



## **SUDBURY CATHOLIC DISTRICT SCHOOL BOARD**

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### **Energy Conservation and Demand Management Plan ( 2013-14 to 2017-18 )**

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## **Ontario 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 1<sup>st</sup> to August 31<sup>st</sup>. The Ministry does not provide Boards with multi-year 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
  - Sites sold
  - Portables
    - installed
    - removed
- Site Use
  - Elementary school
  - Secondary school
  - Administrative building
  - Maintenance/warehouse facility
- Shared Use Sites (e.g. one building, two boards share common areas and/or partnered with a municipality)
  - Swimming pools
  - Libraries
  - Lighted sports fields
  - Enclosed sports domes



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

### ***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

### **Background**

1. It is the policy of the Sudbury Catholic District School Board to make every effort possible to reduce the consumption and the cost of energy in the daily operation of all Board owned buildings.

In order to promote a wiser use of energy, the Board has approved guidelines intended for employees, students and community groups who make use of its facilities. These guidelines include procedures for managing lighting, use of computers, ventilation, equipment, appliances, water, architectural design for new construction and retrofitting/updating of existing systems and schools.

2. To date the Board's energy management strategy has included the following:
  - Development of on-line Sudbury Catholic School (SCS) Eco-Centre to provide students, staff and community stakeholders:
    - Access to previous year energy consumption for all Sudbury Catholic schools
    - School energy efficiency plans and initiatives
    - Resources for teachers, students, parents and community
    - Interactive home energy audit
    - Energy and conservation news and announcements



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- Participation in the Ontario Power Authority's Feed-in Tariff (FIT) Program with the installation of solar photo-voltaic systems
  - Installation of energy efficient boilers
  - Conversion of florescent lighting to minimize electricity consumption
  - Installation of energy conservation components to vending machines
  - Installation of gray-water re-capturing systems to reduce municipal water consumption
  - Environmental/Conservation initiatives at the school level (Dearness Conservation)
3. The management of the Energy portfolio is a shared responsibility within the Facility Services Department.

### **Energy Consumption Data for the Board**

The following statistics apply to the Board's Fiscal Year 2012-13

Total Number of Sites: **24**

Total Number of Students: **5,879**

*The values below are "metered" data for the Board.*

Utility	Fiscal Year 2011-12 (Baseline)	Fiscal Year 2012-13 (Current)
Total Electricity (kWh)	5,370,843	5,349,267
Total Natural Gas (m3)	1,454,161	1,439,400
Total Heating Fuel	26,495	31,443
Total Propane	0	0
Total Wood	0	0
Total District Heat	0	0
Total Distict Cool	0	0

*The values below are raw data.*

	Fiscal Year 2011-12 (Baseline)	Fiscal Year 2012-13 (Current)
Total Energy Consumed (eKWh)	20,693,536	21,018,096
Energy Intensity (eKWh/m2)	19.26	19.58



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### **Energy Conservation Goal**

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

	2013-14	2014-15	2015-16	2016-17	2017-18
Conservation Goal	1.50%	1.50%	1.25%	1.25%	1.00%
Target Energy Consumption (eKwh)	20,702,824	20,392,282	20,137,378	19,885,661	19,686,805
Target Energy Intensity (eKwh/m2)	19.29	19.00	18.76	18.53	18.34

	FY 2013 to 2018
Cumulative Target Energy Consumption Savings (eKwh)	1,016,020

### **Renewable Energy**

The Board has the following renewable energy systems:

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	Board owned electrical power generation by converting solar radiation through solar panles on the roof at St. Francis Elementary School.	1 of 2	10	10,144	10,144
Solar photovoltaic	Board owned electrical power generation by converting solar radiation through solar panles on the roof at Holy Cross Elementary School - PENDING OPA APPROVAL	2 of 2	10	0	0
Total			20	10,144	10,144



## **Energy Management Strategies**

Energy management strategies fall into three key categories:

### **1. 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.

See Appendix A

### **2. Operations and maintenance**

Strategies the Board uses to ensure that the existing buildings and equipment perform at peak efficiency.

See Appendix B

### **3. Occupant Behaviour**

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.

See Appendix C

**The Energy Management Plan for the 2013-14 through and including 2017-18 school year is detailed by strategy and component within the attached in Appendix A, B and C.**



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### **4. Energy Efficient Incentives**

- a) The Board applies to incentive programs to support the implementation of energy efficient projects on a regular basis.
- b) The Board uses the services of the sector's Incentive Program Advisor to assist with exploring opportunities.

### **5. Energy Procurement**


- a) The Board participates in the Catholic School Board Services Association (CSBSA) consortia arrangement to purchase electricity and natural gas.

### **6. Demand Management**

- a) The Board monitors electrical and natural gas monthly by reviewing invoice and account invoices and data collected within the Ministry of Education's Utility Consumption Database.
- b) The Board uses appropriate scheduling of building automation systems (lights, heating plants, ventilation, etc) to reduce utility consumption.

## **Approval of this Energy Conservation and Demand Management Plan**

I confirm that the Sudbury Catholic District School Board has reviewed and approved this Energy Conservation and Demand Management Plan

  
\_\_\_\_\_  
Cheryl Ann Corallo  
Superintendent of Business and Finance

  
\_\_\_\_\_  
Date July 8, 2014

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	\$ -	-	\$ -	-	\$ -	-	\$ 35,100	34,667	\$ -	-	69,333
Daylight Sensors	10	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Outdoor Lighting	15	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Occupancy Sensors	10	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Daylight Harvesting	10	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Other (Describe)		\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
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	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
High Efficiency Boilers (condensing)	15	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
High-efficiency boiler burners	10	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Geothermal	15	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Heat recovery/enthalpy wheels	30	\$ -	-	\$ 35,100	81,643	\$ -	-	\$ -	-	\$ -	-	326,572
Economizers	15	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Energy efficient HVAC systems	30	\$ -	-	\$ 35,100	5,557	\$ -	-	\$ -	-	\$ -	-	22,229
Energy efficient Rooftop units	15	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
High Efficiency Domestic Hot Water	15	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Efficient Chillers and Controls	25	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
High-efficiency motors	20	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
VFD	15	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Demand Ventilation	10	\$ 25,000	59,374	\$ 17,241	40,946	\$ 236,340	561,294	\$ -	-	\$ -	-	2,144,537
Entrance Heater Controls	20	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Other (Describe)		\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
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	\$ -	-	\$ 36,000	28,499	\$ -	-	\$ -	-	\$ -	-	113,997
Building Automation Systems - Upgrade	10	\$ 150,000	118,747	\$ -	-	\$ -	-	\$ -	-	\$ -	-	593,736
Other (Describe)		\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
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	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Increased Wall Insulation	50	\$ 150,000	69,780	\$ 87,750	40,822	\$ 104,740	48,725	\$ 658,543	306,356	\$ 123,801	57,593	1,328,669
New Roof	25	\$ 425,000	39,542	\$ -	-	\$ -	-	\$ 88,561	8,240	\$ 784,038	72,947	287,138
New Windows	30	\$ -	-	\$ 52,650	12,246	\$ -	-	\$ -	-	\$ 54,000	12,560	61,546
Treatments	10	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Shading Devices	30	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Exterior Doors	25	\$ 50,950	37,923	\$ 77,220	57,477	\$ 386,100	287,384	\$ -	-	\$ 48,000	35,728	1,317,402
Design, Construction and Retrofit Strategies Total		\$ 800,950	325,367	\$ 341,061	267,191	\$ 727,180	897,403	\$ 782,204	349,262	\$ 1,009,839	178,828	6,265,161



Appendix B

Operations and Maintenance Strategies														
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)
New school design/construction guidelines and specifications			5	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	
Day and Night Temperature Guidelines for all Schools			10	\$ 5,000	18,608	\$ 5,000	18,608	\$ 5,000	18,608	\$ 5,000	18,608	\$ 5,000	18,608	279,122
Night time blackout of sites	Interior	10	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	
	Exterior	10	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	
Procures only Energy Star certified appliances			5	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	
Daylight Harvesting (servicing)			3	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	
Demand Ventilation (servicing)			3	\$ 15,000	35,624	\$ 15,000	35,624	\$ 15,000	35,624	\$ 15,000	35,624	\$ 15,000	35,624	534,362
Other (Describe)				\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	
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	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	
Engineering Audit			5	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	
Other (Describe)					-		-		-		-		-	
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)
Real-time energy data for operators to identify and diagnose building issues			5	\$ 5,000	14,533	\$ 5,000	14,533	\$ 5,000	14,533	\$ 5,000	14,533	\$ 5,000	14,533	217,988
Other (Describe)				\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	
Operations and Maintenance Strategies Total				\$ 25,000	68,765	\$ 25,000	68,765	\$ 25,000	68,765	\$ 25,000	68,765	\$ 25,000	68,765	1,031,473

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	\$ 5,000	17,661	\$ 5,000	17,661	\$ 5,000	17,661	\$ 5,000	17,661	\$ 5,000	17,661	264,915
NRCan Benchmarking Program	5	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Building Automation Training (site specific)	3	\$ 5,000	52,983	\$ 5,000	52,983	\$ 5,000	52,983	\$ 5,000	52,983	\$ 5,000	52,983	794,744
Ongoing training and awareness programs for energy conservation	5	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Provide detailed information on Building Operational costs	1	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Provide detailed information on energy consumption (e.g. via the Utility Consumption Database or other database)	1	\$ 5,000	59	\$ 5,000	59	\$ 5,000	59	\$ 5,000	59	\$ 5,000	59	891
Participate in environmental programs, such as EcoSchools, Earthcare	1	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Other tools (Define)		\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Occupant Behaviour Strategies Total		\$ 15,000	70,703	\$ 15,000	70,703	\$ 15,000	70,703	\$ 15,000	70,703	\$ 15,000	70,703	1,060,549