

2021 PSO Climate Change Accountability Report

5/30/2022



Shas Ti Kelly Road Secondary—Construction photos fall 2021



Learning that Enriches the Life of Each Student

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



www.sd57.bc.ca

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2021 PSO Climate Change Accountability Report

School District No. 57 (Prince George)

This Climate Change Accountability Report for the period January 1, 2021 to December 31, 2021 summarizes our emissions profile, the total offsets to reach net-zero emissions, the actions we have taken in 2021 to reduce our greenhouse gas emissions and our plans to continue reducing emissions in 2021 and beyond.

By June 30, 2022, School District No. 57 (Prince George) final 2021 Climate Change Accountability Report will be posted to our website at:

<https://www.sd57.bc.ca/Programs/DistrictDepts/Maintenance/>

or can be found on the government website at:

<https://www2.gov.bc.ca/gov/content/environment/climate-change/public-sector/cnar/annual-reports-cnars-table>

Executive Summary

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

In 2021 we have continued our efforts to reduce our carbon footprint by;

- Upgrading inefficient, atmospheric type gas fired boiler systems with high efficient condensing units in 4 schools.
- Replacement of domestic hot water systems with condensing on-demand units in 3 schools.
- Installed new low temperature fan coils and terminal units in one school as part of a final phase HVAC upgrades.
- Replaced lighting in 6 schools with LED technology.
- Added piping insulation in various schools.

By reducing our gas emissions and electricity consumption we have reduced our carbon footprint. We will return the cost savings to use on more sustainability projects, which will result in further reductions to our carbon emissions. For 2021 and beyond we plan on continuing on the success of our past actions.

For the year 2021 our District's total emissions were 5519 tCO₂e plus 0 tCO₂e for emissions to be included for prior years.

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



Barry Beppe
Energy & Sustainable
Conservation Coordinator

Emissions and Offsets Summary Table:

| School District No. 57 (Prince George) GHG Emissions and Offsets for 2021 (TCO ₂ E) | |
|---|-----------------|
| | |
| Total Emissions (tCO ₂ e) | 5519 |
| Total BioCO ₂ | 12.7 |
| Total Offsets (tCO ₂ e) | 5506 |
| Adjustments to Offset Required GHG Emissions Reported in Prior Years | |
| Total Offsets Adjustment (tCO ₂ e) | 0 |
| Grand Total Offsets for the 2020 Reporting Year | |
| Grand Total Offsets (tCO ₂ e) to be Retired for 2020 Reporting Year | 5506 |
| Offset Investment (\$25 per tCO ₂ e) | \$137,650 + GST |

Retirement of Offsets:

In accordance with the requirements of the *Climate Change Accountability 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 2021 calendar year, together with any adjustments reported for past calendar years (if applicable). The Organization hereby agrees that, in exchange for the Ministry of Environment Climate Change Strategy (**the Ministry**) ensuring that these offsets are retired on the Organization's behalf, the Organization will pay within 30 days, 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:

Signature

Date

Cindy Heitman

Superintendent

Name (Print)

Title

2021 Greenhouse Gas Emissions

Out of Scope Emissions

Out-of-Scope Emissions include refrigerants:

R-22 (HCFC), R-401a (HCFC), MP-39 (HCFC).

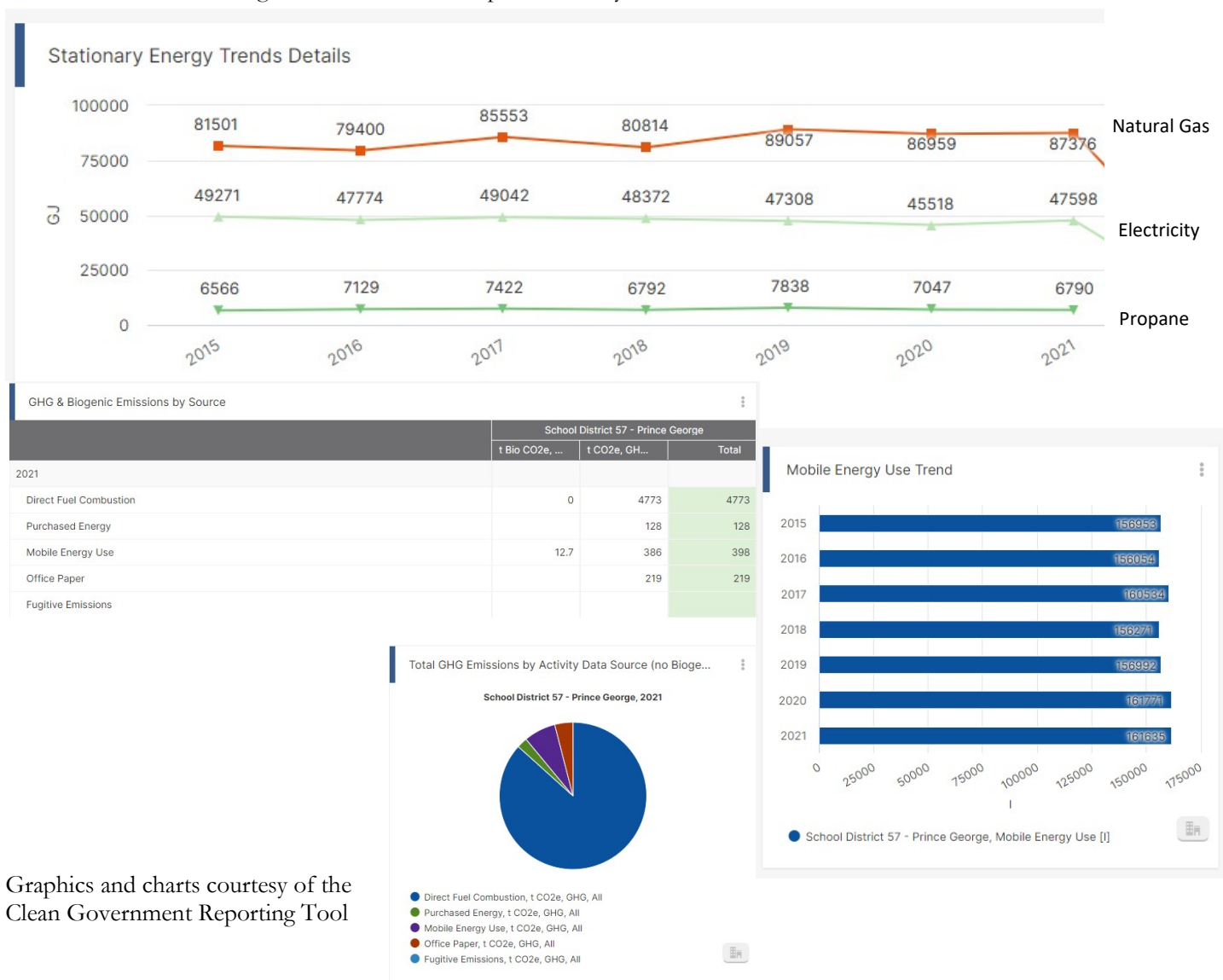
Fugitive emissions are estimated to be less than one percent of the District's emissions based on the refrigerant recharge amounts of R-134a and R-404a (HFCs) in the year 2021. Thus, these emissions are deemed to be out of scope and have not been included in the total District's greenhouse gas emissions profile.

Emissions

Direct Fuel Combustion, natural and propane gas emissions, account for the majority of GHG emissions in our district at 86.7%. Electricity, mobile fuel and paper only amount to 13.3% combined. This ratio was the same for 2020.

Our focus has been on reducing natural and propane gas consumption through modernization and efficiency improvements of the equipment. Unfortunately, COVID ventilation requirements impacted both direct and indirect fuel consumption for 2021. We no longer utilize CO₂ demand based strategies and the electric fan systems run on a longer schedule to protect the health of occupants. Therefore we will have to adjust the figures for new baselines consistent with new protocols as new data becomes available.

Mobile fuel use was essentially the same as 2020 as tradesmen were not able to always share a vehicle to job sites because of COVID concerns resulting in a 3% increase over pre-COVID years.



Graphics and charts courtesy of the Clean Government Reporting Tool

Emissions Reduction Programs

Low Temperature Terminal Units/Fan Coils/Boilers—Van Bien Elementary

8 Herman Nelson unit ventilators at Van Bien Elementary were replaced with new Apollo unit ventilators supplying 1200 cfm of conditioned air each in the summer of 2021.

Along with the ventilators, new piping, insulation, boilers and controls were added so that each classroom has it's own ventilation unit for the space. This replaces the original 1967 (54 year old) equipment that served the building well.

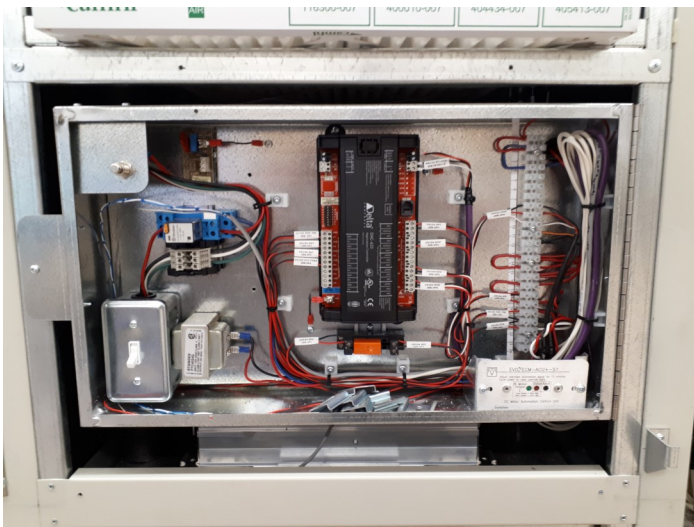
Although the past 6 months of data for the schools shows an overall drop from the previous 5 years on average, we expect a further decline in consumption once COVID ventilation requirements are relaxed to ASHRAE standards. In 2022 we expect to complete another half of the school with low temperature terminal units that will then enable another SD57 building to be geo-thermal ready.



IBC 40-399 Boiler Plant—construction photo



Apollo unit ventilators in each classroom—construction photo



Dedicated DDC BMS controls for each unit ventilator



Low-temperature fan coil units

Emissions Reduction Programs—(continued)

Boiler Replacements

As part of the Ministry of Education's Carbon Neutral Capital Plan submission, Morfee Elementary underwent a change from atmospheric type boilers to a more modern condensing boiler plant system. All the air handling equipment is contained within the penthouse mechanical room serving the entire school. As one of our most Northern facilities, Morfee Elementary requires reliable equipment to serve the town of Mackenzie, a 2 hour drive from Prince George. The climate is colder. It has an average of 5571 Heating Degree Days and is more than 7% colder than Prince George (5188 HDD) and 97% colder than Vancouver (2824 HDD).



Construction Photo's of the new boiler room and tankless water heaters being installed. A comparison of the old boiler system is shown below.

We utilize the Caleffi hydraulic water separator to balance all the heating water flows throughout the school.

New Grundfos circulating pumps auto-adapt to required flows and the on-demand tankless Navien domestic water heater provides ample water for the school's needs.

The building management system was replaced at the same time to efficiently control the schools operations and take advantage of the low water temperature for the condensing boiler system.



Emissions Reduction Programs—(continued)

Boiler Replacements (continued)



Further boiler replacement projects were completed at McBride Centennial Elementary and Valemount Secondary School.

New condensing 97% efficient boilers were installed at both sites, to replace original equipment and to reduce the use of Propane, a fuel that is substantially more expensive than Natural Gas and emits more kg of CO₂ per million Btu as well. At Valemount Secondary new EX Series IBC boilers were used because we required a larger boiler in a smaller space than the usual 399,000 btu boilers. These suited the design very well.

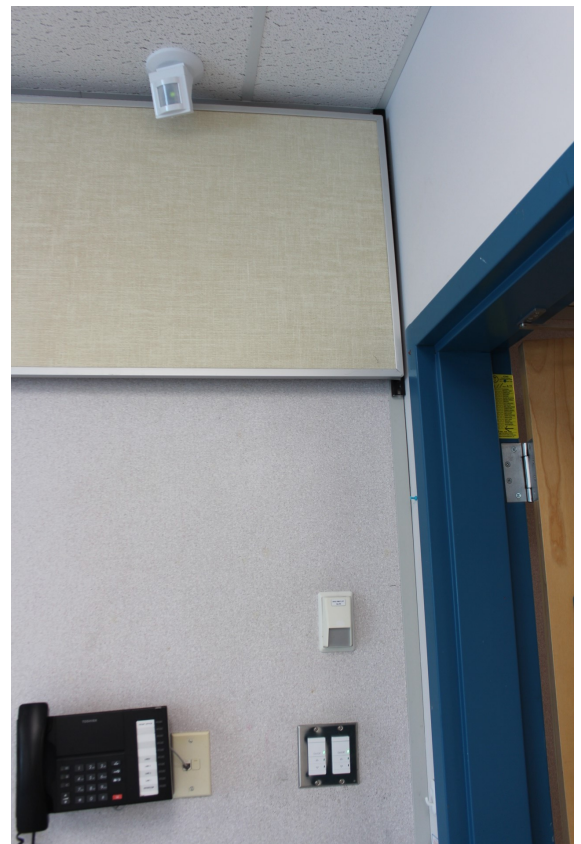
Lighting Replacements

Lighting projects at a number of facilities were initiated in 2021.

Ron Brent Elementary had 372 LED lighting fixtures, 34 dimmer switches, 28 power packs and 15 occupancy sensors installed in the Spring of 2021 to fully modernize classrooms. This technology enables the teacher to select banks of lights and dim them individually according to their needs. Occupancy sensors control the lights so they automatically shut off when not needed.

Further work for design, tendering and installation of new LED lighting systems was started in the summer for Valemount Secondary, McBride Centennial Elementary, McBride Secondary, Harwin Elementary, Hart Highlands Elementary and, Heritage Elementary. Due to supply constraints most of the work was completed in the fall and the remainder had to be left until the spring of 2022.

Classroom showing occupancy sensor, dimmer switching, DDC temperature sensor and telephone system at a glance at Ron Brent Elementary




Geo-Thermal Projects—Shas Ti Kelly Road Secondary and others

Shas Ti Kelly Road Secondary opened September 2020 and is our second geo-thermally heated facility. A four pipe hydronic system provides both hot and cold water to a single coil controlled by a six way valve to independent unit ventilators in each room. Office and theatre areas are served by a roof top air handling unit that has two coils to provide temperature control, with an additional re-heat coil for each space. The facility has an 80 ton geo-thermal field with condensing boiler backup to supply thermal energy.

The school still uses some natural gas, notably for domestic hot water and the metalwork shop forge. However, real world data on the facility indicates it would qualify for an Energy Star Score of 100, the highest attainable score.

Our long-term goal is to convert the existing 8 elementary and 2 secondary schools that are currently ‘geo-thermal ready’ over to actual geo-thermal fields and reduce our GHG consumption by an approximate 16,700 Gj of natural gas. We may not get all our schools to an Energy Star Score of 100, however you need a score of 75 to get certification of which 22 of our schools would.



LEARN MORE AT
energystar.gov

ENERGY STAR® Statement of Energy Performance

100

ENERGY STAR®
Score¹

SHAS TI KELLY ROAD SECONDARY

Primary Property Type: K-12 School
Gross Floor Area (ft²): 103,226
Built: 2020

For Year Ending: December 31, 2021
Date Generated: March 30, 2022

1. The ENERGY STAR score is a 1-100 assessment of a building's energy efficiency as compared with similar buildings nationwide, adjusting for climate and business activity.

| Property & Contact Information | | | | |
|--|--|---|--|--|
| Property Address SHAS TI KELLY ROAD SECONDARY 7405 Kelly Rd. S. Prince George, British Columbia V2K2H4 | Property Owner Board of Education School District No. 57 2100 Ferry Avenue Prince George, BC V2L4R5 () - | Primary Contact Barry Bepple 2100 Ferry Avenue Prince George, BC V2L4R5 250-561-6814 bbepple@sd57.bc.ca | | |
| Property ID: 14845906 | | | | |

| Energy Consumption and Energy Use Intensity (EUI) | | | | |
|---|------------------------------|-----------------|--|------|
| Site EUI 23.8 kBtu/ft² | Annual Energy by Fuel | | National Median Comparison | |
| | Natural Gas (kBtu) | 242,843 (10%) | National Median Site EUI (kBtu/ft²) | 53.2 |
| | Electric - Grid (kBtu) | 2,215,789 (90%) | National Median Source EUI (kBtu/ft²) | 99.3 |
| | | | % Diff from National Median Source EUI | -55% |
| Source EUI 44.4 kBtu/ft² | | | Annual Emissions | |
| | | | Greenhouse Gas Emissions (Metric Tons CO2e/year) | 21 |

Signature & Stamp of Verifying Professional

I _____ (Name) verify that the above information is true and correct to the best of my knowledge.

LP Signature: _____ Date: _____

Licensed Professional

() -

Professional Engineer or Registered Architect Stamp (if applicable)

Geo-Thermal Ready Schools:

Blackburn Elementary
College Heights Elementary
Glenview Elementary
Lac des Bois Elementary
Nusdeh Yoh Elementary
Quinson Elementary
Spruceland Elementary
Van Bien Elementary (2022)
College Heights Secondary
Mackenzie Secondary

Current Geo-Thermal Schools:

Duchess Park Secondary
Shas Ti Kelly Road Secondary

In Conclusion

In 2021 we continued to reduce our carbon footprint by installing more efficient heating and lighting systems and then controlling the operation and schedule of them. Four further boiler replacement projects are planned for 2022. Additional low temperature unit ventilator installations, DDC controls upgrades and improved control strategies are being implemented as we do so. These improvements should continue to substantially reduce our use of fossil fuels, compared to doing nothing. In 2021, the COVID pandemic created additional energy use as we provided more ventilation and longer facility operating times.

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 2021.

Sincerely,



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

* MEASURE * REDUCE * OFFSET * REPORT * PLAN *

