



ENERGY MANAGEMENT PLAN
for the
NEAR NORTH DISTRICT SCHOOL BOARD
2013-2018

Prepared by

Near North District School Board Plant Department

June 2014

This publication is available through the Near North District School Board's website
www.nearnorthschools.ca and in accessible formats upon request.

EXECUTIVE SUMMARY

The Green Energy Act, Ontario Regulation 397/1, 2009 (published on August 25, 2011), requires all public agencies to prepare an Energy Conservation and Demand Management Plan (referred to as an Energy Management Plan). The Conservation and Demand Energy Management Plan must include the following information:

- An annual listing of the energy consumption and greenhouse gas emissions data for each facility (building) is to be submitted to the Ministry of Energy. The first listing was submitted on July 1, 2013 for the 2011/12 school year, and is due annually thereafter. The 2012/2013 energy consumption data is the baseline against which subsequent annual energy consumption (per facility) will be compared, until 2018. A new Energy Management Plan would be required for 2018 to 2023.
- A description of previous, current and proposed measures for reducing the public agency's energy consumption and a forecast of expected results. The first plan is the one contained herein, and must be submitted to the Ministry of Energy by July 1, 2014, and is due every five years thereafter.

The NNDSB Energy Management Plan fulfills the reporting requirements of the Green Energy Act, and provides the Board with a framework to support continued energy and sustainability initiatives within the built environment. Implementation of all initiatives will be subject to future budget approvals.

Energy Conservation and Demand Management Plan (Phase II – due July 1, 2014)

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 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

About the Board

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

Total Number of Sites: **47**

Total Number of Students: **10,029**

Background

1. The Board has a qualitative energy conservation goal

Yes Our Goal is to discuss strategies to encourage school level participation in environmental programs, such as EcoSchools. In the upcoming fiscal year we will strive to better educate and involve students and staff regarding the importance of energy conservation. We will attain our goal through the use of environmental initiatives, environmental policy, and commitment to promoting change in organizational practices that result in reducing our ecological footprint.

No

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

During the last five years, the Board has taken advantage of a number of incentive programs towards the replacement of inefficient lighting, HVAC systems and roofing components.

3. The Board has an energy management position.

In-house

Full time

Part time

Shared job function

Contracted third party

None

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)	14,913,057.90	9,856,896.78
Total Natural Gas (m3)	2,749,458.05	2,389,236.37
Total Heating Fuel (Type 1 and 2) (litres - L)	80,220.60	80,622.7
Total Propane (litres - L)	138,459.90	139,752.40

The values below are raw data.

	Fiscal Year 2011-12 (Baseline)	Fiscal Year 2012-13 (Current)
Total Energy Consumed (ekWh)	40,125,944.89	43,287,464.95
Energy Intensity (ekWh/m ²)	76.26	81.64

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	0.179358823	0.228572793	0.223368513	0.171693722	0.555432356

	FY 2013-14 to 2017-18 (ekWh/m²)
Cumulative Conservation Goal	3.380010623

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

1. In 2013-14 schools within the Board that participated in environmental programs.

- EcoSchools
_____ Number of schools that participate
- Earthcare Schools
_____ Number of schools that participate

Other

Name of Program: Greening Program

2 Number of schools that participate

Energy Efficient Incentives

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

Yes No

Between Fiscal Year 2009-10 and 2012-13, the Board has received \$280,595 in incentive funding from various agencies to support the implementation of energy efficient projects.

2. The Board uses the services of the sector’s Incentive Program Advisor.

Yes No

Energy Procurement

1. The Board participates in a consortia arrangement to purchase electricity.

Yes No

If yes,

CSBSA Electricity Consortia

Other

Provide Name of Consortia: _____

2. The Board participates in a consortia arrangement to purchase natural gas.

Yes No

If yes,

CSBSA Natural Gas Consortia

Other

Provide Name of Consortia: _____

Demand Management

1. The Board monitors electrical Demand.

Yes No

If yes,

- Daily
 Monthly
 Quarterly
 Annually

2. The Board uses the following method to monitor electrical Demand:

- Invoices
 Real-time data
 Online data from the Local Distribution Company (LDC)
 Other

_____ **Utility Consumption Database** _____

3. The Board uses the following methodologies to reduce electrical Demand:

- Equipment scheduling
 Phased/staged use of equipment
 Demand-limit equipment
 Deferred start-up of large equipment (e.g.: chiller start-up in spring)
 Other

4. The Local Distribution Companies (LDCs) for the Board explicitly state the Power Factor on each bill.

Yes

The Board monitors Power Factor.

Yes No

If yes,

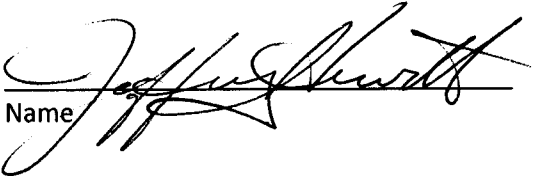
- Monthly
 Quarterly
 Annually

No

Some LDCs provide Power Factor, some don't

Senior Management Approval of this Energy Conservation and Demand Management Plan

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



Name

June 23, 2014

Date

Superintendant of Support Services

Job Title

Appendix A

Renewable Energy

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	Almaguin Secondary	1	100		100,000
Solar air					
Solar water					
Wind Turbine					
Biomass	South Shore Ed. Centre	1	220		200000
Other					

See Note 1

See Note 2

Note 1

FIT Application currently under review by OPA-Anticipated start-up September 2014

Note 2

2014/2015 will be first year boiler fully operational

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)	
High Efficiency Lighting Systems (T-8, T-5, CFL, LED ...)	15	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ 268,000	264,691	264,691
Outdoor Lighting	15	\$ -	-	\$ -	-	\$ -	-	\$ 23,400	23,111	\$ -	-	46,222
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)	
Energy efficient HVAC systems	30	\$ 430,000	68,082	\$ -	-	\$ -	-	\$ -	-	\$ 973,000	154,055	494,463
Energy efficient Rooftop units	15	\$ 380,000	150,413	\$ 600,000	237,494	\$ 266,000	105,289	\$ -	-	\$ 488,000	193,162	2,211,073
High Efficiency Domestic Hot Water	15	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ 148,000	304,143	304,143
Demand Ventilation	10	\$ -	-	\$ -	-	\$ 38,500	91,435	\$ 98,000	232,745	\$ 32,500	77,186	816,981
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)	
Building Automation Systems - Upgrade	10	\$ 40,000	31,666	\$ -	-	\$ -	-	\$ -	-	\$ 154,000	121,914	280,243
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)	
New Roof	25	\$ 800,000	74,432	\$ 671,000	62,430	\$ 377,000	35,076	\$ -	-	\$ -	-	727,112
New Windows	30	\$ 160,000	37,216	\$ -	-	\$ 245,000	56,987	\$ 385,000	89,552	\$ 221,000	51,405	587,551
Design, Construction and Retrofit Strategies Total		\$ 1,810,000	361,809	\$ 1,271,000	299,925	\$ 926,500	288,788	\$ 506,400	345,407	\$ 2,284,500	1,166,556	5,732,481

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

Energy Payback Period	% related to Electricity	% related to Natural Gas
75	50	50
30	50	50
10	15	85
5	50	50

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

Energy Payback Period	% related to Electricity	% related to Natural Gas
200	20	80
80	20	80

Appendix C

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	5	-	-	\$ 70,000	166,246	\$ 70,000	166,246	\$ -	-	\$ -	-	1,163,723
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)
Engineering Audit	5	\$ -	-	\$ 80,000	950	\$ 80,000	950	\$ -	-	\$ -	-	6,650
Operations and Maintenance Strategies Total		\$ -	-	\$ 150,000	167,196	\$ 150,000	167,196	\$ -	-	\$ -	-	1,170,373

Energy Payback Period	% related to Electricity	% related to Natural Gas
5	50	50

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

Appendix D

Occupant Behaviour Strategies		2013-14		2014-15		2015-16		2016-17		2017-18		2013/14-2017/18
Training and Education	Quantity of Time that Measure will be in place (years)	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 Training (site specific)	3	\$ 2,000	21,193	\$ 2,000	21,193	\$ 2,000	21,193	\$ 2,000	21,193	\$ 2,000	21,193	317,898
Ongoing training and awareness programs for energy conservation	5	\$ 1,000	801	\$ 1,000	801	\$ 1,000	801	\$ 1,000	801	\$ 1,000	801	12,015
Occupant Behaviour Strategies Total		\$ 3,000	21,994	\$ 3,000	21,994	\$ 3,000	21,994	\$ 3,000	21,994	\$ 3,000	21,994	329,913

Energy Payback Period	% related to Electricity	% related to Natural Gas
1	60	40
10	90	10

Appendix E
Conservation Goal

	FY2013
Total Building Area (includes portables) (m ²)	198,800
Total Building Area (includes portables) (ft ²)	2,139,865
Energy Consumption for the board (ekWh)	43,287,465

	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 B; Design, Construction and Retrofit Strategies Total	\$ 1,810,000	361,809	\$ 1,271,000	299,925	\$ 926,500	288,788	\$ 506,400	345,407	\$ 2,284,500	1,166,556	5,732,481
Appendix C; Operations and Maintenance Strategies Total	\$ -	0	\$ 150,000	167,196	\$ 150,000	167,196	\$ -	0	\$ -	0	1,170,373
Appendix D; Occupant Behaviour Strategies Total	\$ 3,000	21,994	\$ 3,000	21,994	\$ 3,000	21,994	\$ 3,000	21,994	\$ 3,000	21,994	329,913
TOTAL	\$ 1,813,000	383,804	\$ 1,424,000	489,115	\$ 1,079,500	477,978	\$ 509,400	367,401	\$ 2,287,500	1,188,550	7,232,766
Percentage reduction		1		1		1		1		3	3.341737121
Conservation Goal (ekWh/m ²)		1.93		2.46		2.40		1.85		5.98	36.38
Conservation Goal (ekWh/ft ²)		0.179359		0.228573		0.223369		0.171694		0.5554324	3.380010623