

# **Strategic Energy Management Plan**

School District No. 72 (Campbell River)

April 2017

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## 1. 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 schools located in the Village of Sayward and on Cortes Island.

### 1.1 Facility Profile

Facility Profile						
Site	Size m <sup>2</sup>	2016 Annual Energy Consumption GJ (e)	2016 Annual Energy Cost (\$)	2016 Energy Intensity GJ (e) per m <sup>2</sup>	2015 Energy Intensity GJ (e) per m <sup>2</sup>	2014 Energy Intensity GJ (e) per m <sup>2</sup>
Carihi	10,533	8,003	120,307	0.76	0.79	0.81
Cortes	1,382	940	32,078	0.68	0.69	0.90
Cedar	2,389	1,746	31,667	0.73	0.79	0.83
Discovery Passage	1,602	869	15,813	0.54	0.80	0.76
EDM	2,409	1,509	26,795	0.63	0.69	0.61
Evergreen	1,330	270	6,746	0.20	0.18	0.23
Georgia Park	3,375	2,120	46,103	0.63	0.65	0.63
Maintenance/Bus Garage (incl 3 portables)	2,069	1,025	24,729	0.50	0.47	0.52
Ocean Grove (incl 1 portable)	2,609	2,116	40,007	0.81	0.76	0.80
Oyster River	2,106	1,940	37,621	0.92	1.11	1.05
Penfield	2,933	1,424	43,648	0.49	0.45	0.51
Phoenix (incl 1 portable)	8,501	4,935	86,548	0.58	0.57	0.59
Pinecrest	3,221	1,813	32,316	0.56	0.55	0.56
Quadra	2,628	1,092	39,989	0.42	0.46	0.43
Ripple Rock (incl 1 portable)	2,809	1,806	36,171	0.64	0.63	0.62
Robron	7,154	4,452	82,498	0.62	0.57	0.62
Sandowne	3,581	2,530	47,223	0.71	0.69	0.83
Sayward	2,977	1,586	53,121	0.53	0.45	0.50
School Board Office (incl 1 portable)	1,824	1,581	47,735	0.87	0.80	0.81
Southgate	7,373	3,594	68,514	0.49	0.54	0.59
Surge Narrows (incl Community Use)	530	373	12,059	0.70	0.18	0.54
Timberline/NIC (incl portables and NIC)	16,429	17,145	300,296	1.04	1.07	1.07
Willow Point	2,772	1,948	36,438	0.70	0.66	0.65
<b>TOTAL</b>	<b>92,534</b>	<b>64,816</b>	<b>1,268,422</b>	<b>0.70</b>	<b>0.71</b>	<b>0.73</b>

## **2. 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 Plan 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.

Strengthening and expanding community relations is a Strategic Focus of the Campbell River School District Strategic Plan. Environmental stewardship awards presented by the City of Campbell River, Union of BC Municipalities, and Campbell River Chamber of Commerce reflect the positive relationships with our community partners. Additionally, strategic partnerships have been established with BC Hydro (Energy Manager program), Fortis BC (incentive programs), Natural Resources Canada (provision of benchmarking data through surveys and the Energy Star program), and the BC Climate Action Secretariat (Carbon Neutral Action Reports).

### **2.2 Operational Procedure 515 – Environmental Responsibility Policy**

#### 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.

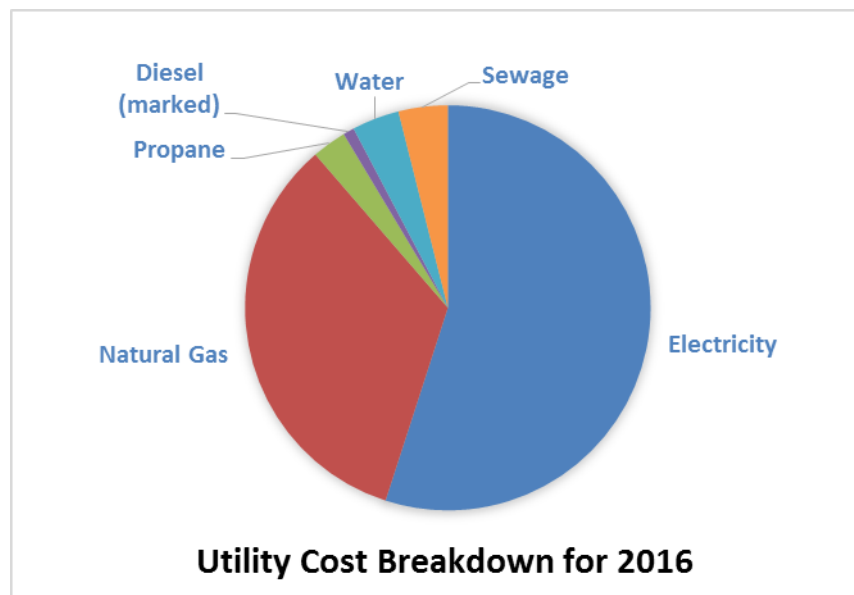
### 3. UNDERSTANDING OUR SITUATION

#### 3.1 Energy Consumption and Costs

Referring to the following charts, electricity historically accounts for more than one-half of School District 72 utility costs. This fact contributed to the school district decision to become an early adopter of the BC Hydro Energy Manager program. In recent years, however, resources have focused more on reduction of natural gas consumption because more than one-half of School District 72 energy consumption, and most of our carbon footprint, are the result of fossil fuel consumption.

School District 72 has also reduced its water consumption. In addition to ongoing plumbing upgrades inside buildings, a pilot project was launched in 2015 to connect one field irrigation system to the University of Victoria’s School-Based Weather Station Network. The pilot project resulted in water consumption being reduced by approximately 25%. As a result, School District 72 intends to convert one playing field each year to this method of irrigation control.

2016 Calendar Year	Normalized Consumption	Normalized Costs	
	GJ	\$	%
Electricity	25,801	747,099	55.0
Natural Gas	36,695	457,899	33.7
Propane	1,724	57,839	4.2
Diesel (marked)	373	12,059	0.9
Water, incl irrigation	80,257 m3	51,297	3.8
Sewage	37,782 m3	53,399	3.9
Total Energy	64,593 GJ	\$1,379,592	100

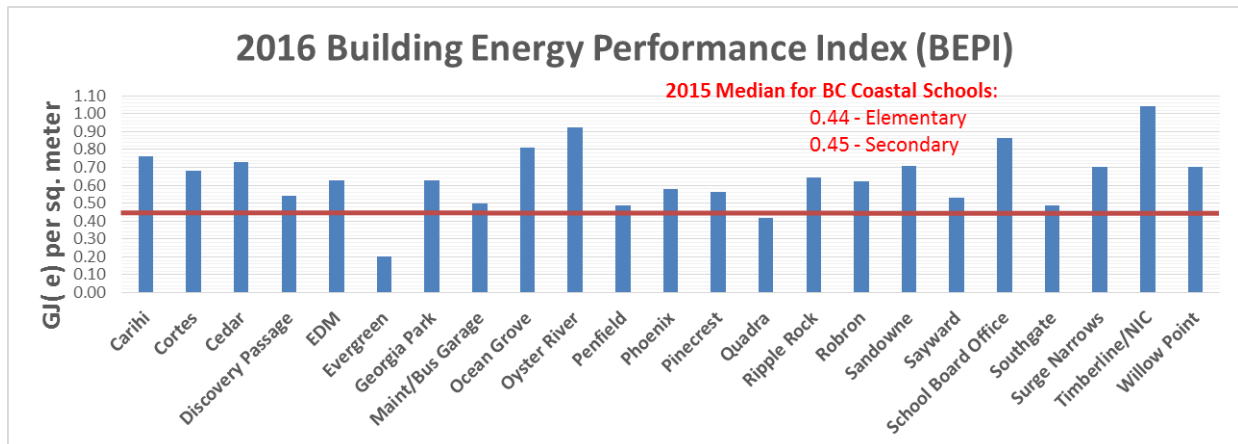


### 3.2 Savings Opportunity Assessment - Energy Consumption Intensity

School District 72 has achieved reductions in energy consumption per square meter for several years. Nevertheless, a comparison with BC coastal schools suggests additional targeted energy conservation initiatives will result in significant savings. For 2016, two locations had a Building Energy Performance Index (BEPI) below the median for BC coastal schools.

For 2016, the buildings in School District No. 72 with the highest BEPI are:

- a. Timberline/North Island College. This facility is jointly occupied with North Island College, with many educational programs not found elsewhere in the school district. Although electricity consumption increased slightly in 2016 compared to 2015, lower natural gas consumption resulted in the overall BEPI decreasing despite a 2.6% increase in Heating Degree Days. A minor contributing factor was relocation of one portable to Ocean Grove (which, in turn, experienced an increase in the BEPI). Ongoing optimization of the building heating, ventilation and air conditioning systems is believed to be the major contribution to improved energy performance in 2016. North Island College is undertaking a site redevelopment and expansion initiative which, upon completion, is expected to significantly increase energy consumption.
- b. School Board Office. Energy intensity increased by 8.8% compared to 2015. The most significant issue was temperature control in the server room, which required extraordinary air conditioning and ventilation pending completion of a major mechanical upgrade. A secondary factor was a noted increase in the number of unit heaters used throughout the building. At times, these heaters seemed to interfere with the air conditioning system (resulting in higher energy costs).
- c. Oyster River Elementary. Energy intensity declined by 17% in 2016, reflecting the impact of School District 72 closing the school in 2016. However, unrealized energy savings opportunities are the result of ongoing occupancy by a daycare and the building's energy intensity is among the highest in the School District 72 portfolio.



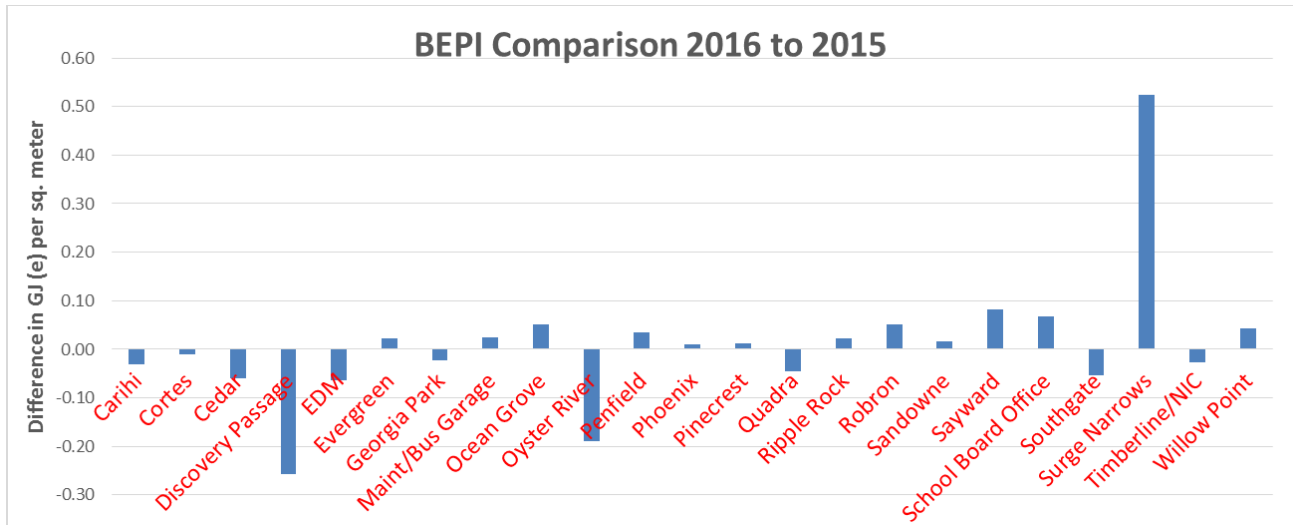
School District 72 buildings with the lowest BEPI in 2016 are:

- a. Quadra Elementary. This small school relies on electric heating. In response to overheating complaints, investigation found damaged relays to the baseboard heaters that occupants had been managing by leaving windows open. Repairs to the relays are believed to be the most significant contribution to the 8.7% decrease in energy consumption in 2016.
- b. Vacant Properties. Evergreen and Discovery Passage are vacant, with only marginal heat being provided. Nevertheless, the BEPI for Discovery Passage remains greater than the 2015 median for BC Coastal Schools. This suggests further energy reductions are possible for this building.
- c. Penfield Elementary and Southgate Middle. These schools had identical BEPI in 2016. In the case of Penfield, the BEPI increased slightly compared to 2015 as a result of a classroom being reoccupied after a unit ventilator failed in late 2014. Energy performance improved significantly in Southgate Middle School. This improvement is attributed to a boiler replacement project in the Lower Wing, in which high efficiency boilers replaced boilers that had reached end of service life.

The sites with the greatest BEPI increase in 2016 were Surge Narrows, Sayward and the School Board Office.

- a. Surge Narrows. Surge Narrows uses a diesel electric generator for heat and electricity. Given the large diesel fuel tank, large changes in the annual BEPI are the result of fuel delivery timings. For example, the 2015 BEPI was the lowest among occupied School District 72 buildings because only one fuel delivery was required in that year.
- b. School Board Office. In 2016, the School Board Office returned to its historical position as an energy intensive building within School District 72. As indicated by the 13% increase in electrical consumption in 2016, the primary factor was the use of fans and portable air conditioners to mitigate heating and ventilation concerns in the server room. A mechanical upgrade has recently been completed for the server room, which should result in lower consumption in 2017. A secondary, anecdotal factor was increased use of portable heaters to service individual workstations. At times, these unit heaters usurped the ability of the air condition system to provide area cooling.

c. Sayward. The 2016 BEPI was the result of heating fuel (propane). Heating Degree Days increased by 2.6% in 2016 compared to 2015. Therefore, most of the energy increase is attributed to weather effects.





## 4. OUR ACTIONS

### 4.1 Program Results 2007-2016

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*. For 2016, School District 72 achieved its 7<sup>th</sup> consecutive year of reduced energy consumption and second highest reduction in energy intensity since 2007.

#### Energy Intensity by Heating Degree Days (HDD)

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

Conversely, a warm summer (i.e. higher Cooling Degree Days) will generally result in high energy consumption because of air conditioning equipment and use of electrical fans for occupant comfort. In the case of School District 72, only the School Board Office and the Heritage Lands facility are air conditioned and occupied for most of the cooling season. Notwithstanding North Island College requires heating of the Heritage Lands facility as early as August, cooling degree days have a relatively small impact on energy consumption for School District 72.

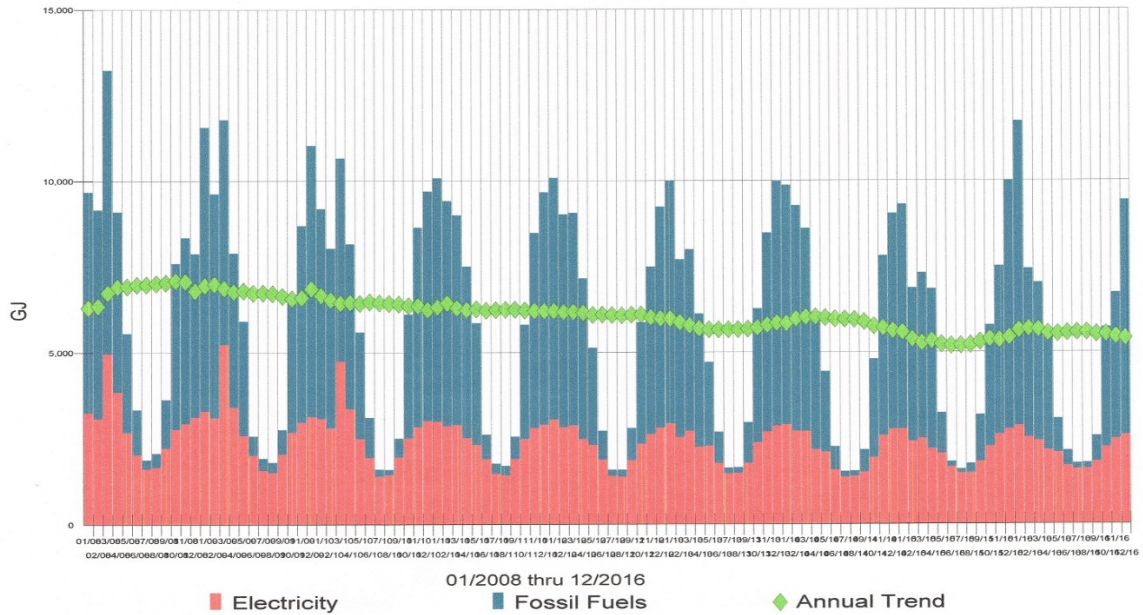
The following charts profile School District 72 energy consumption. Between 2009 and 2014, facilitated by the BC Hydro Energy Manager program, School District 72 implemented significant electricity conservation projects and initiatives. In recent years, mechanical upgrade projects, combined with generally milder winters, has generated most of the energy reductions.

Year	Annual Normalized Energy Consumption (GJ(e))	HDD	Energy Intensity (GJ(e)/HDD)	Percent Change in Energy Intensity (%)
2006	72,371	3153	22.95	
2007	76,264	3066	24.87	8.4%
2008	81,521	3363	24.24	-2.5%
2009	82,275	3116	26.40	8.9%
2010	74,901	2761	27.13	2.7%
2011	74,485	3192	23.33	-14.0%
2012	71,795	2723	26.37	13.0%
2013	70,210	2584	27.17	3.1%
2014	67,475	2461	27.42	0.9%
2015	64,956	2410	26.95	-1.7%
2016	65,001	2474	26.27	-2.5%
Total (Current Year to 2009 start of Energy Manager Program)				-0.5%

While energy consumption has steadily decreased, energy costs have increased. BC Hydro rate increases are the primary cause of cost increases. Fossil fuel costs (primarily natural gas) have begun to decrease as a result of FortisBC rate adjustments affecting Vancouver Island customers.

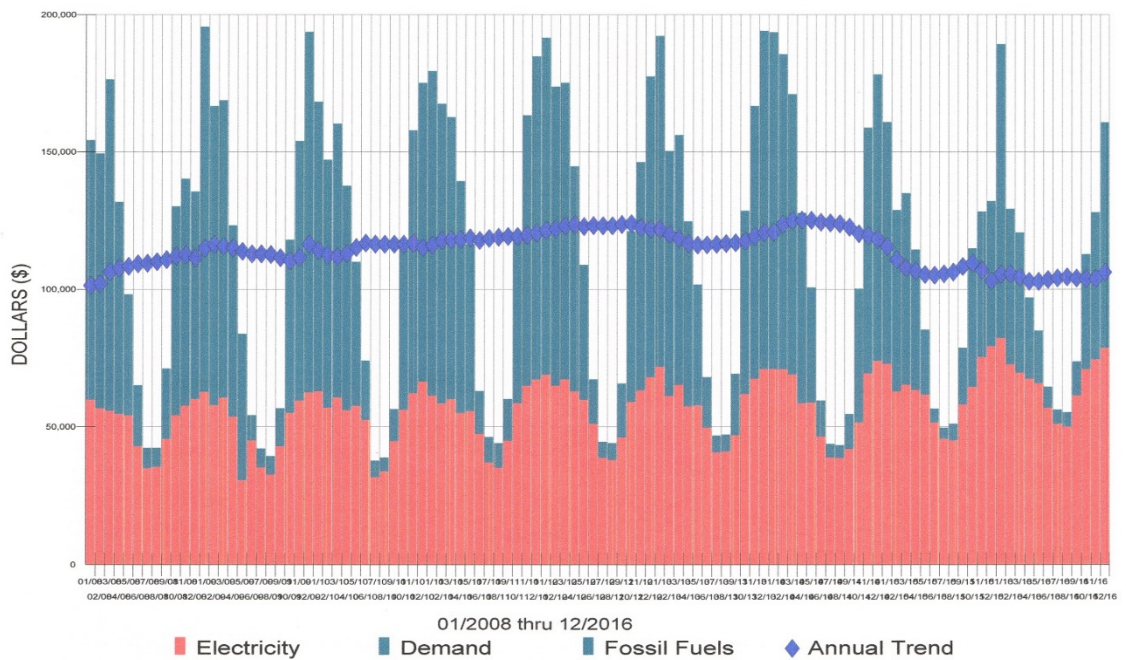
Energy Use Graph – Monthly and Annual Trend since 2006

Energy Use Graph - Monthly and Annual Trend for School District 72, Campbell ...



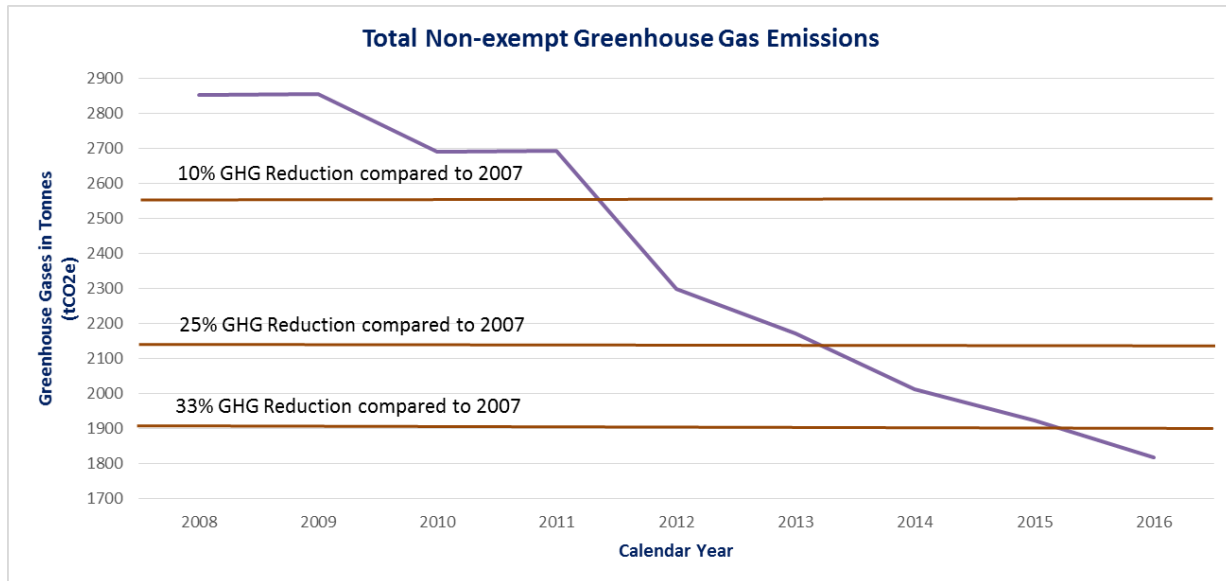
Energy Cost Graph – Monthly and Annual Trend

Energy Cost Graph - Monthly and Annual Trend for School District 72, Campbell...



## 4.2 Impact on Greenhouse Gas Emissions

Energy consumption accounts for most Greenhouse Gas Emissions from School District 72. Therefore, energy conservation is a key factor for meeting provincial requirements to achieve carbon neutral operations. As shown in the following graph, since 2007 School District 72 has reduced its total non-exempt Greenhouse Gas Emissions by 36%.



## 4.3 Energy Conservation Targets 2017 and beyond

As previously indicated, School District 72 has consistently exceeded energy conservation and greenhouse gas reduction targets by taking full advantage of opportunity funding and external grants. Going forward, energy conservation initiatives will strive for continuous improvement of a 2% reduction per year. To achieve this goal, the Annual Facilities Grant, Capital Program, and School Enhancement Programs will prioritize energy conservation projects when considering school renewal projects.

Approved projects for 2017 are summarized in the following table:

<b>Location</b>	<b>Description</b>	<b>Estimate Cost</b>	<b>Funding Source(s)</b>	<b>Comments</b>
Pinecrest Elementary	Various Mechanical Upgrades	\$957,400	Ministry of Education – School Enhancement Program	Completion of work identified during boiler upgrade project funded by Annual Facilities Grant
Southgate Middle	Upper Wing Boiler Upgrade	\$409,500	Ministry of Education – School Enhancement Program (\$359.5 K) and Carbon Neutral Capital Program (\$50 K)	Phase Two of Boiler Replacement Project (Phase One funded by Annual Facilities Grant)
Sandowne Elementary	Boiler Upgrade	\$156,000	Annual Facilities Grant	BEPI currently among the highest in SD 72
Penfield Elementary	Upgrade of two Unit Ventilators	\$50,000	Annual Facilities Grant	Continuing Life Cycle Replacement program

A variety of energy conservations projects have been identified for 2018 and beyond. Near-term priorities include heating and ventilations upgrades for Carihi Secondary (est \$1.5 M), boiler replacements for Ecole des Deux Mondes (\$108 K) and Ecole Willow Point, and continuing the unit ventilator replacement program for Penfield Elementary.