

School District No. 43 (Coquitlam) 2022 Climate Change Accountability Report



Earth Day Eco-Week Challenge Competition

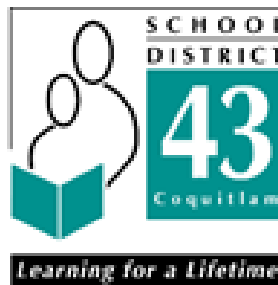


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EXECUTIVE SUMMARY

This Climate Change Accountability Report for the period January 1st, 2022, to December 31st, 2022; summarizes our emissions profile, the total offsets to reach net-zero emissions, the actions we have taken in 2022 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 3-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. Further, to support our Net Zero journey, we'll soon be launching a Low Carbon Strategy, our action plan to achieve our 2030 goals and beyond. 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 29%.

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.

The last two years have been slightly different compared to previous years due to the Global Pandemic (COVID-19). However, the district has continuously worked towards its commitment to reducing its carbon footprint. Population expansion throughout the district causing the need to add new buildings coupled with increased ventilation requirements has led to an overall increase in energy consumption and subsequently, an increase in GHG Emissions.

PART 1: LEGISLATIVE REPORTING REQUIREMENTS

DECLARATION STATEMENT

This SD43's Climate Change Accountability Report for the period January 1st, 2022, to December 31st, 2022, summarizes our emissions profile, the total offsets to reach net-zero emissions, the actions we have taken in 2022 to reduce our greenhouse gas emissions, and our plans to continue reducing emissions in 2023 and beyond.

EMISSION REDUCTIONS: ACTIONS AND PLANS

Coquitlam school district came out with Directions 2025 and recognizes 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 2022 and plans for 2023 and beyond to promote environmental stewardship and create sustainable learning spaces.

a. Stationary Sources (Building/Heating Plants)

As our buildings age so do the assets in the buildings including boilers, DHW Heaters, Unit ventilators, RTUs, and Air Handlers. SD43 recognizes this and continually upgrades its buildings based on their needs and as funds become available. We aligned our energy projects with the Capital Upgrades planned by the district to ensure a synchronous approach to SD43's green objective. In 2022, the following upgrades were performed:

1. Hot water tanks were replaced with In-line water heaters at Hampton Park Elementary to reduce gas consumption. This program will continue in 2023 with our Maintenance staff changing over these heaters with higher AFUE (approx. 97-99%) heaters.
2. Replacing non-condensing terminal units with newer condensing terminal units along with associated piping at Hillcrest Middle and Mary Hill Elementary to ensure improved energy performance of the building.
3. Replacing old atmospheric and non-condensing boilers with newer higher efficiency condensing boilers to reduce GHG Emissions and heat losses in both Aspenwood Elementary and Hampton Park Elementary. This program will continue in 2023 with our District's SEMP.
4. We are also investing in new technologies such as Gas Absorption heat pumps (GAHPs) to gain first-hand knowledge of these pumps and their performance in anticipation of reducing boiler use and reducing our natural gas consumption.
5. We have been testing an additive "Endotherm" to improve heating performance while reducing Natural Gas consumption in school. This year, we introduced Endotherm in Mary Hill Elementary, Ranch Park Elementary, Port Moody Secondary, and Pinetree Way Elementary. We saw an overall gas savings of 13% over the baseline.
6. 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.

7. We will continue to invest in Recommissioning (RCx) the existing heating plants with a focus on reducing gas consumption and therefore, reducing GHG Emissions.
8. We continue to invest in ways to reduce our GHG emissions. Our newest school, Coast Salish Elementary, will be opening this summer. The Coast Salish school will be heated by an electric air source heat pump as the primary heat source with highly efficient gas-fired boilers as a backup. The gas purchased to fuel the boilers will be 100% RNG (Renewable Natural Gas). In addition, there will be a 50 KWP solar PV array on the roof. This will be our first “Green School”.

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 replaced our security runner van, which travels over 65,000 km per year around the district.

Replacing this vehicle with an electric one has created:

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

After 1.5 years and with mileage now over 110,000, with increased gas prices, our business case has improved tremendously, achieving our payback already. We have ordered 2 more EVs for our fleet which we are waiting to receive due to a lack of inventory from the manufacturers. Our intention is to convert our fleet to 100% electric as suitable EVs become available.



2. We continue to add “NO IDLING” signs across the district to encourage parents and employees not to run their cars when waiting.



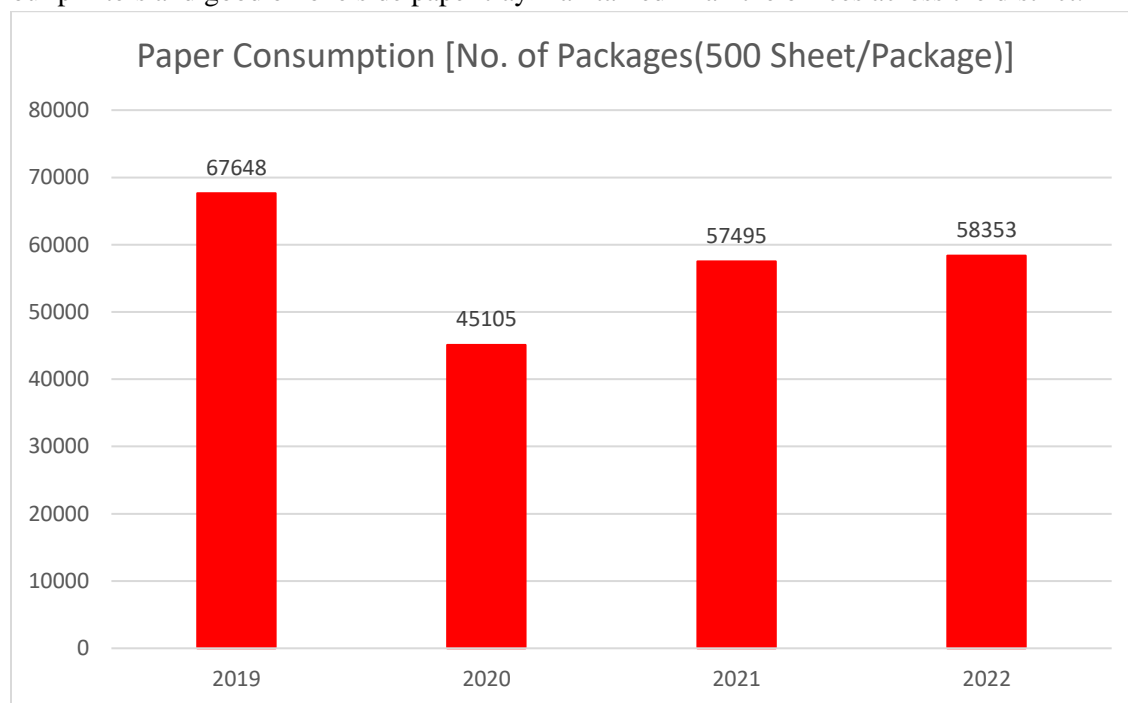
3. With the addition of 10 New EV (Electric Vehicle) Chargers at the Education and Learning Centre (ELC), we now have EV chargers at 7 locations offering 32 EV Chargers. These EV chargers are available to staff and students who wish to charge their EVs. At this time, we have 77 staff and students signed up to charge their EVs at our station.



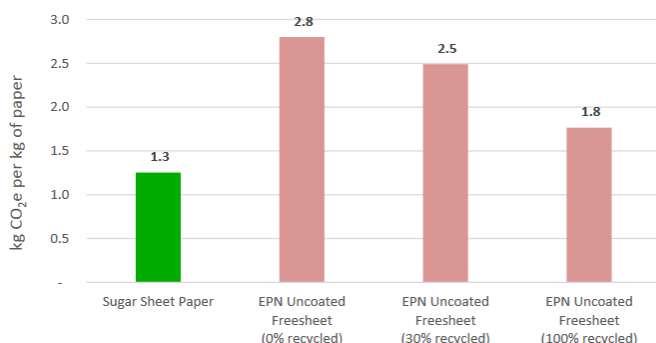
4. We at SD43 are going to continue installing EV charging stations as the funds permit across the district. We are also installing 4 EV charging stations at the Riverside Secondary which will make a total of 36 Charging stations. We also plan to install EV Chargers at the newly constructed Irvine Elementary and Coast Salish Elementary in 2023.

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. With the return to classrooms after Covid we have seen our paper consumption rise by 29.4% w.r.t. 2020. The Coquitlam School district is in the process of finding ways for running programs to reduce by encouraging staff to go paperless using digital signing as a norm and setting printing to double-sided as the default on all our printers and good on one side paper tray maintained in all the offices across the district.



We are also exploring the possibility of replacing our existing 8.5” to 11” paper (white) which has the maximum usage in the district (approx. 95%) with Sugar Sheets. Sugar Sheets are manufactured from Sugarcane bagasse is a fibrous material containing cellulose as its main component. Therefore, no trees are cut in manufacturing this paper. If we compare the GHG Emissions footprint (based on the Report “Environmental Performance of Sugar Sheet Paper” prepared by Trucost), sugar paper has lower emissions than 100% PCR paper.



SD43 EMISSIONS AND OFFSET SUMMARY TABLE 2022:

For the year 2022, our total emissions were 8267 tCO₂e. Of those emissions, 10.7 tCO₂e were from low-carbon biogenic mobile equipment fuels which do not require an offset payment. Since CAS has included offset-exempt emissions for buses within the total emissions, the total offsets are not equal to total emissions minus the total Bio CO₂. Therefore, the total offset for the 2022 calendar year, 8,236 tCO₂e of offsets is required.

If we compare our emissions based on contribution between 2021 and 2022, we can see that the emissions have increased largely due to increased natural gas and electricity emissions. The main reason for this is the higher ventilation requirements set by the Ministry and the new buildings added in the district.

Description	2022	2021
Direct Fuel Combustion t CO₂e, GHG, All	7360	6984
Purchased Energy t CO₂e, GHG, All	248	196
Mobile Energy Use t CO₂e, GHG, All	298	312
Office Paper t CO₂e, GHG, All	349	339
Total	8236	7831

An offset summary of GHG Emissions of our district for 2022 is tabulated below:

<i>Coquitlam School District (#43) 2022 GHG Emissions and Offsets Summary</i>	
GHG Emissions for the period January 1- December 31, 2022	
Total BioCO ₂ (tCO ₂ e)	10.7
Total Emissions(tCO ₂ e)	8267
Total Offsets (tCO ₂ e)	8236
Adjustments to Offset Required GHG Emissions Reported in Prior Years	

Total Offsets (tCO ₂ e)	0
Grand Total Offsets for the 2022 Reporting Year	
Grand Total Offsets to be Retired for 2022 Reporting Year (tCO ₂ e)	8236
Offset Investment (Grand Total Offsets to be Retired for 2022 Reporting Year X \$25/tCO ₂ e)	\$ 205,900

RETIREMENT OF OFFSETS

In accordance with the requirements of the Climate Change Accountability Act and Carbon Neutral Government Regulation, Coquitlam School District No. 43 (**the Organization**) is responsible for arranging for the retirement of the offsets obligation reported above for the 2022 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. In 2021, SD43 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.

SD43 is a large district with an increasing emissions profile due to aging existing buildings and the addition of newer buildings. To mitigate these conditions and prepare for our future emission reduction goals of 2030 and beyond, we are in the process of preparing a low-carbon strategy that will pave the way for our future initiatives.

2B: OTHER SUSTAINABILITY INITIATIVES

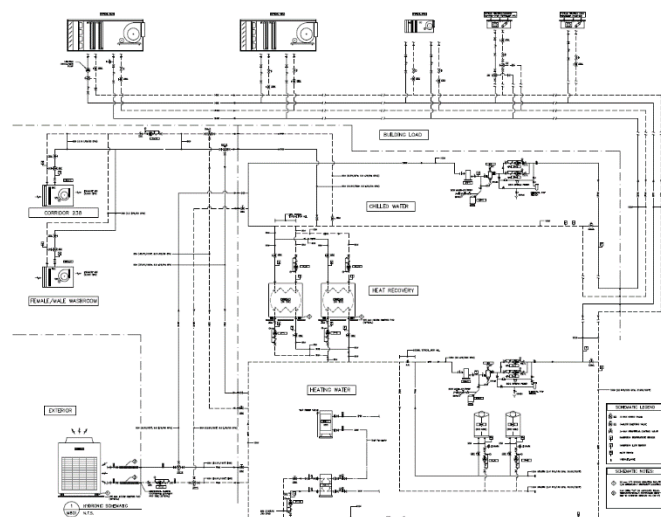
The energy management and sustainability team with SD 43 has introduced several sustainable initiatives to engage staff and students across the district. These initiatives are listed below:

1. District Sustainability Leadership (DSL) and Student Sustainability Council:
We continue to develop and empower a sustainability contract at every school. We hold regular monthly meetings with our Secondary school's students who are interested in sustainability and green initiatives in schools and our community. Our students and staff have worked with us on several sustainability initiatives including the Earth Day engagement program (Earth Day Eco Challenge) with over 4500 students participating, Holiday Shutdowns, Tree plantation, Garden Clubs, Waste Audits, and a recycling program among others.
This year a Student Sustainability Council was created by our secondary students to interact and share common ideas on sustainability that could be implemented at their schools.
2. Waste Audits and Recycling
Each year, the DSL with support from the energy management and sustainability team 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
Each year, we engage with schools and offer free-of-charge plants for their garden. We have developed a Tree Planting program that engages schools in the planting of trees along with lesson plans supported by Urban Roots.
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 amount of turned-off or unplugged 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 and created a monthly newsletter to highlight the many different sustainability initiatives that are going on at our schools. These newsletters are published every month during the regular school months from September through to June. We have now published our 12th monthly Energy Wire Newsletter.
7. HVAC Training for Trades Team on utilizing heat pumps for reducing gas consumption.
We organized a FortisBC-funded training for the HVAC trades team focused on utilizing heat pumps to reduce natural gas consumption. This training was attended by SD43 staff along with staff from Surrey School District and Vancouver School District.
8. Pro D Workshop for Training and Engaging Teachers to Focus on Climate Change:
We successfully organized a BC Hydro-funded Pro D Day Workshop/Training for teachers (Mix of EL, MID, and SEC) focused on Climate Change and human and social development. This workshop was appreciated by all the teachers and had wonderful reviews on the range of initiatives that they could undertake across their school.

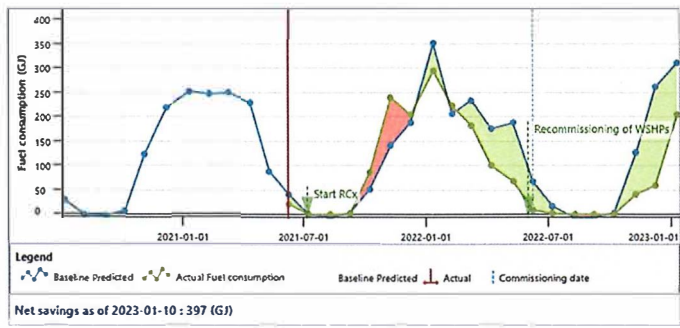
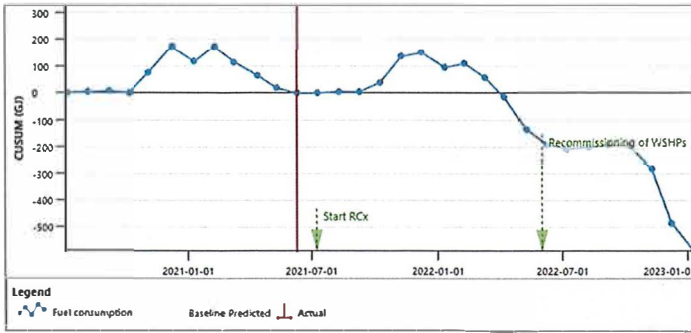
2C: SUCCESS STORIES

This year we were able to successfully recommission the Eagle Mountain Middle School heating plant. However, there were issues with the Heating Plant as a result, depending on Natural Gas fired (100%) to heat the building despite having heat pumps as they remained in failure mode. To fix the problem, the school was

enrolled in the BC Hydro Continuous Optimization program (C.Op.) under Recommission scope. This project study was funded 100% by BC Hydro with a commitment to invest in ECMs generated by the study. Several ECMs were identified which included recommissioning the WSHPs, Optimize Heat Pump Enable Sequence, Adding an Occupancy Sensor to AHU-1, and Aligning AHU weekly schedule with occupancy sensors. Implementation of these ECMs would result in an annual electricity savings of 62,441 KWh, and natural gas savings of 1552 GJ with a simple payback of 1.9 years. Further, we will be showing the changes made in DDC programming that led to the successful recommissioning of the whole heating plant.



An M&V was performed to review the actual savings. We used IPMVP Part C: Whole building analysis and RETScreen Expert V9, we realized an actual gas savings of 400 GJ approx. due to recommissioning of WSHP and review of the schedule of operation of the heat pumps which is approx. 20 tons of CO₂e.



EXECUTIVE SIGN-OFF:

Signature

May 11, 2023

Date

Ivano Cecchini

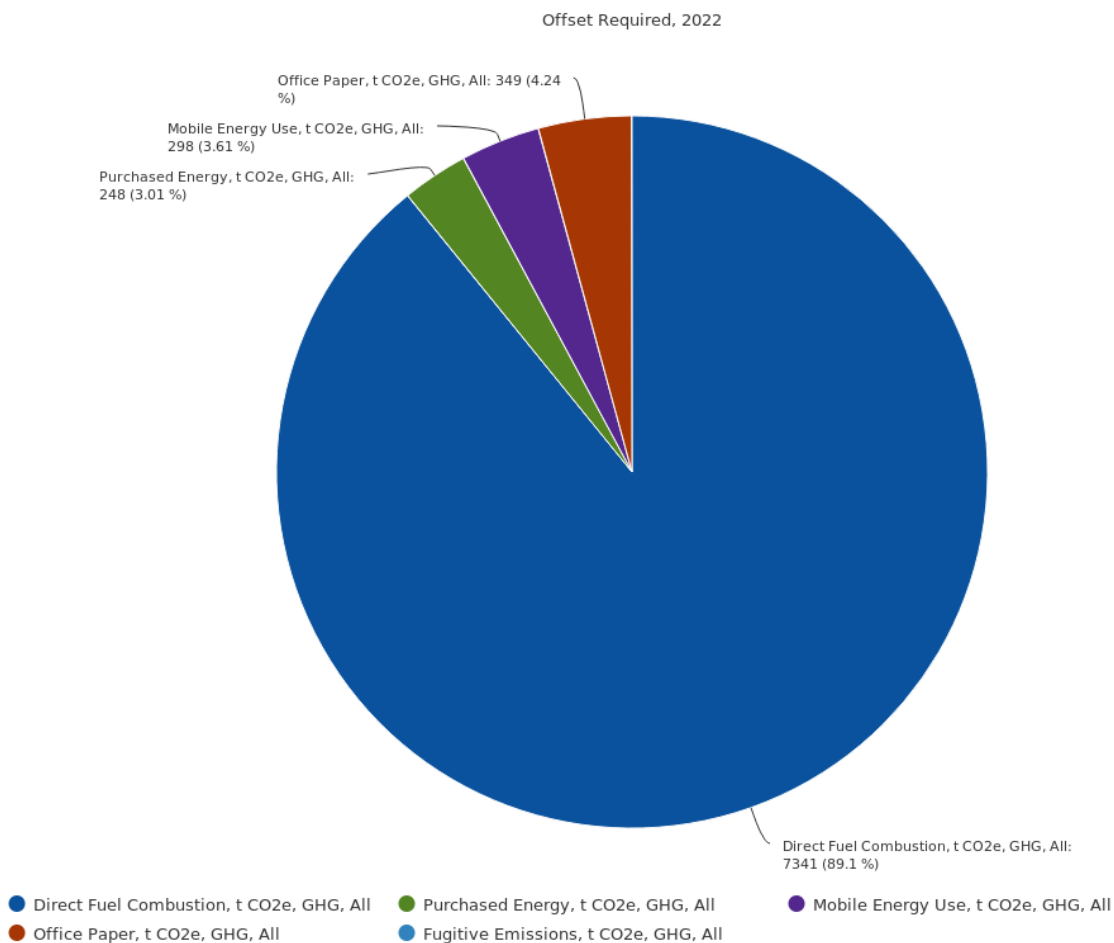
Title: Executive Director Facilities

**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 Greenhouse Gas Emissions by source in 2022 at SD43.

School District 43 - Coquitlam Greenhouse Gas Emissions by Source for the 2022 Calendar Year (tCO₂e*)



Total Emissions: 8236 tCO₂e

Offsets Applied to Become Carbon Neutral in 2022 (Generated on March 30th, 2022 2:00 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

The total offsets required for 2022 including adjustments are 8,236 tCO₂e. At the government offset price of \$25/tCO₂e, the total offset investment is \$205,900 which allows the district to achieve carbon neutrality for 2022.

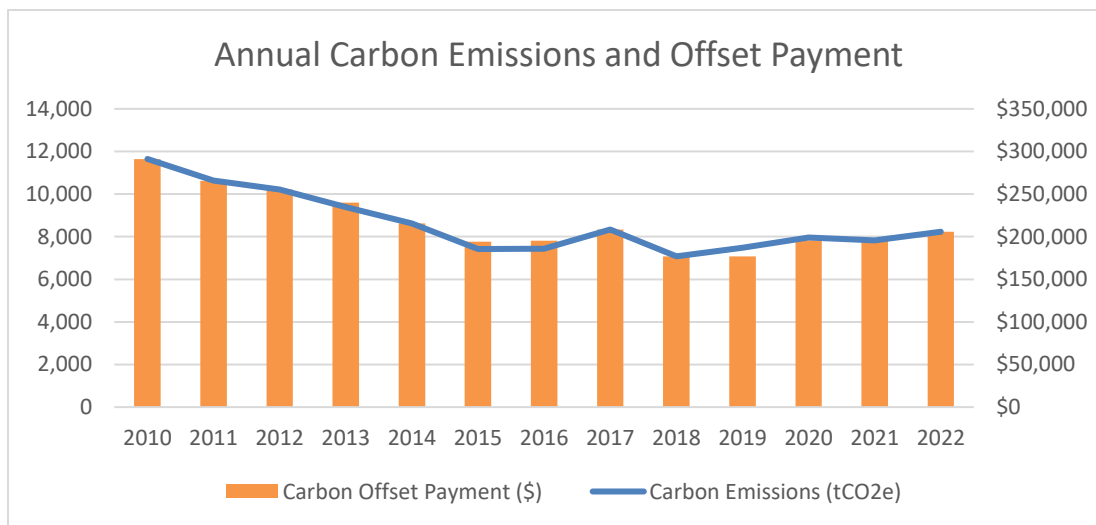
CHANGES TO GREENHOUSE GAS EMISSIONS AND OFFSETS FROM THE BASELINE YEAR 2010

In 2010, the total offsets required were 11,649 tCO₂e. The total offset investment was \$291,225.00. As a result of energy conservation focus and commitment, in 2022, SD43 saw a reduction in emissions by 3,413 tCO₂e and \$85,325 in offset payment representing a drop of 29% 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
2022	8,236	\$205,900



ACTIONS TAKEN TO REDUCE GREENHOUSE GAS EMISSIONS IN 2022

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 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 2022, 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 retrofitting heating systems by replacing inefficient plants with high-efficiency condensing boilers, installing variable frequency drives, 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. To maximize the benefit from FortisBC and BCH, we are also aligning our studies with Capital Projects to take advantage of undertaking some additional upgrades over and above capital requirements. This helps us work and drive the needs of our facilities management team and promote our energy savings measures as well.

2022 HEATING PLANT RETROFIT PROJECTS:

- **Aspenwood Elementary:**
 - Replaced existing atmospheric boilers with high-efficient condensing boilers
 - Upgrade DDC, Install Destratification fans in Gym, install VFDs
 - Expected Energy savings: 541 GJ/year



Old Atmospheric Boilers



New Condensing Boilers

- **Hampton Park Elementary:**
 - Replaced existing atmospheric boilers with high-efficient condensing boilers
 - Upgrade DDC, Install Destratification fans in Gym, install VFDs
 - Expected Energy savings: 400 GJ/year
- **Hillcrest Middle:**
 - Replace existing hydronic terminal units with low-temperature devices suitable for condensing operations, Recommission the DDC system, and retrofit the existing ventilation system for demand-controlled ventilation.
 - Expected savings of 531 GJ/yr
- **Mary Hill Elementary**
 - Replace existing hydronic terminal units with low-temperature devices suitable for condensing operations, Recommission the DDC system and retrofit the existing ventilation system for demand-controlled ventilation, and install destratification fans in the gym.
 - Expected savings of 264 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 2022, the district continued to implement full-school LED upgrades across numerous sites, and this program will continue for years to come.

2022 LED LIGHTING RETROFIT PROJECTS

In 2022, SD43 completed LED lighting changeovers at three schools. These upgrades will reduce our District's electrical consumption by approximately 279,651 kWh while at the same time will allow for classroom lights to be dimmed to create a better learning environment.



The 3 schools and 3 school gyms:

- **Kwayhquiltum Middle School:**
 - LED upgrade. Project Cost: \$108,225. Energy savings: 105,274 kWh / yr.

- **Winslow Centre:**
 - LED upgrade. Project cost: \$75,597. Energy Savings: 90,945 kWh / yr.
- **Baker Drive Elementary:**
 - LED upgrade. Project cost: \$67,520. Energy Savings: 56,065 kWh/ yr.
- **RC MacDonald Elementary, Dr. Charles Best Secondary, and Burquitlam Elementary Gym**
 - LED Upgrade. Project Cost: \$47636, Energy Savings: 27,367 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 have installed 10 EV charging stations at the Education Learning Centre (ELC) which will make a total of 32 Charging stations.



Till now, 77 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 replaced our security runner van, which travels over 65,000 km per year around the district. Replacing this vehicle with electric has created:

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

With a mileage of 110,000 approx. in 1.5 years along with increased gas prices, our business case has improved tremendously, and we have achieved our payback already. We have already ordered 2 more EVs for our fleet which are yet to be received due to a lack of inventory with manufacturers. 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 team have been included in all the new building designs to ensure energy-efficient and carbon-neutral technologies are put into new buildings.

In 2022, we started operating our new board office i.e. Education Learning Centre located at 1080 Winslow Ave, Coquitlam. This state-of-the-art building replaces the old board office (worst performing building) built to the LEED Gold standard. It uses Air Source Heat pumps as its primary heating source with preinstalled LED lighting which has software controlling the level of light depending on the time of day.



We have achieved occupancy of the new Irvine Elementary which replaces the old school and has been built to LEED Gold Standard with its primary heating relying on Air Source Heat pumps.



BEHAVIOURAL PROGRAMS

With the ease of COVID-19 restriction by the Ministry of Health, Govt. of BC, our schools have hit 100% occupancy in 2022. These changes created opportunities for new ideas and to restructure direction and focus. In 2022 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

We regularly conduct a Waste Audit through our 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

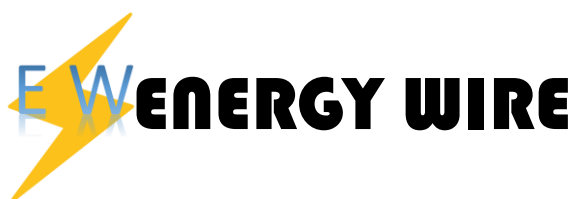


Each of these streams was then analyzed by Waste Connections to determine the approximate volume of each stream compared to the total volume of all streams combined.



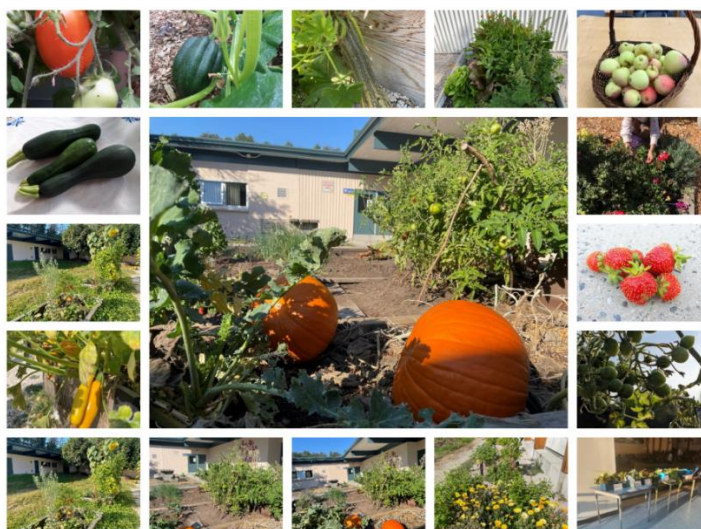
ENERGY WIRE NEWSLETTER

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 PLANTING

This program has been 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 Urban Roots we were able to plant 40 trees across various schools in the district.



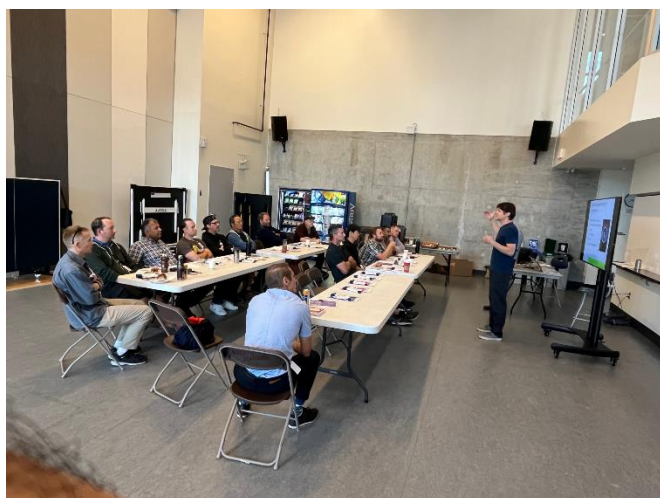
HOLIDAY SHUTDOWN CAMPAIGN

The concept of working with our students in closing our schools before extended breaks has become a tradition. Each year, before the school breaks SD43 launches Energy Shutdown campaigns, raising awareness, and instilling behavioral actions. Impactful posters and shutdown checklists are distributed throughout the school district. Participating schools are asked to complete the checklists for their school as well as submit behavioral action photos.



HVAC TRAINING FOR THE TRADES TEAM ON UTILIZING HEAT PUMPS FOR REDUCING GAS CONSUMPTION

With an intent to promote energy management and sustainability through our Mechanical Trades team, The energy management and sustainability department conducted HVAC Training focused on promoting a reduction in the use of natural gas and emphasizing the better application of electric heat pumps coupled with natural gas-fired boilers to promote the reduction in GHG Emissions. This training was approved by FortisBC under their Conservation, Education, and Outreach program and conducted jointly by Prism Engineering and Olympic International. We had participation from Surrey School District and Vancouver School District as well. The event was a great success, and we'll have a follow-up training session focused on the Operation and Maintenance of the Gas Absorption Heat Pump.

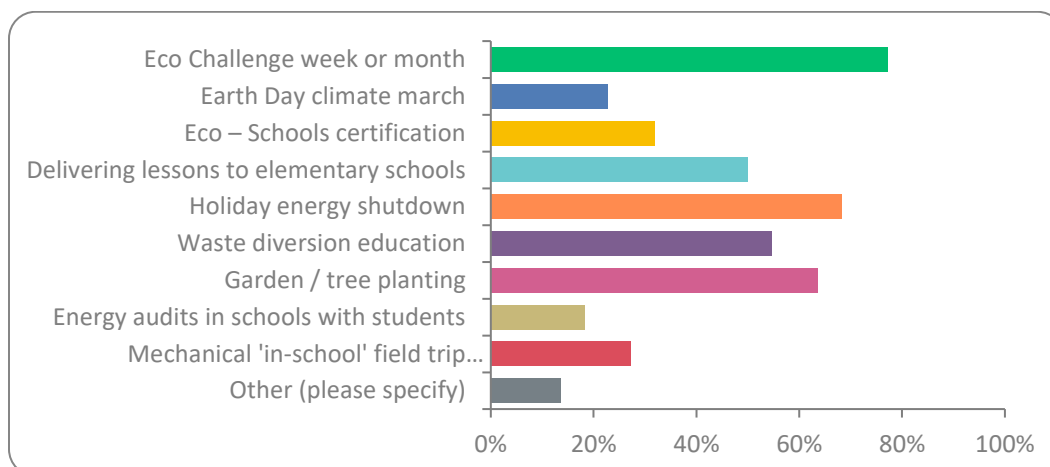


PRO D WORKSHOP FOR TRAINING TEACHERS FOCUSED ON CLIMATE CHANGE

On the October 21st Pro D Day, we, the energy, and sustainability team conducted a Sustainability Interactive Workshop for teachers around our district that focused on developing the sustainability culture in our schools. The workshop discussed the successes of the different sustainability initiatives that we have developed in the past and brainstormed new ideas that we should all peruse in the future. This workshop was conducted at our newly inaugurated Education Learning Centre building on Winslow Ave, Coquitlam. Post-workshop, a survey was conducted to assess the event and gauge the interest of teachers towards various sustainability initiatives. Below is a summary of the results:



- 44 teacher participants
- Lunch and Learn Opportunity (Breakfast and Working Lunch)
- A mix of EL, MID & SEC Schools teachers
- Jeopardy Game in the middle to engage listening. Sustainable items as gifts were appreciated
- Excellent feedback (90% of Attendees were "Very Satisfied")
- The presentation by Taniell (Prism) on the Climate Change Report was appreciated
- Presentation by Ecoschools, HSR Zero Waste, PowerSmart for Schools by BCH
- Shared past success stories and experiences and engaged in a group discussion over lunch



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 2023, 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 2023, the following projects will take place:

NEW CONSTRUCTION 2023

Coast Salish Elementary

In the fall of 2023, we expect to hit partial occupancy at Coast Salish Elementary which is going to be our district's First Green School. The school utilized ASHP, supported by boilers that use 100% Renewable Natural Gas (RNG) for heating. Also, it'll have a solar rooftop plant of 50 KWp capacity on BC Hydro's Net Metering program.



Graphic Image of Coast Salish Elementary



Actual Site Image of Coast Salish Elementary

MECHANICAL UPGRADES 2023

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
- **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 replace 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 at Hampton Park Elementary(2 Nos.) and Aspenwood Elementary. We'll continue this program in 2023 depending on funds availability.

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

- **Heritage Woods Secondary**
 - Install Gas Absorption Heat Pump, DDC Upgrade, and recommissioning. Expected Savings: 300 GJ/year
- **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 in 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 the Gym to a heat pump
 - Convert the Gym to a heat pump
- **Vanier Centre Elementary:**
 - Replace existing old atmospheric boilers with Condensing boilers.
 - Replace the existing DHW heating plant with 2 Navien DHWs
 - DDC Upgrade
 - Unit Ventilators replacement
 - Natural Gas Savings: 1260 GJ
- **Central Elementary (Phase 3):**
 - Replace 13 X Horizontal Unit Ventilators
 - DDC upgrade

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 is driven by natural gas. The GAHP is a self-contained unit that is installed outside connected to the building, on a pad, or on 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.

Projected savings revealed an average of 14% natural gas consumption savings with variations between each project based on existing systems and overall demand.

We have completed the study on three schools and Heritage Woods SEC has been selected by FortisBC and we'll receive funding of \$200,000. GAHP will help us meet a part of our heating and cooling load requirement at Heritage Woods SEC. The construction will happen over the summer of 2023.



C.OP STUDY: PITT RIVER MIDDLE SCHOOL

Pitt River 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 (WSHP-1, 2, and 3) which was getting heat supply from general exhaust fans equipped with heat recovery coils. Two condensing boilers and one mid-efficiency boiler were designed to operate in conjunction with the water source heat pumps to provide supplemental hot water to the heating during occupied hours and the primary source of heating during unoccupied hours. However, due to certain mechanical issues and incorrect programming, these heat pumps are not performing as per expectation. We have undertaken 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. Revise Boiler Hot Water Supply Setpoint
2. Align HRU weekly schedule with Occupancy
3. Revise Gym CO2 Setpoint
4. Revise the Heat Pump Control Sequence

We are discussing the next steps and hope to recommission the plant in 2023.



LIGHTING UPGRADES 2023

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 2023:

- **Panorama Heights Elementary:**
 - LED upgrade. Project Cost: \$85,000 Energy savings: 32,881 kWh / yr.
- **Westwood Elementary:**
 - LED upgrade. Project Cost: \$75,000 Energy Savings: 37,816 kWh / yr.
- **Heritage Mountain Elementary:**
 - LED upgrade. Project Cost: \$80,000 Energy Savings: 32,633 kWh/ yr.
- **Hampton Park Elementary**
 - LED Upgrade. Project Cost: \$70,000 Energy Savings: 27,921 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 29% 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 2022

Approximated 2022 GHG Emission by Source					
					2022
	GJ	kg	unit	l	t CO ₂ e, GHG, All
Direct Fuel Combustion					
Offset Exempt					
Offset Required	147,281			3,791,005,393	7,341
Total	147,281			3,791,005,393	7,341
Purchased Energy					
Offset Exempt					
Offset Required	77,515				248
Total	77,515				248
Mobile Energy Use					
Offset Exempt					
Offset Required				122,239	298
Total				122,239	298
Office Paper					
Offset Exempt					
Offset Required			58,353		349
Total			58,353		349
Fugitive Emissions					
Offset Exempt					
Offset Required					
Total					
Total	224,796		58,353	3,791,127,632	8,236
Calculated: 30.03.2023 15:13, Cache: 30.03.2023 02:00					