

# Strategic Energy Management Plan

School District No. 72 (Campbell River)

March 2014

Partnering with:

**BChydro** 

**powersmart**

Senior Management Support:

Name: Kevin Patrick, CGA

Position: Secretary-Treasurer

Signature:

Original Signed by Kevin Patrick

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# 1. BC HYDRO: ENERGY MANAGER 4<sup>TH</sup> QUARTER ASSESSMENT FORM - SEMP SELF-EVALUATION

For BC Hydro to complete

File Number			
Quarter			
PSE Signature: SEMP Completed			
Projects that used PS incentives:	<b>PS Program Incentive</b>		<b>kWh</b>
	PSP		
	PSP Express		
	New Construction		
	<b>Total</b>		
	Behavioural Program (2%)		

Turn around time for 4<sup>th</sup> Q review: \_\_\_\_\_ days

## Energy Manager: Please complete appropriate year below

- Note: All areas (in your contract Year) must be covered in order to receive 4<sup>th</sup> quarter payment

## Year 1: Plan requirements

<b>5 Critical Element must be included in the Strategic Energy Management Plan</b>	<b>Page number where the element is addressed in the SEMP</b>	<b>Energy Manager evaluation</b>	<b>PSE Agrees</b>
1) A purpose statement which answers the following questions: <input type="checkbox"/> a) What are you trying to do? <input type="checkbox"/> b) What is the Key Performance Indicator for your organization? <input type="checkbox"/> c) Who do you need to engage to make you plan successful?		<input type="checkbox"/>	<input type="checkbox"/>
2) A table that compares all your buildings in your portfolio <input type="checkbox"/> a) BEPI		<input type="checkbox"/>	<input type="checkbox"/>
3) Explain what the opportunities are to become more efficient. <input type="checkbox"/> a) Project List		<input type="checkbox"/>	<input type="checkbox"/>
4) Outline the budget to implement projects <input type="checkbox"/> a) No Budget? Can't forecast your budget? You must explain why not and what you intend to do about getting a budget.		<input type="checkbox"/>	<input type="checkbox"/>
5) Conclusion: How is your plan doing? <input type="checkbox"/> a) Outlined kWh saved <input type="checkbox"/> b) Actual total dollars saved to the organisation <input type="checkbox"/> c) Outlined avoided cost <input type="checkbox"/> d) Total dollars saved = Actual + Avoided Cost		<input type="checkbox"/>	<input type="checkbox"/>

## Year 2 +: Strategic Energy Management Plan requirements

<b>6 Critical Elements must be included in the Strategic Energy Management Plan</b>	<b>Page number where the element is addressed in the SEMP</b>	<b>Energy Manager evaluation</b>	<b>PSE Agrees</b>
<b>1) A purpose statement which answers the following questions:</b> <input type="checkbox"/> a) What is your kWh reduction target? <input type="checkbox"/> b) What is the Key Performance Indicator for your organization? <input type="checkbox"/> c) Who do you need to engage to make you plan successful?	p15-16, sect 5.2 p8, sect 2.3 p25, sect 6	<input type="checkbox"/>	<input type="checkbox"/>
<b>2) A table that compares all your building in your portfolio</b> <input type="checkbox"/> a) BEPI- updated to the current year <input type="checkbox"/> b) Explanation of Top 10 worst performing buildings	p12-14, sect 4.2 p12, sect 4.2	<input type="checkbox"/>	<input type="checkbox"/>
<b>3) Explain what the opportunities are to become more efficient.</b> <input type="checkbox"/> a) Project List <input type="checkbox"/> b) Initiative List: Behavioural and Organisational <input type="checkbox"/> c) Studies: Outline which buildings have had studies completed.	p23, sect 5.5 (separate spreadsheet) p23, sect 5.5 (separate spreadsheet) p23-24, Sect 5.5; p29, sect 6.5	<input type="checkbox"/>	<input type="checkbox"/>
<b>4) Outline the budget to implement projects</b> <input type="checkbox"/> a) If No Budget? Can't forecast your budget? You must explain why not and what you intend to do about getting a budget.	p6, Sect 2.1	<input type="checkbox"/>	<input type="checkbox"/>
<b>5) Conclusion: How is your plan doing?</b> <input type="checkbox"/> a) Outlined kWh saved <input type="checkbox"/> b) Outlined GHG tons saved <input type="checkbox"/> c) Outlined total dollars saved to the organisation <input type="checkbox"/> d) Outlined avoided cost <input type="checkbox"/> e) Outlined total dollars saved	p17-22, sect 5.3 p23, sect 5.4 p17, sect 5.3.1; p20, sect 5.3.2 p17, sect 5.3.1; p20, sect 5.3.2 p17, sect 5.3.1; p20, sect 5.3.2	<input type="checkbox"/>	<input type="checkbox"/>
<b>6) Senior Management Support</b> <input type="checkbox"/> a) Approval of the SEMP : Signature on the SEMP	page 1	<input type="checkbox"/>	<input type="checkbox"/>

	2 <sup>nd</sup> Q Draft SEMP Submitted Date	Date PSE Coaching Comments Returned to EM	4 <sup>th</sup> Q SEMP submitted date	Reviewed and Coaching comments returned to EM: Date	If EM needed to resubmit date	If PSE reviewed: Date
Energy Manager	2013-11-22		2014-03-07			
PSE						

**Tracking:****PSE Coaching Comments For Improvements (Not required for sign-off)**

	Date: Duration	Date: Duration	Date: Duration	Date: Duration
Energy Manager contacted PSE for assistance				

## 2. OUR ORGANIZATION

### 2.1 Organizational Profile

Organization Profile									
P E O P L E	Sector	<input type="checkbox"/> Government <input checked="" type="checkbox"/> Education <input type="checkbox"/> Health <input type="checkbox"/> Commercial ( ) <input type="checkbox"/> Other ( )							
	Number of Employees	600 FTE	Number of Students	5152 FTE	Number of Sites	23			
O P E R A T I O N S	Energy Management Issues / Obstacles	<ul style="list-style-type: none"> <li>North Island College and tenants not directly accountable for energy efficiency</li> <li>Funding and resource limitations</li> </ul>							
	Core Business Metrics	1. Per Square meter 2. Student FTE							
	Business Year	July 1 <sup>st</sup>		to		June 30 <sup>th</sup>			
	Budget Cycle	July 1 <sup>st</sup>		to		June 30 <sup>th</sup>			
	Maintenance Cycle	July 1 <sup>st</sup>		to		June 30 <sup>th</sup>			
	Maintenance Budget (\$ M)	2012/13	\$2.2	2013/14	\$2.2	2014/15	\$2.2	2015/16	\$2.2
	Energy Efficiency Projects Budget (\$ K)	2012/13	\$714	2013/14	\$202	2014/15	\$50	2015/16	\$50
	Utilities budget (\$ M)	2012/13	\$1.7	2013/14	\$1.6	2014/15	\$1.6	2015/16	\$1.6
	Other Incentives (\$ K)			2013/14	\$50	2014/15	\$50	2015/16	\$50
AFG Capital Budget (\$ M)	2012/13	\$1.2	2013/14	\$1.2	2014/15	\$1.1	2015/16	\$1.1	

**Comments:**

In recent years School District No. 72 has completed a significant number of energy conservation projects. As a result, the utilities budget has been reduced despite rate increases.

## 2.2 Facility Profile

Facility Profile						
Site	Size m <sup>2</sup>	2013 Annual Energy Consumption GJ (e)	2013 Annual Energy Cost (\$)	2013 Energy Intensity GJ (e) per m <sup>2</sup>	2012 Energy Intensity GJ (e) per m <sup>2</sup>	2011 Energy Intensity GJ (e) per m <sup>2</sup>
Carihi	10,533	7,882	143,404	0.75	0.74	0.75
Cortes	1,382	1,231	41,165	0.89	1.00	0.91
Cedar	2,389	2,139	44,225	0.90	0.88	1.00
Discovery Passage	1,602	1,222	24,184	0.76	0.81	0.87
EDM	2,409	1,577	31,797	0.65	0.69	0.71
Evergreen	1,330	238	6,490	0.18	0.34	0.03
Georgia Park	3,375	2,294	48,447	0.68	0.73	0.92
Maintenance/Bus Garage (incl 3 portables)	2,031	1,417	39,911	0.70	0.66	0.68
Ocean Grove	2,525	2,196	46,071	0.87	0.87	0.85
Oyster River	2,106	2,270	48,700	1.08	1.18	1.14
Penfield	2,933	1,589	39,332	0.54	0.60	0.59
Phoenix (incl 5 portables)	8,835	5,509	97,414	0.62	0.60	0.69
Pinecrest	3,221	1,938	40,176	0.60	0.61	0.44
Quadra	2,647	868	26,511	0.33	0.46	0.49
Ripple Rock	2,725	1,858	39,747	0.68	0.68	0.65
Robron	7,154	4,793	90,375	0.67	0.67	0.65
Sandowne	3,581	3,099	63,006	0.87	0.75	0.73
Sayward	2,977	1,573	52,024	0.53	0.72	0.62
School Board Office (incl 1 portable)	1,824	1,654	41,005	0.91	0.95	1.03
Southgate	7,373	4,421	83,791	0.60	0.62	0.63
Surge Narrows (incl Community Use)	530	338	14,245	0.64	0.78	0.59
Timberline/NIC (incl 3 portables and NIC)	16,542	17,774	332,587	1.07	1.08	1.20
Willow Point	2,772	1,872	39,541	0.68	0.72	0.74
TOTAL	92,795	69,752	1,434,148	0.75	0.77	0.80

**2.3 Key Performance Indicators**

Key Performance Indicator (as of Dec in each year)				
Variable	Totals			
	3 years ago (2010)	2 years ago (2011)	Last year (2012)	Current year (2013)
Square Meters	88,086	91,220	91,932	92,795
Student FTE	5307	5388	5237	5152



### 3. OUR COMMITMENT

#### 3.1 Energy Policy

In support of the School District 72 Strategic Plan (2009-2012), our organization established a long term (4 year) goal to obtain energy reduction of 5% by the year 2012 by implementing cost-effective energy management initiatives at all of our facilities. Progress towards this goal and School District No. 72 (Campbell River) is forecasting an energy reduction 13% by the end of 2012.

For 2013-2015, School District No. 72 (Campbell River) has established a new energy reduction target of an additional 5% savings relative to the average consumption from 2011-2012. The methodology used to establish this target is provided in Appendix 6.7.

#### 3.2 Environment Responsibility Policy

*School District No. 72 (Campbell River) adopted the following Environment Responsibility Policy B-15 on June 23, 2009.*

The Board of Education has a responsibility towards sustainable environmental stewardship.

The Board of Education is committed to raising environmental awareness of all staff, students, trustees and the community by delivering effective environmental education and modeling environmentally responsible practices (with respect to wise water use, energy-use reduction and waste minimization). The Board will endeavour to:

- Provide teachers with environmental education resources
- Align what is taught in the classrooms with school operations (curriculum, transportation and facilities)
- Reduce its impact on the environment
- Recognize successful environmental initiatives and programs.

The Board of Education expects that:

- The School district will consistently consider the impact of the environment of decisions that are made in the delivery of curriculum and in daily operations
- Schools will integrate environmental education and environmentally responsible action within the school setting.

The Board of Education authorizes the establishment of an Environmental Awareness Focus Group, which will set goals in relations to

- Environmental education
- Effective implementation of sustainable environmental practices
- Ongoing measurement and evaluation of environmental performance.

#### Definitions

"Environment" is the surroundings in which an organization operates including air, water, land, natural resources, flora, fauna, humans and their inter-relations.

"Environmental Education" refers to organized efforts to teach about how natural environments function and, particularly, how human beings can manage their behaviour

and ecosystems in order to live sustainably. Although the term is often used to imply education within the school system, from primary to post-secondary, it is sometimes used more broadly to include all efforts to educate the public and other audiences, including the use of print materials, websites, media campaigns, etc. Related disciplines include outdoor education and experiential education.

"Impacts on the environment" are any changes to the environment whether adverse or beneficial, wholly or partially resulting from an organization's products or services.

"Sustainable means practices that serve to meet the needs of the present without compromising the ability of future generations to meet their own needs.

"Stewardship" is the act of caring for something that one doesn't own.

### 3.2.1 Environment Responsibility Regulation

#### 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.

### 3.3 Why Energy Management is Important to Us?

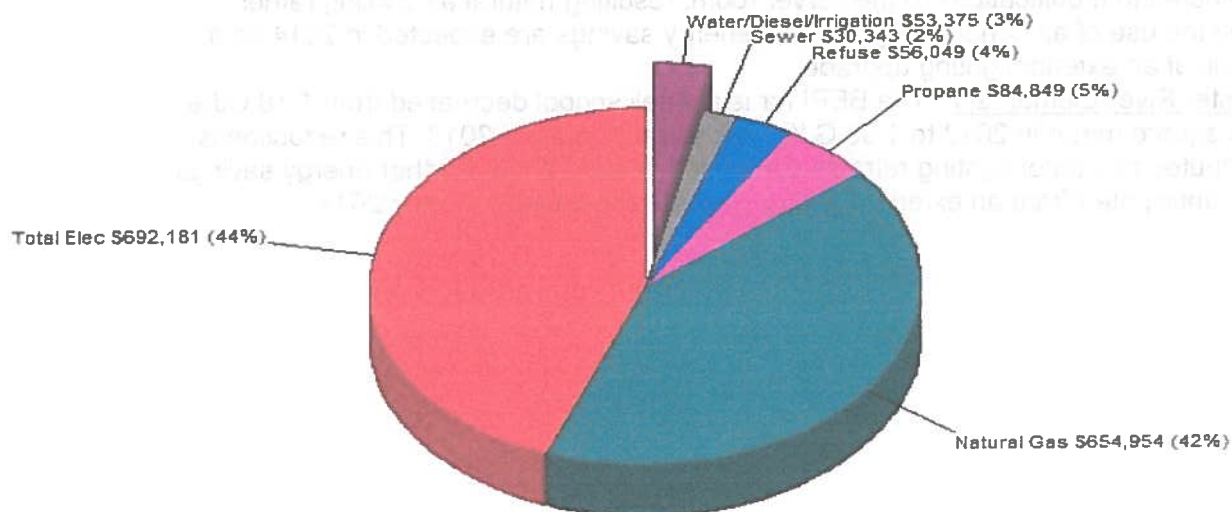
In addition to the financial benefits of an effective energy management program, energy conservation awareness is considered an integral component of sustainable environmental practices and education curriculum. Therefore, energy management is an extension of our core organizational raison d'être.

## 4. UNDERSTANDING OUR SITUATION

### 4.1 Energy Consumption and Costs

Utility 2013 Calendar Year	Normalized Consumption	Normalized Costs	
	GJ	\$	%
Electricity	27,026	692,182	45.7
Natural Gas	40,367	654,954	43.2
Propane	2,416	84,849	5.6
Diesel (marked)	340	14,245	0.9
Water, incl irrigation	72632 m3	39,126	2.6
Sewage	30101 m3	30,344	2.0
Total	70,149 GJ	\$1,515,700	100

### Utility Cost Breakdown for School District 72, Campbell River



\$1,571,752 — Total Utility Bill for  
Year Ending 12/2013

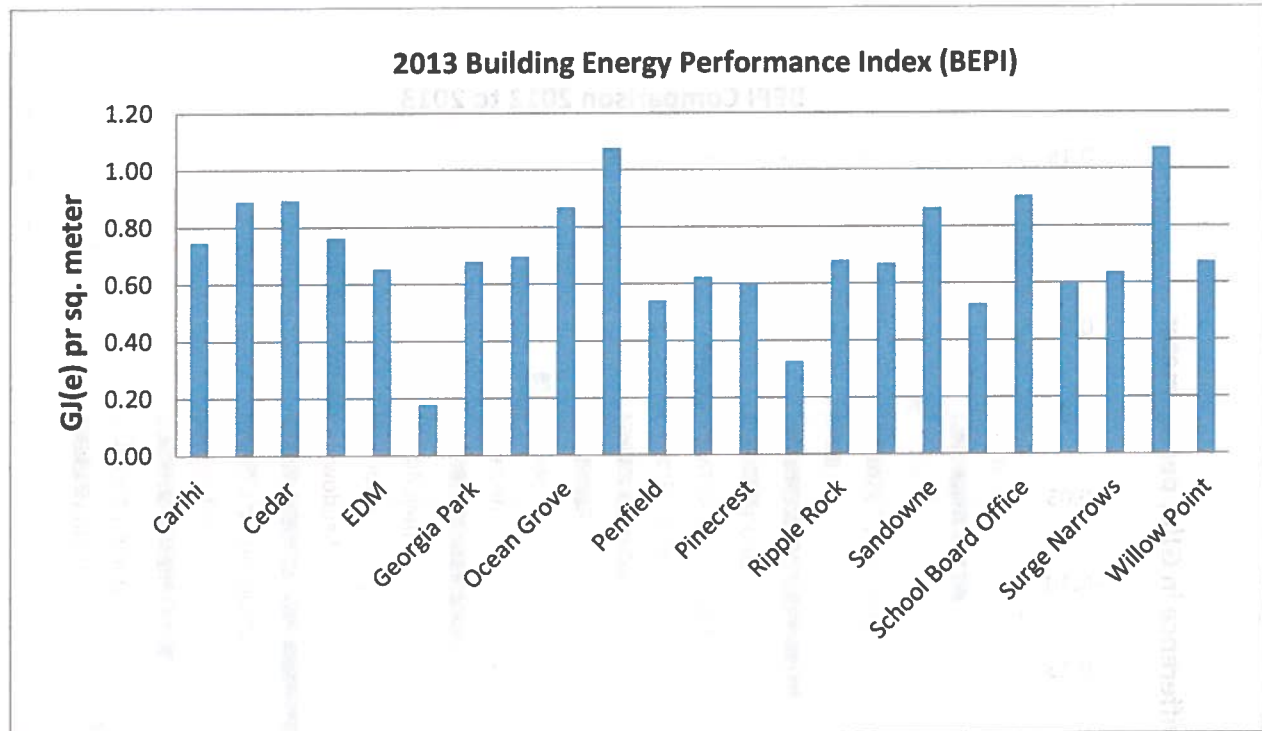
#### 4.2 Savings Opportunity Assessment - Energy Consumption Intensity

According to Natural Resources Canada, the Building Energy Performance Index (BEPI) for the Educational Sector is an average of 1.8 equivalent Gigajoules (GJ (e)) per square meter. The School District No. 72 BEPI baseline, representing the 2005-2008 four-year average, is 0.93 GJ (e) per square meter. Relative to this BEPI baseline, the 4-year target was to achieve a 5% reduction in energy intensity by the end of 2012.

School District No. 72 surpassed the 2009-2012 (4-year) energy savings target. For 2012, the energy intensity was 0.77 GJ (e) per square meter, compared to the target of 0.88 GJ (e) square meter. This represents an actual reduction of 26.7% since 2009, when School District No. 72 enrolled in the BC Hydro Energy Manager program.

For 2013, three buildings in School District No. 72 with the highest BEPI are:

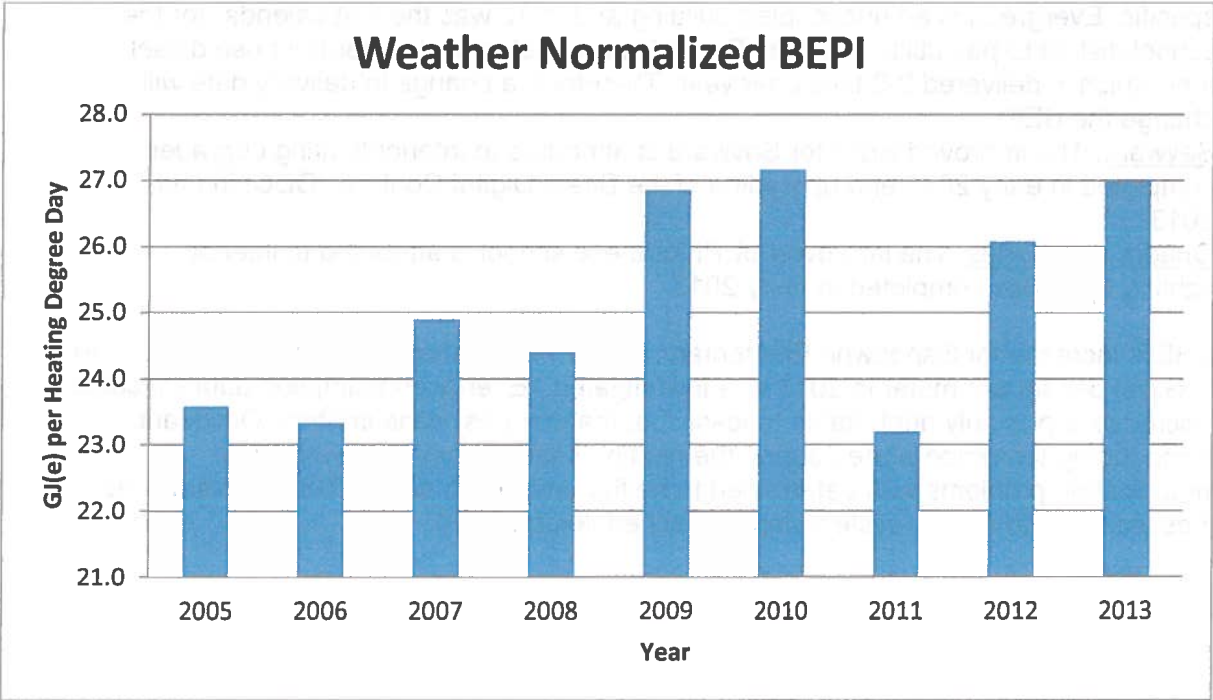
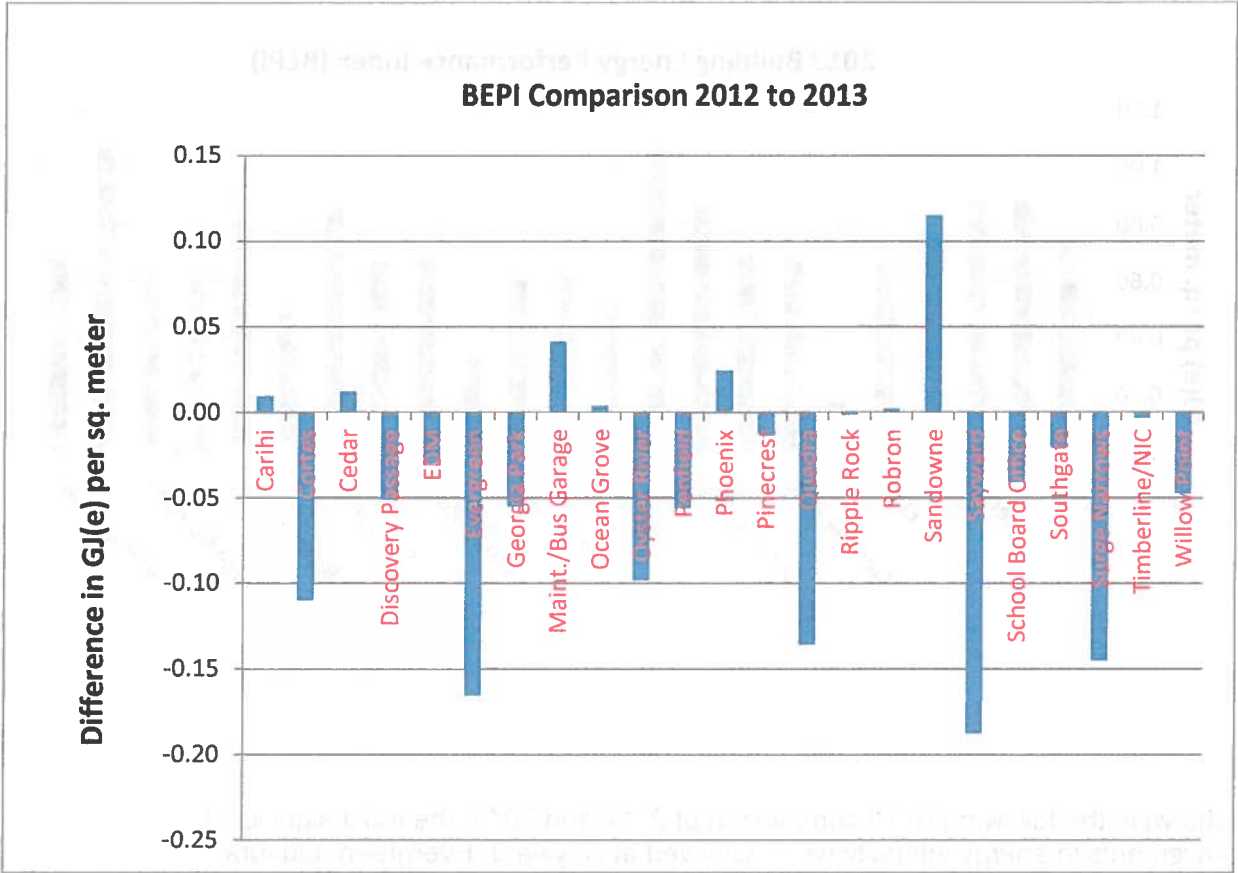
- a. Timberline/North Island College. The BEPI for this facility decreased from 1.08 GJ(e) per square meter in 2012 to 1.07 GJ(e) per square meter in 2013. Facility is jointly shared, with many educational programs that are not found elsewhere in the school district. Another unique feature (not found in School District No. 72 schools) is the air conditioning system. North Island College does not have an energy management program. The improved energy performance in 2013 is attributed to heating boiler and building control upgrades completed in late 2011/early 2012 and domestic hot water boiler and interior lighting upgrades in 2013. Additional energy savings opportunities include exterior lighting upgrades and replacement of the HVAC chiller with a heat pump.
- b. School Board Office. The BEPI for this site decreased from 0.95 GJ(e) per square meter in 2012 to 0.91 GJ(e) per square meter in 2013. This improvement is attributed to modifications to the server room, resulting natural air cooling rather than the use of air conditioning. Further energy savings are expected in 2014 as a result of an exterior lighting upgrade.
- c. Oyster River Elementary. The BEPI for is a small school decreased from 1.18 GJ(e) per square meter in 2012 to 1.08 GJ(e) per square meter in 2013. This reduction is attributed to interior lighting retrofits completed in early 2013. Further energy savings are anticipated from an exterior lighting upgrade scheduled for early 2014.



As shown in the following BEPI comparison of 2012 and 2013, the most significant improvements in energy intensity were achieved at Sayward, Evergreen, Quadra, Surge Narrows, Oyster River and Cortes.

- Evergreen and Surge Narrows. The improved BEPI for these two sites is site specific. Evergreen is an unoccupied building and 2013 was the first calendar for the school district to pay utility invoices. Surge Narrows' electrical generators use diesel fuel, which is delivered 2-3 times per year. Therefore, a change in delivery date will change the BEPI.
- Sayward. The improved BEPI for Sayward is attributed to interior lighting upgrades completed in early 2013 and upgrading of the Direct Digital Controls (DDC) in mid-2013.
- Quadra and Cortes. The improved BEPI for these school is attributed to interior lighting upgrades completed in early 2013.

The BEPI increase for Sandowne Elementary, from 0.75 GJ(e) per square meter in 2012 to 0.87 GJ(e) per square meter in 2013 was investigated.. Energy consumption data indicates the increase is primarily attributable to fossil fuel (natural gas) consumption. Occupant demand for higher temperatures during the heating season combined with DDC communication problems was determined to be the underlying cause. This problem is being addressed through a DDC system upgrade scheduled for 2014.





## 5. OUR ACTIONS

### 5.1 Energy Manager Program Results 2009-2012

In 2009, our organization established a long term goal to obtain a reduction of 5% in energy per square meter by the year 2012 (4 years) by implementing cost-effective energy management initiatives at all of our facilities. The baseline used to establish the 2012 target is a four-year average, from 2005-2008. The 2012 target year coincides with the School District No. 72 Strategic Plan, which includes a focus on environmental and energy conservation and awareness.

The following tables demonstrate that School District No. 72 exceeded its 2012 energy reduction target. For 2012, the actual reduction was 17.7% compared to the baseline.

Energy Intensity Targets [GJ(e) per square meters]				
2012 Target	2009 Actual	2010 Actual	2011 Actual	2012 Actual
0.88	1.05	0.84	0.80	0.77

Electricity Consumption (KwHr)			
2009 Actual	2010 Actual	2011 Actual	2012 Actual
9,326,287	8,768,978	7,902,166	7,735,920

Fossil Fuel Consumption (GJ)			
2009 Actual	2010 Actual	2011 Actual	2012 Actual
50,105	43,533	45,858	43,161

Despite a significant reduction in energy consumption since enrolling in the Energy Manager program in April 2009, overall energy cost savings remained elusive because of rate increases. Nevertheless, cost avoidance is significant (the amount School District No. 72 would have paid without any reductions in energy consumption). For the period April, 2009 to December, 2012, total year-to-year cost avoidance is \$192,895. Of this amount, \$137,847 (or 71%) is attributable to electricity conservation.

### 5.2 Energy Conservation Target 2013-2015

The significant energy conservation achievements from 2009-2012 lowered the energy consumption baseline. To retain a meaningful target, therefore, a new energy baseline has been adopted. This baseline is summarized in the follow table and reflects the average energy consumption of 2011 and 2012.

Metric	Annual Baseline Energy Consumption
Total Energy	
Total Consumption	72,658 GJ
Energy Intensity (based on Oct 2012 building area)	0.87 GJ <sub>e</sub> per sq m
Energy Intensity (based on Oct 2012 student FTE)	13.61 GJ <sub>e</sub> per student FTE
Fuel Type	
Electrical Consumption	7,819,043 KwHr (or 28,148 GJ <sub>e</sub> )
Fossil Fuel Consumption	44,510 GJ

Given that electricity and natural gas are the two primary sources of the School District 72 carbon footprint, a secondary metric is available by using the LiveSmartBC SmartTool carbon footprint information. The information is normalized for weather and building area each year, therefore the most recent reporting period (2012) is an appropriate baseline. Using the 2012 SmartTool report, the baseline carbon footprint is 2151 tCO<sub>2e</sub>; the equivalent of 25.62 kg CO<sub>2e</sub> per square meter or 403 kg CO<sub>2e</sub> per student FTE.

Based on anticipated energy savings opportunities, School District 72 Energy Consumption targets are summarized in the following table. Note that these targets are not normalized for future changes such as weather, building use, hours of operation, etc.

	Baseline (2011-2012 Ave)	2013	2014	2015
<b>Energy</b>				
<i>Electricity (KwHr)</i>	7,819,043	7,771,943	7,621,943	7,621,943
<i>Fossil Fuel (GJ)</i>	44,510	44,255	43,855	43,455
<i>Totals (GJ<sub>e</sub>)</i>	72,658	70,706	69,766	69,366
<b>Energy Intensity</b>				
<i>Energy (GJ<sub>e</sub> per sq m)</i>	0.87	0.84	0.83	0.83
<i>Energy (GJ<sub>e</sub> per Student FTE)</i>	13.61	13.23	13.05	12.98

Based on carbon footprint information available from LiveSmartBC, the energy conservation targets can be expressed as CO<sub>2e</sub> emissions targets<sup>1</sup>.

Metric	Baseline (2012)	2012	2013	2014
<b>Building GHG (tCO<sub>2e</sub>)</b>	2151	2004	1971	1954
<b>Energy Intensity</b>				
<i>Weather Normalized Building KgCO<sub>2e</sub> per sq m</i>	25.62	24.57	24.34	24.22
<i>Weather Normalized Building kgCO<sub>2e</sub> per Student FTE</i>	403	375	369	366

<sup>1</sup> LiveSmartBC data is published approximately 6-8 months after the end of the reporting period. Therefore, reporting progress towards reducing carbon footprint in 2015 is not possible within the 3-year target setting timeframe of the SEMP.



### 5.3 Energy Savings 2013-15

The following tables demonstrate strong early achievement towards the 2015 energy savings target. Going forward, the challenge for School District 72 will be maintaining momentum for even greater savings.

Energy Intensity Targets [GJ(e) per square meters]			
2015 Target	2013 Actual	2014 Actual	2015 Actual
0.83	0.75		

Electricity Consumption (KwHr)			
2015 Target	2013 Actual	2014 Actual	2015 Actual
7,621,943	7,507,152		

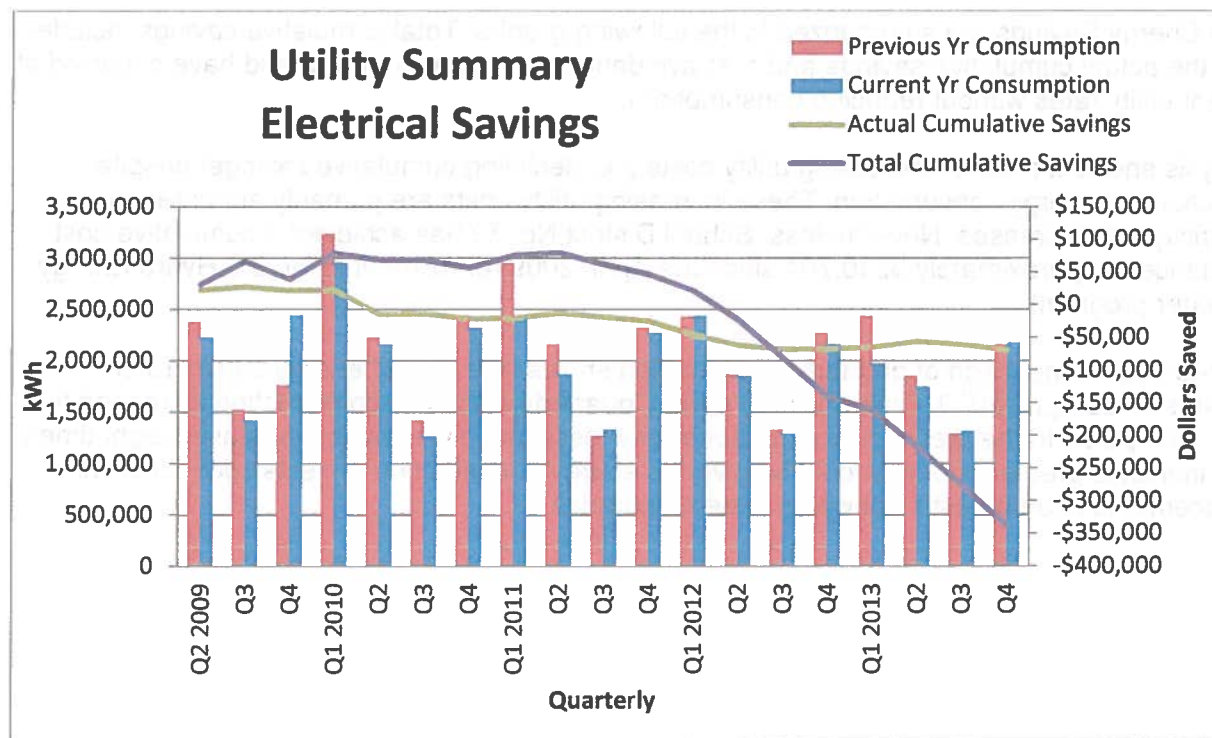
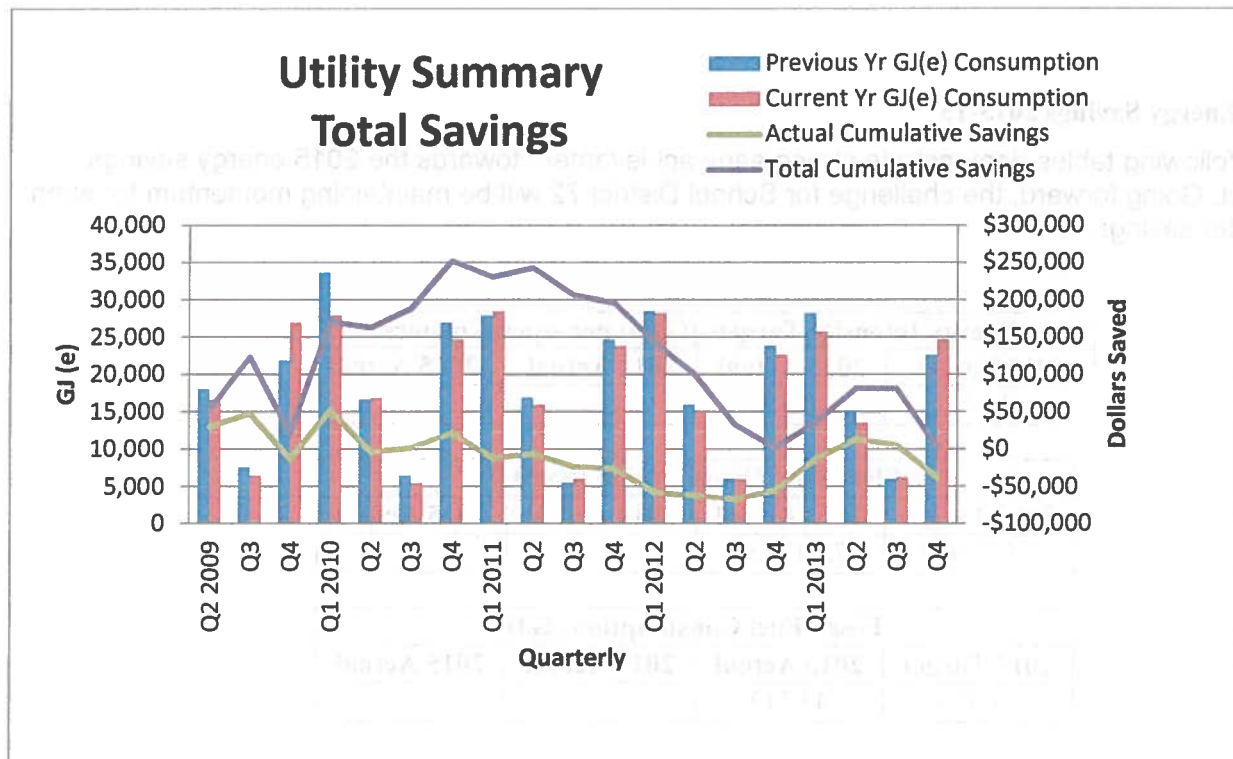
Fossil Fuel Consumption (GJ)			
2015 Target	2013 Actual	2014 Actual	2015 Actual
43,455	43,117		

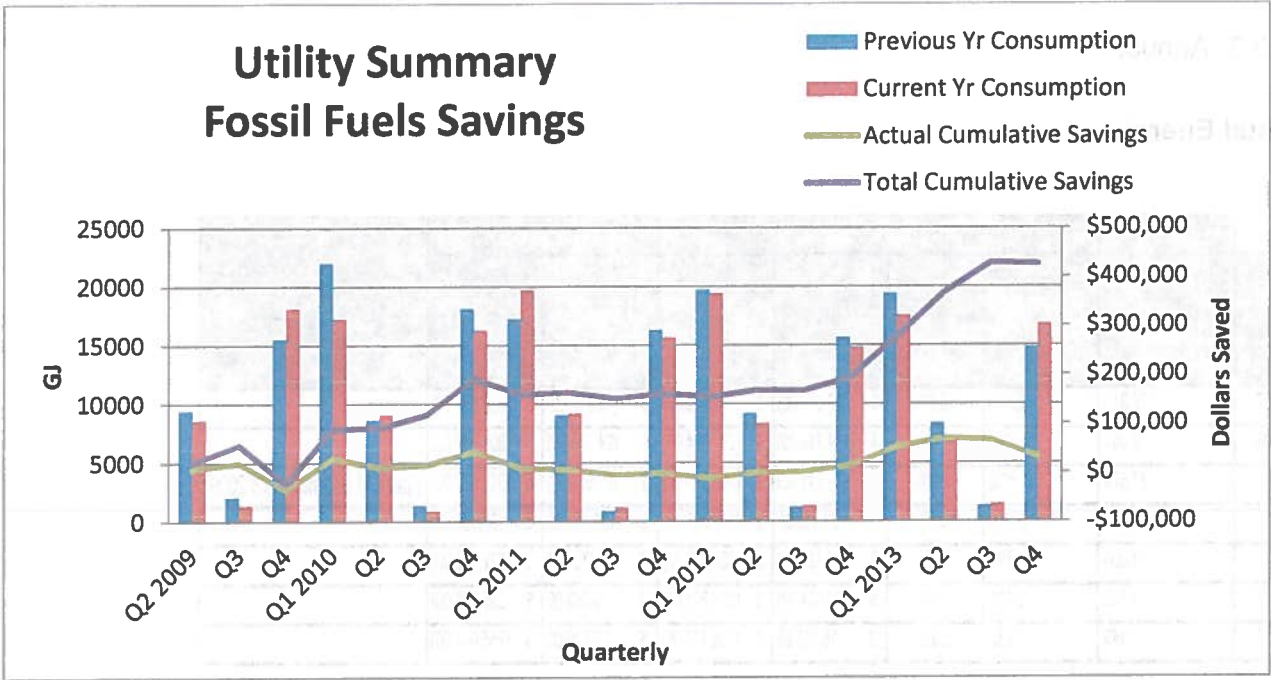
#### 5.3.1 Quarterly Results

Total Energy Savings are summarized in the following graphs. Total cumulative savings includes both the actual cumulative savings and cost avoidance (the expense that would have occurred at current utility rates without reducing consumption).

Analysis shows a trend of increasing utility costs (i.e. declining cumulative savings) despite reductions in energy consumption. These increasing utility costs are primarily attributed to electricity rate increases. Nevertheless, School District No. 72 has achieved a cumulative cost avoidance of approximately \$210,704 since the April, 2009 (enrollment in the BC Hydro Energy Manager program).

Year-to-year comparison of quarterly consumption shows less overall energy use in 13 of 19 quarters since April, 2009. Over this time period, quarterly electricity consumption increased five times compared to the previous year and quarterly fossil fuel consumption increased eight times. This indicates greater priority should be given to energy conservation projects such as boiler replacements and domestic hot water system upgrades.





## 5.3.2 Annual

## Total Energy

Quarter	Total GJ(e) Consumption	Actual Savings			Total Savings			Notes
		GJ(e) Comparison savings from previous year	GJ(e) % Reduction	\$	Actual Cumulative \$ Savings	Avoided Costs	Total Cumulative Savings	
2007	76,315	(2,742)	-3.7%	\$ (82,976.00)	\$ (82,976.00)	\$ (43,876.00)	\$ (126,852.00)	
2008	82,051	(5,737)	-7.5%	\$ (124,718.00)	\$ (207,694.00)	\$ (94,093.00)	\$ (301,787.00)	
2009	83,679	(1,628)	-2.0%	\$ (74,711.00)	\$ (282,405.00)	\$ (27,633.00)	\$ (310,038.00)	Start EM Program April 2009
2010	75,101	8,578	10.3%	\$ 34,810.00	\$ (247,595.00)	\$ 160,107.00	\$ (87,488.00)	
2011	74,306	795	1.1%	\$ (37,122.00)	\$ (284,717.00)	\$ 11,758.00	\$ (272,959.00)	
2012	71,775	2,531	3.4%	\$ (19,504.00)	\$ (304,221.00)	\$ 49,033.00	\$ (255,188.00)	
2013	70,143	1,632	2.3%	\$ 16,115.00	\$ (288,106.00)	\$ 33,099.00	\$ (255,007.00)	

## Electricity

Quarter	Total KwHr Consumption	Actual Savings			Total Savings			Notes
		KwHr Comparison savings from previous year	KwHr % Reduction	\$	Actual Cumulative \$ Savings	Avoided Costs	Total Cumulative Savings	
2007	8,567,852	(68,527)	-0.8%	\$ (16,675.00)	\$ (16,675.00)	\$ (4,654.00)	\$ (21,329.00)	
2008	9,496,898	(929,046)	-10.8%	\$ (30,531.00)	\$ (47,206.00)	\$ (59,913.00)	\$ (107,119.00)	
2009	9,328,287	170,611	1.8%	\$ 12,867.00	\$ (34,339.00)	\$ 10,968.00	\$ (23,371.00)	Start EM Program April 2009
2010	8,768,978	557,309	6.0%	\$ (43,119.00)	\$ (77,458.00)	\$ 44,981.00	\$ (32,477.00)	
2011	7,902,166	866,812	9.9%	\$ (3,686.00)	\$ (81,124.00)	\$ 66,884.00	\$ (14,240.00)	
2012	7,735,920	166,246	2.1%	\$ (43,330.00)	\$ (124,454.00)	\$ 58,435.00	\$ (66,019.00)	
2013	7,507,152	228,768	3.0%	\$ (2,488.00)	\$ (126,942.00)	\$ 53,965.00	\$ (72,977.00)	

## Fossil Fuels

Quarter	Total GJ Consumption	Actual Savings			Total Savings			Notes
		GJ Comparison savings from previous year	GJ % Reduction	\$	Actual Cumulative \$ Savings	Avoided Costs	Total Cumulative Savings	
2007	45,471	(2,496)	-5.8%	\$ (66,302.00)	\$ (66,302.00)	\$ (35,080.00)	\$ (101,382.00)	
2008	47,863	(2,392)	-5.3%	\$ (94,185.00)	\$ (160,487.00)	\$ (36,652.00)	\$ (197,139.00)	
2009	50,105	(2,242)	-4.7%	\$ (87,579.00)	\$ (248,066.00)	\$ (36,735.00)	\$ (284,801.00)	Start EM Program April 2009
2010	43,533	6,572	13.1%	\$ 77,929.00	\$ (170,137.00)	\$ 115,137.00	\$ (55,000.00)	
2011	45,858	(2,325)	-5.3%	\$ (53,456.00)	\$ (223,593.00)	\$ (39,992.00)	\$ (263,585.00)	
2012	43,926	1,932	4.2%	\$ 23,825.00	\$ (199,768.00)	\$ 30,786.00	\$ (168,982.00)	
2013	43,117	809	1.8%	\$ 18,605.00	\$ (181,163.00)	\$ 13,558.00	\$ (167,605.00)	

### 5.3.3 Annual Electricity by Key Performance Indicators

Analysis shows that electrical consumption was increasing significantly in the years immediately prior to School District No. 72 adopting the BC Hydro Energy Manager Program in April 2009. This trend has now been reversed.

#### Energy Intensity by Student Enrollment

Prior to the 2009 enrollment in the BC Hydro Energy Manager Program, energy intensity by student enrollment was increasing. This trend has been reversed, resulting in no overall change in energy intensity since 2006. The significant increase in the number of computer workstations and labs since 2006 (approximately doubled), highlights the contribution of Green IT initiatives to managing energy intensity by student enrollment.

Year	Annual Normalized Electricity Consumption (kWh(e))	# FTE Students (as of Sep 30 <sup>th</sup> )	Energy Intensity (kWh(e)/ FTE Students)	Percent Change in Energy Intensity (%)
2006	8,499,325	5927	1434	
2007	8,567,852	5714	1499	+4.5
2008	9,496,898	5538	1714	+14.3
2009	9,326,287	5440	1701	-0.8
2010	8,768,978	5278	1661	-2.4
2011	7,902,166	5312	1488	-10.4
2012	7,735,920	5338	1449	-2.6
2013	7,507,152	5230	1435	-1.0
Total (Current Year to 3 years prior to Energy Manager Program)				0.0



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

Only two elementary schools rely on electric heat. Therefore, with the exception of occupant use of portable electric heaters, weather has relatively little impact on electrical consumption. Prior to enrolling in the BC Hydro Energy Manager Program in 2009, energy intensity was steadily increasing. Since 2009, energy intensity has remained relatively static.

Year	Annual Normalized Electricity Consumption (kWh(e))	HDD	Energy Intensity (kWh(e)/HDD)	Percent Change in Energy Intensity (%)
2006	8,499,325	3153	2696	
2007	8,567,852	3066	2794	+3.6
2008	9,496,898	3363	2824	+10.7
2009	9,326,287	3116	2993	+6.0
2010	8,768,978	2761	3176	+6.1
2011	7,902,166	3192	2476	-22.0
2012	7,735,920	2723	2841	+14.7
2013	7,507,152	2584	2905	+2.3
Total (Current Year to 3 years prior to Energy Manager Program)				+7.8

**Energy Intensity by Building Area**

Decreasing electrical consumption combined with increased building area have resulted in a significant decrease in energy intensity by building areas. Underlying factors for these trends include: disposal of obsolete portables; new portables, modular buildings and building additions that incorporate energy saving technologies; and completion of various energy saving projects.

Year	Annual Normalized Electricity Consumption (kWh(e))	Sq. M	Energy Intensity (kWh(e)/Sq M.)	Percent Change in Energy Intensity (%)
2009	9,326,287	80,402	116.0	
2010	8,768,978	88,086	99.6	-14.1
2011	7,902,166	91,220	86.6	-13.1
2012	7,735,920	91,932	84.1	-2.9
2013	7,507,152	92,240	81.4	-3.2
Total (Current Year to start of Energy Manager Program)				-29.8

## 5.4 Greenhouse Gas Emissions

As a public sector organization, School District No. 72 is required to report annually on steps taken to reduce Greenhouse Gas Emissions. A copy of the School District No. 72 Carbon Neutral Action Report is available from the LiveSmart BC web site ([http://www.livesmartbc.ca/government/neutral\\_action\\_reports.html](http://www.livesmartbc.ca/government/neutral_action_reports.html)). Pursuant to the Greenhouse Gas Reduction Targets Act, School District No. 72 is carbon-neutral through the purchase of carbon offsets from the Pacific Carbon Trust at current rate of \$25 per tonne of CO<sub>2</sub> (e). Cost avoidance achieved through reduced greenhouse gas emissions.

For 2013, the decrease in greenhouse gas emissions is primarily due to reduced electricity consumption and an apparent change in the formula used to calculate indirect emissions from purchased electricity.

### *Reportable Greenhouse Gases in Tonnes CO<sub>2</sub>(e)*

Calendar Year	Direct Emissions		Indirect Emissions		Total non-exempt Emissions	Savings
	Buildings	Fleet	Buildings	Office Supplies		
2008	2103	449	194	108	2853	NA
2009	2151	355	226	124	2856	(\$75)
2010	1933	450	202	75	2690	\$4150
2011	1997	465	176	41	2695	(\$125)
2012	1977	470	174	60	2300	\$9875
2013	1900	517	91	45	2173	\$3175

## 5.5 Planned Actions (Project List)

A listing of technical projects, organizational/behavioural initiatives, and completed studies is available at the following:

[http://www2.sd72.bc.ca/downloads/SD72\\_S5\\_Timeline1\\_14\\_14.zip](http://www2.sd72.bc.ca/downloads/SD72_S5_Timeline1_14_14.zip)

Projects completed in 2012/13 resulted in reduced annual electrical consumption of approximately 520,303 Kwh and \$55,914 per year in electricity costs.

Approved 2013/14 projects are expected to result in reduced annual electrical consumption of approximately 111,000 Kwhr and \$15,160 per year in electricity costs.

Energy studies have been completed on all buildings in School District No. 72. Unless otherwise noted in the following table, all recommendations from energy studies have been implemented.

Site	Description	Potential Annual Savings
Southgate	Interior and Exterior Relamping	\$6000
Ripple Rock	Interior and Exterior Relamping	\$1600
Heritage Lands	Exterior Relamping	\$10000 (includes savings to North Island College)
Phoenix	Boiler Replacement	\$4300
Carihi	Mechanical System Upgrade	Previous study being updated
Southgate	Replace lower mechanical room boiler	\$2400
Southgate	Upgrade DDC with Building Automation System	\$1600
Southgate	Replace upper mechanical room boiler	\$2000
Robron	Upgrade DDC with Building Automation System	\$1200
Oyster River	Reduce building air leakage	\$2200
Pinecrest	Reduce building air leakage	\$2100
Pinecrest	Mechanical System upgrade	\$9700
Penfield	Reduce building air leakage	\$4100
Carihi	Reduce building air leakage in Shop Building	\$1200
Cedar	Boiler Replacement	\$10000
Heritage Lands	HVAC system upgrade	\$49,200 (includes savings to North Island College)



## 6. APPENDIX

Number of stakeholders	2	Energy Manager	Steve Woods
Executive Support	Tom Longridge, Kevin Patrick, Nevenka Fair	Energy Committee	Jeanne Stoppard, Steve Woods
Energy Volunteers	0		

### 6.1 List of Stakeholders:

Groups			
<u>Name</u>	<u>Title</u>	<u>Organization</u>	<u>Contact Info</u>
Steve Woods	Manager of Operations	Operations	Steve.woods@sd72.bc.ca
Jeanne Stoppard	Secretary	Operations	Jeanne.stoppard@sd72.bc.ca

### 6.2 List of Energy Volunteers

Between 2009 and 2011, School District 72 had an active Environmental Awareness Focus Group (EAFG). This group met several times a year to discuss progress on energy conservation and environmental stewardship projects, and review proposals for new activities. However, the EAFG has become inactive as a result of the labour disruption during the 2011/12 school year and a lack of new proposals.

The January 2014 Energy Management Assessment identified the need for site-based energy coordinators. This focus area may result energy volunteers being identified.

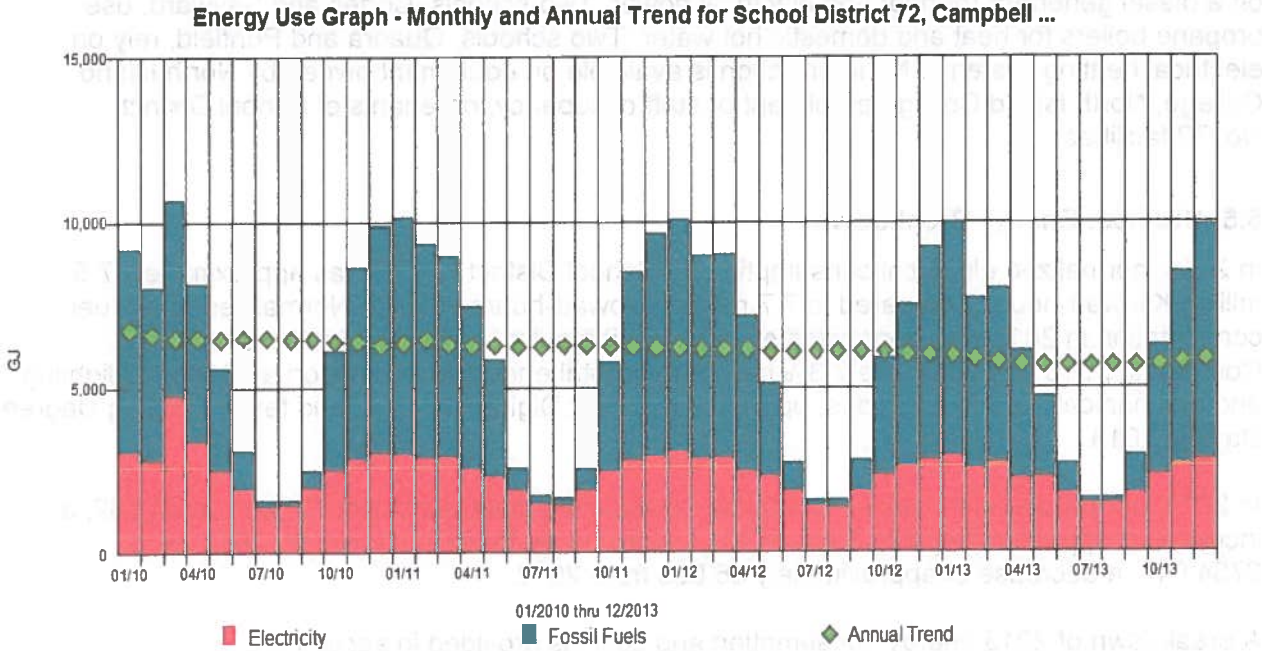
### 6.3 Baseline Energy Use: Account Histories

The following table summarizes baseline energy costs using the 2011 and 2012 average. Electrical Demand Charges are included in the Energy Charges.

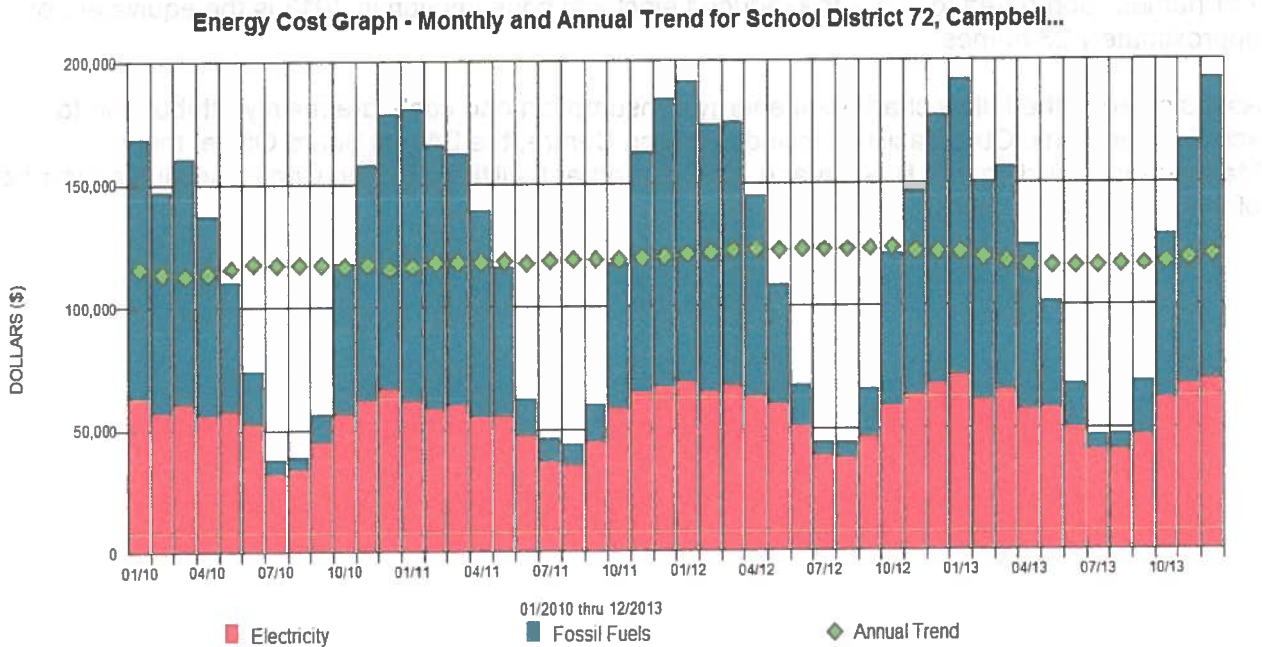
	Electricity (Normalized)			Fossil Fuels (Normalized)	Overall
Month	Energy Charge \$	Power Factor Charge \$	Total Electricity Cost \$	Total Charges \$	Total Charges \$
Jan	65,155	12	65,167	120,947	186,114
Feb	61,778	9	61,787	108,224	170,011
Mar	63,641	10	63,650	105,228	168,879
Apr	58,870	24	58,995	83,022	142,016
May	57,782	51	57,833	54,782	112,614
Jun	49,290	84	49,374	15,605	64,979
Jul	37,925	222	38,147	7,503	45,650
Aug	36,570	258	36,828	7,460	44,287
Sep	45,644	79	45,723	17,141	62,863
Oct	58,814	6	58,820	60,577	119,397
Nov	64,091	0	64,091	90,128	154,218
Dec	67,616	0	67,616	107,698	175,314
TOTAL	\$667,176	\$755	\$667,931	\$778,315	\$1,446,246
2011-2012 Percentage	46.2%	0.0%	46.2%	53.8%	100%
2005-2008 Percentage	48.5%	0.0%	48.5%	51.5%	100.0%

The following graphs show a gradual reduction in energy consumption, resulting in stable energy costs despite utility rate increases. This demonstrates cost is being achieved.

**Energy Use Graph – Monthly and Annual Trend**



**Energy Cost Graph – Monthly and Annual Trend**



#### 6.4 Asset Registry

School District No. 72 does not have an Asset Registry. One school, Surge Narrows, relies on a diesel generator for heat and electrical power. Two schools, Cortes and Sayward, use propane boilers for heat and domestic hot water. Two schools, Quadra and Penfield, rely on electrical heating systems. No information is available on equipment owned by North Island College, North Island College enrolment or staff occupancy, or tenants of School District No. 72 facilities.

#### 6.5 Studies: Energy Breakdown

In 2013, normalized electrical consumption for School District No. 72 was approximately 7.5 million Kilowatt-hours, compared to 7.7 million Kilowatt-hours in 2012. Normalized fossil fuel consumption in 2013 was approximately 43,117 gigajoules, compared to 43,161 in 2012. Comparing 2013 and 2012, the 2.3% reduction in total energy consumption attributed to lighting and mechanical system upgrades, upgrades to Direct Digital Controls, and fewer Heating Degree Days in 2013.

In 2013, normalized electrical consumption costs for School District No. 72 were \$692,182, a increase of approximately \$2,489 from 2012. Normalized fossil fuel costs for 2013 were \$754,048, a decrease of approximately \$6,093 from 2012.

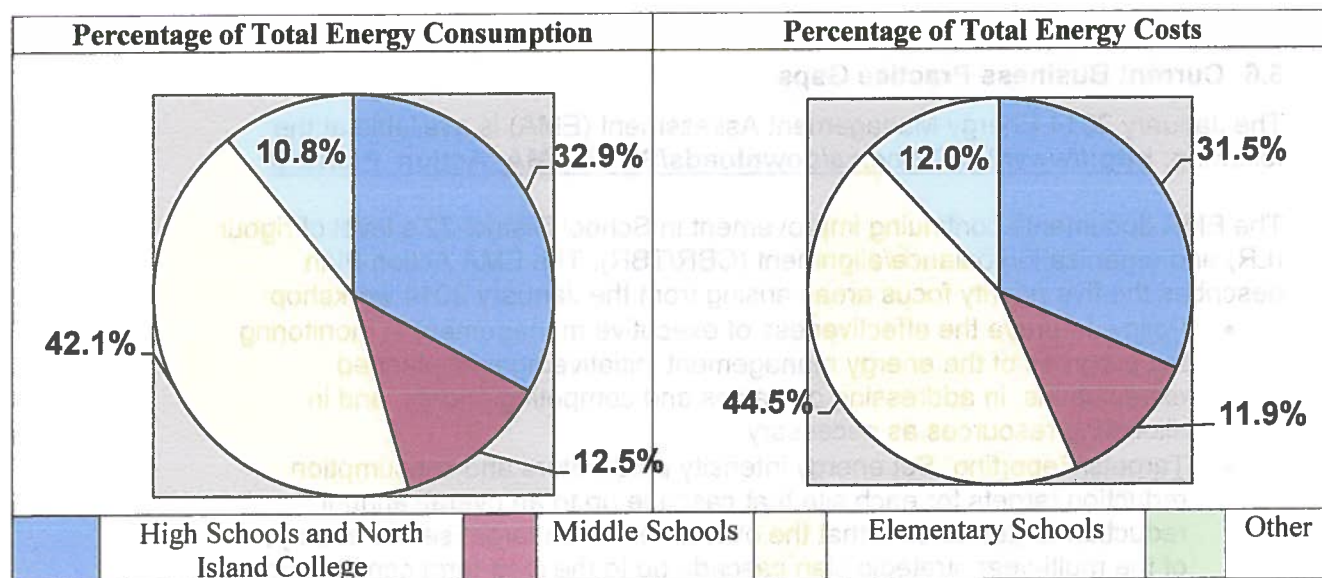
A breakdown of 2013 energy consumption and costs is provided in section 4.1.

Based on average household consumption of about 10,000 kilowatt-hours of electricity per year<sup>2</sup>, School District No. 72 annual electrical consumption in 2013 is the equivalent of approximately 751 homes. Compared to 2012, the reduced electrical consumption in 2013 is the equivalent of approximately 23 homes.

As indicated in the follow chart, total energy consumption and costs are mainly attributable to school operations. Other facilities include Robron Centre, the School Board Office, the Maintenance Building and Bus Garage. Of these other facilities, Robron Centre accounts for most of the energy consumption.

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<sup>2</sup> The BC Energy Plan (<http://www.energyplan.gov.bc.ca/bcep/default.aspx?hash=4>)



#### Studies in progress for 2014:

- Update of Carihi High School mechanical system upgrade. Study is in support of project proposal included as #5 priority on School District Capital Plan.

#### Studies completed in 2014:

- Update of Pinecrest Elementary mechanical system upgrade. Study included as #4 priority on School District Capital Plan.
- Cedar Elementary Boiler Replacement. Study included in Carbon Neutral Capital Program grant application.

#### Studies completed prior to 2013:

- Mechanical upgrades for Pinecrest Elementary. Project proposal included as #2 priority on School District Capital Plan and only proposal for funding under the Carbon Neutral Capital Program. Savings are primarily related to fossil fuel consumption.
- Air leakage assessments for 6 schools. Minor repairs completed in 2012. Four projects included on AFG for future funding consideration. Savings are primarily related to fossil fuel consumption.
- Mechanical upgrades to Timberline/NIC facility. Climate Action Secretariat approved funding for 50% of recommended scope, and work has been completed. Remaining scope has been referred to North Island College (co-owners of the facility) for funding consideration. Savings are primarily related to fossil fuel consumption.
- Green IT Energy Upgrades. Potential annual electricity savings are less than 50,000 KwHr. Due to relatively long payback period, project is being implemented as part of ongoing "evergreening" program.
- Fortis BC Opportunity Assessment. Eight projects are included in the AFG, pertaining to two Middle Schools, two High Schools and Robron Centre. Savings are primarily related to fossil fuel consumption.
- PowerSmart Opportunity Assessment for interior re-lamping of 4 buildings and exterior re-lamping of 21 sites. Preliminary information indicates potential annual energy savings of 372,000 KwHr.



## 6.6 Current Business Practice Gaps

The January 2014 Energy Management Assessment (EMA) is available at the following: [http://www2.sd72.bc.ca/downloads/SD72\\_EMA\\_Action\\_Plan.zip](http://www2.sd72.bc.ca/downloads/SD72_EMA_Action_Plan.zip)

The EMA documents continuing improvement in School District 72's level of rigour (LR) and organization balance/alignment (CBR/TBR). The EMA Action Plan describes the five priority focus areas arising from the January 2014 workshop:

- **Policy.** Improve the effectiveness of executive management in monitoring the progress of the energy management initiative against planned expectations, in addressing obstacles and competing priority, and in allocating resources as necessary
- **Targets/Reporting.** Set energy intensity parameters and consumption reduction targets for each site that cascade up to an overall annual reduction target. Ensure that the overall reduction target set for each year of the multi-year strategic plan cascade up to the long-term conservation goal in the energy policy.
- **Plans/Actions.** Establish a revolving fund to provide an on-going financing mechanism for energy conservation project and activities that support the long-term objectives of the energy management program.
- **Teams/Committees.** Increase broader participation in the energy conservation initiative by establishing site energy coordinators and leverage "green teams" to improve broader participation in the energy conservation program. Consider using site energy "report cards" to report on progress in a familiar "grading" format.
- **Employee Awareness/Training.** Improve the understanding of opportunities for energy savings associated specifically with operations, maintenance and behavioral issues. Tailor communication of the energy management initiative to each key stakeholder group to improve participation in conservation activities.

The Energy Management Assessment Gantt chart (Action Timeline) and journal notes are available at the following:

[http://www2.sd72.bc.ca/downloads/SD\\_S5\\_EMA\\_Timeline1\\_14-14.zip](http://www2.sd72.bc.ca/downloads/SD_S5_EMA_Timeline1_14-14.zip)

## 6.7 Energy Conservation Targets 2013-2015

A discussion paper used to develop 2013-15 energy conservation targets is available at the following:

[http://www2.sd72.bc.ca/downloads/SD72\\_3year\\_energy\\_target\\_analysis.zip](http://www2.sd72.bc.ca/downloads/SD72_3year_energy_target_analysis.zip)

The paper includes a brief business environment scan from a School District No. 72 and BC Hydro perspective. A description is provided of progress between 2009-2012 in energy consumption and carbon footprint. Minimum recommended targets (subsequently approved) are provided. Finally, a synopsis of other energy savings opportunities is described.