

School District No. 43 (Coquitlam) 2021 Climate Change Accountability Report



District's Tree Planting Drive

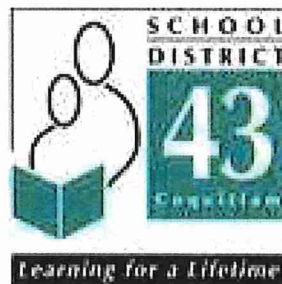


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EXECUTIVE SUMMARY

This Climate Change Accountability Report for the period January 1st, 2021 to December 31st, 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 2022 and beyond.

Over the last few years, there has been increased interest and excitement by our Board of Education to consider climate change and sustainability as a District priority. The education of staff, students, and parents on the impact of our behaviors around energy consumption and conservation have become integrated into our daily actions. The Coquitlam School District continues to fully support BC 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, and fuel and paper consumption remain a concern for our District leaders. Energy conserving strategies implemented should not compromise indoor thermal comfort, lighting levels, 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. We have developed a 5 year Strategic Energy Management Plan including the amendment of our Administrative Procedure 547 Resource Conservation is now” Energy and Resource Conservation” to engrain Energy Management and Sustainability practices into the organization's procedures with senior management support. Our ongoing goal of reducing our overall energy consumption by 3% annually provides significant cost savings to the district and finances further energy conservation projects. Since 2010, total GHG emissions in SD43 have dropped by 33%.

Through the work of staff, students, and our larger community, Coquitlam School District will continue to implement further changes addressing climate action targets and will pursue carbon neutrality through its core beliefs and principles to develop and maintain safe, inclusive, and socially responsible learning communities.

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 behavior
- 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

This year has been slightly different compared to previous years due to a Global Pandemic (COVID-19). However, the district has continuously worked towards its commitment to reducing its carbon footprint.

PART 1: LEGISLATIVE REPORTING REQUIREMENTS

DECLARATION STATEMENT

This SD43's Climate Change Accountability Report for the period January 1st, 2021, to December 31st, 2021, summarizes our emissions profile, the total offsets to reach net-zero emissions, the actions we have taken in 2020 to reduce our greenhouse gas emissions, and our plans to continue reducing emissions in 2021 and beyond.

EMISSION REDUCTIONS: ACTIONS AND PLANS

Coquitlam school district came out with Directions 2025 and recognize so many cross-cutting themes that we take direction from, to develop our strategic action plan to reduce emissions and meet provincial GHG emission targets. SD43 acknowledges climate change and has undertaken several actions for 2021 and plans for 2022 and beyond to promote environmental stewardship and create sustainable learning spaces.

a. Stationary Sources (Building/Heating Plants)

As a building age so ages its assets including boilers, DHW Heaters, Unit ventilators, RTUs and Air Handlers. SD43 recognizes this principle and has been undertaking several upgrades over the years. In 2021, the following upgrades were performed:

1. Hot water tanks were replaced with In-line water heaters at 3 locations (Centennial Secondary school, Maple Creek Middle, and Aspenwood Elementary) to reduce gas consumption. This program will continue in 2022 with our Maintenance staff changing over these heaters.
2. Old and worn-out furnaces were replaced with higher efficiency gas furnaces (AFUE-98%) at Walton Elementary.
3. Replacing old atmospheric and non-condensing boilers with newer higher efficiency condensing boilers to reduce GHG Emissions and heat losses in Montgomery Middle School, Miller Park Community School, Leigh Elementary, Eagle Ridge Elementary, Central Elementary, and Plesantside Elementary. This program will continue in 2022 with our District's SEMP.
4. We are also investing in new technologies such as a Gas Absorption heat pumps (GAHPs) to gain first-hand knowledge of these pumps and their performance.
5. We also invest in DDC upgrades that help improve the operations of equipment in schools. Thus, enhancing the equipment life while reducing energy costs to the district.

b. Mobile Sources (Fleet)

1. In 2021, SD43 bought its first fully electric fleet vehicle to replace the security runner which has the highest mileage to reduce our GHG Emissions. The business case was solid and prompted us to go electric. With the charging infrastructure in place, we were able to replace our security runner van, which travels over 65,000 km per year around the District.

Replacing this vehicle with an electric one will create:

- 7700 Liters in Annual Gas savings.
- Annual GHG emission Reduction; 18,361 Kg CO₂e

- Estimated Annual Savings; \$13,000

With a simple payback of under 3 years the business case for this vehicle is understandably very strong, and as gas prices go up will become stronger. We hope that as suitable EVs become available, we will have the support of the district to continue to electrify our fleet.



2. Further, we are adding “NO IDLING” signs across the district to encourage parents and employees not to run their cars when waiting.



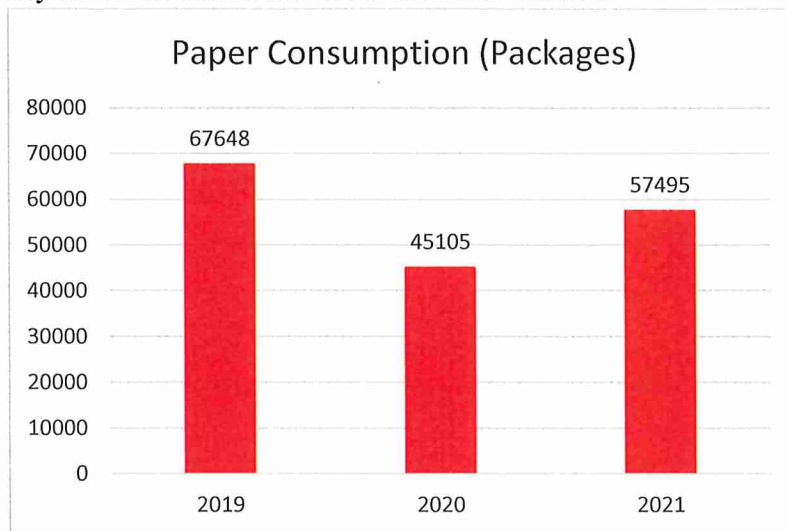
3. With the addition of 4 New EV (Electric Vehicle) Chargers at Port Moody Secondary school, we now have EV chargers at 7 locations offering 22 EV Chargers. These EV chargers are available to staff and students who wish to charge their EVs. At this time we have forty-three staff and students signed up for charging their EVs at our station.



4. We at SD43 are going to continue installing EV charging stations as the funds permit across the district. We are also installing 10 EV charging stations at the ELC Board Office (New Building) which will make a total of 32 Charging stations.

c. Paper Consumption:

Coquitlam School District has been focused on reducing paper consumption and continues to work with teachers and administrators to reduce GHG emissions. Though our paper consumption has seen a rise of 27.5% w.r.t. 2020, Coquitlam School district is running programs, Go Paperless using digital signing as a norm and Double-Sided Printing set as default on all our printers and Good on one side paper tray maintained in all the offices across the district.



SD43 EMISSIONS AND OFFSET SUMMARY TABLE 2021:

For the year 2021, our total emissions were 7,842 tCO₂e. Of those emissions, 10.7 tCO₂e were from low-carbon biogenic mobile equipment fuels which do not require an offset payment. This means that for the 2021 calendar year, 7,831 tCO₂e of offsets are required.

B.C.'s published EEIF for the integrated grid was 40.1 tCO₂e/GWh in 2020 and decreased to 9.7 tCO₂e/GWh in 2021 due to a change in the methodology used to determine the EEIF. The methodology for determining the EEIF is set in Schedule D of the Greenhouse Gas Emission Reporting Regulation (GGERR). An amendment to the methodology came into force in 2022 to ensure the published EEIF values more accurately reflect the carbon intensity of the electricity consumed in B.C. The updated methodology considers B.C.'s surplus clean energy position and ability to be a provider of energy storage services, while also better aligning B.C. with other trading jurisdictions, including California and Washington state. The two primary changes made to the methodology include a move from a "gross imports" basis to a "net imports" basis and from a 3-year rolling average to a 4-year rolling average. The proposed changes were informed by discussions with BC Hydro, Powerex, and FortisBC. The updated methodology will be used going forward from the 2021 EEIFs. Revising the methodology to account for "net imports" instead of "gross imports" reflects the distinction between imports needed to meet domestic demand and trading activities intended to maximize the value of B.C. as a provider of energy storage services. This is because in a "net imports" methodology only emissions associated with the portion of imports needed for domestic use are included in the EEIF. Revising the methodology to use a 4-year rolling average will further dampen the impact of annual fluctuations. For additional information about the

methodology change, please refer to GGIRCA Bulletin #022. Therefore, changes to Emissions Intensity Factors by CAS coupled with a rise in paper and natural gas consumption have caused our emissions to be 7831 tCO₂.

Description	2021	2020	2020 (Before Amendment)
Direct Fuel Combustion t CO ₂ e, GHG, All	6984	6632	6632
Purchased Energy t CO ₂ e, GHG, All	196	732	197
Mobile Energy Use t CO ₂ e, GHG, All	312	337	337
Office Paper t CO ₂ e, GHG, All	339	263	263
Total	7831	7964	7429

<i>Coquitlam School District (#43) GHG Emissions and Offset for 2021 (tCO₂e)</i>	
GHG Emissions created in Calendar Year 2020	
Total Emissions (tCO ₂ e)	7,842
Total BioCO ₂	10.7
Total Offsets (tCO ₂ e)	7,831
Adjustments to GHG Emissions Reported in Prior Years (2021)	
Total Emissions (tCO ₂ e)	0
Total Offsets (tCO ₂ e)	0
Grand Total Offsets for the 2020 Reporting Year	
Grand Total Offsets Required (tCO ₂ e)	7,831
Total Offset Investment (Grand Total Offsets Required X \$25/tCO ₂ e)	\$ 195,775

RETIREMENT OF OFFSETS

Following the requirements of the Climate Change Accountability Act and Carbon Neutral Government Regulation, The Coquitlam School District No. 43 (the Organization) is responsible for arranging for the retirement of the offset's 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 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.

PART 2: PUBLIC SECTOR LEADERSHIP

As a signatory to the climate action charter, SD 43 is committed to supporting continued planning for emission reduction and climate change adaptation initiatives across its operated schools. As part of this commitment, SD 43 has undertaken several initiatives mentioned below:

2A: CLIMATE RISK MANAGEMENT

Coquitlam School District has started the process of creating a plan for emission reductions by acknowledging Climate Change and its risk. Also, SD43 has modified its administrative procedure (AP 547) from “Resource Conservation” to “Energy and Resource Conservation” to D 43 has a strong commitment to reducing its impact on the environment through many programs and initiatives. SD 43 uses resources in many ways through its day-to-day activities such as heating and lighting buildings, running equipment, mobilizing its’ fleet, water consumption, paper use, and others. These resources all have financial costs and environmental impacts, which if left un-scrutinized are a concern to the operations and management of the district. Moreover, as a signatory to the Climate Action Charter, Coquitlam School District is required to reduce Green House Gas (GHG) emissions. AP 547 focuses on resources including water, paper, fuel (gasoline/diesel), natural gas, and electricity.

2B: OTHER SUSTAINABILITY INITIATIVES

The energy management and sustainability department with SD 43 has introduced several sustainable initiatives to engage staff and students across the district. These initiatives are listed below:

1. District Sustainability Leadership (DSL):
We have developed a sustainability contact at every school. We hold a monthly meeting with our Secondary school’s students who are interested in sustainability and green initiatives in schools. They have worked with us on several sustainable initiatives including Tree plantation, Waste Audits, and a recycling program among others.
2. Waste Audits and Recycling
During fall 2021, the DSL with support from the energy management and sustainability department at the district and Waste Connections carried out a waste audit in all our secondary schools. The purpose of this initiative was to sensitize students about waste segregation to ensure correct handling and recycling.
3. Tree Planting
During the fall of 2021, we developed a Tree Planting program that engaged 22 schools in the planting of Trees along with lesson plans and was supported by the cities of Coquitlam, Port Coquitlam, Port Moody, and a private sponsor.
4. Holiday Shutdown
Each year before holidays (Summer and Winter), we hold a holiday shutdown campaign wherein all the lights and equipment (including projectors, coffee makers, etc.) are plugged out and the numbers are recorded. Schools with the highest number of plugged-out equipment are rewarded.
5. Energy Lessons
We have now created a pool of sustainability support teachers who are creating lesson plans that promote energy conservation and sustainability initiatives in the district. We have monthly meetings with teachers to discuss various initiatives that we can promote in the district.
6. Energy Wire Newsletter
We have designed created a monthly newsletter to highlight the many different sustainability initiatives that are going on at our schools. Till now, we have written the 6th monthly Energy Wire Newsletter.
7. Training for Caretakers focused on passive energy conservation in schools

Last year due to COVID-19 restrictions instead of students and staff, we shifted our focus on caretakers for training focused on passive energy conservation opportunities in schools.

2C: SUCCESS STORIES

Fully electric fleet vehicle to replace the security runner which has the highest mileage to reduce our GHG Emissions. The business case was solid and prompted us to go electric. With the charging infrastructure in place, we were able to replace our security runner van, which travels over 65,000 km per year around the district.

Replacing this vehicle with an electric one will create:

- 7700 Liters in Annual Gas savings.
- Annual GHG emission Reduction; 18,361 Kg CO₂e
- Estimated Annual Savings; \$13,000

With a simple payback of under 3 years the business case for this vehicle is understandably very strong, and as gas prices go up will become stronger. We hope that as suitable EVs become available, we will have the support of the district to continue to electrify our fleet.



With 4 New EV (Electric Vehicle) Chargers at Port Moody Secondary school, we now have EV chargers at 7 locations offering 22 EV Chargers. These EV chargers are available to staff and students who wish to charge their EVs. Till now, forty-three staff and students have signed up for charging their EVs at our station.



EXECUTIVE SIGN-OFF:

A handwritten signature in black ink, appearing to be "MA".

Signature

May 30/2022

Date

Mohammed Azim

Name (please print)

Secretary-Treasurer

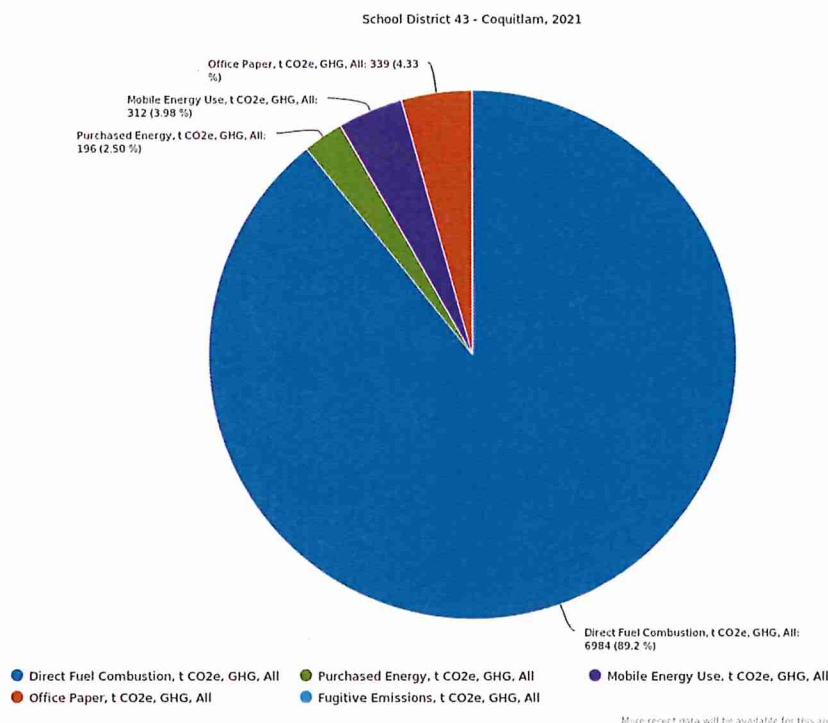
Title

**Signature by a senior official such as CEO, COO, Secretary-Treasurer, or Superintendent*

GREENHOUSE GAS EMISSIONS SOURCE BREAKDOWN

The chart below shows the breakdown of the Greenhouse Gas Emissions by source in 2021 at SD43.

School District 43 - Coquitlam Greenhouse Gas Emissions by Source for the 2021 Calendar Year (tCO₂e*)



Total Emissions: 7,831 tCO₂e

Offsets Applied to Become Carbon Neutral in 2021 (Generated on April 21st, 2022 3:04 PM)

*Tonnes of carbon dioxide equivalent (tCO₂e) 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 Climate Change Accountability Act*, all emissions from the sources listed above must be reported. As outlined in the regulation, some emissions do not require offsets.

OFFSETS APPLIED TO BECOME CARBON NEUTRAL IN 2021

Total offsets required for 2021 including adjustments are 7,831 tCO₂e. At the government offset price of \$25/tCO₂e, the total offset investment is \$195,775 which allows the district to achieve carbon neutrality for 2021.

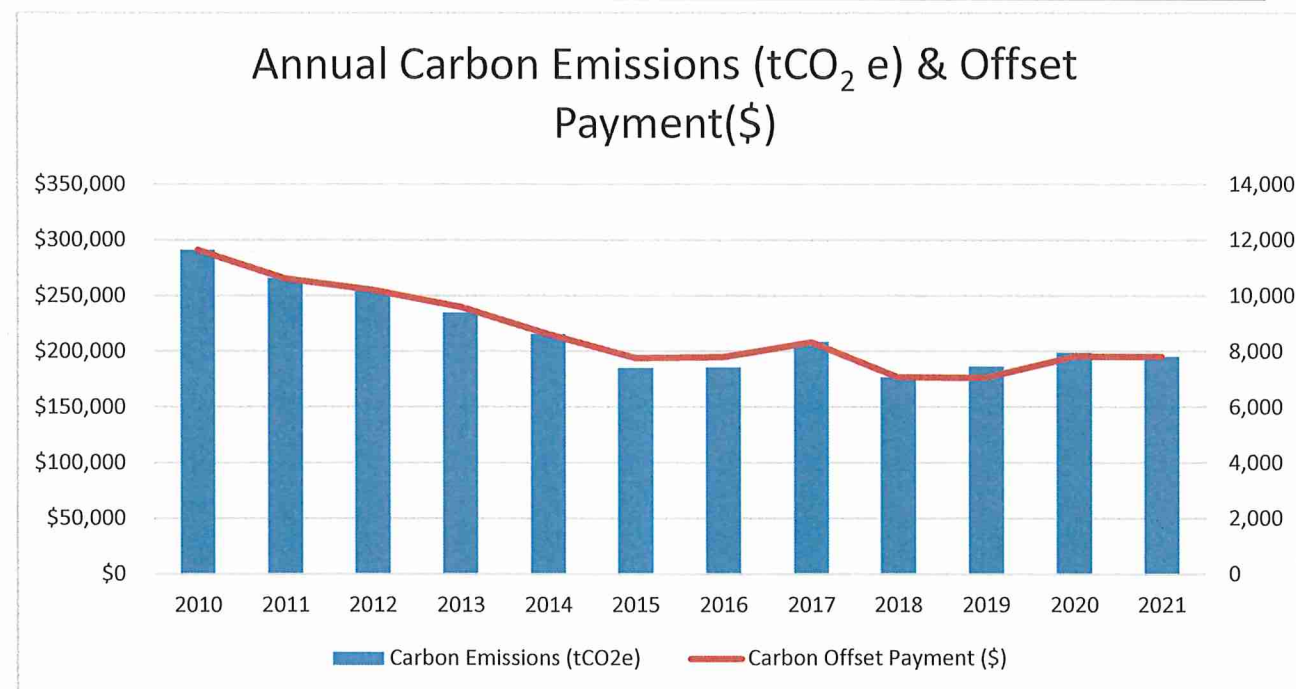
CHANGES TO GREENHOUSE GAS EMISSIONS AND OFFSETS FROM THE BASELINE YEAR 2010

In 2010, the total offsets required were 11,649 tCO₂e. The total offset investment was \$291,225.00. As a result, in 2021, SD43 saw a reduction in emissions by 4,172 tCO₂e and \$95,450 in offset payment representing a drop of 33% over baseline.

ANNUAL EMISSIONS AND OFFSETS YEAR OVER YEAR

The table below shows the annual carbon emissions by the district and offset payments made.

Year	Carbon Emissions (tCO ₂ e)	Carbon Offset Payment (\$)
2010	11,649	\$291,225
2011	10,636	\$265,575
2012	10,216	\$255,400
2013	9,392	\$239,950
2014	8,623	\$215,575
2015	7,417	\$194,195
2016	7,436	\$195,195
2017	8,343	\$208,400
2018	7,078	\$176,950
2019	7,474 (7073)	\$176,825
2020	7,964 (7429+401=7830; change to current value of 7964 tCO ₂ e by EEIF change)	\$195,750
2021	7,831	\$195,775



ACTIONS TAKEN TO REDUCE GREENHOUSE GAS EMISSIONS IN 2021

SD43 has been a Power Smart Partner with BC Hydro since 2010 employing an Energy Manager and involving the District in the BC Hydro Energy Manager Program. The district also utilizes the Energy Specialist Program with FortisBC to employ an Energy Specialist which has added significant depth to our Energy Management portfolio. Our Energy Management team works within the Facilities Maintenance and Development department providing resources to develop a variety of carbon reduction initiatives such as lighting retrofits, HVAC upgrades, DDC (Direct Digital Controls) improvements, and building energy studies. The Energy Management team also works with our staff and students on numerous behavioral and educational initiatives to further our organizations and our community's understanding and adoption of sustainability and the reduction of our carbon footprint to mitigate climate change.

HEATING PLANT UPGRADES

In 2021, like almost all other years, approx. 89% of greenhouse gas emissions were from the combustion of natural gas for heating. This is one of the key drivers to retrofit heating systems by replacing inefficient plants with high efficiency condensing boilers, installing variable frequency drive, changing over to electrification by way of heat pumps, and improving DDC controls and scheduling. These projects have multiple benefits, including better efficiency, a high turn-down rate, and a far greater ability to meet building load. All these measures reduce natural gas consumption and in turn reduce GHG emissions.

2021 HEATING PLANT RETROFIT PROJECTS:

- **Montgomery Middle:**
 - Replaced existing atmospheric boilers with high-efficient condensing boilers
 - Expected Energy savings: 1400 GJ/year



Old Atmospheric Boilers



New Condensing Boilers

- **Miller Park Community School:**
 - Upgrade DDC, replace unit-ventilators
 - Expected Energy savings from boilers alone: 397 GJ
- **Leigh Elementary**
 - Replace Existing boilers with high-efficient boilers and on-demand water heaters, upgrade DDC, and replace unit ventilators.
 - Expected savings of 319 GJ/yr
- **Central Elementary**
 - Replace existing boilers with high-efficient boilers, new AHUs, upgrade DDC, and new unit ventilators.
 - Expected savings of 410 GJ/yr.
- **Pleasantside Elementary**
 - Replace existing condensing boilers with high-efficient IBC Condensing boilers as the existing boilers were undergoing a lot of breakdowns.
 - Expected Savings 100 GJ/year
- **Eagle Ridge Elementary**
 - Replace existing boilers and water heaters with high-efficient boilers and on-demand water heaters; upgrade DDC; new AHU; replace unit ventilators.
 - Expected savings of 320 GJ/yr

LIGHTING UPGRADES

Every year, Coquitlam School District undertakes several lighting upgrade projects i.e. changing over from existing HID, incandescent, and fluorescent lights to LEDs, with funding support from BC Hydro to reduce energy consumption and improve the learning space. In 2021, the District continued to implement full-school LED upgrades across numerous sites, and this program will continue for years to come.

2021 LED LIGHTING RETROFIT PROJECTS

In 2021, SD43 completed LED lighting changeovers at three schools. These upgrades will reduce our District electrical consumption by approximately 375,619 kWh while at the same time will allow for classroom lights to be dimmed to create a better learning environment.



The three schools:

- **Port Moody Secondary School:**
 - LED upgrade. Project Cost: \$230,000. Energy savings: 237,796 kWh / yr.
- **Winslow Centre:**
 - LED upgrade. Project cost: \$110,000. Energy Savings: 106,366 kWh / yr.
- **Baker Drive Elementary:**
 - LED upgrade. Project cost: \$25,000. Energy Savings: 31,457 kWh/ yr.

ELECTRIC VEHICLE INTEGRATION

In 2020 SD43 began to start the gradual implementation of EV Chargers at selected sites. Through CleanBC programs, seven sites have now been provided charging to encourage District staff to select Electric cars as their mode of transport to work. With 4 New EV (Electric Vehicle) Chargers at Port Moody Secondary school, we now have EV chargers at 7 locations offering 22 EV Chargers. These EV chargers are available to staff and students who wish to charge their EVs. We at SD43 are going to continue installing EV charging stations as the funds permit across the district. We are also installing 10 EV charging stations at the ELC Board Office (New Building) which will make a total of 32 Charging stations.



Till now, forty-three staff and students have signed up for charging their EVs at our station. We will continue to add charging at other sites going forward, this includes at all our newly constructed sites.

The district added its First Electric vehicle (Kia Soul) into the Maintenance Fleet starting in 2021. With the charging infrastructure in place, we were able to replace our security runner van, which travels over 65,000 km per year around the district. Replacing this vehicle with an electric one will create:

- 7700 Liters in Annual Gas savings.
- Annual GHG emission Reduction; 18,361 Kg CO₂e
- Estimated Annual Savings; \$13,000

With a simple payback of under 3 years the business case for this vehicle is understandably very strong, and as gas prices go up will become stronger. We hope that as suitable EVs become available, we will have the support of the district to continue to electrify our fleet.

NEW CONSTRUCTION

At SD43, all new capital construction projects continue to employ innovative and sustainable design practices by complying with LEED Gold building standards. The energy management and sustainability department have been included in all the new building designs to ensure energy-efficient and carbon-neutral technologies are put into new buildings.

In 2021, there were no new schools commissioned. However, in 2022, we are expecting to start operating Coast Salish Elementary and Irvine Elementary. Also, in 2022, we expect to complete the construction of our new board office called “Education and Learning Centre (ELC)” with state-of-the-art design and building systems.

BEHAVIOURAL PROGRAMS

Due to COVID-19, the district was restricted from many of the usual behavioral initiatives and campaigns amongst students that had become part of our culture. However, with a partial lifting of bans and policy changes being introduced by the Ministry of Health, Govt. of BC, students started coming back to school with 50% occupancy. These changes created opportunities for new ideas and to restructure direction and focus. In 2021 the district was innovative in ways of engagement, using virtual meetings to interact which has proven successful for engagement and involvement.

DISTRICT SUSTAINABILITY LEADERSHIP

To promote interaction between green teams within the school, a District Sustainability Leadership (DSL) has been launched with all eight Secondary schools with students and teachers (representatives from green teams) meeting monthly to discuss their respective sustainability initiatives in their respective schools and opportunities to working together on common topics. These meetings are facilitated and promoted by the energy management and sustainability team of SD43. We have continued this effort from the last year and have had wonderful participation from students and teachers.

ENERGY STAR AND ENERGY LEADERS- EARTH DAY

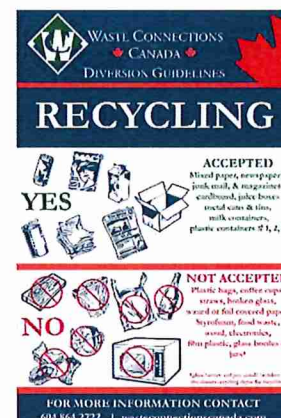
To appreciate and celebrate Earth Day and sensitize staff and students about energy conservation and sustainability, we have started issuing Energy Star and Energy Leaders stickers for students of all age groups and schools.



WASTE AUDIT AND RECYCLING

In 2021, we conducted a Waste Audit and recycling program at various locations (mainly secondary schools) to determine the efficacy of sustainability programs in fostering positive and proactive behaviors from staff and students around waste management. The objective of the audits is to capture a snapshot of how staff and students are complying with expected waste protocols and to identify areas of non-compliance to educate staff and students. The streams were sorted as follows.

- Organics
- Single Stream Recycle
- Refundable
- Waste



Each of these streams was then analyzed by Waste Connections to determine the approximate volume of each stream compared to the total volume of all streams combined.



ENERGY WIRE NEWSLETTER

To promote energy management and sustainability across the district and highlight various sustainability initiatives being undertaken by the district, we have started to publish a monthly newsletter. We also publish any sustainability initiatives that staff, and students would be interested in working with the district. We also include a calendar of events to showcase any new initiatives that are coming and would be of interest to staff and students.



TREE PLANTATION

Twenty-two schools participated in our District Tree Planting Program. This program was developed to provide an opportunity for schools to develop lessons around the importance of trees, maintaining a balanced environment, and the effects and remedies for Climate Change. Partnering with both the City of

Coquitlam and Port Moody and with the generous sponsorship from Emperor Stone, a local business, we were able to plant 54 trees in total.



HOLIDAY SHUTDOWN CAMPAIGN

The concept of working with our students in closing our schools before extended breaks has become a tradition. Before the breaks SD43 launched Energy Shutdown campaigns, raising awareness, and instilling behavioral 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 behavioral action photos.



PLANS TO CONTINUE REDUCING GREENHOUSE GAS EMISSIONS IN 2022

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 behavioral 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 2022, we will also focus on creating a roadmap for carbon reduction for the district to meet the provincial goals and eventually focus on becoming Net-Zero. In 2022, the following projects will take place:

NEW CONSTRUCTION 2022

- **Education Learning Centre (Replacement Board Office)**



Graphic Image of ELC Board Office

- In addition, SD43 has started construction in 2020 on two schools (Irvine Elementary and Coast Salish Elementary).



Graphic Image of Coast Salish Elementary

MECHANICAL UPGRADES 2022

School District 43 will continue to reduce Greenhouse Gas Emissions by improving aging mechanical systems as funding comes available.

The following mechanical projects will be completed in the summer of 2022:

- **Aspenwood Elementary**
 - Replace existing boilers and water heaters with high-efficient boilers and on-demand water heaters; upgrade DDC: Expected savings of 500 GJ/yr.
- **Mary Hill Elementary**
 - Upgrade DDC; new AHU; replace unit ventilators. Expected savings of 200 GJ/yr.
- **Hampton Park Elementary**
 - Replace existing boilers and water heaters with high efficiency condensing boilers and on-demand water heaters, Installing Destratification fans in Gym, Install VSDs, CO2 sensors, and DCV on AHU, and RTUs, and Upgrade DDC. Expected Savings: 499 GJ/year
- **Heritage Woods Secondary**
 - Install Gas Absorption Heat Pump, DDC Upgrade, and recommissioning. Expected Savings: 300 GJ/year
- **Hillcrest Middle**
 - Replace Existing Hydronic Terminal Heating Devices w/ Low Temp. Devices Suitable for Condensing Boiler Operation, Retrofit Existing Ventilation System for DCV, DDC Upgrade, and Recommissioning. Expected Savings: 500 GJ/year

Last year, we started a **comprehensive DHW Upgrade program** wherein we are replacing existing gas-fired DHW tank heaters with Tankless in-line Condensing DHW heaters (Navien's 240 MBH) to reduce Gas consumption and related emissions. We have replaced DHWs on the following sites, Aspenwood Elementary (2 Nos.), Maple Creek Elementary (2 Nos.), and Centennial Secondary (4 Nos.). We'll continue this program in 2022 depending on funds availability.

In 2023, we are planning to undertake the following projects depending on the availability of funds:

- **Mountain Meadows/Seaview/Hillcrest /Mary Hill**
 - Install Heat Pumps for each school's gym to provide cooling to the school and community
- **Millside Centre (Phase 1 & 2):**
 - Change old atmospheric boilers in two boiler rooms to highly efficient condensing boilers.
 - Provide a heat pump in the gym which is currently not ventilated.
 - Change all 8 X UVs to new, new AHU to the admin area (currently non-ventilated.)
- **Eagle Ridge Elementary (Phase 2):**
 - In the main classroom wing (14 rooms) provide ductwork modification and replacement of Reheat coils to be compatible with the recently installed condensing boiler plant,
 - DDC upgrade including Control Valve replacement
 - Replace 2 X old furnaces in Admin Area with a new ventilation system
 - Install 5 UVs in south wing classrooms and tie them into the central boiler loop to remove the old boiler located in the south wing. Convert Gym to a heat pump
 - Convert Gym to a heat pump

- **Walton Elementary:**
 - Comprehensive replacement of various models and ages of furnaces and UVs. Rather than infrastructure to move to the central plant, replace 22 separate units each with Air Source Heat Pump with gas back-up. Maximizes occupant comfort while cutting carbon fuel use and modernizes the HVAC system. Includes Gym and environs.
- **Central Elementary (Phase 3 & 4):**
 - Replace 23 X Horizontal Unit Ventilators
 - DDC upgrade
 - new AHU for the admin area which currently has no ventilation
 - Replace GHU AHU with Heat Pumps

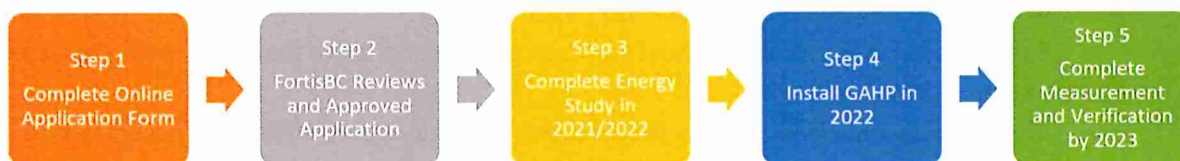
NEW TECHNOLOGY DEMONSTRATION: GAS ABSORPTION HEAT PUMP

GAHPs are heat pumps that can supply space heating (and potentially cooling), ventilation heating, and domestic hot water driven by natural gas. The GAHP is a self-contained unit that is installed outside: connected to the building, on a pad, or the roof. This allows for a variety of applications across residential, commercial, and industrial installations. Gas absorption heat pumps are significantly more efficient than condensing boilers, water heaters, and rooftop units. The benefits are as under:

- Approximately 10-25% more efficient than a condensing boiler, water heater, or rooftop unit.
- Natural gas absorption heat pumps can operate off both renewable natural gas and hydrogen.
- GAHPs typically require less space in mechanical rooms than traditional condensing units.
- GAHP retrofits do not typically require electric service upgrades.

FortisBC worked with Building Energy Solutions and Campbell Scientific to conduct a pilot program for GAHPs, involving seven test sites (five multi-unit residential buildings and two secondary school facilities). Each site had two Robur GAHP-A units installed to investigate the performance in domestic hot water (DHW) and space heating applications. Projected savings revealed an average of 14% natural gas consumption savings with variations between each project based on existing systems and overall demand.

Process of Application and our status:



We have completed the study on three schools and Heritage woods SEC has been selected by FortisBC and we'll receive funding of \$70,000. GAHP will help us meet a part of our heating load requirement at Heritage woods SEC.



C.OP STUDY: EAGLE MOUNTAIN MIDDLE SCHOOL

Eagle Mountain Middle School was established in 2014 and has a state-of-the-art mechanical system. It was SD43's first attempt to be net-zero with limited support from gas-fired condensing boilers. The main source of heat is Water Source Heat Pump (WWSHP-1 and 2) that was getting heat supply from exhaust air from the building (HRV-1 to 3) during occupied hours and ASHP (AERMEC) for unoccupied hours. However, due to certain mechanical issues and incorrect programming, these heat pumps were not performing as per the expectation. We undertook a C.Op. study with Prism Engineering as our Consulting Engineer to review and suggest changes to the building. The following ECMs have been suggested by Prism Engineering:

1. Recommission Water Source Heat Pumps
2. Optimize heat pumps to enable sequence
3. Add Occupancy Control to AHU-1 & align weekly schedules for AHU with Occupancy
4. Deep Setback during the holiday shutdown

Implementation agreement signed with PRISM to undertake the implementation of ECMs suggested. We will continue to work with Prism Engineering, ESC (Delta Controls), and Daikin to recommission the heat pumps. We expect to complete the project and recommission the mechanical system by End of the 1st Quarter of 2022.



LIGHTING UPGRADES 2022

School District 43 will continue to change older lighting to LED to reduce Greenhouse Gas Emissions, and operating costs and improve the learning space of the schools.

The following LED retrofit projects have been initiated for 2021:

- **Hillcrest Middle:**
 - LED upgrade. Project Cost: \$71,000 Energy savings: 91,176 kWh / yr.
- **Kwayhquiltum Middle:**
 - LED upgrade. Project Cost: \$97,000 Energy Savings: 105,274 kWh / yr.
- **Aspenwood Elementary:**
 - LED upgrade. Project Cost: \$84,000 Energy Savings: 90,945 kWh/ yr.
- **Hampton Park Elementary**
 - LED Upgrade. Project Cost: \$77,000 Energy Savings: 56,065 kWh/yr.

CONCLUSION

The district continues to strive towards a combination of both technical and behavioral projects to reduce energy consumption across our portfolio. With a 33% reduction in total energy consumption since 2010, we have exceeded both our internal goals and those set out by the provincial government. We are proud to be leaders in the climate action field.

We are confident that with sustained executive support and the enthusiasm of students and educators, the district will continue to surpass its GHG reduction goals. Our enduring optimism is driven by the belief that educating through example will be the best path to a greener tomorrow.

APPENDIX A: GHG EMISSIONS SOURCE DETAIL REPORT FOR 2021

Approximated 2021 GHG Emissions by Source

	2021				
	GJ	kg	unit	l	t CO ₂ e, GHG, All
Direct Fuel Combustion					
Offset Exempt					
Offset Required	140,038			3,604,593,042	6,984
Total	140,038			3,604,593,042	6,984
Purchased Energy					
Offset Exempt					
Offset Required	72,623				196
Total	72,623				196
Mobile Energy Use					
Offset Exempt					
Offset Required				125,516	312
Total				125,516	312
Office Paper					
Offset Exempt					
Offset Required			57,495		339
Total			57,495		339
Fugitive Emissions					
Offset Exempt					
Offset Required					
Total					
Total	212,661		57,495	3,604,718,559	7,831

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