



School District No. 43 (Coquitlam) 2017 Carbon Neutral Action Report



Pitt River Middle School Students Spring into Action for Shutdown Small Appliances Campaign

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OVERVIEW

This Carbon Neutral Action Report for the period January 1st, 2017 to December 31st, 2017 summarizes our emissions profile, the total offsets to reach net-zero emissions, the actions we have taken in 2017 to reduce our greenhouse gas emissions and our plans to continue reducing emissions in 2018 and beyond.

By June 30, 2018, the School District 43 final *Carbon Neutral Action Report* will be posted to our website at www.sd43.bc.ca.

SD43 Emissions and Offset Summary Table 2017:

In 2017, total emissions were 8,343 tCO₂e. Of those emissions, 7 tCO₂e were from low-carbon biogenic mobile equipment fuels which do not require an offset payment. This means that for the 2017 calendar year, only 8,336 tCO₂e of offsets are required. However, adjustments from prior years also had to be accounted for which were only 2 tCO₂e. Hence, the total offsets required for 2017 including adjustments are 8,338 tCO₂e.

SD43 Greenhouse Gas Emissions and Offsets for 2017 in tonnes of CO ₂ -equivalent (tCO ₂ e)	
GHG Emissions created in Calendar Year 2017:	
Total Emissions (tCO ₂ e)	8,343 tCO ₂ e
Total Offsets (tCO ₂ e) less 7 tCO ₂ e	8,336 tCO ₂ e
Adjustments to GHG Emissions Reported in Prior Years:	
Total Emissions (tCO ₂ e)	2 tCO ₂ e
Total Offsets (tCO ₂ e)	2 tCO ₂ e
Grand Total Offsets for the 2017 Reporting Year:	
Grand Total Offsets (tCO ₂ e)	8,338 tCO ₂ e

Executive sign-off:


May 30, 2018

Signature Date

Chris A. Nicolls
Secretary-Treasurer / CFO
School District No. 43 (Coquitlam)

Name (please print) Title

EXECUTIVE SUMMARY

Over the last few years, there has been increased interest and excitement by our Board of Education to consider climate change and sustainability a District priority. Educating staff, students, and parents on the impact of our behaviours around energy consumption and conservation has become integrated into our daily actions. The Coquitlam School District continues to be a full supporter of the Climate Action Legislation and the targets established by the Greenhouse Gas Reduction Targets Act of 2007. We have established a culture of awareness and action and have worked diligently to reduce our carbon footprint through multiple means. The increasing financial and environmental costs of utility consumption, waste management, fuel and paper consumption remain a concern for our District leaders. Energy conserving strategies implemented do not require employees to compromise indoor thermal comfort, lighting or air quality; it is the responsible management of these resources that makes the difference.

Coquitlam School District began taking comprehensive action against climate change by promoting environmentally sustainable designs for all schools. Financially, the District continues to devote targeted funds to sustainability projects contributing towards carbon neutrality. Outlined in our District's Strategic Energy Management Plan (SEMP) is a goal of reducing our overall energy consumption by 3% annually providing significant cost savings to the District and financing further energy conservation projects. Since 2010, total GHG emissions in SD43 have dropped by 35%.

Through the work of staff, students and our larger community, Coquitlam School District will continue to implement further changes addressing climate action targets and pursue carbon neutrality through the mantra, *education, activation and innovation*.

Our sustainability mandate continues to be based on District guidelines that contribute to our overall goals of energy management and environmental sustainability. Some of the key objectives in our District guidelines are:

- Educate students and staff on energy consumption, carbon footprint, and the moral imperative
- Engage students and staff in climate action programs to promote sustainable behaviour
- Support projects to reduce energy consumption and our carbon footprint
- Participate in the design of new buildings to ensure the implementation of up-to-date sustainable design practices
- Maintain a well-represented SD43 Executive Green Committee that works closely with executive management

GREENHOUSE GAS EMISSIONS

The chart below shows the breakdown for the Greenhouse Gas Emissions by source in 2017 at SD43. As shown, 92.6% of emissions are from energy consumption in buildings. Fleet and paper comprise the remaining 7.4%.

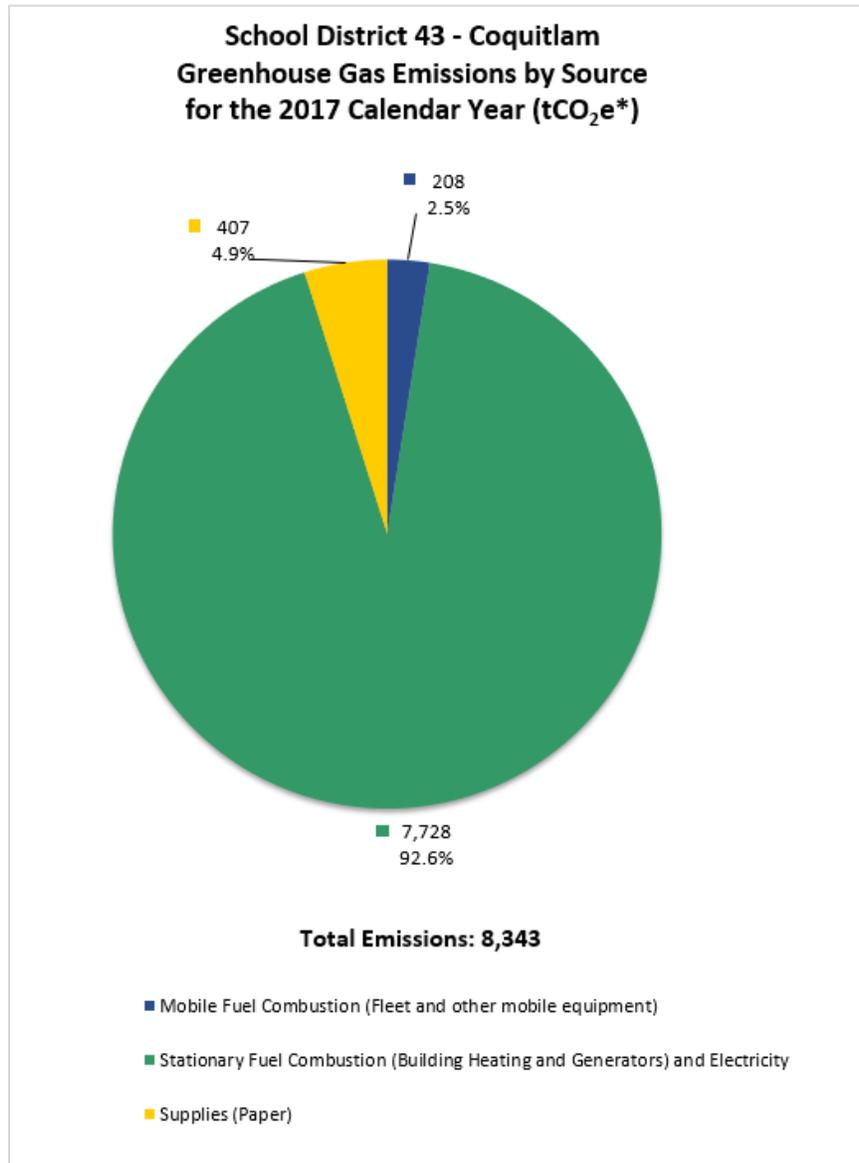


Figure 1: SD43 2017 Greenhouse Gas Emissions by Source

Offsets Applied to Become Carbon Neutral in 2017

Total offsets required for 2017 including adjustments are 8,338 tCO₂e. At the government offset price of \$25/tCO₂e, the total offset investment is \$208,450.00 which allows the District to achieve carbon neutrality for 2017. Emissions exempt from offset payment are 7 tCO₂e which are from low-carbon biogenic fuels.

Changes to Greenhouse Gas Emissions and Offsets from 2010

In 2010, the total offsets required were 11,601 tCO₂e. Total offset investment was \$290,025.00. As a result, in 2017, SD43 saw a reduction in emissions by 3,265 tCO₂e and \$81,625.00 in offset payment representing a drop of 28%.

Actual Emissions and Offsets

Table 1: Annual Carbon Emissions & Offsets

Year	Carbon Emissions (tCO ₂ e)	Carbon Offset Payment (\$)	Cumulative Reduction from Baseline (tCO ₂ e)
2010	11,649	\$290,025	Baseline
2011	10,636	\$265,575	1,013
2012	10,216	\$255,400	2,446
2013	9,392	\$239,950	4,703
2014	8,623	\$215,575	7,729
2015	7,417	\$194,696	11,961
2016	7,436	\$195,195	16,174
2017	8,343	\$208,400	19,480

Figure 2 below compares the actual annual emissions (green line) against the business-as-usual baseline case in 2010 (orange line). The baseline represents the annual emissions that SD43 would have seen if no investments were made to reduce energy consumption and carbon emissions since 2010. The area between the two lines represents the avoided emissions since 2010 which add up to 22,825 tCO₂e and \$570,632 of avoided offset payments.

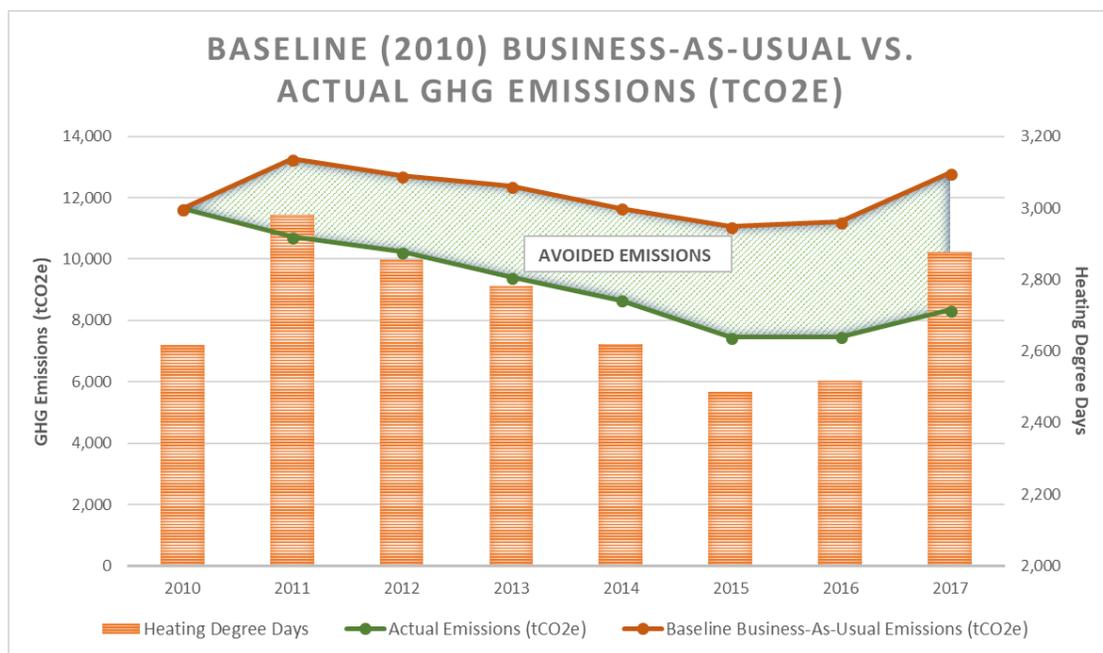


Figure 2: Avoided Emissions: Annual Actual Emissions vs. Annual Baseline Emissions

Weather-Normalized Emissions

In 2017, a colder weather pattern resulted in higher heating demand in buildings across the District. This is represented in Figure 3 below through the *Heating Degree Days* metric (orange bars). The higher heating demand naturally caused higher natural gas consumption and carbon emissions for the year.

However, to compare annual emissions while excluding the weather component, Figure 3 below shows the annual weather-normalized emissions. These are the emissions that would have been created if the weather and heating demand in all years since 2010 were equivalent to the 30-year average heating demand.

Even though the actual emissions increased in 2017 because of the colder weather, the weather-normalized emissions in 2017 are actually the lowest since 2010. This is a result of the improved efficiency of upgraded equipment and efficient operation of heating plants. The natural gas consumption and carbon emissions did not increase in a linear manner with the increase in heating demand.

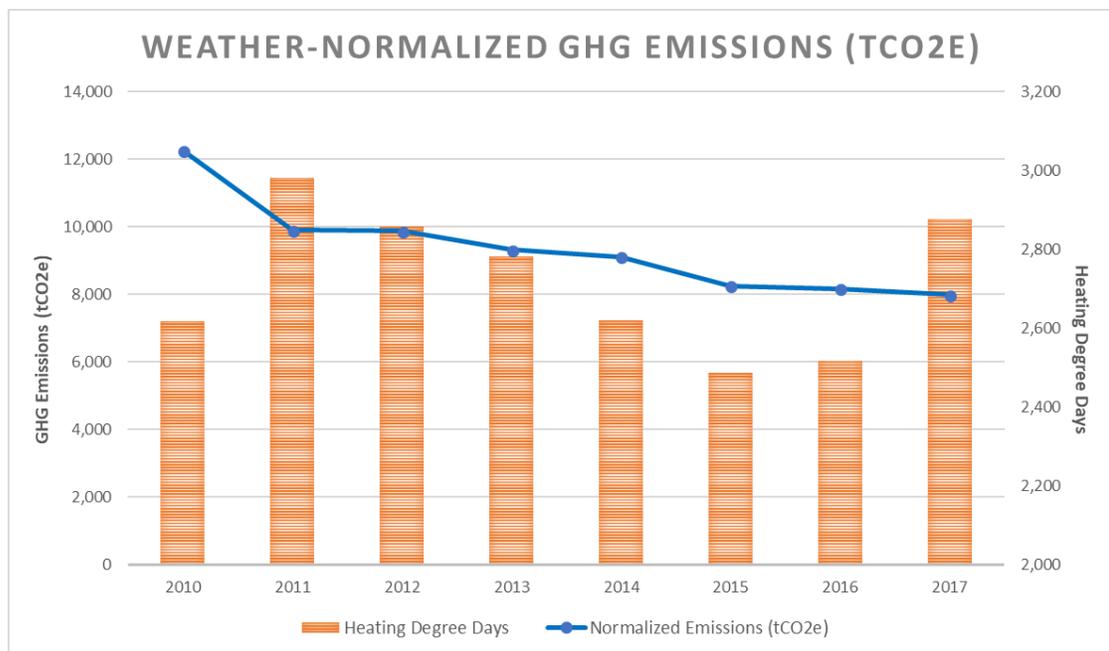


Figure 3: Annual Normalized Emissions (blue line) & Heating Degree Days (orange bars)

More details on the District's emission profile are shown in Appendix A (GHG Emissions Source Detail Report) and Appendix B (Total GHG Emissions by type).

ACTIONS TAKEN TO REDUCE GREENHOUSE GAS EMISSIONS IN 2017

SD43 has been a Power Smart Partner with BC Hydro for many years and has utilized the Energy Manager Program with BC Hydro to employ an Energy Manager. The District has also utilized the Energy Specialist Program with FortisBC to employ an Energy Specialist which has added significant scope to our Energy Management portfolio. Our executive management met regularly in 2017 for BC Hydro Quarterly presentations to provide support and guidance around energy conservation and environmental sustainability initiatives. Our Maintenance Department continues to use infrastructure funding for lighting retrofits, HVAC upgrades, and improvements to DDC (Direct Digital Controls) which directly improve energy efficiency and reduce energy costs.

Our Energy Team continues to work in partnership with our DDC (Direct Digital Control) Technologist and HVAC Supervisor to align daily operation scheduling to reduce energy consumption in buildings across the district while pursuing continuous optimization.

Heating Upgrades

In 2017, 90% of greenhouse gas emissions were from the combustion of natural gas for heating. This is one of our key drivers to prioritize retrofit heating projects by replacing inefficient plants with high efficiency condensing boilers with variable frequency drives. In 2017, the heating plants at Riverside Secondary and Coquitlam Alternative Basic Education were upgraded.



Figure 4: High Efficiency Condensing Boilers (IBC) Installed in Heating Plant Upgrades

Lighting Upgrades

In 2015, SD43 proudly initiated the first full-school LED lighting upgrade in BC saving over 230,000 kWh annually. In 2017, the District continued to implement full-school LED upgrades in Riverside Secondary, Maillard Middle, Kilmer Elementary and CAFE (Coquitlam Alternative Basic Education).

Riverside Secondary was awarded \$800,000 by the Ministry's Carbon Neutral Capital Program (CNCP) to upgrade both lighting and heating systems. The Carbon Neutral Capital Program was introduced by the Ministry as part of the Carbon Neutral Government to provide funding for projects that reduce carbon emissions. The funding received is equivalent to the carbon offsets purchased by our District over a four-year period.

SD43 implemented a cutting-edge lighting technology research project at Riverside Secondary in conjunction with BC Hydro and the University of British Columbia. Tunable LED lights allow users to change the color temperature from warm yellow to cool white and the project aims to evaluate the relationship between lighting color temperature and student performance.



Figure 5: Tunable LED Light Switch

Maillard Middle, Kilmer Elementary and CAFE (Coquitlam Alternative Basic Education) schools were all funded by the Annual Facilities Grant budget. All the schools were upgraded to LED with an overall savings of 186,840 kWh.



Figure 6: Riverside Secondary School

New Construction

At SD43, all new capital construction projects continue to employ innovative and sustainable design practices by complying with LEED Gold building standard.

One of the major positive impacts on greenhouse gas emissions was the completion of the replacement school for Centennial Secondary in September 2017. This is because the old building was the highest consumer of natural gas in the District and the school saw a significant drop in consumption after occupancy in the new building.

Behavioural Programs

We implemented various energy conservation and behavioural campaigns in 2017 with great success. A major contributor to the success of our campaigns was the enthusiastic participation by students, teachers and our executive team.

SD43 Executive Green Committee

Our SD43 Executive Green Committee was initiated in 2017 with our first meeting held in February 2018. We are very pleased to have committed executive leaders who support our green initiatives and policies. Their input and resources are invaluable to the success of our committee.

SD43 Conservation Green Grant Program

The SD43 Conservation Green Grant Campaign promotes green behavioural initiatives throughout our school district. Schools are invited to participate in the program by submitting their “Green Project Ideas”. Eligibility is based on how their projects can contribute to sustainability and the reduction of their carbon footprint. There were 11 exciting projects that were submitted including Green Gardens, Shopping Cart Gardens, Stop Ocean Plastic, and Recycling Bin projects.

Small Appliance Shutdown Campaign

With the assistance of BC Hydro Energy Wise Network, SD43 launched a Small Appliance Shutdown campaign raising awareness and instilling behavioural actions. Impactful posters and shutdown checklists were distributed throughout the school district. Participating schools were asked to complete the checklists for their school as well as submit behavioural action photos. We were very pleased to receive 11 amazing submissions.



Figure 7: Pitt River Middle Shutdown Campaign

Sweater Campaign

A district wide Sweater Campaign was implemented with the assistance of BC Hydro Energy Wise Network. Schools were invited to participate by raising energy conservation behavioural awareness through posters, social media and by submitting sweater day photos. Nine schools enthusiastically participated in our Sweater Campaign by submitting some very creative behavioural photos. Our Energy Team visited each of the schools and presented a Sweater Mug to the School Admin Team and thanked them for participating in our behavioural campaign.



Figure 8: Cape Horn Elementary Sweater Campaign

FortisBC Behavioural Programs

The Energy Management Team collaborated with the CFL BC Lions coordinator to deliver **The Energy Champions** workshops to some of our schools to raise awareness about practical measures for energy conservation. Also, the **Energy Leaders** program was adopted by various teachers in the District which provided BC curriculum-aligned lesson plans and activities related to energy concepts, sources, safety, and literacy. The lessons cover a wide range of subjects including science, arts, and social studies.



Figure 9: Energy Champions workshop delivered by CFL players

Print-Wise

The District continues to move forward on its overall print strategy, “Print-wise”, replacing and/or removing all outdated printers and fax machines and monitoring user copy/print volumes. This new approach showed a decrease in paper and copy amounts and costs. All schools continue to phase out excessive printers to further reduce consumption. Also, more teachers, staff and schools are going to paperless newsletters and notices, as well as creating virtual classrooms and online homework and discussion boards in attempts to reduce paper consumption. District level meetings encourage posting handouts online and increased use of tablet technology to review resources and electronically recorded notes.

PLANS TO CONTINUE REDUCING GREENHOUSE GAS EMISSIONS IN 2018

School District 43 will continue to reduce Greenhouse Gas Emissions by **educating** our students, staff and parents, facilitating **actions** and promoting **innovations** leading to sustainable behavioural change throughout our community.

As part of our overall strategy to reduce our GHG emissions, Coquitlam School District has made energy management and environmental sustainability a priority. With the continued support from the Ministry as well as BC Hydro and FortisBC, the District will continue to make every effort to meet or exceed the annual energy reduction target of 3%.

Facilities and Maintenance will continue with HVAC and lighting upgrades to contribute to more energy efficient buildings and better learning and working environments for students and staff. Also, as part of the design process for new schools, the District will continue to consult with energy modelers to ensure that all new buildings perform at optimal levels of energy efficiency. In 2018, the following projects will take place:

Heating Upgrades

- **Charles Best Phase 1 of 2: Roof Top Units and DDC (SEP).** Project cost: \$820,312 (including all project costs, fees, taxes, permits, etc.). Energy savings: 1,493 GJ
- **Summit Middle Phase 1 of 3: Heating plant and DDC (SEP).** Project cost: \$393,750 (including all project costs, fees, taxes, permits, etc.). Energy savings: 479 GJ
- **Coquitlam River Heating plant, hot water, DDC (CNCP).** Project cost: \$387,178 (including all project costs, fees, taxes, permits, etc.). Energy savings: 832 GJ
- **Hazel Trembath Heating plant, hot water, DDC (CNCP).** Project cost: \$354,375 (including all project costs, fees, taxes, permits, etc.). Energy savings: 364 GJ

Lighting Upgrades

- **Gleneagle Secondary: LED upgrade.** Project cost: \$550,000. Energy savings: 446,245 kWh

Behavioural Programs

We are looking forward to continuing with our behavioural sustainability programs and campaigns. We will continue with the following energy conservation programs which will reduce our carbon footprint.

- SD43 Executive Green Committee
- SD43 Green Grant Conservation Program
- BC Hydro Energy Wise Network Green Day Conference
- BC Hydro Energy Wise Network Sweater Campaign
- FortisBC Energy Champions Workshops
- FortisBC Energy Leaders Curriculum

District Wide 4-Bin Recycling

We are excited to confirm that our SD43 Board has approved the implementation of a standardized **4-bin Recycling System** throughout the District. Roll out is expected to start in Fall 2018.



Figure 10: SD43 New 4-Bin Recycling System

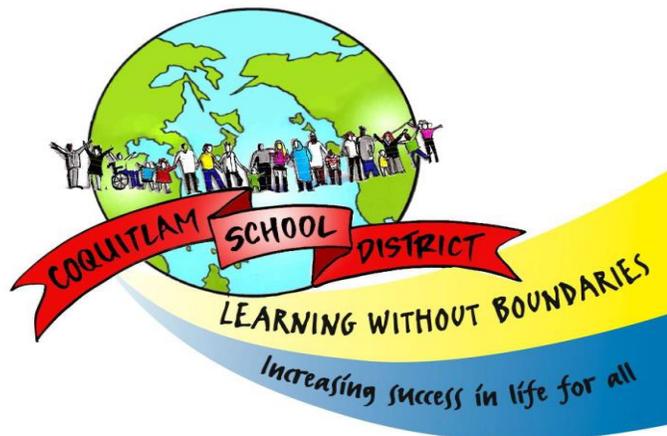
In conclusion, the District continues to work on a combination of both technical and behavioural projects to reduce energy consumption levels by a minimum of 3% by the end of the 2018-2019 school year. As noted throughout this report, we are well on our way and are confident that with continued executive support and the enthusiasm of students and educators, the District will surpass this goal. Our actions encourage global social responsibility in the areas of conservation and sustainability.



Patricia Gartland
Superintendent of Schools
School District 43 (Coquitlam)



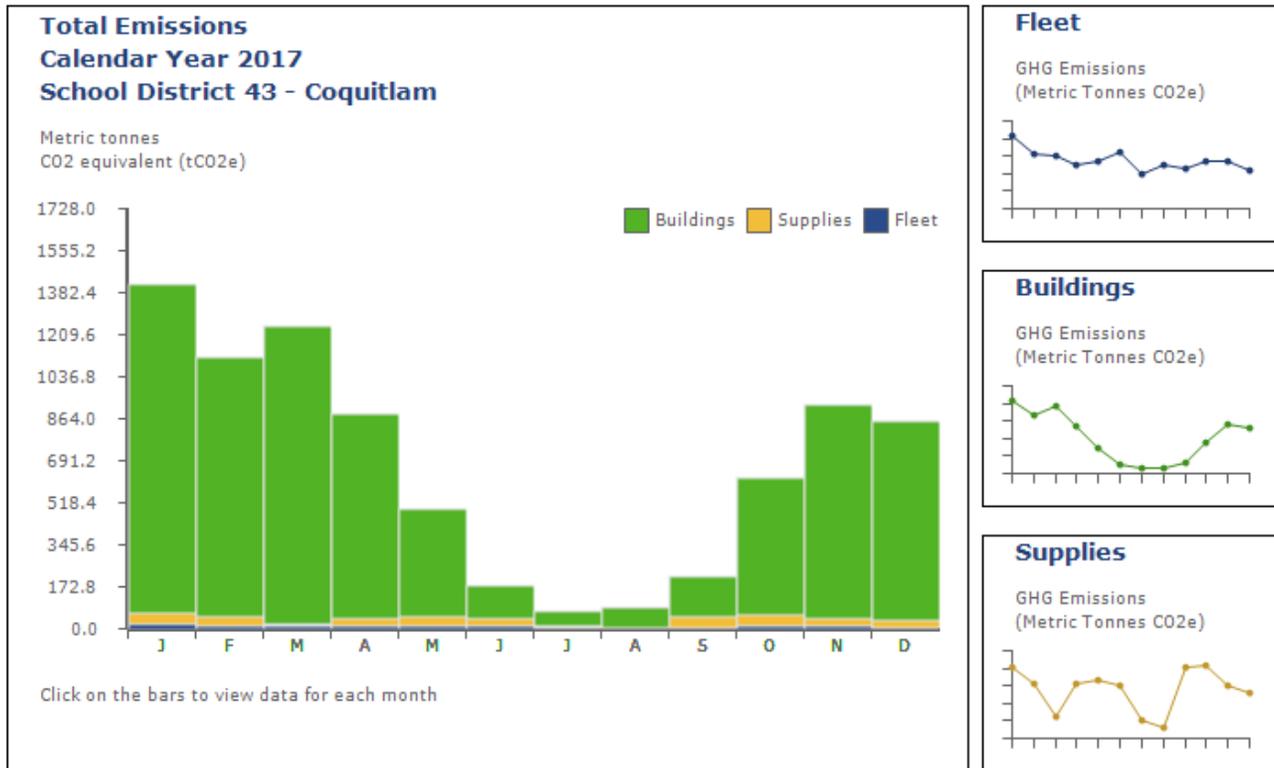
Chris Nicolls
Secretary Treasurer
School District 43 (Coquitlam)



APPENDIX A: GHG EMISSIONS SOURCE DETAIL REPORT

School District 43 - Coquitlam							
Greenhouse Gas Emissions Source Detail Report for the 2017 Calendar Year							
Generated: May 25, 2018							
Source	Quantity	Greenhouse Gases In Tonnes					
		CO ₂	CH ₄	N ₂ O	tCO ₂ e *		
Stationary Fuel Combustion (Building Heating and Generators) and Electricity							
Offset Required	Fuel Combustion **	150,200.38 GJ	7,446.94	0.15	0.14	7,490.97	
	Purchased Energy	78,854.15 GJ	236.56	0.00	0.00	236.56	
	Offset Required Sub Total		7,683.50	0.15	0.14	7,727.54	
	TOTAL STATIONARY EMISSIONS		7,683.50	0.15	0.14	7,728	
Supplies (Paper)							
Offset Required	Non-recycled Content Paper	1,772 Pkg	11.65	0.00	0.00	11.65	
	Recycled Content Copy Paper	67,433 Pkg	395.51	0.00	0.00	395.51	
	Offset Required Sub Total		407.16	0.00	0.00	407.16	
	TOTAL SUPPLIES EMISSIONS		407.16	0.00	0.00	407	
Mobile Fuel Combustion (Fleet and other mobile equipment)							
Offset Required	Fuel Combustion **	81,565.20 L	189.86	0.02	0.04	201.22	
	Offset Required Sub Total		189.86	0.02	0.04	201.22	
Offset Exempt	CO ₂ from Biogenic Fuel Combustion		6.81	N/A	N/A	6.81	
	Offset Exempt Sub Total		6.81	0.00	0.00	6.81	
	TOTAL MOBILE EMISSIONS		196.67	0.02	0.04	208	
	Total Offset Exempt		6.81	0.00	0.00	7	
	Total Offset Required		8,280.51	0.17	0.17	8,336	
	TOTAL EMISSIONS		8,287.32	0.17	0.17	8,343	
* Each greenhouse gas has been converted to a standard measurement (tCO ₂ e) by multiplying its emissions by its global warming potential (GWP).							
The GWP of carbon dioxide (CO ₂) from both anthropogenic and biogenic sources is 1; methane (CH ₄) is 25, and nitrous oxide (N ₂ O) is 298.							
The Totals for tCO ₂ e are shown here rounded to the nearest whole metric tonne as only whole tonnes of tCO ₂ e can be purchased for offsets.							
** Includes Fossil Fuels and CH ₄ and N ₂ O from Biogenic Fuels							

APPENDIX B: MONTHLY GREENHOUSE GAS EMISSIONS BY TYPE



Totals Calendar Year 2017, School District 43 - Coquitlam

	Measure	Quantity	Greenhouse Gases in Tonnes				
			CO ₂	BioCO ₂	CH ₄	N ₂ O	tCO ₂ e ¹
Scope 1 (Direct) Emissions							
Mobile Combustion (Fleet)	Litres	81,565.20	189.86	6.81	0.02	0.04	208.03
Stationary Combustion, Reported ³	GigaJoules	150,200.38	7,446.94	0.00	0.15	0.14	7,490.97
Scope 2 (Indirect) Emissions							
Purchased Energy, Reported ³	GigaJoules	78,854.15	236.56	0.00	0.00	0.00	236.56
Scope 3 (Business Travel and Office Paper) Emissions							
Office Paper	Packages	69,205.00	407.16	0.00	0.00	0.00	407.16
Total Emissions, Calendar Year 2017			8,280.51	6.81	0.17	0.17	8,343
Carbon Neutral or Offset Exempt			0.00	6.81	0.00	0.00	7
Total for Offsets⁴			8,280.51	0.00	0.17	0.17	8,336

1. Each greenhouse gas has been converted to a standard measurement (tCO₂e) by multiplying its emissions by its global warming potential (GWP). The GWP of carbon dioxide (CO₂) from both anthropogenic and biogenic sources is 1; methane (CH₄) is 25, and nitrous oxide (N₂O) is 298. The Totals for tCO₂e are shown here rounded to the nearest whole metric tonne as only whole tonnes of tCO₂e can be purchased for offsets.

2. Estimated data has been calculated based on the methods described in the Methodology Document.

3. Reported data refers to consumption which has been directly billed to the organization.

4. The tCO₂e value from the "Total for Offsets" line represents the quantity of offset purchases required to become carbon neutral.

Part 1: CNAR Survey

1. General Information

Name: Marilyn Christensen

Contact Email: mchristensen@sd43.bc.ca

Organization Name: Coquitlam School District SD43

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)

Conducted an energy audit/study of building(s) in the organization's portfolio.; Performed energy retrofits of the organization's building(s); Built, or are building new LEED Gold or other "Green" buildings

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

How many buildings were retrofitted?: 2

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

How many new "Green" buildings?: 2

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

Yes, we did.

Riverside Secondary School - LED Retrofits saving 415,000kWh

Maple Creek Middle School - LED Retrofits saving 107,000kWh

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

Our plan would be to
Continue LED retrofits to reduce kWh at our schools
Continue Boiler, RTU, upgrades
Continue our Print Strategy by reducing paper use
Continue our Behavioral Campaigns
Considering Electric Cars

b) Over the following 6-10 years

Our plan would be to
Continue LED retrofits to reduce kWh at our schools
Continue Boiler, RTU upgrades
Continue our Print strategy by reducing paper use
Continue our Behavioral Campaigns
Considering Electric Cars

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)

Replaced existing vehicles with hybrid or electric vehicles

3) Mobile Sources - Other? Please specify: We are sourcing out opportunities for electric or hybrid vehicles

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

How many vehicles?: 1

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

Continue to source out Electric and Hybrid Car Options

b) Over the following 6-10 years

Continue to source out Electric and Hybrid Car Options

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)

4) Supplies (Paper): Indicate which actions your PSO took in 2017: - Other? Please describe briefly:: We are currently in the process of sourcing out ways to reduce paper use

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

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

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 currently sourcing ways to reduce paper consumption

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)

A Green, Sustainability or Climate Action Team

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)

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