



DISTRICT SCHOOL BOARD ONTARIO NORTH EAST



Energy Conservation and Demand Management Plan

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Date: June 2014

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Preface

Environmental concerns and the need to be globally competitive are providing a driving force for local industry to change the way energy use and energy costs are viewed. Rather than being an inevitable cost of doing business, energy is now considered to be a manageable input to the process, much like any raw material or other resource cost.

The first step in managing energy costs is creating an energy management plan. This document contains a template that lays out a logical format for capturing information critical to energy management planning. It formalizes the thought process involved in understanding the relative magnitude of energy costs, the possible ways to reduce energy use, energy targets that are likely to be achievable, and other associated activities that need to occur. While stand-alone energy management projects are satisfying to complete, the energy management plan provides the “big picture” view as an ongoing framework for optimizing overall energy use and achieving success.

Purpose

This report reviews all related energy management processes and assesses adequate planning and communication strategies and opportunities supporting the reduction of energy demand and consumption for District School Board Ontario North East (referred to as the “Board” in this report).

Regulatory Requirements

The Green Energy Act, notes in s.6(1): “The Lieutenant Governor in Council may, by regulation, require public agencies to prepare an energy conservation and demand management plan.”

The Green Energy Act, 2009 includes Ontario Regulation 397/11 that sets out the requirements for public agencies to submit an Energy Conservation and Demand Management Plan through the Ministry of Energy that is to be posted on the Board Website.

Background

Ontario Education Sector

One of the largest asset portfolios in North America is the network of schools that stretch across Ontario. With more than 5,500 sites and over 250,000,000 ft², Ontario’s education sector is larger in size than several of Canada’s leading national property management company’s portfolios combined.

Ontario’s education sector consists of 72 district school boards including Public, Catholic, English and French.

Each district school board is autonomous and makes their own decisions about policies and programs related to operations issues, such as energy management.

District School Board Ontario North East

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

Total Number of Sites: 37

Floor Area: 1,892,258 square metres

Annual Energy Use: 47,000,665 ekWh

Greenhouse Gas Emissions: 7,757,885 kgCO₂;

Annual Natural Gas Use: 3,222,828 m³

Annual Electricity Use: 12,387,229 kWh

Total Number of Students: 7,247

The energy management position at the Board is currently a shared job function.

Energy Management Goals and Objectives

District School Board Ontario North East will:

- endeavour to reduce energy consumption through all available means
- Reduce operating costs associated with utility energy consumption
- have broad awareness of the benefits of energy efficiency
- collect and utilize information to manage energy use
- integrate energy management into their overall management structure
- have an energy management plan for the short and long terms
- have a procurement policy that favours energy efficient equipment and materials
- provide leadership on energy management through dedicated staff
- improve energy awareness in the overall school environment by effectively involving students and staff
- Enhance the classroom learning environment for students and staff (increased comfort conditions and improved lighting standards)
- be an effective leader of energy awareness within our City by showing and teaching the benefits of environmental awareness

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 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. The savings are based on the Board's current portfolio taking into account facility variables.

The District School Board Ontario North East believes in providing, operating and maintaining schools and facilities in an effective and efficient manner to support student achievement.

Asset Portfolios and Energy Management Planning

Energy consumption at a site can be impacted by a number of variables. The following table provides 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

Variable Type	Type 1	Type 2	Type 3	Type 4
Year of Construction	(#) Prior to 1946	(#) 1946-1969	(#) 1970-1979	(#) 1990-2014
Building Area (sq ft)	Additions	Sites sold or demolished	Portables installed/removed	
Site Use	(#) Administrative	(#) Other	(#) Elementary School	(#) Secondary School
Shared Use Sites	Pools	Libraries	Lighted Sports Fields	Other School Boards
Equipment & Systems	Age of equipment	Technology type	Life-cycle	% of building with A/C
Additional Site Use	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		

Other factors that can also cause significant changes in utility consumption are:

- Weather conditions
- Facility operation - scheduled hours of operation and temperature settings
- Office equipment inventory (e.g. computers, copiers, printing machines)
- Lighting and HVAC equipment inventory
- Building envelope

Energy Consumption Data for the Board

Refer to Appendix A for the Board’s consumption data for 2012-2013.

The values below are “metered” data.

Utility	Fiscal Year 2011-12 (Baseline)	Fiscal Year 2012-13 (Current)
Total Electricity (kWh)	10,970,749.05 kWh	12,387,229 kWh
Total Natural Gas (m3)	2,880,087.03 m3	3,222,828 m3
Total Heating Fuel (Type 1 and 2) (litres - L)	30,013.00 Litres	33,578.20 Litres

The values below are raw data.

	Fiscal Year 2011-12 (Baseline)	Fiscal Year 2012-13 (Current)
Total Energy Consumed (ekWh)	41,903,183	47,000,665
Energy Intensity (ekWh/m ²)	21.83	24.84

Energy Baseline (FY 2012-2013)

Fuel Source	Total Annual Consumption	Total Annual Cost
Electricity	12,387,229 kWh	\$1,635,016
Natural Gas	3,222,828 m ³	\$1,187,709
Fuel Oil	33,578 litres	\$44,204

Electrical Energy by End Use (FY 2012-2013)

End Use	Energy/Yr (kWh)	Peak Load (kW)	% of Total
Lighting	3,840,041	877	31%
Cooling	1,610,340	368	13%
Office Equipment	2,229,701	509	18%
Ventilation	1,981,957	453	16%
Space Heating	743,234	170	6%
Refrigeration	495,489	113	4%
Cooking	123,872	28	1%
Water Heating	123,872	28	1%
Other	1,238,723	283	10%
Totals	12,387,229	2,828	100%

Natural Gas by End Use (FY 2012-2013)

End Use	Energy/Yr (m³)	% of Total
Space Heating	2,642,719	82%
Water Heating	257,826	8%
Cooking	128,913	4%
Other	193,370	6%
Totals	3,222,828	100%

Equivalent Energy Intensity (All Fuel Types) (FY 2012)

Average ekWh
24.84

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

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.

Refer to Appendix C for the Board's relevant energy conservation projects over the next five years.

Energy Efficiency Funding

Using the Ontario Ministry of Education Energy Efficient Schools Program funding in 2009, the Board engaged external consultants to review energy efficiency across all buildings of the Board. The review provided a school-by-school comparison, and 15 high energy-use schools were identified for an in-depth energy audit. Consultants identified improvement opportunities and cost savings which were shared with the Board. Based on available funding and guaranteed cost savings, the Board approved projects which were implemented and tracked with the assistance of the consultants.

The comprehensive energy management plan saves the Board an annual guaranteed savings of \$318,274 which includes utility costs savings of \$293,190 and operational cost savings of \$25,082. An annual measurement and verification report is completed by the consultants.

An example of some of the projects included:

1. Lighting Measures
 - a. 32W T8 to 28W T8 Group Relamp and Reballast
 - b. HID Retrofit / Redesign
 - c. Lighting Occupancy Sensors
2. Electrical System Measures
 - a. Vending Machine Controllers
3. Control System Measures
 - a. Schedule HVAC Systems to Match Occupancy
 - b. Expand / Upgrade Building Automation System
 - c. Install New Building Automation System
 - d. Temperature Setback Perimeter Rads
4. Mechanical System Measures
 - a. Install Variable Frequency Drives & HE Motors
5. Central Plant System Measures
 - a. Upgrade / Modify Heating Plant Equipment
6. Building Envelope Measures
 - a. Building Envelope (seal leaks)

Renewable Energy

The Board received funding from the Renewable Energy Funding for Schools Program to fund the installation of a 100kw roof-top solar photovoltaic system at a highschool in New Liskeard (TDSS). The Board is waiting to secure a FIT contract with the OPA so it can be connected to the grid. Once the contract is in place, the Board will receive an estimated annual incentive of \$62,238. This is based on the expected 113,573 kWh of electricity generated annually at a rate of 54.8¢ per kWh.

Refer to Appendix B for a list of the Board's renewable energy projects.

Energy Efficient Incentives

The Board applies to incentive programs to support the implementation of energy efficient projects on a regular basis. The Board uses the services of the sector's Incentive Program Advisor.

Between Fiscal Year 2009-10 and 2012-13, the Board has received \$118,166 in incentive funding from various agencies to support the implementation of energy efficient projects.

A sample of these projects is shown below:

1. Union Gas –
Timmins High and Vocational School Boilers - \$14,000
JHKennedy PS Roof-top ventilator- \$1,000
RRoss Beattie Senior PS Boilers - \$9,000
New Liskeard PS Boilers - \$6,000

Available incentives through Union Gas could be viewed at www.uniongas.com

2. Hydro One -
Energy Efficient Schools Funding projects (ERIP)- \$88,166

Available incentives through Hydro One could be viewed at www.hydroone.com

Although not noted, incentives will be obtained for many of the projects identified in the five year plan.

New Construction

The recent construction of the Board's new Administration office has many energy saving systems such as condensing boilers, occupancy sensors, and a building automation system. These systems will save energy consumption thereby saving energy costs.

2. Operations and Maintenance

Operations and maintenance includes the strategies the Board uses to ensure that the existing buildings and equipment perform at peak efficiency.

Refer to Appendix D for the Board's relevant projects over the next five years.

Energy Procurement

The Board participates in the Catholic School Boards Services Association, a consortium led by the York Catholic DSB and comprised of 49 other Ontario school boards for the purchase of electricity.

The Board has an authorized agent for the purchase of their natural gas supply. Target prices are established and new strategies are implemented if target prices are not met.

The Board's purchasing policy and procedures and environmental education policy require that it should have environmentally responsible purchasing practices, while considering quality, price and service.

Tracking and Reporting

Building Automation Systems

The Board has fully implemented building automation systems (BAS) in 15 schools.

The Board uses equipment scheduling, phased/staged use of equipment and deferred start-up of large equipment (e.g.: chiller start-up in spring) to reduce electrical and natural gas demand.

Utility Consumption Database

The Board uses the Utility Consumption Database (UCD) to monitor electrical and natural gas demand.

The UCD is built-up through billing information from the Local Distribution Company (LDC). The LCDs do not provide consolidated bills and except for one LCD, they do not state the Power Factor on each bill.

The Board reviews the data such as electrical and natural gas consumption and energy intensity in the UCD twice a year and when required, to further improve monitoring and analysis of consumption data to support the Energy Management Plan.

Energy Efficiency Funding – Measurement and Verification

An Energy and Operational Savings Report, which quantifies utility and operational savings achieved from implementation of the Energy Efficiency Funding projects, will be prepared for each year of the guarantee period by outside consultants. The savings will be calculated using the retrofit isolation method and based on the energy savings validated at project commencement and the latest average energy rates. The report will contain utility and operational cost savings breakdowns for each school.

Opportunity Identification and Analysis

Building Audits

Through the use of walk-through assessments and engineering audits, major energy using equipment and systems will be identified.

The Principal and Building Supervisor will conduct a general energy assessment of a facility when performing annual cleaning audits.

Engineering consultants will perform energy audits of the poorest two performing schools every year to determine what can be done to improve energy performance.

Energy Conservation and Demand Management Plan

This plan will be updated annually with extended conservation goals for another year. This will produce a rolling five year target that when compared to results achieved, should continue to justify investment in conservation for years to come.

Maintenance Work Order System

Equipment and system issues can be identified through an effective work order system. The computerized work order system at the Board can identify issues associated with energy consuming equipment. Repairing the equipment in a timely manner will improve its efficiency and may prevent a future capital expense. Recurring work orders on the same piece of equipment will identify a need to review the equipment in-depth in order to repair or replace.

A future Asset Management program, working in conjunction with the maintenance work order system, will be implemented and will improve the operation of assets in order to operate efficiently and effectively.

Operational Savings

Operational savings are typically achieved through non-capital improvements to control systems. Optimizing the operation of a system from an energy perspective can often produce significant and measurable savings while maintaining or improving the system reliability and throughput. Operational savings can be achieved by operator training on energy conservation. Training is being developed in order to present it to all operational staff.

System operators will often have ideas for optimizing their system and eliminating wasteful idling or other unnecessary run time. Communicating of energy saving ideas has always been encouraged throughout the Board.

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.

Refer to Appendix E for the Board's relevant projects over the next five years.

Environmental Programs

The Board's Committee for Environmental Stewardship in Action (CESA), was established in line with the School Board's policy on Environmental Education. Although this committee is not currently active, the areas of focus are being practiced in many of the schools.

The three areas of focus CESA promoted were:

1. Teaching and Learning
2. Student Engagement and Community Connections
3. Environmental Leadership

Student participation in sustainable environmental practices is encouraged. The goal is to develop programs that empower students and develop their environmental consciousness. Education is the first step in this process, and is achieved by holding environmental awareness days at schools with workshops and guest speakers.

The next step is student engagement. For younger students, initiatives such as Honeywell's light-switch design contest accomplished this goal. For older students, Envirothons, which are similar to science fairs, are a great way to engage them.

The final step is to empower students with environmental leadership positions. Many of the highschools have a student environmental leader(s).

Each school has an environmental education leader who champions various environmental initiatives. The environmental champion for each facility could double as an energy champion as they work in tandem. These individuals have an impact on energy use for their facility and can identify any projects that could benefit their school by saving energy.

All of these measures are meant to decrease energy consumption across the school board and foster a greener future.

Operational Savings and Employee Awareness Plan

Employee awareness programs identify and target everyday actions that employees can be encouraged to do, with the intent that the actions become second nature in order for the savings to persist well past the initial push for awareness. This type of activity dovetails well with operational savings mentioned earlier. System operators need the environment to encourage the development of energy saving opportunities.

Opportunities to improve energy intensity through operational and employee awareness programs will be implemented through newsletters, posters and training.

An annual environmental report card showing electricity, natural gas, CO2 emissions and waste will be distributed to each school and the school that show their commitment to decrease their energy intensity would be rewarded.

Posters regarding Earth Hour are distributed to all schools across the Board in order to promote awareness on energy savings and the environment. A Board Earth Hour, where many of the lights in a facility are turned off for one designated hour, will be an operational savings. Implementation of this Earth Hour will be reviewed by Senior Administration.

A Sustainability Information System (SIS) will be set up at TDSS when the Roof-top solar PV is operational.

The SIS accesses resource usage data gathered by your building's meters (electrical, gas) and consolidates it all onto one convenient platform for display of real-time resource consumption via a screen kiosk and onto the web. Some of the benefits of the system include:

- Learning how the "green" features of a building work
 - Tracking/comparing renewable energy and conservation technologies
 - Understanding how sustainable technologies translate into tangible environmental benefits
- The management system will enable students and the public to learn how the building's design conserves resources, preserves the natural environment and captures renewable energy.

The SIS will also act as an interactive tool for sustainability education.

Easy access to real-time and compiled data will enable students to assess the direct and indirect benefits of renewable energy sources, including tracking the net reduction in their school's carbon footprint. Customized information will be displayed on a monitor and over the web. Interactive features and colourful graphs and gauges will present daily, weekly and monthly resource consumption data to compare and translate energy savings into tangible environmental benefits.

Energy Management Training

As a best-practice, energy management training can modify building occupant behaviour. Committing to a comprehensive, ongoing training plan can empower staff to recognize the energy impact of their daily operations and change their behaviour, which will improve the efficiency and performance of the building.

Training provides a variety of benefits throughout the organization, including:

- increased staff and building occupant awareness
- enhanced knowledge and skills
- reduced energy and cost savings
- engaged staff and culture of energy savings
- extended building life
- reduced maintenance costs

A training program is being developed in order to be presented to all Board staff.

Energy Conservation Goal

By implementing this energy management program, the Board’s qualitative energy conservation goal in the next 5 years, is as follows:

- 1) Reduce energy costs by an estimated 14% in 5 years;
- 2) Reduce the amount of greenhouse gas emissions by as much as 3,290,545 kgCO₂;
- 3) Reduce electricity consumption by an estimated 3,994,973 kWh;
- 4) Reduce natural gas consumption by an estimated 1,474,750 m³;
- 5) There are also additional water savings within our energy management program that have not been accounted for, but will also benefit the environment by utilizing less water in our daily activities.

Refer to Appendix F for the Board’s 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	<i>6.29</i>	<i>7.22</i>	<i>8.62</i>	<i>9.78</i>	<i>6.35</i>

	FY 2013-14 to 2017-18 (ekWh/m²)
Cumulative Conservation Goal	<i>112.08</i>

Senior Management Approval of this Energy Conservation and Demand Management Plan

I confirm that District School Board Ontario North East’s senior management has reviewed and approved this Energy Conservation and Demand Management Plan.

Linda Knight
Director of Education
District School Board Ontario North East

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	Temiskaming District Secondary School	1	100		113,573
Solar air					
Solar water					
Wind Turbine					
Biomass					
Other					

Energy Consumption Data (2012-2013)											Appendix B			
Operation Name and/or Unique Identifier	Operation Type	Address	City	Postal Code	Total Floor Area of the Indoor Space in which Operation is Conducted		Average # Hours Per Week	Number of Portables	Energy Type and Amount Purchased and Consumed in Natural Units					
									Electricity	Natural Gas	Fuel Oil 1 & 2			
Bertha Shaw Public School	School	109 Powell Avenue	South Porcupine	P0N1H0	26,934.00	Square feet	45	1	163,687.27	kWh	48,888.36	Cubic Meter	0.00	Litre
Central Public School	School	23 Station Road	Kirkland Lake	P2N2H2	24,523.00	Square feet	45		163,018.13	kWh	68,985.43	Cubic Meter	0.00	Litre
Charlton-Savard Public School- closed	School	RR #1	Charlton Station	POJ1B0	19,656.00	Square feet	40		287,359.36	kWh	0.00	Cubic Meter	0.00	Litre
Clayton Brown Public School	School	27 - 10th Street	Hearst	P0L1N0	39,897.00	Square feet	45		173,730.78	kWh	88,294.59	Cubic Meter	0.00	Litre
Cobalt Public School- closed	School	5 Dunning Avenue	Cobalt	POJ1C0	23,864.00	Square feet	40		73,497.36	kWh	46,657.57	Cubic Meter	0.00	Litre
Diamond Jubilee Storage	Administrative o	22 King Street	Kapuskasing	P5N1K2	263.72	Square feet	0		52.21	kWh	0.00	Cubic Meter	0.00	Litre
Elk Lake Public School	School	First Street	Elk Lake	POJ1G0	11,464.00	Square feet	45		203,059.34	kWh	0.00	Cubic Meter	0.00	Litre
Englehart High School	School	61 Fourth Street	Englehart	POJ1H0	58,902.00	Square feet	60	2	405,132.44	kWh	95,230.84	Cubic Meter	0.00	Litre
Englehart Public School	School	70 Eighth Avenue	Englehart	POJ1H0	36,419.00	Square feet	45		770,505.14	kWh	26,904.12	Cubic Meter	0.00	Litre
ES Cochrane HS & PS	School	453 Chalmers Avenue	Cochrane	P0L1C0	123,241.00	Square feet	60		651,061.09	kWh	184,373.14	Cubic Meter	0.00	Litre
Federal Public School	School	80 Tweedsmuir Road	Kirkland Lake	P2N1J5	24,910.00	Square feet	45		142,364.32	kWh	50,804.27	Cubic Meter	0.00	Litre
Foleyet Public School	School	7 Young Street	Foleyet	P0M1T0	4,559.00	Square feet	45		95,059.97	kWh	0.00	Cubic Meter	0.00	Litre
Frank P. Krznaric Whitney PS	School	712 Earl Street	Porcupine	P0N1C0	31,644.00	Square feet	45		232,213.41	kWh	50,184.96	Cubic Meter	0.00	Litre
Gogama Public School- mothballed	School	26 Clark Street	Gogama	P0M1W0	3,968.00	Square feet	0		24,751.85	kWh	0.00	Cubic Meter	0.00	Litre
Golden Avenue Public School	School	117 Golden Avenue	South Porcupine	P0N1H0	35,527.00	Square feet	45		345,021.64	kWh	43,574.85	Cubic Meter	0.00	Litre
Haileybury Public School	School	333 Rorke Avenue	Haileybury	POJ1K0	38,999.00	Square feet	45		192,770.69	kWh	65,494.60	Cubic Meter	0.00	Litre
Iroquois Falls Public School	School	900 Centennial Street	Iroquois Falls	P0K1G0	46,964.00	Square feet	45		287,363.49	kWh	91,421.56	Cubic Meter	0.00	Litre
Iroquois Falls Secondary School	School	44 Anson Drive	Iroquois Falls	P0K1E0	156,013.00	Square feet	60		676,848.59	kWh	304,661.25	Cubic Meter	0.00	Litre
Joseph H Kennedy Public School	School	422 - 4th Avenue	Matheson	P0K1N0	38,279.00	Square feet	45		189,483.43	kWh	84,652.03	Cubic Meter	0.00	Litre
Kapuskasing District HS & Diamond Jubilee	School	61 Devonshire St.	Kapuskasing	P5N1C2	157,947.00	Square feet	60		514,673.62	kWh	294,523.14	Cubic Meter	0.00	Litre
Kerns Public School	School	Hwy 65W, Con. 4, Lot 9	Thornloe	POJ1P0	23,154.00	Square feet	45		190,378.59	kWh	0.00	Cubic Meter	33,578.20	Litre
Kirkland Lake Maintenance Shop	Administrative o	115 Queen Street	Kirkland Lake	P2N2S1	3,900.00	Square feet	45		18,900.65	kWh	9,344.42	Cubic Meter	0.00	Litre
Kirkland Lake District Composite School	School	60 Allen Street	Kirkland Lake	P2N3J5	110,000.00	Square feet	60		608,012.20	kWh	217,668.74	Cubic Meter	0.00	Litre
New Liskeard Board Office	Administrative o	198022 River Road	New Liskeard	P4N1P0	8,220.00	Square feet	45		173,293.36	kWh	0.00	Cubic Meter	0.00	Litre
New Liskeard Public School	School	141 Dymond Avenue	New Liskeard	POJ1P0	59,665.00	Square feet	45	4	380,892.99	kWh	120,609.09	Cubic Meter	0.00	Litre
P.A.C.E. - leased	School	206 Third Avenue	Timmins	P4N1E1	2,910.00	Square feet	45		40,078.55	kWh	10,452.99	Cubic Meter	0.00	Litre
Pinecrest Public School	School	542 Toke Street	Timmins	P4N6W1	27,826.00	Square feet	45		108,913.29	kWh	53,974.42	Cubic Meter	0.00	Litre
R. Ross Beattie Sr. Public School	School	300 Pearl Avenue	Timmins	P4N7K2	55,855.00	Square feet	50		312,870.29	kWh	85,037.82	Cubic Meter	0.00	Litre
Roland Michener Secondary School	School	155 Legion Drive	South Porcupine	P0N1H0	128,170.00	Square feet	60		763,727.73	kWh	246,395.71	Cubic Meter	0.00	Litre
Schumacher Public School	School	64 Croatia Avenue	Schumacher	P0N1G0	45,037.00	Square feet	45		204,077.64	kWh	72,912.95	Cubic Meter	0.00	Litre
Smooth Rock Falls PS	School	50 Third Street	Smooth Rock Falls	P0L2B0	29,688.00	Square feet	45		100,773.37	kWh	62,277.80	Cubic Meter	0.00	Litre
Swastika Public School- closed	School	30 Grenfell Avenue	Swastika	P0K1T0	16,080.00	Square feet	40		23,603.17	kWh	25,884.11	Cubic Meter	0.00	Litre
Temagami Public School	School	11 School Road	Temagami	POH2H0	27,201.00	Square feet	45		92,168.93	kWh	51,579.54	Cubic Meter	0.00	Litre
Timiskaming District Secondary School	School	90 Niven Street	New Liskeard	POJ1P0	159,884.00	Square feet	60	4	1,071,304.64	kWh	315,995.06	Cubic Meter	0.00	Litre
New Liskeard Maintenance Shop	Administrative o	99 Scott Street	New Liskeard	POJ1P0	2,675.00	Square feet	45		32,420.91	kWh	3,605.66	Cubic Meter	0.00	Litre
Timmins High & Vocational School	School	451 Theriault Blvd.	Timmins	P4N8B2	194,004.00	Square feet	60		2,002,432.14	kWh	271,392.15	Cubic Meter	0.00	Litre
Timmins Centennial Public School	School	545 Wilcox Street	Timmins	P4N3K5	56,563.00	Square feet	45		486,689.41	kWh	82,765.31	Cubic Meter	0.00	Litre
W. Earle Miller Public School	School	200 Victoria Avenue	Timmins	P4N8G9	37,452.00	Square feet	45	1	185,037.01	kWh	48,281.93	Cubic Meter	0.00	Litre

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	\$ -	-	\$ 30,000	28,986	\$ 35,000	33,816	\$ 55,000	53,140	\$ 40,000	38,647	362,319
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		-	\$ -	-	\$ 400,000	658,953	\$ 400,000	658,953	\$ -	-	3,294,764
High Efficiency Boilers (condensing)	15	\$ 184,000	454,677	\$ 400,000	988,429	\$ 150,000	370,661	\$ 180,000	444,793		-	8,228,673
High-efficiency boiler burners	10		-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Geothermal	15	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Heat recovery/enthalpy wheels	30	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Economizers	15	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Energy efficient HVAC systems	30		-	\$ 280,000	43,077		-		-		-	172,306
Energy efficient Rooftop units	15	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
High Efficiency Domestic Hot Water	15	\$ -	-	\$ -	-	\$ -	-	\$ 65,000	128,117	\$ 20,000	39,421	295,655
Efficient Chillers and Controls	25	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
High-efficiency motors	20	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
VFD	15	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Demand Ventilation	10	\$ 169,000	389,996	\$ 50,000	115,384	\$ 100,000	230,767	\$ 120,000	276,920	\$ 335,000	773,069	4,430,727
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	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Building Automation Systems - Upgrade	10		-	\$ 100,000	76,922	\$ 60,000	46,153	\$ -	-	\$ -	-	446,150
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	\$ -	-	\$ 40,000	8,950	\$ -	-	\$ 10,000	2,237	\$ -	-	40,274
Increased Wall Insulation	50	\$ -	-	\$ -	-	\$ -	-	\$ 100,000	44,748	\$ -	-	89,497
New Roof	25	\$ 1,093,000	97,820		-	\$ 331,000	29,623		-	\$ 330,000	29,534	607,503
New Windows	30	\$ 80,000	17,899	\$ 20,000	4,475	\$ -	-	\$ -	-	\$ 400,000	89,497	196,893
Walls (Caulking, Sealants)	10	\$ 80,000	143,195	\$ -	-	\$ 80,000	143,195	\$ 60,000	107,396	\$ 80,000	143,195	1,503,544
Shading Devices	30	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Other (Describe)		\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-

Design, Construction and Retrofit Strategies Total		\$ 1,606,000	1,103,588	\$ 920,000	1,266,222	\$ 1,156,000	1,513,169	\$ 990,000	1,716,306	\$ 1,205,000	1,113,363	19,668,304
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APPENDIX C

Energy Payback Period	% related to Electricity	% related to Natural Gas
7.5	100	0
5	100	0
7.5	100	0
5	100	0
5	100	0
0		100

Energy Payback Period	% related to Electricity	% related to Natural Gas
15	5	95
10	5	95
5	5	95
40	100	0
8	20	80
7.5	50	50
75	50	50
30	50	50
10	15	85
100	100	0
15	100	0
5	75	25
5	50	50
5	50	50
0		100

Energy Payback Period	% related to Electricity	% related to Natural Gas
15	50	50
15	50	50
0		100

Energy Payback Period	% related to Electricity	% related to Natural Gas
80	20	80
40	20	80
200	20	80
80	20	80
10	20	80
20	100	0
0		100

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	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Night time blackout of sites	Interior	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
	Exterior	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Procures only Energy Star certified appliances	5	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Daylight Harvesting (servicing)	3	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Demand Ventilation (servicing)	3	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
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	\$ -	-	\$ 8,000	92	\$ 8,000	92	\$ 8,000	92	\$ 8,000	92	923
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	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Other (Describe)		\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Operations and Maintenance Strategies Total		\$ -	-	\$ 8,000	92	\$ 8,000	92	\$ 8,000	92	\$ 8,000	92	923

\$0.138 = cost of 1 ekWh electricity
 \$ 0.0353 = cost of 1 ekWh natural gas
 0.0955 m³ = 1 ekWh
 \$0.37 = cost of 1 m³ of natural gas

APPENDIX D

Energy Payback Period	% related to Electricity	% related to Natural Gas
5	50	50
5	20	80
7	100	0
7	100	0
5	100	0
5	100	0
5	50	50
0		100

Energy Payback Period	% related to Electricity	% related to Natural Gas
1000	50	50
1000	50	50
0		100

Energy Payback Period	% related to Electricity	% related to Natural Gas
3	80	20
0		100

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 Total Accumulated Energy Savings (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 Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	
Building Operator Training	3		-	\$ 50	172	\$ 50	172	\$ 50	172	\$ 50	172	1,719
NRCan Benchmarking Program	5	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Building Automation Training (site specific)	3	\$ 200	2,063	\$ 200	2,063	\$ 200	2,063	\$ 200	2,063	\$ 200	2,063	30,949
Ongoing training and awareness programs for energy conservation	5		-	\$ 200	157	\$ 200	157	\$ 200	157	\$ 200	157	1,566
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		-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Participate in environmental programs, such as EcoSchools, Earthcare	1	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Other tools (Define)		\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Occupant Behaviour Strategies Total		\$ 200	2,063	\$ 450	2,392	\$ 450	2,392	\$ 450	2,392	\$ 450	2,392	34,234

\$0.138 = cost of 1 ekWh electricity
 \$ 0.0353 = cost of 1 ekWh natural gas
 0.0955 m³ = 1 ekWh
 \$0.37 = cost of 1 m³ of natural gas

APPENDIX E

Energy Payback Period	% related to Electricity	% related to Natural Gas
3	60	40
1000	50	50
1	60	40
10	90	10
1000	50	50
1000	50	50
5	90	10
0		100

Conservation Goal

APPENDIX F

	FY2013
Total Building Area (includes portables) (m ²)	175,797
Total Building Area (includes portables) (ft ²)	1,892,257.77
Energy Consumption for the board (ekWh)	47,000,665

1 ft² = 0.0929 m²

	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)
Appendix C; Design, Construction and Retrofit Strategies Total	\$ 1,606,000	1,103,588	\$ 920,000	1,266,222	\$ 1,156,000	1,513,169	\$ 990,000	1,716,306	\$ 1,205,000	1,113,363	19,668,304
Appendix D; Operations and Maintenance Strategies Total	\$ -	0	\$ 8,000	92	\$ 8,000	92	\$ 8,000	92	\$ 8,000	92	923
Appendix E; Occupant Behaviour Strategies Total	\$ 200	2,063	\$ 450	2,392	\$ 450	2,392	\$ 450	2,392	\$ 450	2,392	34,234
TOTAL	\$ 1,606,200	1,105,651	\$ 928,450	1,268,706	\$ 1,164,450	1,515,653	\$ 998,450	1,718,790	\$ 1,213,450	1,115,847	19,703,461
Percentage reduction		2		3		3		4		2	8.384332828
Conservation Goal (ekWh/m ²)		6.29		7.22		8.62		9.78		6.35	112.08
Conservation Goal (ekWh/ft ²)		0.584302428		0.670471889		0.800975832		0.908327413		0.589690733	10.41267275

APPENDIX G

BUILDING ENERGY PERFORMANCE INDEX	List of schools in Board in order of energy intensity		
	Considers gas and electricity only		
SCHOOL	Energy Consumption (ekWh)	Floor Area (sq.ft)	Energy Intensity (ekWh/sq.ft)
Diamond Jubilee Storage	48.34	263.72	0.18
Gogama Public School-mothballed	22,755.79	3,968.00	5.74
Kerns Public School E	182,925.58	23,154.00	7.9
Charlton-Savard Public School-closed	282,619.71	19,656.00	14.38
Elk Lake Public School	199,873.97	11,464.00	17.43
Swastika Public School-closed	283,691.01	16,080.00	17.64
W. Earle Miller Public School	669,976.86	37,452.00	18.26
Foleyet Public School	89,299.65	4,559.00	19.59
New Liskeard Board Office	164,918.93	8,220.00	20.06
ES Cochrane HS & PS	2,499,972.02	123,241.00	20.29
Schumacher Public School	936,060.48	45,037.00	20.78
R. Ross Beattie Sr. Public School	1,168,523.57	55,855.00	20.92
Golden Avenue Public School	777,080.98	35,527.00	21.87
Haileybury Public School	858,220.58	38,999.00	22.01
Kapuskasing District High School & Diamond Jubilee	3,513,417.90	157,947.00	22.24
Temagami Public School	620,015.75	27,201.00	22.79
Cobalt Public School-closed	548,020.22	23,864.00	22.96
Timmins Centennial Public School	1,301,705.55	56,563.00	23.01
Frank P. Krznaric Whitney Public School	728,870.95	31,644.00	23.03
Pinecrest Public School	656,011.38	27,826.00	23.58
Englehart High School	1,347,178.31	58,902.00	23.87
Timmins High & Vocational School	4,633,356.16	194,004.00	23.88
Smooth Rock Falls PS	714,229.91	29,688.00	24.06
Iroquois Falls Secondary School	3,757,696.25	156,013.00	24.09
Bertha Shaw Public School	659,159.93	26,934.00	25.19
Kirkland Lake District Composite School & Elementary	2,778,153.89	110,000.00	25.26
Roland Michener Secondary School	3,252,516.26	128,170.00	25.38
Timiskaming District SS (New Liskeard Maintenance Shop)	68,423.59	2,675.05	25.58
Iroquois Falls Public School	1,206,175.12	46,964.00	25.68
Federal Public School	651,993.23	24,910.00	26.17
Clayton Brown Public School	1,066,078.47	39,897.00	26.72
Timiskaming District Secondary School	4,253,308.67	159,884.00	27.16
Joseph H Kennedy Public School	1,053,530.29	38,279.00	27.52
Englehart Public School	1,031,307.00	36,419.00	28.32
New Liskeard Public School	1,601,994.33	59,665.00	28.41
Kinder School (Kirkland Lake Mtce. Shop)	113,789.50	3,900.00	29.18
Central Public School	869,460.55	24,523.00	35.45
P.A.C.E.-leased	146,504.50	2,910.00	50.35