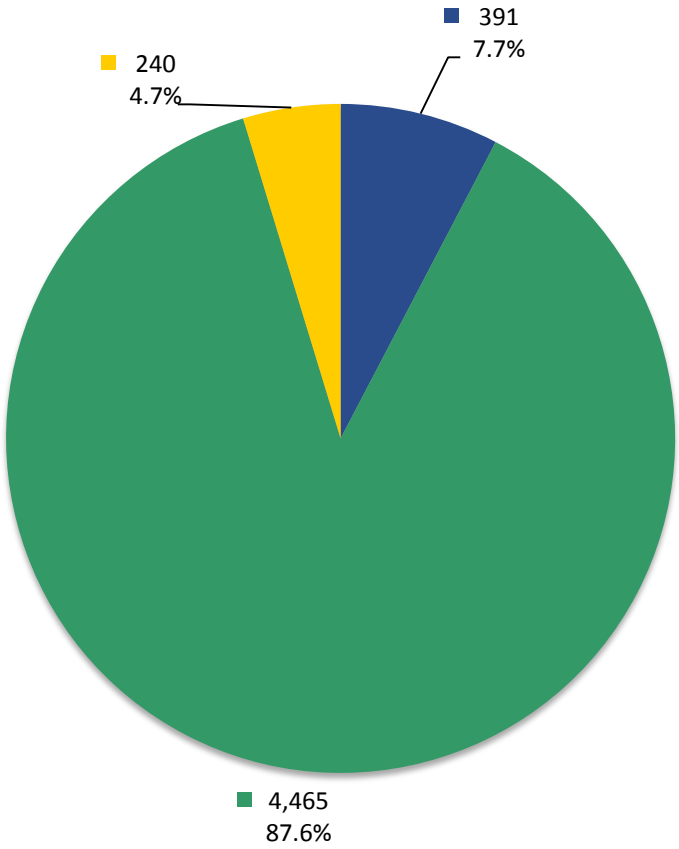
We will look forward to another exciting year as we look back at the accomplishments in 2016.

Sincerely,

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

* MEASURE * REDUCE * OFFSET * REPORT * PLAN *

School District 57 - Prince George
Greenhouse Gas Emissions by Source
for the 2016 Calendar Year (tCO_2e*)



Total Emissions: 5,096

- Mobile Fuel Combustion (Fleet and other mobile equipment)
- Stationary Fuel Combustion (Building Heating and Generators) and Electricity
- Supplies (Paper)

Offsets Applied to Become Carbon Neutral in 2016 (Generated May 15, 2017 4:01 PM)

Total offsets required: **5,084**. Total offset investment: $**127,100**. Emissions which do not require offsets: **12** **

*Tonnes of carbon dioxide equivalent (tCO_2e) is a standard unit of measure in which all types of greenhouse gases are expressed based on their global warming potential relative to carbon dioxide.

** Under the *Carbon Neutral Government Regulation* of the *Greenhouse Gas Reduction Targets Act,* all emissions from the sources listed above must be reported. As outlined in the regulation, some emissions do not require offsets.

2016 Carbon Neutral Action Report Survey

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Part One (external)

Contact Name(s):

Barry Bepple

Organization Name:

School District No. 57

Please select your sector:

- School District

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

During 2016, did your organization take any of the following actions to support emissions reductions from buildings?

Select all that apply

- Performed energy retrofits of the organization's buildings.: 15

Briefly describe your organization's plans to continue reducing emissions from its stationary sources in future years.

Replacement of atmospheric and mid-efficient boilers remains a top priority. We intend on coupling these boiler retrofits with the continuation of the installation of low temperature terminal units, including unit ventilators and radiators. Further reduction in emissions is expected with the installation of modern Digital Direct Controls on our Building Management Systems throughout the district.

During 2016, did your organization participate in utility-sponsored energy demand management program(s) (e.g. BC Hydro's Energy Management (Manager))?

No

If yes, please describe briefly:

(No response)

2) Mobile Sources (Vehicles, Off-road/Portable Equipment): Fuel Combustion.

During 2016, did your organization take any of the following actions to support emission reductions from its mobile sources?

Select all that apply

(No response)

Briefly describe your organization’s plans to continue reducing emissions from its mobile sources in future years.

For 2017 we are reducing our fleet vehicles issued to staff by at least 2 - 3 vehicles in total.

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3) Supplies (Paper):

During 2016, did your organization take any of the following actions to support emissions reductions from paper supplies?

Select all that apply

(No response)

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

Our organization already purchases recycled paper for use in our photocopiers and for student and staff use.

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4) Other Sustainability Actions:

Business Travel:

During 2016, did your organization take any of the following actions to support emissions reductions from business travel?

Select all that apply

(No response)

Education Awareness:

During 2016, did your organization have any of the following programs or initiatives to support sustainability education and awareness?

Select all that apply

- Support for professional development on sustainability (e.g. workshops, conferences, training)

Other Sustainability Actions:

During 2016, did your organization have any of the following programs or initiatives to support sustainability?

Select all that apply

- An operations policy or program to facilitate the reduction and diversion of building occupant waste (e.g., composting, collection of plastics, batteries) from landfills or incineration facilities