2019 CARBON NEUTRAL ACTION REPORT

COMOX VALLEY SCHOOLS

SCHOOL DISTRICT NO. 71 (COMOX VALLEY)

SD71

Comox Valley Schools
A Community of Learners
INNOVATIVE • INQUISITIVE • INCLUSIVE

VANCOUVER ISLAND

CONTENTS

DECLARATION STATEMENT

This Carbon Neutral Action Report (CNAR) for the period January 1st, 2019 to December 31st, 2019 summarizes our emissions profile, the total offsets to reach net-zero emissions, the actions we have taken in 2019 to reduce our greenhouse gas emissions, and our plans to continue reducing emissions in 2020 and beyond.

By June 30, 2020 the School District No. 71 (Comox Valley) final Carbon Neutral Action Report will be posted to our website at www.comoxvalleyschools.ca/.

SD71 ENVIRONMENTAL STEWARDSHIP

As part of its *Value Statement,* The Board of Education of School District No. 71 (Comox Valley) embraces and encourages Global Awareness and Environmental Stewardship. Furthermore, Organizational Stability & Environmental Stewardship is one of four strategic priorities of the district's *Strategic Plan* with the goal of cultivating environmental stewardship by fostering the following actions:

- Align outdoor and environment learning opportunities for long-term sustainability
- Reduce carbon emission and environmental footprint
- Support the establishment and augmentation of school garden projects
- Reduce the use of single-use plastics throughout the district
- Implement strategies for zero waste by increasing recycling and composting efforts in all facilities
- Augment the Active Travel Program and public transit commute initiatives

OVERVIEW - COMOX VALLEY SCHOOLS

School District No. 71 (Comox Valley), also referenced as SD71 or Comox Valley Schools, is one of 60 school districts in British Columbia. In addition to serving the central Vancouver Island municipalities of the City of Courtenay, the Town of Comox and the Village of Cumberland, SD71 also serves students in the surrounding communities of Black Creek, Merville, Royston, Union Bay, Hornby Island and Denman Island.

QUICK FACTS – SD71 serves:

- 1 Regional District
- 3 Municipalities
- 2 Islands
- 1 First Nation
- 8500 + students

Vancouver Island, BC

Fifteen Elementary Schools: Airport, Arden, Aspen Park, Brooklyn, Courtenay, Cumberland Community School (K-9), Denman Island, École Puntledge Park, École Robb Road, Hornby Island, Huband Park, Miracle Beach, Queneesh, Royston, Valley View

One Middle School: Lake Trail Middle School (Gr. 6-9)

Three Secondary Schools: Georges P. Vanier, Highland, Mark R. Isfeld

Additional Schools/Programs: Glacier View Secondary Centre (Alternate Gr. 8-12), Nala'atsi Alternate Program, Navigate (NIDES), International Student Program

SD71's Vision and Mission Statement:

"An inclusive learning community that embraces diversity, fosters relationships and empowers all learners to have a positive impact on the world. To inspire engaged, compassionate, resilient lifelong learners and cultivate a collaborative community together.

Board of Education 2019 – 2023

OVERVIEW - GHG REPORTING

In 2007, the BC Government took a major step in the fight against climate change by setting aggressive greenhouse gas (GHG) reduction targets and making it legally binding. The Climate Change Accountability Act (CCAA), formerly titled "Greenhouse Gas Reduction Targets Act (GGRTA)" updates legislated targets for reducing greenhouse gases. Under the Act, BC's GHG emissions are to be reduced by the following listed targets set for the Public Sector Organizations (PSOs) and regulated by the Carbon Neutral Government:

- By 2030, BC will reduce GHG emissions by 40 per cent, compared to 2007 levels
- By 2040, BC will reduce GHG emissions by 60 per cent, compared to 2007 levels
- By 2050, GHG emissions will be reduced by at least 80 per cent below 2007 levels

To meet legislated targets, all PSOs including school districts, are required to be carbon neutral. The phrase "carbon neutral" is a way to explain and take responsibility for the GHGs emitted. As a PSO "adding" GHGs to heat buildings, the emissions can be "subtracted" by purchasing carbon offsets. These purchased offsets support innovative BC-based projects that create economic opportunities and fosters the use and development of clean technologies across the province. All public sector organizations follow a five-step process to become carbon neutral and have been doing so since 2010.

SD71 has implemented these five steps to become carbon neutral. Firstly, measuring operational GHG emissions from district buildings, district vehicles and district wide paper consumption. Secondly, reducing emissions where possible through an integrated approach. Thirdly, offsetting SD71 GHG emissions by purchasing an equivalent amount of high quality, made-in-BC carbon offsets. Fourthly, reporting annually on progress through the Carbon Neutral Action Report (CNAR) and finally, verifying data and emissions through the BC government online application Clean Government Reporting Tool (CGRT) to convert GHG emissions into a unit of measure. All PSOs enter their data into CGRT which then converts this data into tonnes of carbon dioxide equivalents (tCO_2e).

To become carbon neutral for the 2019 calendar year, SD71 purchased carbon offsets for 1956 tonnes of carbon dioxide equivalent (tCO_2e) emitted.

Since SD71 began annual reporting in 2010, tCO_2e emissions have varied but have shown some declining trends, although 2017 had a very cold winter. While the highest tCO_2e level was reported in 2012, the lowest level was in reported in 2015. Historical SD71 annual levels of tCO_2e emission are as follows:

2010 – 2463 tCO_2e
2011 – 2475 tCO_2e
2012 – 2504 tCO_2e
2013 – 2268 tCO_2e
2014 – 2208 tCO_2e
2015 – 1973 tCO_2e
2016 – 2018 tCO_2e
2017 – 2407 tCO_2e
2018 – 1956 tCO_2e
2019 – 1956 tCO_2e

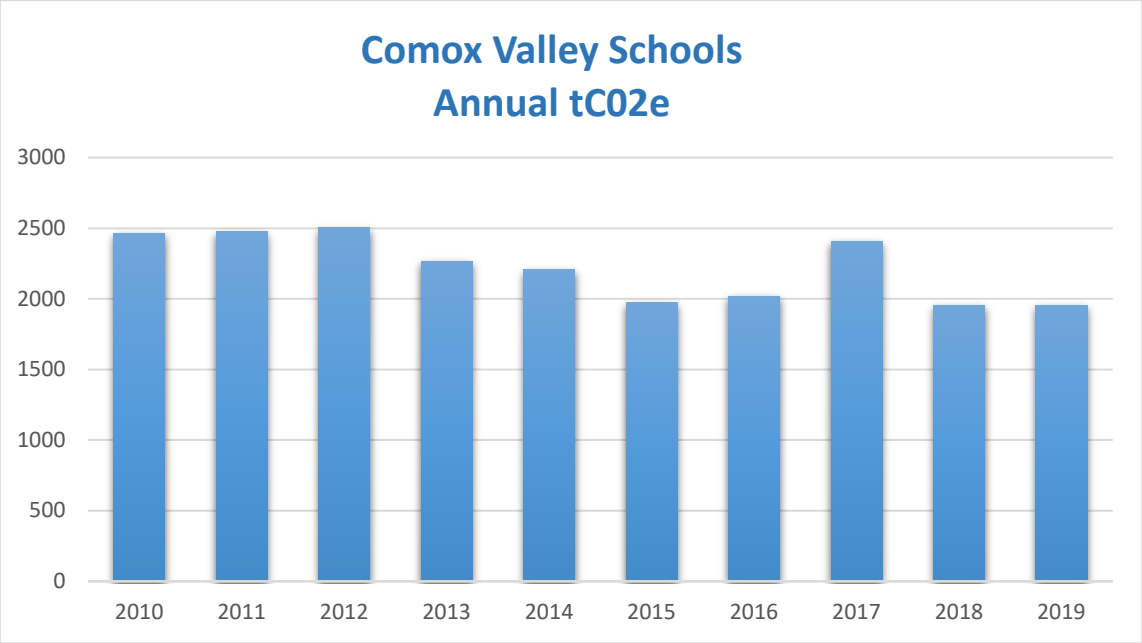

Figure 1 - SD71 Historical tCO_2e Emissions 2010 – 2019.

Clean Government Reporting Tool (CGRT)

In the winter/spring of 2020, BC's Carbon Neutral Government Program transitioned from using SMARTTool to employing the Clean Government Reporting Tool (CGRT). PSOs are to use the CGRT to record and track their GHG emissions for 2019 and beyond. Additionally, Energy Star Portfolio Manager was implemented in place of SMARTTool Electronic Data Exchange (EDX). PSOs who are BC Hydro electricity & FortisBC natural gas customers set up their organizations to use Portfolio Manager. Their utility data gets stored in Portfolio Manager and then shared/synced with CGRT, meaning that electricity and gas consumption automatically transfers to CGRT for the PSO. The PSO is then responsible for entering all other direct and indirect fuel and energy consumption into CGRT including fleet and paper.

Due to the impact of the COVID-19 pandemic, not all PSOs are able to report their final 2019 GHG emissions and offset totals as required by the May 29, 2020 reporting deadline. Thus, the Climate Action Secretariat (CAS) directed all PSOs to use their total reported 2018 GHG emissions as a temporary estimate for 2019. Subsequently, 2020 GHG emissions will include an adjustment for the difference not reported in 2019.

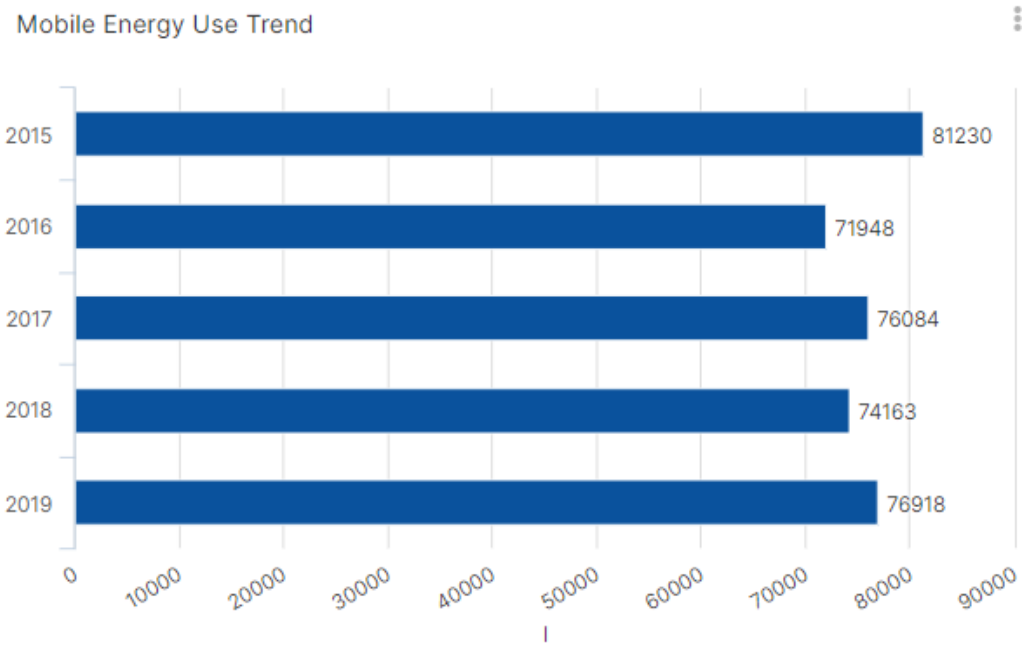

Figure 2 – CGRT graph showing the litres of fuel used by the SD71 for its fleet from 2015-2019.

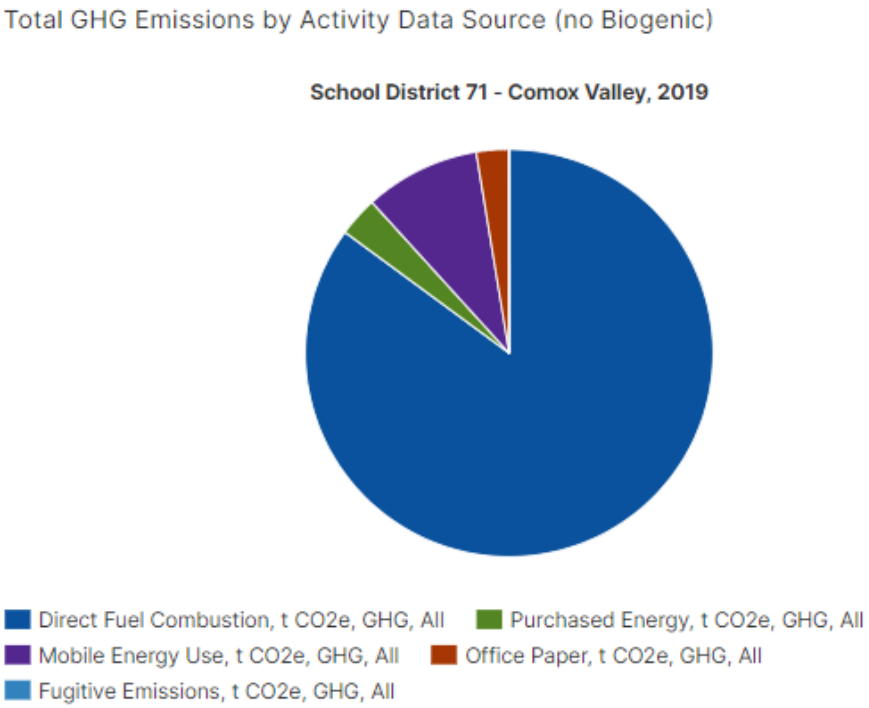

Figure 3 – CGRT graph showing the ratio of GHG emissions used by the School District in 2019.

Direct Fuel Combustion: Natural Gas and Propane (Direct Emissions)

Purchased Energy: Electricity (Indirect Emissions)

Mobile Energy: Fleet/Vehicles

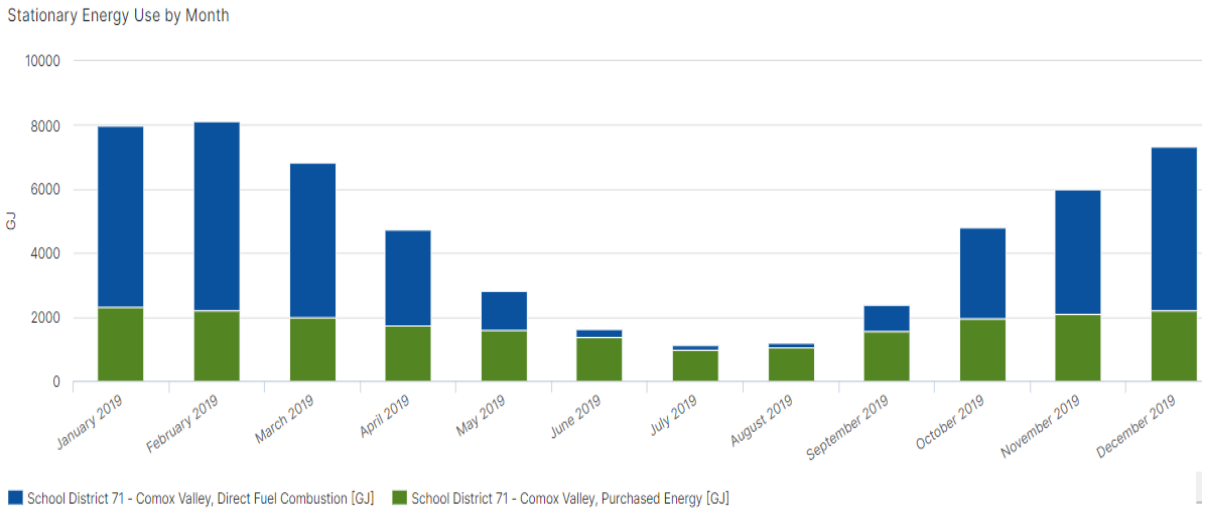

*Figure 4– CGRT showing the 2019 monthly Stationary Energy Giga Joules (GJ) levels from **Direct Fuel Combustion** (natural gas and propane) and **Purchased Energy** (electricity). Note consumption is related to weather and when schools are in session.*

OVERVIEW - ACTIONS TAKEN IN 2019

Throughout SD71 we are committed to preparing all learners for a changing world. We value educational excellence, community engagement, organizational stability, environmental stewardship, physical health, and mental well-being. SD71 has met the challenges of rising heating costs and increased demand on aging facilities. Senior management plays an active role in seeking out and securing funding opportunities that will result in GHG emission reductions. SD71 is committed to minimizing GHG emissions and energy efficiency highly contributes to this goal. The following four principles are of key importance when assessing the need for replacing equipment:

1. Creating healthy environments, including air, temperature and noise for students, teachers and support staff
2. Reducing GHGs
3. Reducing energy consumption and waste
4. Increasing equipment and system efficiency

The most significant GHG reduction upgrade projects completed in 2019 include:

1. Cumberland Community School Boiler Plant Project
2. Highland Secondary Boiler Plant Upgrade Project
3. Ecole Puntledge Park Boiler Plant Upgrade and DDC Replacement Project
4. Mark R. Isfeld Secondary Boiler Plant Upgrade Project
5. Various Building and Equipment Upgrades

1. Cumberland Community School Boiler Plant Upgrade Project

This project consists of two phases: replacing old inefficient boilers with a new high efficiency condensing boiler plant in 2019 and upgrading the ventilation exhaust systems plus replacing inefficient cooling units in 2020. The estimated annual reduction in emissions is about 50 tCO_2e. These replacements/upgrades will improve student & staff safety, improve the indoor school climate and reduce energy and operational costs.

Figure 5 – Cumberland Community School Boilers (pumps also replaced).

The photos above show six Viessmann high efficiency boilers that replaced the old, inefficient Bryan boilers in the summer of 2019. This project was subsidised by the BC Ministry of Education, Capital Management Branch's School Enhancement Program (SEP) funding.

2. Highland Secondary Boiler Plant Upgrade Project

As the boilers at Highland Secondary School were at the end of their service life, the old, inefficient Lochinvar boilers were removed and replaced with six high efficiency Viessmann condensing boilers and pumps in July 2019.

Figure 6 – Highland Secondary Boiler Plant Replacement Project.

This will reduce approximately 61 tCO_2e, reduce natural gas consumption, operational costs, and improve the heating climate for students and staff. This project was partially funded by the BC Ministry of Education, Capital Management Branch's School Carbon Neutral Capital Program (CNCP).

3. Ecole Puntledge Park Boiler Plant Upgrade Project

Completed in August 2019, this project consisted of replacing the existing inefficient atmospheric boiler plant with four high efficiency Viessmann condensing boilers and pumps to significantly reduce carbon emissions. This project was subsidised by the BC Ministry of Education Annual Facilities Grant (AFG).

Figure 7 – Ecole Puntledge Park Boiler Plant Upgrade Project: four new high efficiency Viessmann condensing boilers and pumps.

Differences between Condensing & Non-Condensing Boilers

Condensing Boilers	Non-Condensing Boilers
One or more larger heat exchangers	Single combustion chamber and single heat exchanger
Lower temperature of combustion products (around 55°C)	Higher temperature of combustion products (around 180°C)
Exhaust gas is recycled through the condensing heat exchanger	Combustion gases go into the flue and 30% of the heat is wasted
Help combat climate change by reducing CO_2 emissions	Higher carbon footprint
Higher initial cost, but cost efficient in the long-run	Lower initial cost, but very costly venting

4. Mark R. Isfeld Secondary Boiler Plant Upgrade Project

This project involved replacing old inefficient boilers with very high efficiency condensing boilers to reduce carbon emissions from this facility by 30 to 45 tCO_2e annually and to reduce energy and operational costs. For students and staff, this will also improve the indoor air quality and heating climate.

Figure 8 – Mark Isfeld Secondary Boiler Replacement Project.

The photos above show Mark R. Isfeld's four new high efficiency Viessmann condensing boilers and pumps. This project was completed in August 2019 and subsidised by BC Ministry of Education, Capital Management Branch's School Enhancement Program (SEP) funding.

5. Various Building and Equipment Upgrades

A. A **Direct Digital Control (DDC) building controls upgrade** was completed at **Ecole Puntledge Park**. DDC systems are used to control a building's various systems from one central point. Depending on the building and its functions, these systems vary in complexity. A building may incorporate a DDC system just to control its HVAC (heating, ventilation and air conditioning) system or to automate the entire building by also controlling other mechanical and electrical systems (such as lighting). An upgraded DDC system reduces energy waste, energy consumption and increases equipment and system efficiency.

B. IT Hardware Upgrades - The IT Department continues to replace older computers that draw more power and create more heat with newer units as a part of the district's ongoing technology replacement plan. At the same time, replacing older liquid-crystal display (LCD) monitors with newer light-emitting diode (LED) monitors results in less heat generation and power loss. Additionally, centrally located printers have replaced multiple personal use printers.

C. Light-emitting diode (LED) Light upgrades were completed in various school classrooms and office spaces. The new LED lighting consumes 40% less electricity, has lower maintenance and a much longer life span than the former fluorescent tube lighting, which contains mercury and uses heat to create light.

D. SD71 Fleet Upgrades - SD71 continues to remove older fleet vehicles and purchase newer vehicles that are fuel-efficient and produce less emissions.

OVERVIEW - SUCCESS STORIES

Roughly, 80% of SD71 buildings have fuel heating. Natural gas and propane have much higher tCO_2e emissions than electricity. Therefore, as funding and budgets allow, it is imperative to assess and plan which equipment, such as boiler plants, should be upgraded/replaced to reduce GHG emissions and gain better fuel efficiency. The next few pages analyze three school boiler replacements from the years 2015, 2016, and 2017.

Lake Trail Middle School Boiler Replacement – Summer 2016

Completion of the boiler replacement at Lake Trail Middle School occurred in July 2016. Like the 2018 Valley View Elementary boiler replacement, a 2015 Mechanical Feasibility study of Lake Trail Middle School identified that the standard gas fired boilers were inefficient and close to the end of their expected service life. The report detailed that the old standard efficiency boilers (approximately 50 to 60% efficient) should be replaced by high efficiency boilers to increase student comfort and to reduce natural gas consumption.

The Lake Trail Middle School boiler replacement was partially funded by the Carbon Neutral Capital Program (CNCP). This program provides grants to PSOs to invest in capital projects that reduce energy costs and lower carbon emissions. Funding is allocated by the Ministry of Health to six health authorities including the Ministry of Education to school districts.

The three bar charts on the following pages show decreasing natural gas tonnes of carbon dioxide equivalent emissions (tCO_2e), increasing total cumulative sum of gas emissions saved (tCO_2e) and decreasing natural gas consumption (GJ's) after the 2016 boiler replacement. The fourth chart illustrates the difference in natural gas fuel consumption when comparing actual consumption to normalized (weather adjusted) consumption.

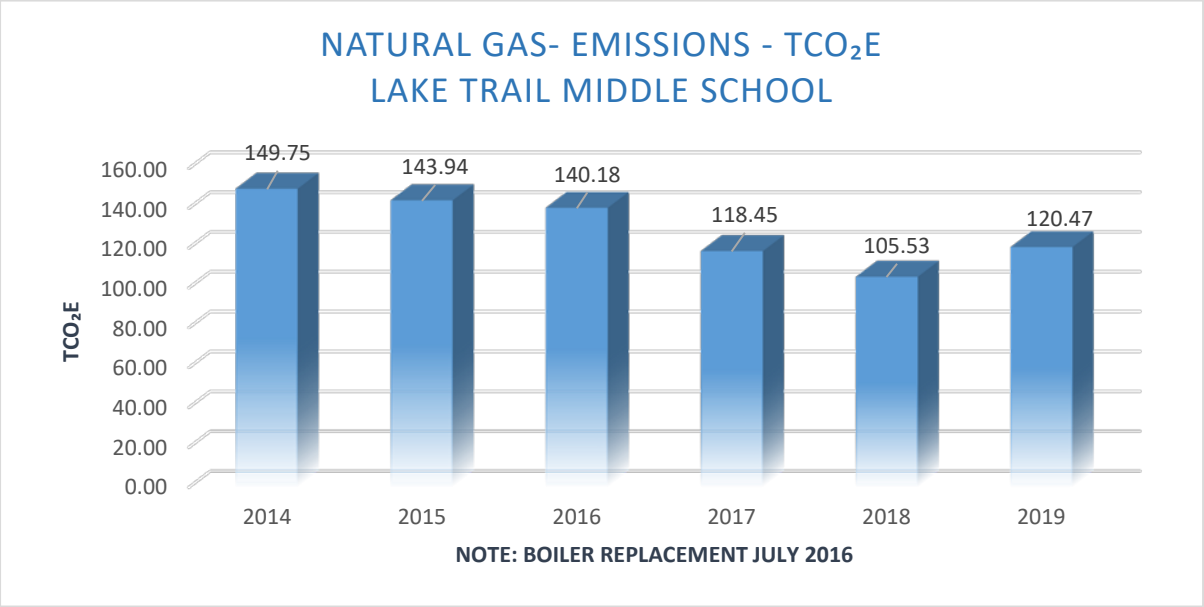

*Figure 9 - Lake Trail Middle School - the amount of natural gas tCO_2e emitted annually from 2014-2019. The amount of emissions in 2019 is **16% less** than in 2015 when an old and inefficient boiler was running.*

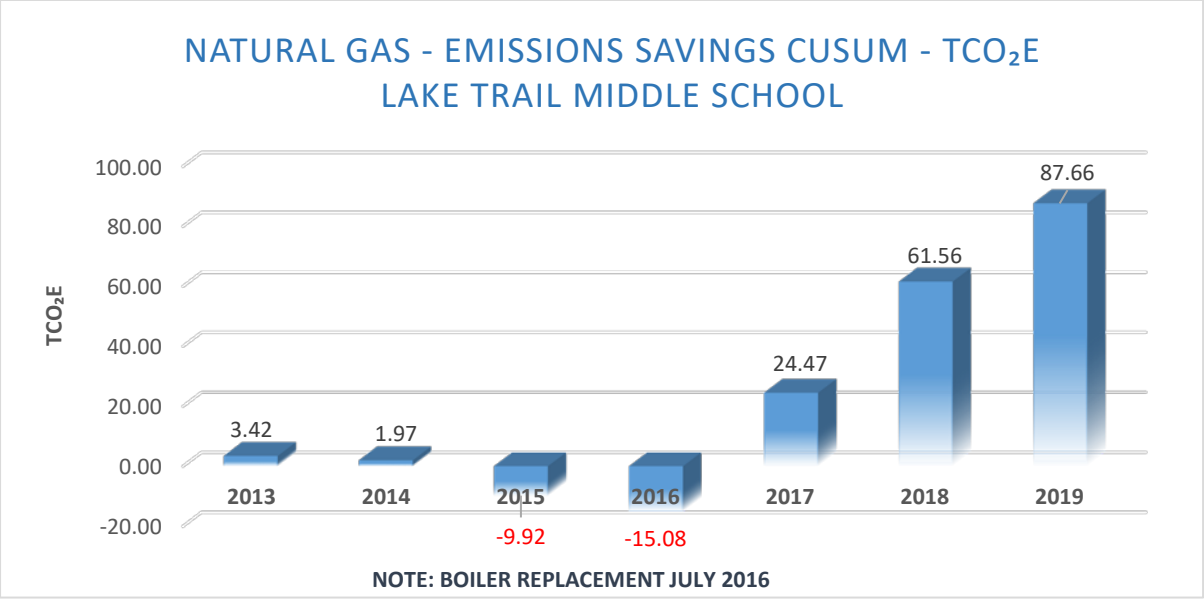

Figure 10 - Lake Trail Middle School - the CUSUM (cumulative sum) of savings of tCO_2e since the baseline year 2013/14. Note the substantial cumulative emissions savings in 2019 since the boiler was replaced July 2016.

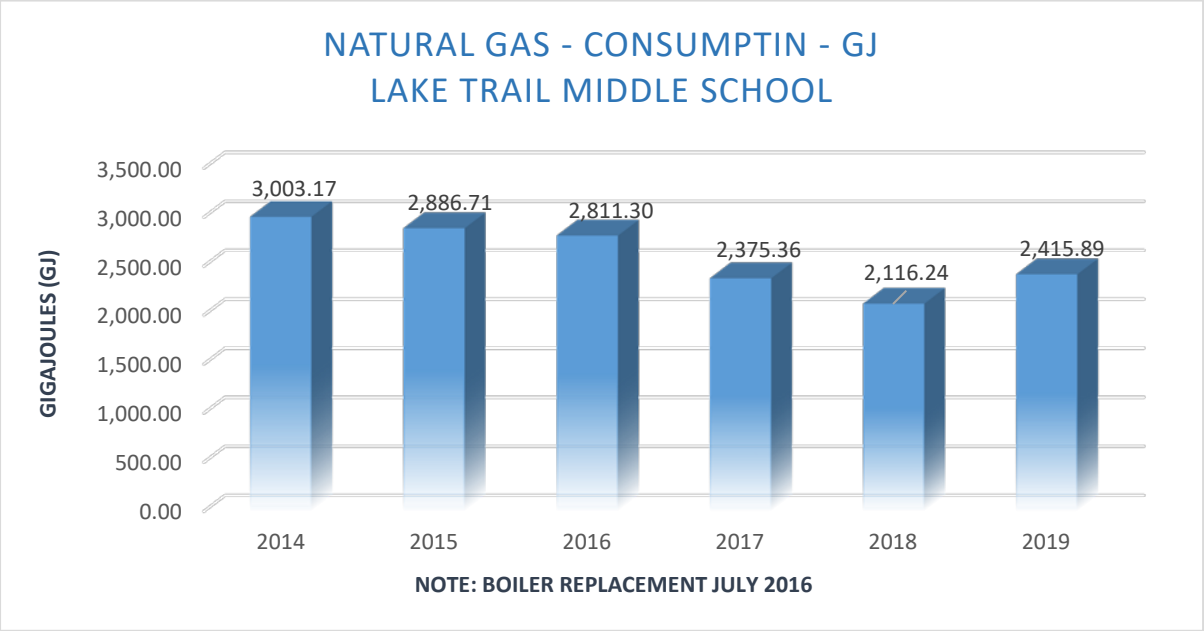

*Figure 11 - Lake Trail Middle School - the amount of natural gas consumed since 2016 **decreased by 15%** in 2017 and **25%** in 2018. In 2018/2019 a Seismic Upgrade Project began at the school, which may partially indicate a reason for higher natural gas consumption in 2019.*

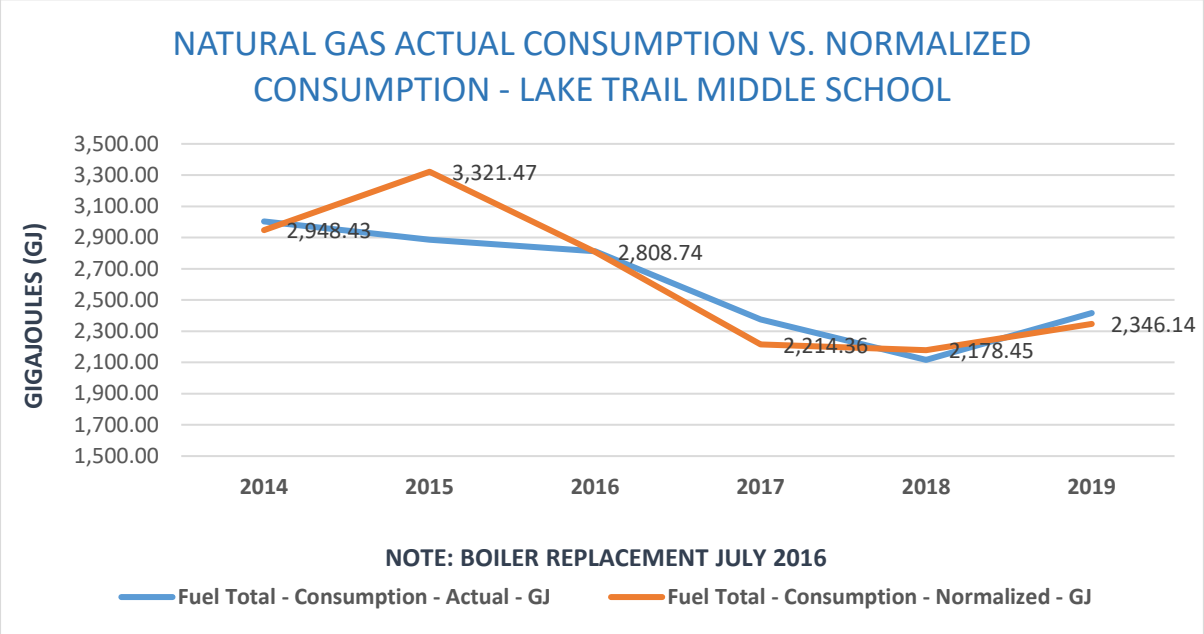

Figure 12 - Lake Trail Middle School – this chart shows the difference in Natural Gas Fuel Consumption when comparing actual consumption to normalized (weather adjusted) consumption. For instance, 2017 and 2019 were colder than 2018.

Courtenay Elementary School and Ecole Robb Road Boiler Replacements – Summer 2017

Completion of both school boiler replacements took place in July 2017 and were funded by School District No. 71 (Comox Valley).

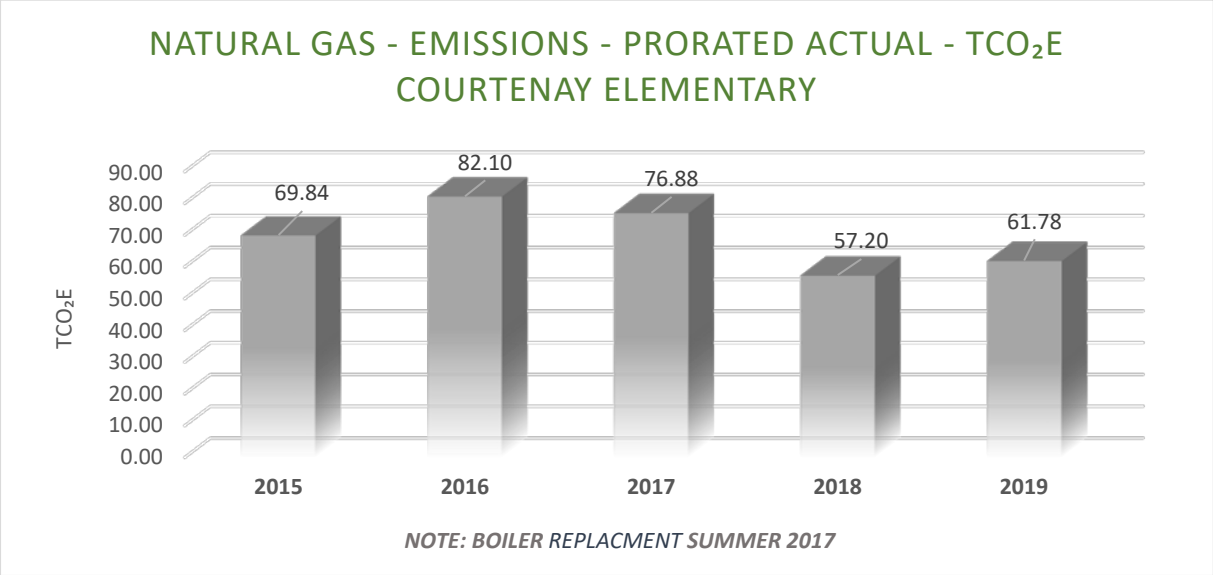

*Figure 13 - Courtenay Elementary - the amount of natural gas tCO_2e emitted annually from 2015-2019. The 2019 emissions are **25% less** than in 2016 when an old and inefficient boiler was running.*

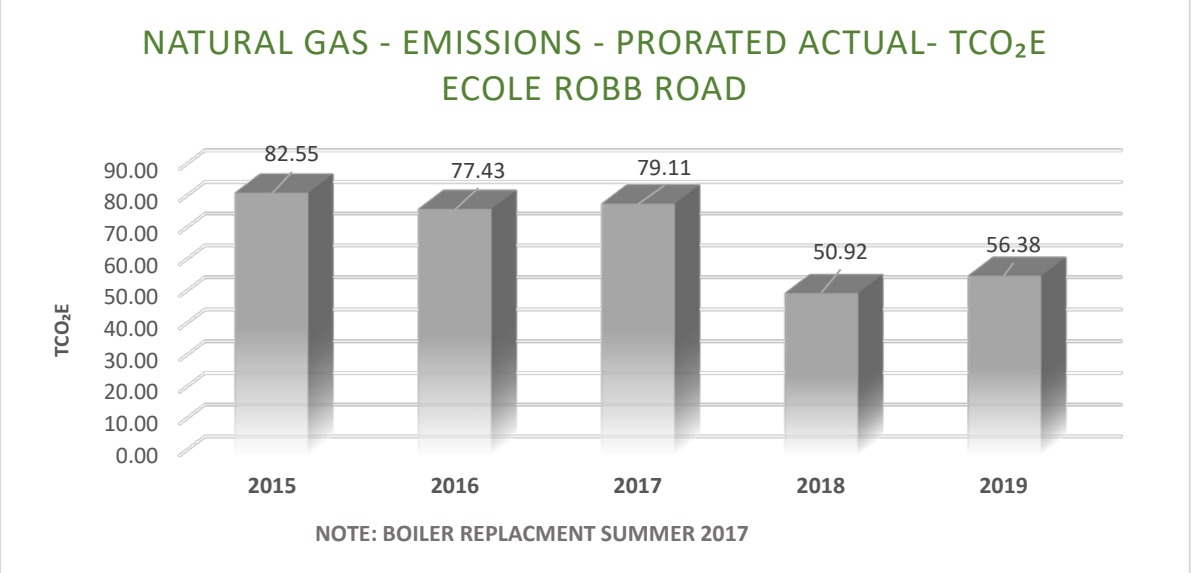

*Figure 14 - Ecole Robb Road - the amount of natural gas tCO_2e emitted annually from 2015-2019. The amount of emissions in 2019 is **27% less** than in 2016 when an old and inefficient boiler was running.*

Royston Elementary School Boiler Replacement – Summer 2015

Royston Elementary School received a boiler replacement in July 2015 funded by School District No. 71 (Comox Valley). The following graph shows cumulative savings.

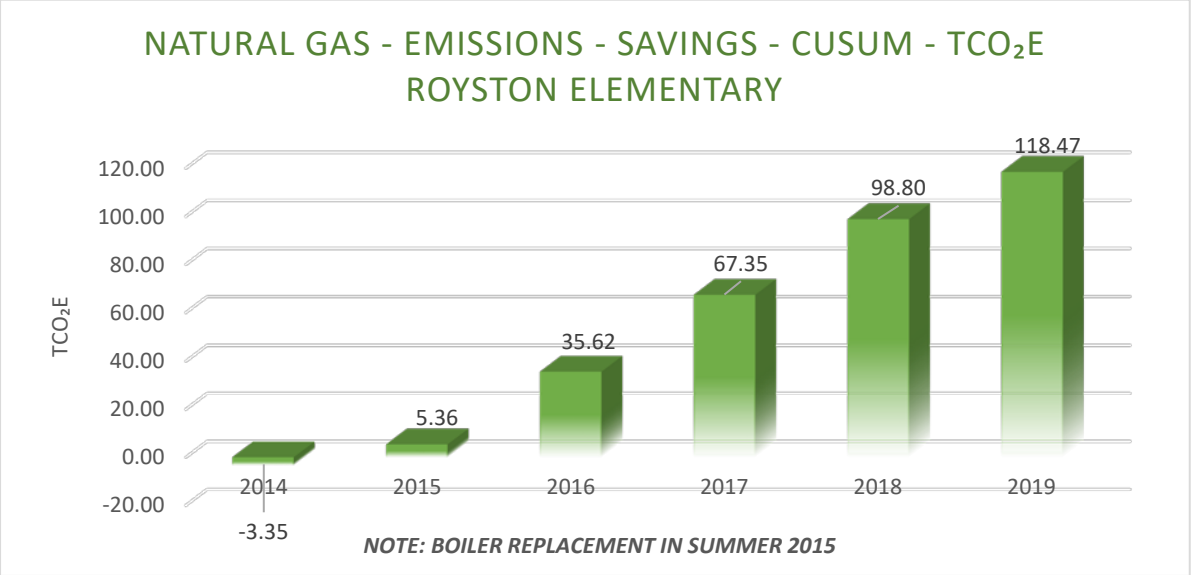

Figure 15 - Royston Elementary – the CUSUM (cumulative sum) of natural gas tCO2e saved from 2014 to 2019 as compared to the baseline year 2013/14, adjusted for weather.

OVERVIEW - FUTURE EMISSIONS REDUCTION

Since 2010, about one-third of BC's 128 PSOs have achieved a 15% reduction in emissions and approximately one-fifth have reduced emissions by approximately 25% or more. SD71 aims to contribute to the 2050 emission reductions targets as set out by the BC government by reducing the GHG emissions in 2020 and beyond.

The largest portion of the School District's GHG emissions originate from the energy used to heat and power the schools, maintenance and administration buildings. Consequently, the largest GHG reduction initiatives and applications for funding are directed towards reducing the energy consumption from buildings. Some key strategies include assessing the energy performance of each school site and identifying future energy efficiency projects that will reduce consumption in the district facilities. These assessments will factor in the *Annual Facility Grant (AFG)* project planning process, the *Annual Capital Plan,* the *Long Range Facilities Plan (LRFP)*, and the *Carbon Neutral Capital Program (CNCP)* funding requests.

Planned Energy Efficiency Projects for 2020:

- Installation of HVAC (mechanical) upgrades Phase II at Mark R. Isfeld Secondary with funding from the provincial *School Enhancement Program (SEP).*
- Installation of a high efficiency boiler plant at Queneesh Elementary School with *SD71 local capital funding.*
- Installation of HVAC (mechanical) upgrades Phase II at Cumberland Community School with funding from the provincial *School Enhancement Program (SEP).*
- Direct Digital Control (DDC) building controls upgrade will be completed at Huband Park Elementary and funded by *SD71 local capital funding.*

Furthermore, SD71 senior management continues to assist teachers, support workers, parents, and students in their educational green initiatives and activities throughout the school district and community. Some related events range from annual one-day to week-long events or run throughout the school year. Celebrations include the following:

	❑ Regional Youth Climate Action Conference 2020
	❑ SD71 School Community Gardens Conference
	❑ Farm to School Coordinator
	❑ Repurposing School Furniture to Benefit the Community
	❑ 1000x5 Book Recycling Project
	❑ Earth Week Celebrations at Various Schools
	❑ Ocean Literacy and Leadership Camp
	❑ Bike Rodeo and iRide - Bike Skills Training Program

EMISSIONS & OFFSETS SUMMARY

Comox Valley Schools, School District 71, GHG Emissions and Offsets for 2019

GHG Emissions created in Calendar Year 2019

Total Emissions (tCO_2e)	1962
Total $BioCO_2$	6
Total Offsets (tCO_2e)	1956
Total Offset Investment ($25 per tCO_2e)	$48,900

Retirement of Offsets:

In accordance with the requirements of the Climate Change Accountability Act and Carbon Neutral Government Regulation, School District No. 71 (Comox Valley) **(the Organization)** is responsible for arranging for the retirement of the offsets obligation reported above for the 2019 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 and 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:** May 29th, 2020

Name: Mr. Tom Demeo **Title:** Superintendent of Schools

APPENDIX A:

Carbon Neutral Action Report (CNAR) Survey - Climate Action Secretariat will append Part 1 of the survey to this report on June 30th, 2020.