



Strategic Energy Management Plan 2020

School District 72 (Campbell River)

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1.0 Our Organization

School District 72 is one of 60 school districts in British Columbia. Based in Campbell River, our school district is 3939 square kilometers in size. Although most schools are located within the City of Campbell River, School District 72 has several outlying schools including the Village of Sayward, Read Island and Cortes Island.

This report provides an overview of our school district's energy consumption, including the financial impact and our organization's carbon footprint.

1.1 Energy Intensity

Energy Intensity expresses a building's energy use as a function of its size or other characteristics. It facilitates comparison of different buildings over time. In 2019, our Energy Intensity of 0.66 GJ(e) per square meter was the lowest level in the past 10 years. The most significant contribution in 2019 was the separation of utility consumption information for the Heritage Lands facility. As a result of the reconfiguration of the building, utility consumption and costs for Timberline Secondary were separated from North Island College commencing January 2019. Space heating is the most significant energy requirement for School District 72. Heating Degree Days in 2019 were 19.1% below the 10-year average.

The following table summarizes the energy consumption, cost and energy intensity for all School District 72 facilities.

Facility Profile

Site	Size m ²	2019 Annual Energy Consumption GJ (e)	2019 Annual Energy Cost (\$)	2019 Energy Intensity GJ (e) per m ²	2018 Energy Intensity GJ (e) per m ²	2017 Energy Intensity GJ (e) per m ²
Carihi	10,533	8,049	114,176	0.76	0.78	0.90
Cortes	1,382	955	37,798	0.69	0.67	0.75
Cedar	2,389	1,949	28,560	0.82	0.80	0.77
Discovery Passage	1,602	936	13,253	0.58	0.61	0.62
EDM	2,409	1,587	23,388	0.66	0.63	0.72
Georgia Park	3,375	2,390	45,009	0.71	0.68	0.73
Maintenance/Bus Garage (incl 3 portables)	2,068	939	15,697	0.45	0.40	0.55
Ocean Grove (incl 3 portables)	2,769	1,853	38,860	0.67	0.79	0.86
Oyster River	2,106	1,378	25,518	0.65	0.71	0.82
Penfield	2,918	1,251	47,260	0.43	0.48	0.53
Phoenix (incl 1 portable)	8,370	5,736	88,133	0.69	0.64	0.68
Pinecrest	3,221	1,978	28,811	0.61	0.51	0.55
Quadra	2,647	1,091	38,779	0.41	0.43	0.46
Ripple Rock (incl 1 portable)	2,809	2,117	33,398	0.75	0.72	0.71
Robron	6,906	4,445	72,565	0.64	0.70	0.62
Sandowne	3,581	2,307	42,990	0.64	0.62	0.77
Sayward	2,977	1,527	68,086	0.51	0.56	0.54
School Board Office (incl 1 portable)	1,824	1,589	46,505	0.87	0.86	0.92
Southgate	7,373	3,688	69,343	0.50	0.51	0.49
Surge Narrows (incl Community Use)	530	360	13,125	0.68	0.73	0.68
Timberline (incl 1 portable)	9,420	6,873	314,843	0.73	1.05	1.16
Willow Point	2,772	2,044	34,643	0.74	0.74	0.75
TOTAL	83,980	55,042	1,240,740	0.66	0.73	0.75

2.0 Our Commitment

2.1 Why is energy conservation important to us?

Energy conservation awareness is considered an integral component of sustainable environmental practices and education curriculum. The Campbell River School District strategic planning reflects this belief by including specific objectives in support of various strategic focus areas.

Financial benefits of energy conservation are both direct (through reduced utility costs) and indirect (reduced carbon offset payments). These savings are made available for educational programs and reinvestment into future energy conservation initiatives.

School District 72 has received recognition at both the community and provincial level for its environmental stewardship and energy conservation efforts. Additionally, strategic partnerships have been established with BC Hydro, Fortis BC, Natural Resources Canada, and the BC Climate Action Secretariat.

2.2 Operational Procedure 515 – Environmental Responsibility

Background

The District is committed to fostering policies, practices and educational programs which will protect and preserve the environment.

Procedures

1. The District will endeavour to purchase “environmentally friendly” products which will provide the highest possible level of performance.
2. The efficient use of energy and water will be guiding principles in all renovations, new construction and operations.
3. The District encourages and supports initiatives to reduce, recycle and recover waste materials in all schools and departments.
4. The District supports staff development initiatives designed to advance environmental awareness, environmental education and care for the environment within annual budget allocations for training and development.
5. Environmental education will continue to be incorporated into the content and methodology of the instructional program.

3.0 Understanding Our Situation

3.1 Utility Consumption and Costs

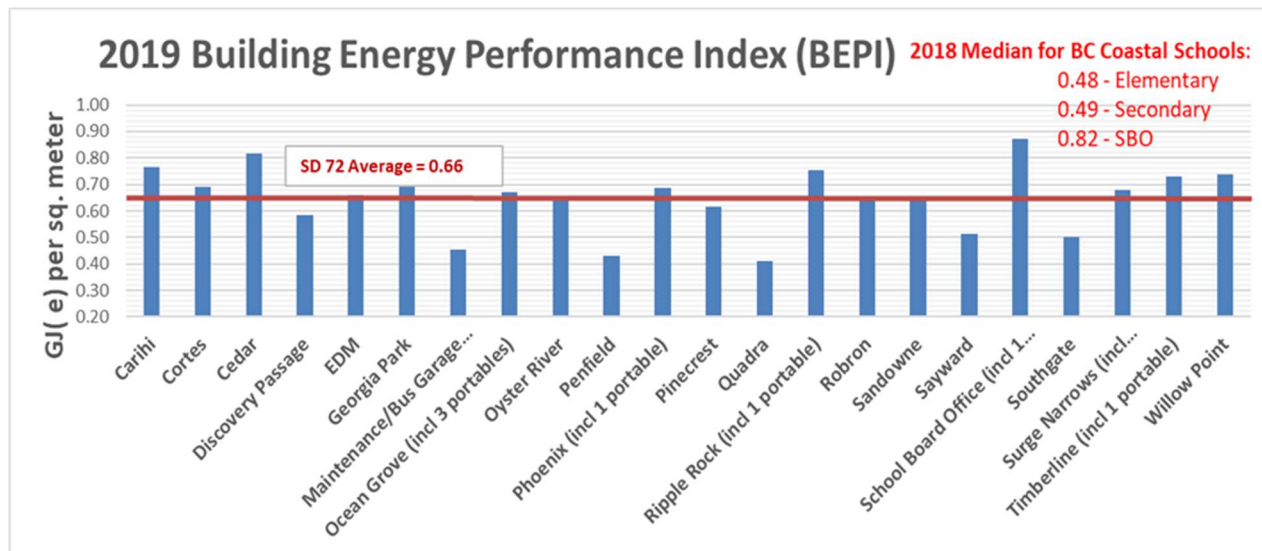
Referring to the following table, electricity historically accounts for more than one-half of School District 72 utility costs. This fact contributed to the school district decision to become a member of the BC Hydro Energy Manager program from 2009 to 2015. In recent years, however, resources have focused more on reducing natural gas use because more than one-half of School District 72 carbon footprint is the result of fossil fuel consumption.

In addition to energy consumption, School District 72 proactively manages other types of utilities. The 2015 pilot project to connect irrigation controls to the University of Victoria's School-Based Weather Station Network has continued, with one site per year is being converted so playing fields are only watered when weather dictates. In concert with the solid waste shared services contract with the City of Campbell River, recycling collection has continued to expand. Efforts have continued to reduce the number of propane-fueled vehicles, resulting in a lower carbon footprint.

2019 Calendar Year	Normalized Consumption	Normalized Costs	
	GJ	\$	%
Electricity	34,488	657,768	51%
Natural Gas	32,427	308,255	24%
Propane (buildings)	2,482	89,436	7%
Diesel (marked)	360	13,091	1%
Water, excl irrigation	48,549 m ³	49,466	4%
Irrigation	48,453 m ³	32,484	3%
Sewage	37,956 m ³	55,150	4%
Refuse	2,122 Tons	63,119	5%
Recycling	316 Tons	20,600	2%

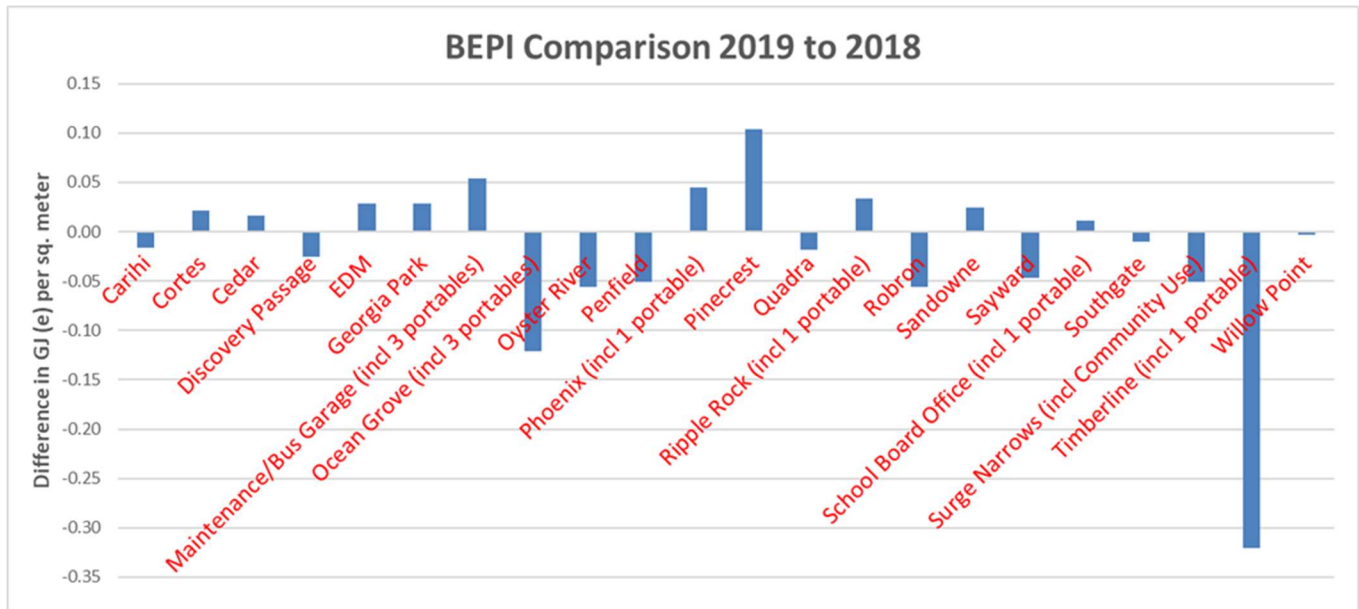
3.2 Savings Opportunity Assessment - Energy Consumption Intensity

Although School District 72 had a significantly improved Building Energy Performance Index (BEPI) in 2019 compared to 2018, we continue to have above average energy intensity compared to most BC coastal school districts. This indicates further opportunities for energy savings, cost avoidance and a lower carbon footprint.



For 2019, the three buildings in School District No. 72 with the highest BEPI were:

- Carihi Secondary. Significant mechanical upgrades throughout 2019, resulted in some energy conservation improvement compared to 2018. However, completion of mechanical upgrades in the main building are expected to lead to greater savings in 2020 and improved occupant comfort.
- School Board Office. School Board Offices typically have high energy intensive relative to other school district facilities. Relative to 2018, energy consumption increased very little. No projects are planned for the school board office that are likely to impact energy consumption.
- Cedar Elementary. Overall energy consumption increased for the fourth year in a row and is now approaching energy use before the 2015 boiler replacement project. Natural gas consumption is the primary contributor to the increase in energy consumption, suggesting an adjustment is needed in heating controls and/or an underlying issue with the building envelope resulting in excessive heat loss. For 2020/21, exterior doors will be replaced. Potential long term solutions include replacement of the school or upgrades to the building envelope.



School District 72 buildings with the greatest BEPI increase in 2019 were:

- Pinecrest Elementary. Both natural gas and electrical consumption increased in 2019 compared to 2018. However, consumption remains less than the 10-year average. Monitoring will continue in 2020 to identify any specific issues.
- Maintenance/Bus Garage. Roof replacements, improvements to the building envelope and replacement of a large shop exhaust unit are believed to cause an increase in energy intensity in 2019. A decrease in energy intensity is expected in 2020 as a result of these facility improvements.
- Phoenix Middle. A boiler replacement project and ongoing building controls upgrades contributed in higher energy consumption while work was in progress. Energy consumption should decrease by 2020, upon completion of building controls upgrades.

4.0 Our Actions

4.1 Program Results 2007-2019

School District 72's successes in energy conservation are described in previous Strategic Energy Management Plans and the feature article in the Ministry of Environment report Carbon Neutral Government: Year in Review 2015.

Energy Intensity by Heating Degree Days (HDD)

Heating Degree Days (HDD) are a significant factor when analyzing energy consumption. A cooler winter generally results in more HDD and higher energy consumption. In School District 72, only two elementary schools rely on electric heat. Therefore, the influence of the heating season is most noticeable on fossil fuel consumption.

Conversely, a warm summer (i.e. higher Cooling Degree Days) will generally result in higher energy consumption because of air conditioning equipment and use of electrical fans for occupant comfort. In the case of School District 72, however, few facilities are air conditioned and occupied during the cooling season. Therefore, Cooling Degree Days are not a significant contributor to energy consumption as HDD.

The following table normalizes energy intensity using Heating Degree Days (HDD). Since 2007, the benchmark year under the Greenhouse Gas Reduction Targets Act, School District 72 has experienced a 6.1% decrease in overall energy intensity per HDD. Since 2009, however, when School District 72 enrolled in the BC Hydro Energy Manager Program, School District 72 has achieved a 9.6% reduction in overall energy intensity per HDD. These comparisons reinforce the importance of a proactive energy management program to identify and implement energy conservation measures and efficiencies.

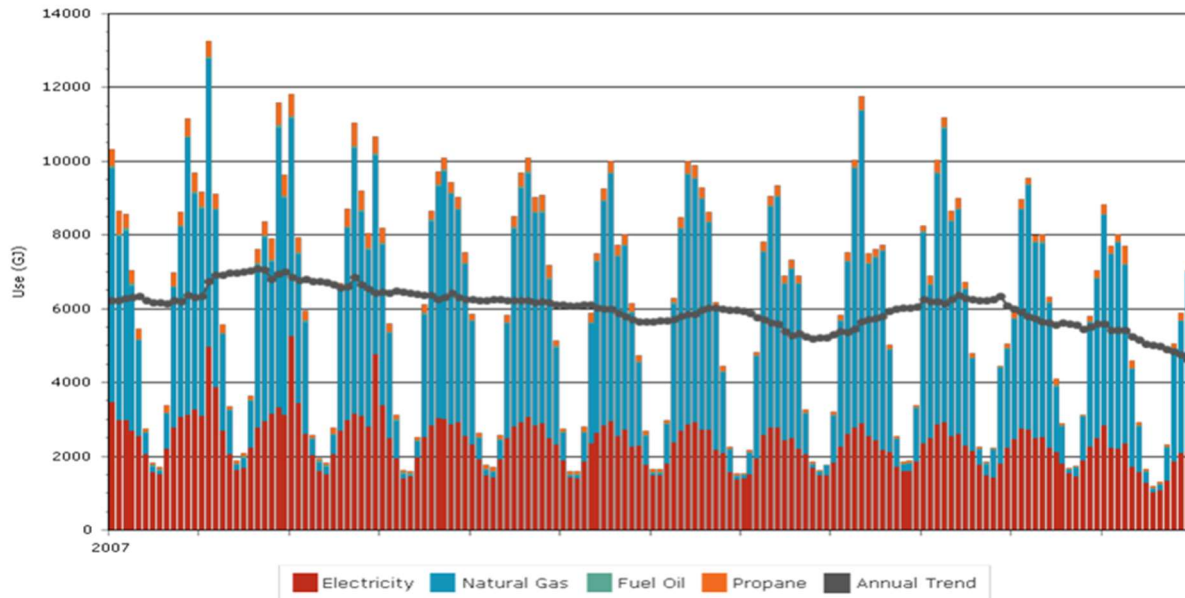
School closures, disposal of surplus buildings, and changes in occupancy also influence energy consumption. This is particularly noteworthy in 2019, when the reconfiguration of the Heritage Lands facility enabled School District 72 to monitor the energy consumption of Timberline Secondary independently of North Island College. As a result, School District 72 energy intensity improved significantly in 2019.

School District 72's greatest successes have been achieved in electrical conservation, reflecting completion of many re-lamping projects. Conversely, fossil fuel consumption continues to be a challenge and provides the greatest opportunities for energy conservation projects. As mechanical equipment reaches end-of-life, School District 72 has a continuing program of mechanical upgrades and boiler replacements using current energy conservation technologies.

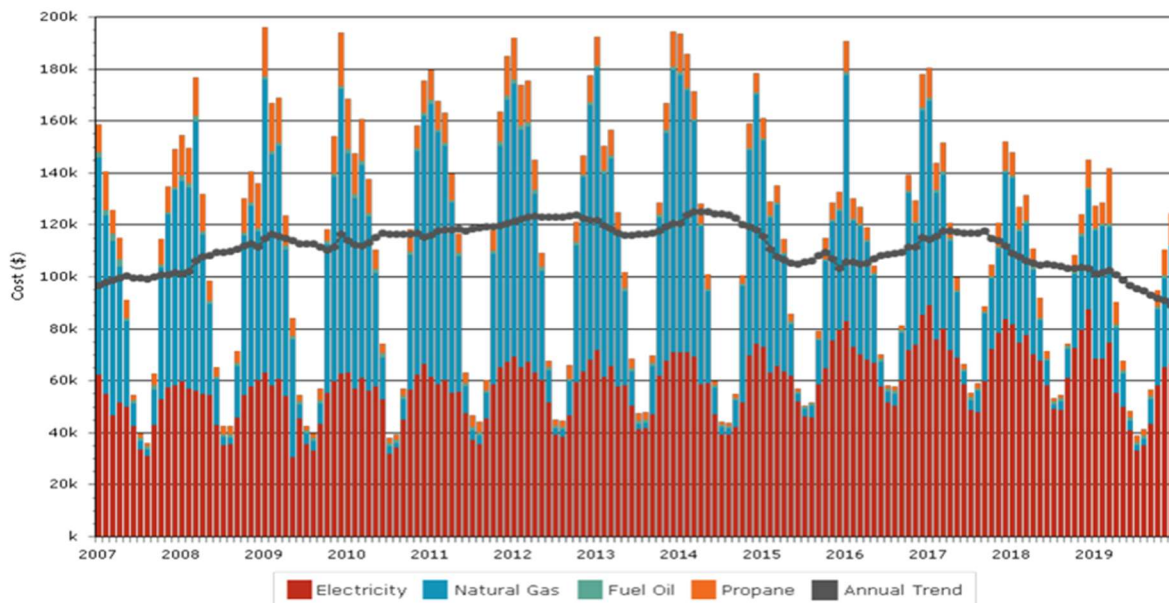
Year	Overall Energy Intensity (GJ(e)/HDD/)	Percent Change in Overall Energy Intensity (%)	Natural Gas GJ/sq M % Chg	Electricity KWH/Sq M % Chg
2007	30.85			
2008	30.51	-1.1%	4.8%	10.8%
2009	32.04	5.0%	2.2%	-1.8%
2010	30.81	-3.8%	-10.2%	-6.0%
2011	28.18	-8.5%	8.5%	-9.9%
2012	28.00	-0.6%	-5.6%	-2.1%
2013	29.09	3.9%	-0.5%	-2.7%
2014	29.02	-0.2%	-2.2%	-5.4%
2015	30.14	3.9%	-5.2%	1.2%
2016	33.14	10.0%	21.5%	1.9%
2017	28.53	-13.9%	-6.7%	-0.3%
2018	31.13	9.1%	-9.7%	-1.8%
2019	28.97	-6.9%	-24.3%	-28.4%

The following charts summarize energy use and cost trends since 2007, the benchmark year of the Greenhouse Gas Reduction Targets Act. Comparing 2019 and 2007, overall energy use has decreased by 26%. The resulting cost savings have more than offset increases in energy rates, resulting in a 22% reduction in the overall annual cost trend. This reinforces the financial benefits of energy conservation and enables more educational dollars to be invested into the classroom.

Energy Use Trend
School District #72 (Campbell River)
All Facilities -- 1/2007 to 12/2019



Energy Cost Trend
School District #72 (Campbell River)
All Facilities -- 1/2007 to 12/2019



4.2 Completed Energy Conservation Projects in 2019

Completed 2019 life-cycle replacement projects with the highest energy conservation impacts are summarized in the following table.

Location	Description	Cost	Funding Source(s)	Comments
Carihi Shop Building	Life cycle replacement of heating system	\$730,900	Ministry of Education; Local Capital (Restricted)	Disconnecting obsolete boilers in main building by installing high efficiency boilers and providing classroom unit ventilators
Pinecrest Elementary	Life cycle replacement of three roof sections	\$414,400	Annual Facilities Grant	Improved roof R-value and reflectivity in conjunction with roof replacements
Timberline Secondary	Life cycle replacement of three roof sections	\$442,700	Annual Facilities Grant	Improved roof R-value and reflectivity in conjunction with roof replacements
Carihi Main Building	Life cycle replacement of heating system	\$1,535,506	Ministry of Education	Providing classroom unit ventilators and upgrade building heating controls
Ecole Phoenix Middle	Life cycle replacement of boilers	\$280,000	Ministry of Education	Conversion to high efficiency boilers in conjunction with life cycle replacement

4.3 Energy Conservation Targets 2020 and Beyond

School District 72 has consistently achieved energy conservation and greenhouse gas reductions targets by taking full advantage of opportunity funding and external grants. Going forward, energy conservation initiatives will strive for an ongoing 2% reduction in energy consumption per year. To achieve this goal, the Annual Facilities Grant, Major Capital Program, Carbon Neutral Capital Program and School Enhancement Program will consider and incorporate energy conservation opportunities when developing school renewal projects.

Planned 2020 life-cycle replacement projects with the highest energy conservation opportunities are summarized in the following table.

Location	Description	Preliminary Budget	Funding Source(s)	Comments
Ecole Willow Point Elementary	Life cycle replacement of boilers	\$167,000	Ministry of Education	Conversion to high efficiency boilers in conjunction with life cycle replacement
Quadra Elementary	Life cycle replacement of six roof sections	\$316,000	Ministry of Education	Improved roof R-value and reflectivity in conjunction with roof replacements
Southgate Middle	Life cycle replacement gym unit ventilator	\$350,000	Annual Facilities Grant	Life cycle replacement of ventilators and upgrade heating controls
Robron Centre	Mechanical controls upgrade	\$209,700	Annual Facilities Grant	Life cycle replacement of building heating controls
Ecole Phoenix Middle	Mechanical controls upgrade	\$240,000	Annual Facilities Grant	Leveraging 2019 boiler replacement to upgrade building heating controls
Timberline Secondary	Life cycle replacement of four roof sections	\$441,000	Ministry of Education	Improved roof R-value and reflectivity in conjunction with roof replacements

4.4 Impact on Greenhouse Gas Emissions

Energy consumption accounts for most School District 72 Greenhouse Gas Emissions. Therefore, energy conservation is a key factor for meeting the provincial requirement for carbon neutral operations.

Although our fossil fuel use has decreased significantly since 2007, the greatest opportunity for reducing our carbon footprint remains natural gas required for heating. School District 72's carbon footprint from electricity use has decreased of 70% since 2009 (the first year of enrollment in the BC Hydro Energy Manager program). Given the increased use of paper products in recent years, consumption of office stationery remains a significant engagement opportunity for staff.

Exempt carbon emissions have increased in recent years as a result of increased school bus mileage. These emissions are exempt from the purchase of carbon offsets because of the positive impact of reducing the use of privately owned vehicles.

To achieve carbon neutrality, School District 72 is required to purchase carbon offsets. For 2019, this is approximately \$50,750.

