



Energy Sustainability Plan



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Executive Summary

As noted in the Sixth Assessment Report of the Intergovernmental Panel on Climate Change, global warming of 1.5°C and 2°C will be exceeded during the 21st century unless deep reductions in CO₂ and other greenhouse gas (GHG) emissions occur in the coming decades.

As a Public Sector Organization, Saanich School District is subject to BC's Climate Change Accountability Act. CleanBC has defined sector-specific targets of:

- 59–64% GHG reduction for buildings by 2030
- 27–32% GHG reduction for transportation by 2030

SD63's emissions are tallied in three categories: buildings, transportation and paper. With total baseline (2010) greenhouse gas emissions of 2,221 tCO₂e, SD63 needs to cut its emissions by 1148-1259 tonnes by 2030.

	Buildings	Transportation	Paper	Total
Baseline (2010) t CO₂e GHG	1,598	508	115	2,221
Mandate	59-64% Reduction	27-32% Reduction	59-64% Reduction	
Reduction Needed	943 - 1023	137 - 163	68-73	1148 - 1259
2030 Target	575-655	345 - 371	41-47	961 - 1073

Buildings

Building Electrification through the installation of heat pumps is a currently feasible strategy to significantly reducing GHG emissions from buildings. A substantial funding gap, on the order of **\$11M**, is a significant barrier to completing this work. Other activities, such as energy management and recommissioning, while important, will not be sufficient on their own to meet the required targets.

Transportation

A transition to electric school buses is the only market-ready option available at this time. 16 school buses should be eligible for replacement by 2030, which would meet the

required GHG reduction in this area. However, there is a **\$2M** gap in funding that will need to be filled.

Paper

A coordinated paper purchasing policy and strategy, in tandem with ongoing advocacy for responsible consumption, should enable a substantial reduction of GHGs associated with paper.

The SD63 Facility Services team has taken meaningful steps to understand and plan for the anticipated de-carbonization of its buildings and fleet. **Securing adequate funding remains the single most significant barrier to achieving the critical GHG reduction targets.**

SD63 Objectives

SD63 issued a request for proposals in the spring of 2021 to create an Energy Sustainability Plan. The purpose was to “identify the required work to reduce the school district’s environmental footprint and energy consumption ... and to meet the CleanBC 2030 emission targets.” The District’s objectives are:

- To position SD63 as a provincial leader in Sustainability Management;
- To enhance SD63’s culture of environmental practices for a strong and sustainable future; and
- To maximize the savings through SD63’s Energy Management Model

GHG Mandate

Carbon reduction targets have been mandated by the BC Government since 2007, first under the Greenhouse Gas Reduction Targets Act, then under the renamed Climate Change Accountability Act. Initially, carbon reduction targets had been set to achieve a 33% reduction by 2020 (using 2007 as a baseline). In May 2019, the Province updated targets for GHG emissions, with new commitments of 40% by 2030, 60% by 2040, and 80% by 2050. These targets represent the sum of all sectors of GHG reporting, including buildings, transportation, and industry. In March of 2021, CleanBC announced sector-specific targets:

The reduction target for buildings is 59–64% by 2030¹

The reduction target for transportation is 27–32% by 2030

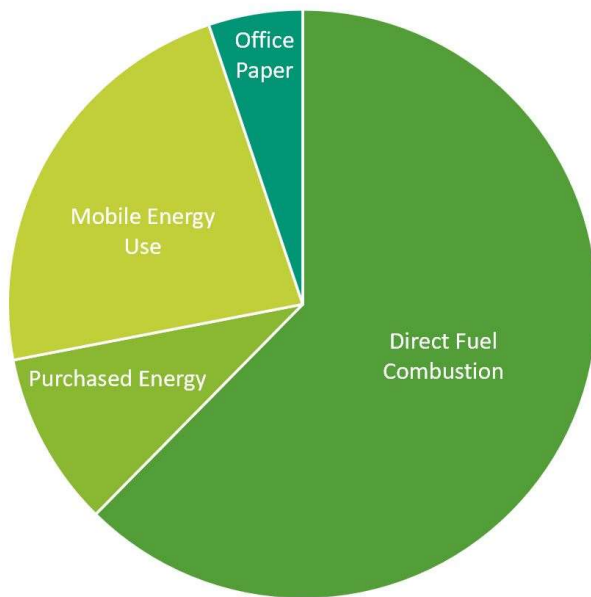
In order to reach these targets, high-carbon energy sources (natural gas, propane, diesel, gasoline) need to be transitioned to lower-carbon sources (electricity, renewable natural gas) to avoid carbon taxes, and to reduce greenhouse gas (GHG) emissions.

¹ <https://news.gov.bc.ca/releases/2021ENV0022-000561>

SD63 Baseline & Target GHGs

GHG reporting is required annually in BC for all public sector organizations (PSOs). This was done initially through SMARTTool, then transitioned to SoFi in 2019, and is reported via a Climate Change Accountability Report (CCAR).

Although provincial legislation references 2007 as the baseline year for calculating GHG reductions, no data is available for SD63 from that time. The earliest available data from SD63 is 2010, therefore all calculations in this document use 2010 numbers as the baseline.



Carbon emissions are reported in 4 categories:

- Direct Fuel Combustion
- Purchased Energy
- Mobile Energy Use
- Office Paper

Direct Fuel Combustion refers to natural gas and propane consumed in buildings by boilers etc. Purchased Energy refers to electricity. Mobile Energy Use captures transportation emissions, while Office Paper is self explanatory.

SD63 GHG Baseline & Reduction Targets

	Direct Fuel Combustion	Purchased Energy	Mobile Energy Use	Office Paper	Total
Baseline (2010) t CO2e GHG	1,598	508	115	115	2,221
Mandate	59-64% Reduction	27-32% Reduction	59-64% Reduction		
Reduction Needed	943 - 1023	137 - 163	68-73		1148 - 1259
2030 Target	575-655	345 - 371	41-47		961 - 1073

Given the mandated reduction target, SD63 is aiming for total GHG emissions in the range of 961 – 1073 t CO₂e by 2030. This would be a reduction of 1148 – 1259 t CO₂e.

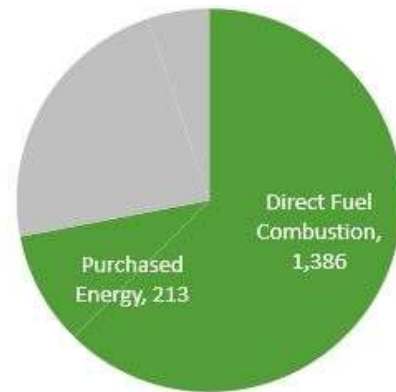
This target can be achieved through a number of pathways. Underachievement in one segment could be offset by overachievement in another segment, so long as the total emissions reduction is met.

The remainder of this report details recommended actions to achieve the reduction targets in each segment: Buildings, Transportation and Paper.

Buildings

In the baseline year of 2010, **72%** of SD63's GHG emissions came from buildings – a total of **1598 tCO₂e**.

As of 2020, the total building GHGs have dropped to 1441 tCO₂e, and now represent 74% of the total.



Baseline (2010) GHGs

Building Targets

Baseline (2010) t CO₂e GHG	1598
Mandate	59-64% Reduction
Reduction Needed	943 - 1023
2030 Target	575-655

The reduction target for buildings is 59–64% by 2030. This is a very ambitious target to meet, but given the mature state of high-efficiency electric technologies, the transition to electrification of building space and water heating can happen immediately.

Building Electrification

How do we reduce our carbon footprint in buildings that still need to be heated and cooled to be comfortable? A common misconception is that the addition of solar panels is the best solution, but in BC, where the electrical grid is already clean thanks to hydroelectricity, the more effective solution is to replace consumption of fossil fuels such as natural gas with electricity. This is referred to as “Fuel Switching” or “Building Electrification”.

The British Columbia Building Electrification Road Map, published in March of 2021, was created through the collaboration of multiple stakeholders in BC's building industry, and is freely available online. This document is recommended reading for understanding Building Electrification, and the current opportunities and barriers.

In the fall of 2021, the **Building to Electrification Coalition** was launched, with a vision that, by 2030, “all new and most replacement space heating and domestic hot water systems in BC’s buildings will be high-efficiency and low-carbon with electric systems being widely used across all market sectors.”

Also in the fall of 2021, BC Hydro launched their **five-year electrification plan**, with the intention of making it easier and more affordable to use electricity in place of fossil fuels to power buildings.

Building electrification will largely be completed via the use of **heat pumps**, which are typically at least 2 to 4 times more efficient, but up to 5 times more efficient than electric baseboard heaters. Heat pumps are categorized by the medium they transfer heat to and from, namely air-source heat pumps, water-source heat pumps, or geexchange (earth) heat pumps. Both air-source and geexchange-source heat pumps will typically perform well in moderate climates such as Saanich.

Further Reading:

The British Columbia Building Electrification Road Map

www.zebx.org/wp-content/uploads/2021/04/BC-Building-Electrification-Road-Map-Final-Apr2021.pdf

Clean BC

<https://www2.gov.bc.ca/gov/content/environment/climate-change/clean-buildings>

Building to Electrification Coalition

www.b2electrification.org

BC Hydro Electrification Plan

www.bchydro.com/electrificationplan

Greenhouse gas emissions reductions come from projects that reduce overall energy consumption and/or projects that employ “fuel switching” by replacing fossil fuel use with electricity or renewable energy.

Electrification Assessment

SD63 engaged SMCN Consulting in the spring/summer of 2021 to complete detailed mechanical assessments across its portfolio of buildings. The intent was to review the condition of the mechanical infrastructure, and to provide recommendations for renewal and upgrades relative to:

- Equipment service life
- Improved energy efficiency, and
- Reduced GHG emissions (system Electrification)

A consolidated summary of those reports, specifically as pertains to Electrification, is detailed below. Upgrade costs listed would result in the “Potential GHG Savings” noted. The upgrades are divided into 2 categories: Central Plant and Zone/Terminal. Central Plant refers to equipment typically found in mechanical rooms such as boilers and air handlers. Zone / Terminal refers to items found distributed throughout the building, often in ceilings above hallways or classrooms. Upgrades to Central Plant items are slightly more cost effective when measuring dollars per ton, and are also less disruptive to building operations to implement.

It is important to note that these cost estimates are very high-level, and any contemplated project would require a detailed mechanical design and thorough cost review. Estimates are based on 2021 construction costs.

Facility	Central Plant		Zone / Terminal	
	Upgrade Cost (\$)	Potential GHG Savings (t)	Upgrade Cost (\$)	Potential GHG Savings (t)
Parkland Secondary	1,225,000	119	800,000	66
Bayside Middle School	1,485,000	118	500,000	46
Stelly's Secondary	1,135,000	114	800,000	85
Royal Oak Middle School	435,000	110	--	--
Claremont Secondary	1,235,000	80	750,000	44
Kelset Elementary	750,000	36	375,000	23
Sidney Elementary	565,000	54	250,000	2
Lochside Elementary	625,000	43	500,000	23
Keating Elementary & DRC	605,000	33	400,000	13
SIDES - Beaver Lake	810,000	15	--	--
Cordova Bay Elementary	155,000	14	500,000	32
School Board Office	60,000	7	--	--
Individual Learning Centre - Saanichton	675,000	30	450,000	13
Deep Cove Elementary	940,000	29	500,000	16
North Saanich Middle School	405,000	40	--	--
Total	11,105,000	842	5,825,000	363

Summarizing the above table, a total of **1205 t** reduction is possible at a cost of **\$16,930,000**. Cost per ton of GHG reduction can be summarized as follows:

- Central Plant Upgrades average **\$13,187 per t**
- Zone Upgrades average **\$16,047 per t**
- Overall **\$14,049 per t**

To reach a 1000 t reduction, we all Central Plant upgrades would need to be completed, plus a selection of Zone upgrades.

Central Plant Upgrades	842 t	\$13,187/t	\$11,105,000
Zone Upgrades	158 t	\$16,047/t	\$2,535,426
Total	1000t		\$13,640,426

Given the Buildings reduction target of 943 – 1023 t eCO₂, \$13-\$14M is needed to meet the specified 2030 targets.

Other Capital Upgrades

Capital Upgrades can be broadly categorized as ‘Major’ or ‘Minor’ projects. Major projects typically cost hundreds of thousands of dollars and require multi-year planning and dedicated funding. The electrification projects proposed by SMCN are all Major capital upgrade projects.

Minor projects can be typically executed within a budget of under \$100,000 and can often be funded through Annual Facility Grants or rolling Green Funds. A well-rounded Energy Management program considers both Major and Minor projects. Rede conducted a desk review of documentation available for the District facilities, to evaluate the extent to which Minor capital upgrades (lighting and controls) are an opportunity for GHG reduction or utility cost savings.

Lighting & Lighting Controls

Findings indicate that LED lighting is prevalent across the District, but that lighting controls remain an opportunity for improvement. BC Hydro recognizes up to **30% electrical savings on lighting loads** when lighting controls are implemented. The Children’s Development Centre (new in 2021) and ILC-Broadmead (leased space) were not included in the review. Sites below with no controls (N) represent an opportunity for savings.

Facility	Classrooms	Hallways	Library / Multi	Gym	Exterior	Mfg.	Linked to BAS
Bayside Middle School	N	N	N	N	N	n/a	N
Brentwood Elementary	N	N	N	N	N	n/a	N
Claremont Secondary	VS	N	N	OS?	N	n/a	N
Cordova Bay Elementary	30% VS	N	VS	N	N	Unknown	N
Deep Cove Elementary	N	N	N	OS	N	n/a	N
Keating Elementary	VS	OS	OS	OS	N	Accuity / ?	N
District Resource Centre	N	N	n/a	n/a	N		
Kelset Elementary	VS	N	OS	OS	Y	Wattstopper	N
Lochside Elementary	VS	N	N	OS	N	Accuity	N
North Saanich Middle School	VS	OS	OS	OS	Y	Accuity Broke	N
Parkland Secondary	N	N	N	OS	N	N	N
Prospect Lake Elementary	N	N	N	OS	N	N	N
Royal Oak Middle School	VS	SCH	OS	OS	Y	Wattstopper	N
Sidney Elementary	N	N	N	OS	N	N	N
Stelly’s Secondary	N	N	N	OS	N	N	N
ILC - Saanichton	N	N	N	N	N	N	N
School Board Office	N	N	n/a	n/a	N	N	N
SIDES - Beaver Lake	N	N	N	OS	N	N	N
SIDES - Royal Oak	N	N	n/a	n/a	N	n/a	n/a

OS=Occupancy Sensor VS=Vacancy Sensor SCH=Scheduled

Building Automation Systems

The extent to which Controls are installed and the effectiveness of their use was also evaluated. The District generally has good digital control systems, but opportunities still exist to optimize how the systems are running. Bayside Middle (upgrade summer 2021) and ILC-Broadmead (no BAS) were not included in the review.

BC Hydro recognizes an average of **10% savings across electricity and fuel** when Building Automation systems are optimized.

BAS - General Info

Facility	System Mfg	System Age	Accessible to Rede	Accessible to Leads	Graphics	Service Provider
Cordova Bay Elementary	Alerton		Y		Excellent	
Deep Cove Elementary	Alerton		Y		Excellent	
Keating Elementary	Alerton		Y		Excellent	
District Resource Centre	Alerton		Y		Excellent	
Lochside Elementary	Alerton		Y		Excellent	
North Saanich Middle School	Alerton	10	Y	N	Excellent	Cougar Pacific
Parkland Secondary	Alerton	5	Y	N	Excellent	Cougar Pacific
Prospect Lake Elementary	Alerton		Y		Excellent	
Sidney Elementary	Alerton		Y		Excellent	
Stelly's Secondary	Alerton	7	Y	N	Excellent	Cougar Pacific
School Board Office	Alerton		Y		Excellent	
SIDES - Royal Oak	Alerton					
Children's Development Centre	EnteliWeb					ITC
Claremont Secondary	EnteliWeb	> 10	Y	N	Excellent	ITC
Royal Oak Middle School	EnteliWeb	> 10	Y	N	Excellent	ITC
Brentwood Elementary	Walker		Y		Poor	
Kelset Elementary	Walker		Y		Poor	
ILC - Saanichton	Walker		Y		Poor	
SIDES - Beaver Lake	Walker					

BAS - Implementation

Facility	Active Schedules	Modulars Connected	Primary Control	Second. Control	Primary CO2 Control	Gym Control	Sec. CO2	Sec. Occ
Cordova Bay Elementary			Y	Y	Y	CO	N	N
Deep Cove Elementary	Y		Y	Y	N	N	N	N
Keating Elementary	Y		Y	Y	Y	N	N	N
District Resource Centre		N/A	N/A	Y	N	N/A	N	N
Lochside Elementary			Y	Y	Y	CO	N	N
North Saanich Middle School	Y	N	Y	Y	Y	CO/OC?	Y	N
Parkland Secondary	Y	N	Y	Y	Y	CO	N	N
Prospect Lake Elementary			Y	Y	Y	N	N	N
Sidney Elementary			Y	Y	Y	CO	N	N
Stelly's Secondary	Y		Y	Y	Y	CO	N	N
School Board Office	Y	N/A	Y	Y	Y	NA	N	N
SIDES - Royal Oak								
Children's Dev. Centre								
Claremont Secondary	N		Y	Y	Y	C/OB	N	N
Royal Oak Middle School	Y	N	Y	Y	Y	C	N	N
Brentwood Elementary	N		Y	Y	Y	N	N	N
Kelset Elementary	N			N	N	C/O	Y	Y
ILC - Saanichton	N		Y	N	GYM Y	C/O	N	N
SIDES - Beaver Lake	N							

Continuous Optimization

Different from Capital Upgrades, Continuous Optimization, also called Recommissioning, is an activity that addresses how well a building is running, like taking a car in for a tune-up.

Recommissioning (RCx): Achieving optimum building performance with an approach that helps to ensure that existing equipment and systems perform together effectively and efficiently to meet the building owner's operating requirements and expectations. It often resolves problems that occurred during building design or construction, or addresses problems that develop during the building's life. The RCx inspection, diagnostic and repair process provides guidance and solutions to best meet current occupant needs considering existing equipment and systems limitations. Typical RCx measures will not exceed 3 to 5 year simple paybacks.

BC Hydro is currently offering incentives in the amount of \$0.15 per square foot for the Investigation phase of work, or 100% of the Investigation. The School District would be responsible for implementing any recommended project with a simple payback of less than 2 years, to a maximum investment responsibility of \$0.20 per square foot.

The following SD63 facilities are good candidates for the Continuous Optimization incentive program:

	Area (ft ²)	Investigation Incentive (\$0.15 / ft ²)	Maximum Investment Responsibility (\$0.20)
Keating Elementary	45,628	6,844	9,126
Lochside Elementary	44,046	6,607	8,809
North Saanich Middle School	56,424	8,464	11,285
Claremont Secondary	126,132	18,920	25,226
Parkland Secondary	98,716	14,807	19,743
	370,946	\$ 55,642	\$ 74,189

Upon the announcement of new eligibility criteria in early November (buildings larger than 25,000 square feet), the following additional facilities should also be considered for the Continuous Optimization program:

Cordova Bay Elementary	38,610	5,792	7,722
Brentwood Elementary	38,599	5,790	7,720
Sidney Elementary	36,102	5,415	7,220
Deep Cove Elementary	35,123	5,268	7,025
Kelset Elementary	33,293	4,994	6,659
		\$ 27,259	\$ 36,345

BC Hydro compiled RCx results² spanning 112 school buildings over 10 years, revealing energy savings of 6.6% for electricity and 11.7% for fuels, for a total 9.9% on average.

² <https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/power-smart/business/programs/continuous-optimization-results-jan-2020.pdf>

Energy Management

Energy-related costs, such as utility bills and carbon taxes, are typically a substantial portion of a School District's annual operating costs. Reducing these costs can free up funding for other operational and educational needs.

Energy Management is best thought of as a cycle. First, energy saving **opportunities** are identified using benchmarks, utility data tracking, and knowledge of existing infrastructure. **Strategies** are then developed, with projects prioritized based on need, potential energy cost savings, available incentives, and required capital investment. This leads to **implementation** of prioritized projects. Finally, the effect on energy consumption can be tracked through utility data to **verify** success. The cycle then begins again by identifying opportunities based on the "new" normal.



Rede offers Energy Management services to school districts, through a recurring annual contract. The offering includes strategic and capital planning, utility tracking and reporting foundational BAS scheduling, incentives management, and annual performance reporting. Energy Management is a recommended activity for all School Districts trying to reduce their carbon footprints and utility bills.

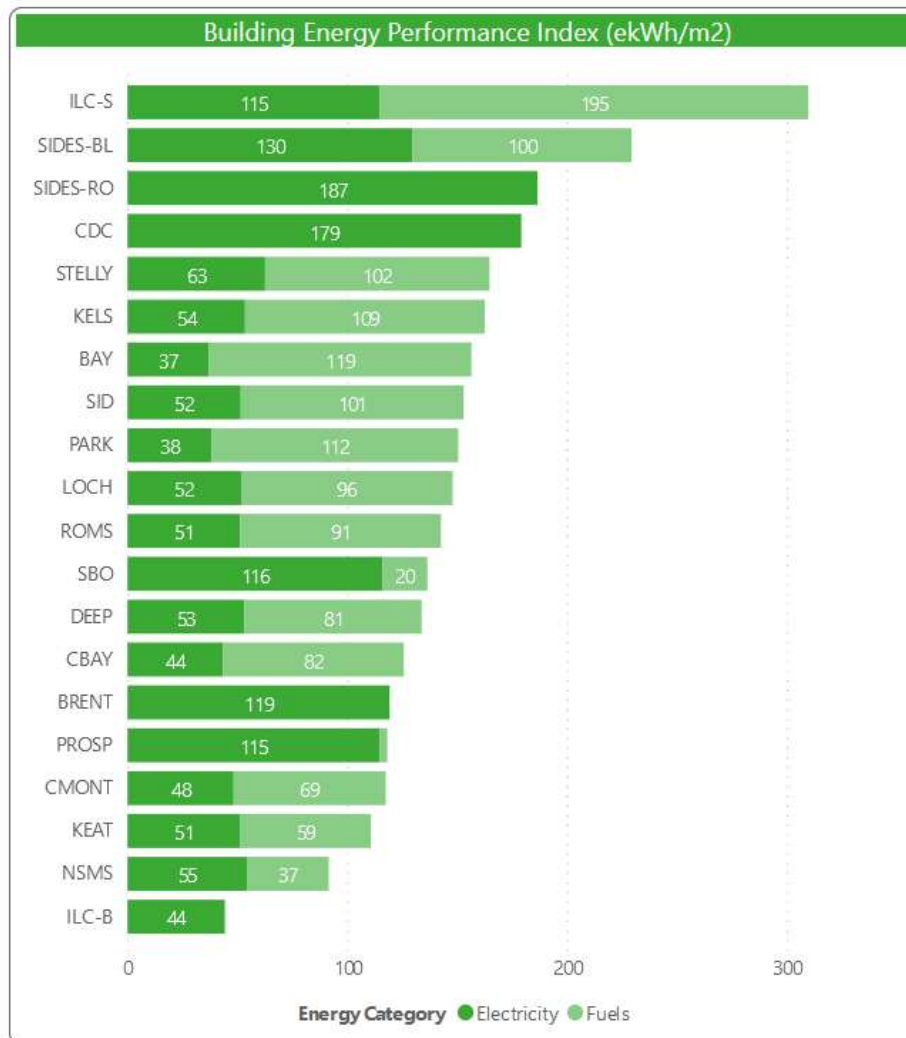
Strategic Priorities

As part of a comprehensive energy management program, all District facilities are reviewed for opportunities. In order to optimize dollars spent for dollars saved, typical strategic priorities include:

1. Worst Performing Facilities
2. Largest Consumers
3. Facilities with End-of-Life Systems

1. Worst-Performing Facilities

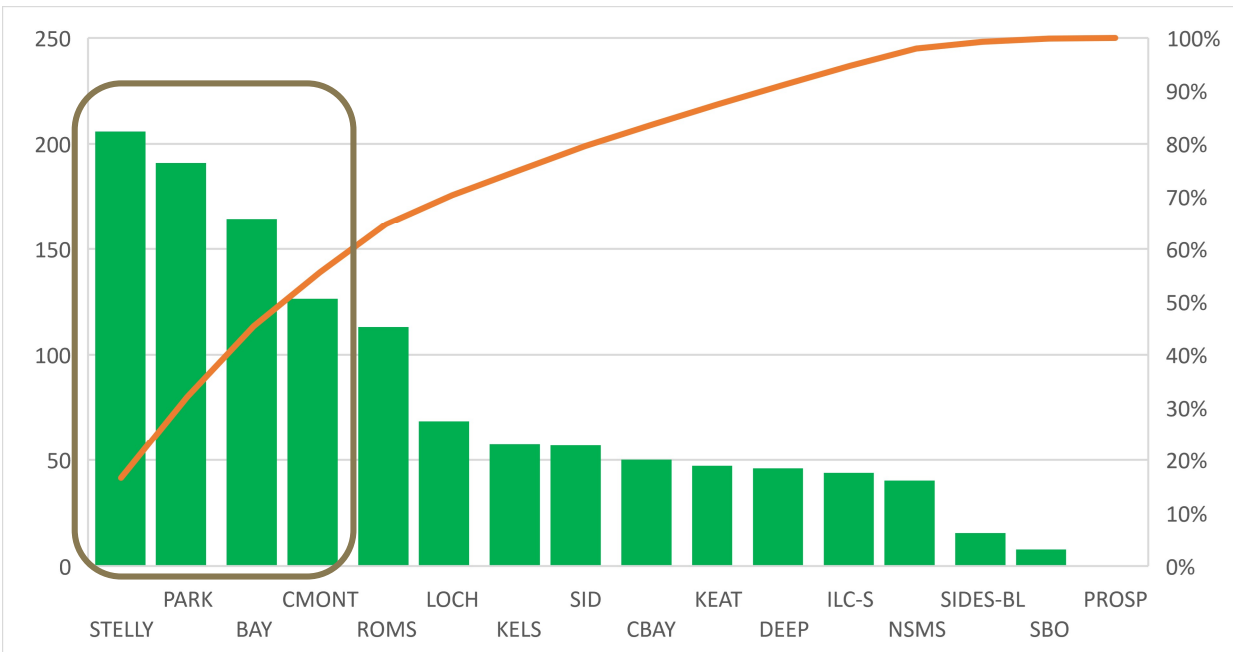
The ratio of energy consumption to building area is defined as the Building Energy Performance Index (BEPI), sometimes called Energy Use Intensity. This parameter allows buildings to be compared to each other, eliminating variations in building size. A preliminary review of the District's facilities shows a significant range in performance between the worst and best-performing facilities, warranting further investigation.



2. Largest Consumers

When identifying priorities, it is also important to recognize the **relative impact** of opportunities: minor improvements to a large energy consumer may represent a more significant opportunity than a substantial improvement to a small consumer.

	STELLY	PARK	BAY	CMONT	All other Buildings	Total
<i>GJ</i>	4128	3829	3298	2537	11016	
<i>tonnes eCO2</i>	206	191	164	127	549	1237



2020 GHGs from Natural Gas by Facility

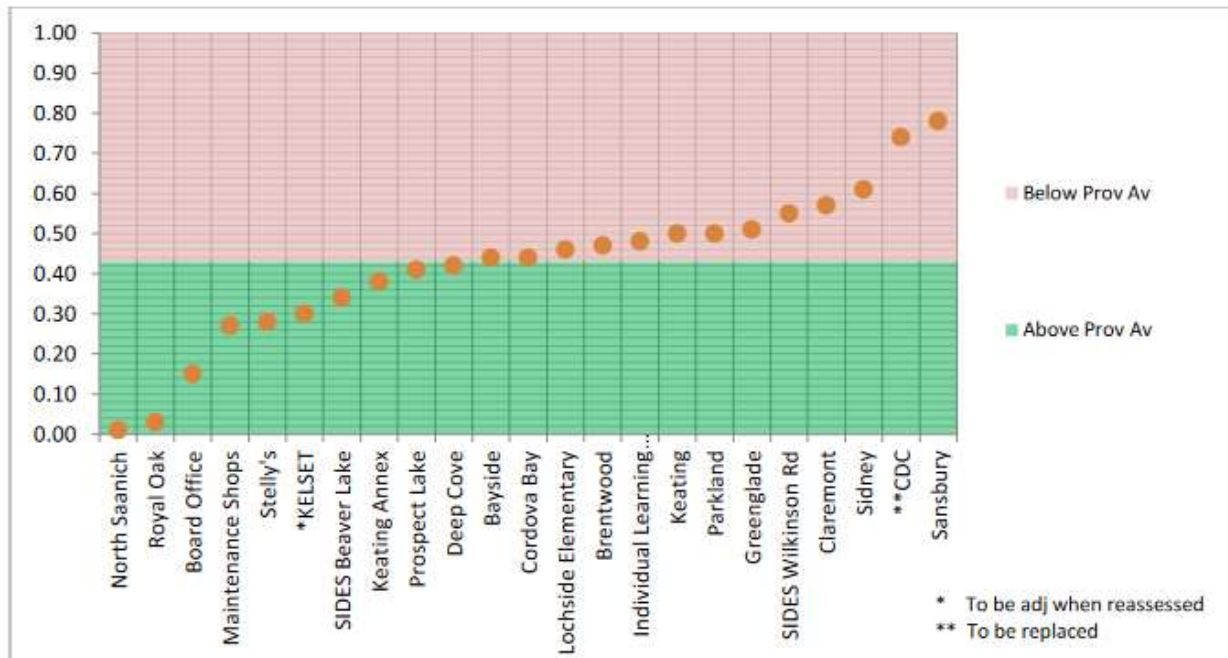
SD63's 4 largest buildings contribute 55% of the total building GHGs

3. End of Life Systems

As part of the planning for Building Electrification, priority consideration should be given to facilities that are nearing replacement or modernization due to end-of-life systems. When replacing or modernizing these facilities, electrification should be a top priority during design. If full electrification is not possible for budget or other reasons, design choices should enable future phases of work to fully utilize electrification.

The following figures are taken from the 2018 Capital Asset Management System building assessments, indicating the Facility Condition Index or FCI.

Rating	Condition	Remarks
< 0.05	Excellent	Near new; meets present and foreseeable future requirements
0.05 - 0.15	Good	Meets all present requirements
0.15 - 0.30	Average	Has significant deficiencies, but meets minimum requirements; some significant building system components nearing end of normal life-cycle
0.30 - 0.60	Poor	Does not meet requirements; immediate attention required to significant building systems; some significant building systems at end of life-cycle
0.6	Very Poor	Does not meet requirements; immediate attention required to most significant building systems; most significant building systems at end of their life-cycle



Funding Needs

Each year, the School District receives funding through multiple funds:

1. AFG – **Annual Facility Grant** – funding is provided to boards of education to be used at their discretion to address maintenance priorities and ensure schools are safe and well-functioning.
2. SEP – **School Enhancement Program** - Successful projects are chosen based on need, priority and how well they support student learning and safety. Eligible projects must be more than \$100,000, but not exceed \$3,000,000.
3. CNCP – **Carbon Neutral Capital Program** - CNCP is a \$5 million/year program which is available to provide specific funding to energy-efficiency projects that lower the school district’s carbon emissions.

SD63 Funding

2021 Value	Source
\$1,500,000	Annual Facility Grant
\$ 1,000,000	School Enhancement Program
\$400,000	Carbon Neutral Capital Program
\$2,900,000	Total

It is important to note that the provided funds are not exclusively available for energy or carbon-related projects. They must also cover building renovations, roof repairs, portable classrooms, IT projects, and numerous other demands. Only the CNCP funds, estimated at \$400,000 per year, can be assumed to be specifically for emission reduction projects.

As per the Electrification Assessment, we have estimated the cost per tonne at \$14,000. Accordingly, the estimated cost to meet the targets are as follows:

	Low	High	
Reduction Needed	943 -	1023	tonnes
x	\$14,000	\$14,000	per tonne
	\$13,202,000	\$14,322,000	

Given the anticipated annual CNCP allocation of \$400,000 for the next 8 years (\$3.2M), there is a funding gap of \$11.1M to complete building electrification.

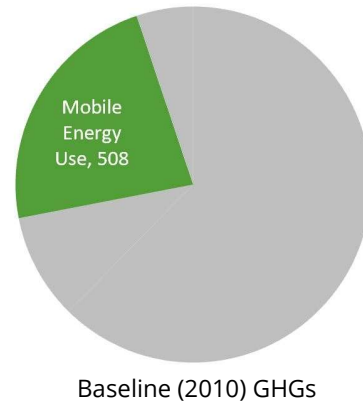
Buildings – Recommended Actions

1. Engage qualified consultants in an ongoing, comprehensive Energy Management program – tracking utility data, identifying and acting on opportunities, and reporting on energy consumption and GHG emissions.
2. Implement Building Electrification across all sites as soon as funding allows, prioritizing largest consuming and worst performing facilities first.
3. Conduct ongoing building optimization activities, including minor capital upgrades and recommissioning.
4. Apply for incentives through the BC Hydro Continuous Optimization Program.
5. Advocate for increased funding to cover the anticipated **\$11M gap** to complete District-wide building electrification.

Transportation

In the baseline year of 2010, **23%** of SD63's GHG emissions came from transportation – a total of **508 tCO₂e**.

As of 2020, the total transportation GHGs have dropped to 439 tCO₂e, but still represent 23% of the total.



Transportation Targets

Baseline (2010) t CO₂e GHG	508
Mandate	27-32% Reduction
Reduction Needed	137 - 163
2030 Target	345 - 371

The reduction target for transportation is 27–32% by 2030. This number is significantly lower than the target for buildings, in recognition of the fact that market-ready solutions are currently available for buildings, but the same is not true across the transportation sector. While electric vehicles are becoming commonplace among light-duty vehicles, there are far fewer options available in the heavy-duty segment of the market.

SD63 Fleet & Consumption

The District's transportation fleet is split into two categories: White and Yellow. The Yellow Fleet consists of school buses, while the White Fleet includes trucks, vans, and utility vehicles (dump truck, flat deck etc). Although there is a higher count of vehicles in the White Fleet, the total fuel consumption of the Yellow Fleet is greater. There are presently no electric vehicles in either fleet.

2020 Fuel Consumption

Fleet	# Vehicles	Diesel	Regular	Mid	Total	
White	34	22,438	50,732	3,088	76,258	43%
Yellow	27	98,845	1,024		99,869	57%
Total	61	121,283	51,756	3,088	176,127	

Fleet Electrification

White Fleet

At present, there are no viable options available on the market for electrifying the White Fleet. 2022 and 2023 should start seeing the first electric trucks coming to market, including a Ford F150 Lightning and Chevrolet Silverado.

The District could consider implementing a purchasing policy that prioritizes electric and hybrid replacement vehicles for the White Fleet. However, given the uncertainty of the electric truck market, we have assumed no White Fleet electrification in our calculations.

Yellow Fleet

School bus replacement is prescribed by the Ministry of Education, based on a formula that considers bus age and mileage. Based on this formula, 3 buses have been included in an application for replacement in the 2021-22 year. By 2030, an additional 13 buses should qualify for replacement. All replacement buses are expected to be electric.

For the 27 Yellow Fleet buses, with a 2020 total consumption of 98,845L of diesel, we can calculate:

$$\begin{array}{r} \text{Emission Factor, Heavy-duty, Diesel} \quad 2.63^* \quad \text{kg/L} \\ \times \quad 98,845 \quad \text{L} \\ \hline 259,962.35 \quad \text{kg} \\ 259.96 \quad \text{t} \\ \\ \text{Divided by 27 buses} \quad 9.63 \quad \text{t per bus} \end{array}$$

** From Table 7: Fleet Fuel Consumption of the B.C. Best Practices Methodology For Quantifying Greenhouse Gas Emissions*

Given that a total of 16 buses are expected to be replaced by 2030, at 9.63 t eCO₂ per bus, we can assume a reduction of

$$\begin{array}{r} 16 \quad \text{buses} \\ \times \quad 9.63 \quad \text{t} \\ \hline 154.08 \quad \text{t} \end{array}$$

If 16 buses are electrified by 2030, SD63 is expected to meet its transportation GHG reduction target.

Electric Charging Infrastructure

Charging facilities will be required as the fleet transitions to electric. To accommodate this, more electrical capacity will be needed at the School Board / Maintenance Office. An upgraded electrical service is currently in the works for this site, and is expected to be complete by December 2021.

Once the upgraded electrical service is in place, installation of vehicle chargers can follow. Incentives are presently being offered through the NR Can Zero Emission Vehicle Infrastructure Program. The program offers up to 50% of the total project costs, with varying rates depending on the type of chargers installed. It is recommended to apply for funding during the next intake period, which opens in December 2021.

Funding Needs

The current cost of 1 electric bus is approximately \$415,000. Extras such as GPS, chains, cameras, and radios add another \$12,000 to the price, bringing the total cost per bus to \$427,000. The current funding available for buses is \$302,000. This leaves a funding gap of \$125,000 per bus.

To meet the goal of 16 electric buses by 2030, the District will require an additional \$2,000,000 in funding, yet to be identified.

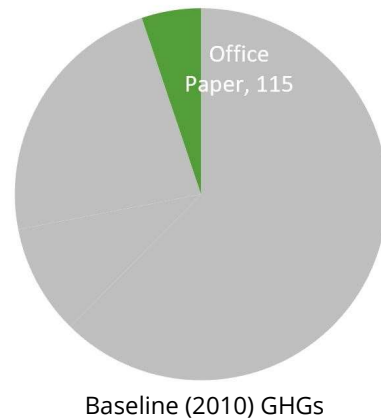
Transportation - Recommended Actions

1. Continue to apply for 1-3 electric buses per year for replacement, as applicable under the Ministry of Education replacement formula.
2. Apply for EV charging infrastructure funding through the NR Can Zero Emission Vehicle Infrastructure Program.
3. Consider adopting a White Fleet purchasing policy that prioritizes hybrids and electric vehicles as they become available.
4. Advocate for increased funding to cover the **\$2M gap**

Paper

In the baseline year of 2010, **5%** of SD63’s GHG emissions came from paper – a total of **115 tCO₂e**.

As of 2020, the total paper GHGs have dropped to 68 tCO₂e, and now represent 4% of the total.



In the classroom, paper is a basic tool of learning. Therefore, the elimination of paper is neither a desirable nor practical solution. However, more intentional sourcing of paper can reduce the GHG impact of its use. At 5%, paper is not a significant source of GHGs for SD63, but reducing this number is highly achievable.

Sustainable Purchasing

When reporting emissions from paper consumption, schools must follow the approach outlined in the “B.C. Best Practices Methodology For Quantifying Greenhouse Gas Emissions”. Accordingly, using the Environmental Paper Network (EPN) Paper Calculator, paper with a higher quantity of post-consumer recycled (PCR) content is recognized as having a lower GHG emission factor.

Emission Factor (kg CO ₂ e/ pkg)	
PCR Content %	8.5" x 11"
0	6.358
10	6.123
20	5.888
30	5.653
40	5.418
50	5.184
60	4.949
70	4.714
80	4.479
90	4.244
100	4.010

By purchasing 100% post-consumer recycled paper rather than “virgin” paper, GHG emissions can be immediately reduced by one third.

Alternative material papers, such as bamboo, eucalyptus, and sugar cane, are presently recognized at the same rates at 100% PCR paper.

A cursory survey of paper prices online reveals a wide range of products and pricing available. In some cases, 100% PCR paper was double the cost of virgin paper; in other cases, the cost difference was negligible.

Though the emission factor decreases as the PCR content increases, the factor never reaches 0. Some vendors are now advertising “carbon-neutral” paper, achieved variously through alternative production methods and/or carbon offsets. It is unclear how these papers would be recognized for reporting purposes, but further investigation is warranted.

Sourcing of low-emission or no-emission paper, while not difficult, can be more time consuming. It is therefore recommended to consolidate the effort through District-wide or School-wide purchasing of paper. This would ensure both that the optimal paper products are chosen, and that bulk-pricing is achieved.

Reducing Consumption

Reducing overall consumption, while not the prime goal, is still a factor to be considered. A culture of responsible resource use can be fostered by discussing and promoting the District’s carbon reduction goals, both in the classroom, and with staff. Simple actions, such as setting printer defaults to double-sided printing, can have a significant impact on paper use.

Personal accountability among staff could be strengthened by implementing photocopy ID codes, tracking paper use by person or by department. Friendly competition among individuals, departments or schools can encourage conservation.

Paper - Recommended Actions

1. Adopt a paper purchasing policy that emphasizes low-emission or no-emission paper over “virgin” paper.
2. Centralize the task of purchasing paper through a single person/role for the entire District, or through a single person/role for each school.
3. Encourage responsible consumption, through various technological or behavioural initiatives.

Summary of Recommendations

Buildings

1. Engage qualified consultants in an ongoing, comprehensive Energy Management program – tracking utility data, identifying and acting on opportunities, and reporting on energy consumption and GHG emissions.
2. Implement Building Electrification across all sites as soon as funding allows, prioritizing largest consuming and worst performing facilities first.
3. Conduct ongoing building optimization activities, including minor capital upgrades and recommissioning.
4. Apply for incentives through the BC Hydro Continuous Optimization Program.
5. Advocate for increased funding to cover the anticipated **\$11M gap** to complete District-wide building electrification.

Transportation

1. Continue to apply for 1-3 electric buses per year for replacement, as applicable under the Ministry of Education replacement formula.
2. Apply for EV charging infrastructure funding through the NR Can Zero Emission Vehicle Infrastructure Program.
3. Consider adopting a White Fleet purchasing policy that prioritizes hybrids and electric vehicles as they become available.
4. Advocate for increased funding to cover the **\$2M gap** to purchase electric buses.

Paper

1. Adopt a paper purchasing policy that emphasizes low-emission or no-emission paper over “virgin” paper.
2. Centralize the task of purchasing paper through a single person/role for the entire District, or through a single person/role for each school.
3. Encourage responsible consumption, through various technological or behavioural initiatives.

In Closing

As noted in the Sixth Assessment Report of the Intergovernmental Panel on Climate Change, global warming of 1.5°C and 2°C will be exceeded during the 21st century unless deep reductions in CO₂ and other greenhouse gas emissions occur in the coming decades.

Saanich School District has an important role to play, both as a Public Sector Organization subject to CleanBC targets, and as an organization modelling good global citizenship to its many students.

The SD63 Facility Services team has taken meaningful steps to understand and plan for the anticipated de-carbonization of its buildings and fleet. Securing adequate funding remains the single most significant barrier to achieving the critical GHG reduction targets.

Further Reading:

The Intergovernmental Panel on Climate Change (IPCC) – Sixth Assessment Report (AR6)

Find at: www.ipcc.ch