



Simcoe Muskoka Catholic District School Board Energy Conservation and Demand Management Plan

Education Sector Background

Funding and Energy Management Planning

All Boards receive 100% of their funding from the Ministry of Education.

The Ministry announces each Board's funding allocation in March for the next Fiscal Year which runs from September 1st to August 31st. The Ministry does not provide Boards with multi-year operational funding allocations.

As a result, while a Board may have a five-year energy management strategy, the Board's ability to implement their strategy is dependent on the funding that they receive in each of the five years covered by their energy management plan.

Asset Portfolios and Energy Management Planning

Energy consumption at a site can be impacted by a number of variables. The following lists provide education sector examples that may impact changes in consumption at a site from one year to the next. These examples will play a significant role in the Board's assessment of energy management priorities.

Facility Variables

- Year of Construction
- Building Area
 - Major additions
 - Buildings sold
 - Portables
 - installed
 - removed
- Site Use
 - Elementary school
 - Secondary school

- Administrative building
- Maintenance/warehouse facility

- Shared Use Sites
 - Community rooms
 - Libraries
 - Gymnasiums

- Equipment/Systems
 - Age
 - Type of technology
 - Lifecycle
 - % of building area that is air conditioned

Other Variables

- Programs
 - Day care
 - Before/After School Programs
 - Summer School
 - Community Use
- Occupancy
 - Significant Increase or decrease in number of students
 - New programs being added to a site

About the Board

The following statistics apply to the Board’s Fiscal Year 2013-14

Total Number of Sites: 55

Total Number of Students: 20,449

Background

The Board has a qualitative energy conservation goal.

To date the Board’s energy management strategy has included the following:

- Implementing energy saving designs into our new buildings as well as to additions or renovations in existing buildings. Such as, ventilation equipment that incorporates energy recovery technology, hydronic in-floor heating, interior daylight harvesting,

- “lights out” strategy on exterior of building during the hours that staff are not present
- Replacing older heating/cooling systems with modern energy efficient units
- Continually searching for and investigating new technologies for energy savings
- Making energy consumption data available on the Board website.
- installation of a building automation control system (BAS) in each school that can be monitored on a daily basis by the Board at a central location.
- Continuous monitoring and on-going commissioning of the current systems in place.
- Monitoring of total energy consumption for each school.
- Installation of wind turbine systems at five locations
- Use of a Solar to Air preheat system at a School where Natural Gas is not available.
- Use of a Solar to Water preheat system for Domestic Hot Water at a new School in Orillia.
- Use of Geo-thermal technology, including a full geo system at the new St.Bernards in Orillia
- Promoting green programs in schools with Eco school initiatives.

The Board has an in-house full time Energy Management position.

Energy Consumption Data for the Board

The values below are “metered” data for the Board.

Utility	Fiscal Year 2012-13 (Baseline)	Fiscal Year 2013-14 (Current)
Total Electricity (kWh)	<i>22,406,512.00 (kwh)</i>	<i>22,832,248.00 (kwh)</i>
Total Natural Gas (m3)	<i>2,795,110.47 (m3)</i>	<i>2,512,648.06 (m3)</i>
Total Heating Fuel (Type 1 and 2) (litres - L)	<i>40,814.8 Litres</i>	<i>39,905 Litres</i>
Total Heating Fuel (Type 3 and 4) (litres - L)	<i>n/a</i>	<i>n/a</i>
Total Propane (litres - L)	<i>n/a</i>	<i>n/a</i>
Total Wood (metric tonnes - MT)	<i>n/a</i>	<i>n/a</i>
Total District Heat (GJ)	<i>n/a</i>	<i>n/a</i>
Total District Cool (GJ)	<i>n/a</i>	<i>n/a</i>

The values below are raw data.

	Fiscal Year 2011-12 (Baseline)	Fiscal Year 2012-13 (Current)
Total Energy Consumed (ekWh)	51,252,052	49,972,520
Energy Intensity (ekWh/ft ²)	16.53	14.93

Energy Conservation Goal

The Board has set out the following energy conservation goals for the next five fiscal years

Fiscal Year	2013-14 (ekWh/m²)	2014-15 (ekWh/m²)	2015-16 (ekWh/m²)	2016-17 (ekWh/m²)	2017-18 (ekWh/m²)
Conservation Goal	3.68	0.78	1.42	0.01	0.09

	FY 2013-14 to 2017-18 (ekWh/m²)
Cumulative Conservation Goal	25.86 (2.4 ekWh/ft ²)

Renewable Energy

For a list of the Board's renewable energy projects, please see *Appendix A*.

Energy Management Strategies

Energy management strategies fall into three key categories:

1. Design/construction/retrofit
2. Operations and maintenance
3. Occupant Behaviour

1. Design/Construction/Retrofit

Definition

Design/construction/retrofit encompasses the original and ongoing intent of how a building and its systems are to perform as a whole through the integration of disciplines such as, architecture and engineering.

For the Board's relevant projects over the next five years, please refer to Appendix B.

2. Operations and Maintenance

Definition

Operations and maintenance includes the strategies the Board uses to ensure that the existing buildings and equipment perform at peak efficiency. For the Board's relevant projects over the next five years, please refer to Appendix C.

3. Occupant Behaviour

Definition

Strategies that the Board uses to educate occupants, including staff, students and community users, with an emphasis in changing specific behaviours to reduce energy consumption. For the Board's relevant projects over the next five years, please refer to Appendix D.

Environmental Programs

By 2013-14 twenty of the schools within the Board have participated in Eco Schools or other similar environmental programs.

Energy Efficient Incentives

The Board applies to incentive programs to support the implementation of energy efficient projects on a regular basis.

Between Fiscal Year 2009-10 and 2012-13, the Board has received \$ 597,000 in incentive funding from various agencies to support the implementation of energy efficient projects.

The Board uses the services of the sector's Incentive Program Advisor when needed.

Energy Procurement

The Board participates in the CSBSA Electricity Consortia to purchase electricity.

The Board participates in the CSBSA Natural Gas Consortia to purchase natural gas.

Demand Management

The Board monitors electrical Demand on a monthly basis through invoices, and has the ability to monitor real-time data at some sites on a daily basis.

The Board uses the following methodologies to reduce electrical Demand:

- a. Equipment scheduling
- b. Variable frequency drives on demand ventilation controlled equipment
- c. Deferred start-up of large equipment (e.g.: chiller start-up in spring)

The Board monitors Power Factor on the monthly bills from the Local Distribution Companies providing that information.

Senior Management Approval of this Energy Conservation and Demand Management Plan

I confirm that Simcoe-Muskoka Catholic District School Board's senior management has reviewed and approved this Energy Conservation and Demand Management Plan.



June 25, 2014

Brian Beal
Director of Education

Date

appendix A						
Renewable Energy	Define	Number of systems in asset portfolio	Total size (kW)	Total number of ekWh generated annually	Actual or Estimated Generation (ekWh)	
Solar photovoltaic						
Solar air	AHU pre-heat	one	2250kwh	2250	2191.24	
Solar water	Domestic Hot Water	one	1	1500	1460	
Wind Turbine		five	17.5	175	250	
Biomass						
Other						

appendix B												
Design, Construction and Retrofit Strategies												
Lighting	Quantity of Time that Measure will be in place (years)	2013-14		2014-15		2015-16		2016-17		2017-18		2013/14-2017/18
		Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Total Accumulated Energy Savings (ekWh)
High Efficiency Lighting Systems (T-8, T-5, CFL, LED ...)	15	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Daylight Sensors	10	\$ -	-	\$ -	-	\$ 5,000	7,407	\$ -	-	\$ -	-	22,222
Outdoor Lighting	15	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Occupancy Sensors	10	\$ -	-	\$ -	-	\$ 5,000	7,407	\$ -	-	\$ -	-	22,222
Daylight Harvesting	10	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
HVAC	Quantity of Time that Measure will be in place	2013-14		2014-15		2015-16		2016-17		2017-18		2013/14-2017/18
		Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Total Accumulated Energy Savings (ekWh)
Efficient Boilers (near condensing)	30	\$ 175,000	303,001	\$ -	-	\$ -	-	\$ -	-	\$ -	-	1,515,004
High Efficiency Boilers (condensing)	15	\$ 199,000	516,833	\$ 60,000	155,829	\$ 115,000	298,672	\$ -	-	\$ -	-	4,103,496
Energy efficient Rooftop units	15	\$ 98,000	38,791	\$ -	-	\$ -	-	\$ -	-	\$ -	-	193,954
Controls	Quantity of Time that Measure will be in place	2013-14		2014-15		2015-16		2016-17		2017-18		2013/14-2017/18
		Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Total Accumulated Energy Savings (ekWh)
Building Automation Systems - New	10	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Building Automation Systems - Upgrade	10	\$ -	-	\$ 30,000	23,749	\$ -	-	\$ -	-	\$ 30,000	23,749	118,747
Building Envelope	Quantity of Time that Measure will be in place	2013-14		2014-15		2015-16		2016-17		2017-18		2013/14-2017/18
		Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Total Accumulated Energy Savings (ekWh)
Glazing	30	\$ 49,000	11,397	\$ -	-	\$ -	-	\$ -	-	\$ -	-	56,987
New Roof	25	\$ -	-	\$ 10,000	930	\$ 388,000	36,100	\$ -	-	\$ -	-	112,021
New Windows	30	\$ -	-	\$ 87,000	20,236	\$ -	-	\$ -	-	\$ -	-	80,945
Design, Construction and Retrofit Strategies Total		\$ 521,000	870,022	\$ 187,000	200,745	\$ 513,000	349,587	\$ -	-	\$ 30,000	23,749	6,225,599

appendix C													
Operations and Maintenance													
Policy and Planning	Quantity of Time that Measure will be in place (years)	2013-14		2014-15		2015-16		2016-17		2017-18		2013/14-2017/18	
		Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Total Accumulated Energy Savings (ekWh)	
Night time blackout of sites	Interior	10	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
	Exterior	10	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Daylight Harvesting (services)		3	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Demand Ventilation (services)		3	\$ -	-	\$ 600	1,425	\$ 600	1,425	\$ 600	1,425	\$ -	-	12,825
Energy Audits	Quantity of Time that Measure will be in place	2013-14		2014-15		2015-16		2016-17		2017-18		2013/14-2017/18	
		Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Total Accumulated Energy Savings (ekWh)	
Walk Through Audit		5	\$ -	-	\$ 2,500	30	\$ 2,000	24	\$ 1,000	12	\$ -	-	214
Engineering Audit		5	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Real Time Monitoring	Quantity of Time that Measure will be in place	2013-14		2014-15		2015-16		2016-17		2017-18		2013/14-2017/18	
		Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Total Accumulated Energy Savings (ekWh)	
operators to identify and diagnose building issues		5	\$ 30,000	87,195	\$ -	-	\$ 5,000	14,533	\$ -	-	\$ -	-	479,574
Operations and Maintenance Strategies Total			\$ 30,000	87,195	\$ 3,100	1,455	\$ 7,600	15,981	\$ 1,600	1,437	\$ -	-	492,613

appendix D												
Occupant Behaviour Strategies												
Training and Education	Quantity of Time that Measure will be in place (years)	2013-14		2014-15		2015-16		2016-17		2017-18		2013/14-2017/18
		Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Total Accumulated Energy Savings (ekWh)
Building Operator Training	3	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
NRCan Benchmarking Program	5	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Building Automation Training (site specific)	3	\$ -	-	\$ -	-	\$ 300	3,179	\$ -	-	\$ -	-	9,537
Ongoing training and awareness programs for energy conservation	5	\$ -	-	\$ 500	401	\$ -	-	\$ -	-	\$ -	-	1,602
information on Building Operational costs	1	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Provide detailed information on energy consumption (e.g. via the Utility Consumption	1	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Participate in environmental programs, such as EcoSchools,	1	\$ 1	2	\$ 1	2	\$ 1	2	\$ 1	2	\$ 1	2	24
Occupant Behaviour Strategies Total		\$ 1	2	\$ 501	402	\$ 301	3,181	\$ 1	2	\$ 1	2	11,163

Conservation Goal - appendix E											
	FY2013										
Total Building Area (includes portables) (m²)	260,238				1 ft² = 0.0929 m²						
Total Building Area (includes portables) (ft²)	2,801,270										
Energy Consumption for the board (ekWh)	49,972,520										
	2013-14		2014-15		2015-16		2016-17		2017-18		2017/18
	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Total Accumulated Energy Savings (ekWh)
Appendix B; Design, Construction and Retrofit Strategies Total	\$ 521,000	870,022	\$ 187,000	200,745	\$ 513,000	349,587	\$ -	0	\$ 30,000	23,749	6,225,599
Appendix C; Operations and Maintenance Strategies Total	\$ 30,000	87,195	\$ 3,100	1,455	\$ 7,600	15,981	\$ 1,600	1,437	\$ -	0	492,613
Appendix D; Occupant Behaviour Strategies Total	\$ 1	2	\$ 501	402	\$ 301	3,181	\$ 1	2	\$ 1	2	11,163
TOTAL	\$ 551,001	957,219	\$ 190,601	202,602	\$ 520,901	368,749	\$ 1,601	1,438	\$ 30,001	23,751	6,729,375
Percentage reduction		2		0		1		0		0	2.693230279
Conservation Goal (ekWh/m ²)		3.68		0.78		1.42		0.01		0.09	25.86
Conservation Goal (ekWh/ft ²)		0.3417089		0.07232502		0.13163623		0.000513497		0.00847867	2.40225869
											Energy Intensity Target = 12.5 ekwh

