



Grand Erie District School Board

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Energy Conservation and Demand Management Plan

Prepared by:
The Grand Erie District School Board

Under the Green Energy Act's Ontario Regulation 397/11

June 2014

Growing Excellence... Inspiring Success

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1.0 **INTRODUCTION**

1.1 Introduction

In 2009, The Green Energy Act (Ontario Regulation 397/11) was passed by the Ontario government in order to promote and expand energy conservation throughout the public sector within the province. Under regulation 397/11 of *The Green Energy Act*, all Ontario public agencies, including school boards, are required to report their annual energy use and greenhouse gas (GHG) emissions in buildings and facilities.

Through educational and operational practices, initiatives and beliefs, the Grand Erie District School Board actively promote energy conservation. This report outlines and highlights the Board's five year energy management plan.

1.2 Green Energy Act

Requirements for the Green Energy Act's Ontario Regulation 397/11 requires school boards report on the following:

- Annual energy consumption and greenhouse gas emissions;
- Building profiles, including type of facility, address, square footage, etc.
- Proposed energy conservation measures;
- Annual energy management strategies;

1.4 Education Sector Background

Ontario Regulation 397/11 requires that all publicly funded school Boards in Ontario develop and publish an energy conservation and demand management plan. Publicly funded Boards receive 100 percent 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.

2.0 GRAND ERIE DISTRICT SCHOOL BOARD PROFILE

2.1 Board Profile and Student Population

The Grand Erie District School Board serves over 26,000 students through 59 elementary schools and 14 secondary schools within the City of Brantford, Brant County, Haldimand County and Norfolk County.

A dedicated staff of 2,700 employees focuses on the achievement, environment, and engagement through our vision: Growing Excellence... Inspiring Success.

2.2 School and Building Profiles

Within this report, the Grand Erie District School Board has reported on the following sites for the 2012-2013 fiscal year:

School:	Operation Type	Address	City	Postal Code	Total Floor Area	Unit
Agnes G Hodge PS	School	52 Clench Avenue	Brantford	N3T1B6	39906.43	Square feet
Anna Melick Memorial S	School	1347 Hutchinson Rd., R.R. #8	Dunnville	N1A2W7	18295.31	Square feet
Banbury Heights PS	School	141 Banbury Rd	Brantford	N3P1E3	4120.85	Square feet
Banbury Heights PS	Other	141 Banbury Rd	Brantford	N3P1E3	2151.83	Square feet
Bellview PS	School	97 Tenth Avenue	Brantford	N3S1G5	31510.63	Square feet
Bellview PS	Other	97 Tenth Avenue	Brantford	N3S1G5	4021	Square feet
Bloomsburg PS	School	25 Concession 12, R.R. #3	Waterford	N0E1Y0	23433.01	Square feet
Board Office	Administrative off	349 Erie Avenue	Brantford	N3S2H7	15683	Square feet
Boston PS	School	2993 Cockshutt Rd., R.R. #1	Waterford	N0E1Y0	21893.79	Square feet
Branlyn PS	School	238 Brantwood Park Rd	Brantford	N3P1N9	60470.69	Square feet
Brantford CI & VS	School	120 Brant Ave	Brantford	N3T3H3	204578.9	Square feet
Brier Park PS	School	10 Blackfriar Lane	Brantford	N3R6C5	35530.92	Square feet
Burford Elementary	School	35 Alexander St	Burford	N0E1A0	46360.16	Square feet

Caledonia Centennial PS	School	110 Shetland St	Caledonia	N3W2H1	29926.53	Square feet
Cayuga SS	School	70 Highway #54	Cayuga	N0A1E0	133232.4	Square feet
Cedarland PS	School	60 Ashgrove Ave	Brantford	N3R6E5	36357.77	Square feet
Centennial-Grand Woodlands S	School	41 Ellenson Dr	Brantford	N3R3E7	29507.56	Square feet
Central PS	School	135 George St	Brantford	N3T6B4	22216.71	Square feet
Cobblestone Elementary School	School	179 Grandville Circle	Paris	N3L0A9	48017.76	Square feet
Courtland PS	School	1012 Queen Street, Box 245	Courtland	N0J1E0	24864.61	Square feet
Delhi DSS	School	393 James St	Delhi	N4B2B6	89890.41	Square feet
Delhi PS	School	227 Queen St	Delhi	N4B2K6	37307.68	Square feet
Doverwood PS	School	109 Hamilton Plank Rd. Box 108	Port Dover	N0A1N0	34552.12	Square feet
Dufferin PS	School	106 Chestnut Ave	Brantford	N3T4C6	38814.63	Square feet
Dunnville SS	School	110 Helena St	Dunnville	N1A2S5	151913.4	Square feet
Echo Place PS	School	723 Colborne St	Brantford	N3S3R5	18374.59	Square feet
Elgin Avenue PS	School	80 Elgin Ave	Simcoe	N3Y4A8	40118.23	Square feet
F C Bodley PS & Learning Alternative	School	365 Rawdon St	Brantford	N3S6J3	20343.77	Square feet
Fairview Avenue PS	School	223 Fairview Ave W	Dunnville	N1A1M4	33327.65	Square feet
Fairview PS	School	34 Norman Street	Brantford	N3R2Y1	27186.71	Square feet
Glen Morris Central PS	School	522 Glen Morris Rd E	Glen Morris	N0B1W0	17889.6	Square feet
Graham Bell-Victoria PS	School	56 Grand St	Brantford	N3R4B2	34102.13	Square feet
Grandview Central PS	School	11 Thrush St	Dunnville	N1A1X7	19708.7	Square feet
Grandview PS	School	68 North Park St	Brantford	N3R4J9	31754.55	Square feet
Greenbrier PS	School	33 White Oaks Ave	Brantford	N3R5N8	23196.21	Square feet
Hagersville Elementary School	School	40 Parkview Road	Hagersville	N0A1H0	30835.02	Square feet
Hagersville SS	School	70 Parkview Rd	Hagersville	N0A 1H0	128206.6	Square feet

Hagersville SS - Haldimand Support C	Administrative off	70 Parkview Rd	Hagersville	N0A 1H0	3622.04	Square feet
H.E. F. Teachers Resource Centre	Administrative off	108 Tollgate Road	Brantford	N3R 4Z6	18158.72	Square feet
Houghton Annex	School	505 Fairground SR, R.R. #5	Langton	N0E 1G0	2798.62	Square feet
Houghton PS	School	505 Fairground Sideroad	Langton	N0E1G0	27289.08	Square feet
J L Mitchener PS	School	Box 99 60 Munsee St South	Cayuga	N0A1E0	35900.22	Square feet
James Hillier PS	School	62 Queensway Dr	Brantford	N3R4W8	30203.5	Square feet
Jarvis PS	School	14 Monson St	Jarvis	N0A1J0	31947.29	Square feet
Joseph Brant Learning Centre	School	347 Erie Ave	Brantford	N3S2H7	3873.264	Square feet
Joseph Brant Learning Centre	Administrative off	347 Erie Ave	Brantford	N3S2H7	14629.43	Square feet
King George PS	School	265 Rawdon St	Brantford	N3S6G7	39245.22	Square feet
Langton PS	School	23 Albert Street	Langton	N0E1G0	24822.62	Square feet
Lansdowne PS	School	21 Preston Blvd	Brantford	N3T5B1	28998.91	Square feet
Lynndale Heights ES	School	55 Donly Drive South	Simcoe	N3Y5G7	35284.1	Square feet
Major Ballachey PS	School	105 Rawdon St	Brantford	N3S6C7	47813.29	Square feet
McKinnon Park SS	School	91 Haddington St	Caledonia	N3W 2H2	122191.3	Square feet
McKinnon Park SS	Other	91 Haddington St	Caledonia	N3W 2H2	3910.29	Square feet
Mount Pleasant PS	School	667 Mt. Pleasant Road	Mt. Pleasant	N0E1K0	18556.98	Square feet
North Park C & VS	School	280 North Park St	Brantford	N3R 4L1	175155.2	Square feet
North Ward PS	School	107 Silver St	Paris	N3L1V2	43927.52	Square feet
Oakland-Scotland PS	School	15 Church Street West	Scotland	N0E1R0	21667.73	Square feet
Oneida Central PS	School	661 4th Line	Caledonia	N3W2B2	21402.61	Square feet
Onondaga-Brant PS	School	21 Brant School Rd., R.R. #1	Brantford	N3T5L4	19447.75	Square feet
Paris Central PS	School	7 Broadway St E	Paris	N3L2R2	24756.99	Square feet
Paris DHS (Sec)	School	231 Grand River St N	Paris	N3L 2N6	148918.6	Square feet

Pauline Johnson C & VS	School	627 Colborne St	Brantford	N3S 3M8	186158.6	Square feet
Port Dover Comp S	School	713 St. George St	Port Dover	N0A1N0	90309.12	Square feet
Port Rowan PS	School	48 College Avenue	Port Rowan	N0E1M0	22927.13	Square feet
Prince Charles PS	School	40 Morton Ave	Brantford	N3R2N5	28621.21	Square feet
Princess Elizabeth PS	School	60 Tecumseh St	Brantford	N3S2B5	25887.18	Square feet
Rainham Central PS	School	RR 1 572 Concession 5	Fisherville	N0A1G0	23795.77	Square feet
River Heights E S	School	37 Forfar St.	Caledonia	N3W1L6	52887.18	Square feet
Russell Reid PS	School	43 Cambridge Dr.	Brantford	N3R5E3	25736.51	Square feet
Ryerson Heights	School	33 Dowden Ave	Brantford	N3T0A3	56893.78	Square feet
Ryerson Heights	Other	33 Dowden Ave	Brantford	N3T0A3	2520.8	Square feet
Seneca Central PS	School	2767 Reg Rd #9	York	N0A1R0	16913.01	Square feet
Simcoe Comp S	School	40 Wilson Ave	Simcoe	N3Y 2E5	146606.8	Square feet
St George-German PS	School	3 College Street	St. George	N0E1N0	41430.29	Square feet
Teeterville PS	School	229 Teeter St. PO Box 1	Teeterville	N0E1S0	19558.56	Square feet
Thompson Creek E S	School	800 Cross St W	Dunnville	N1A 1N7	52463.25	Square feet
Tollgate Technological Skills Centre	School	112 Tollgate Rd	Brantford	N3R 4Z6	98844.89	Square feet
Valley Heights SS	School	2561 #59 Highway	Langton	N0E 1G0	109092.1	Square feet
Walpole North E S	School	1895 Regional Rd. #55, R.R. #5	Hagersville	N0A1H0	19886.65	Square feet
Walsh Public School	School	933 St. John's Road West ,RR#2	Simcoe	N3Y4K1	35761.47	Square feet
Waterford DHS	School	227 Main St., South	Waterford	N0E 1Y0	118216.7	Square feet
Waterford DHS - Norfolk Support Ce	Administrative off	227 Main St., South	Waterford	N0E 1Y0	6906.82	Square feet
Waterford DHS	Other	227 Main St., South	Waterford	N0E 1Y0	1137.18	Square feet
Waterford PS	School	100 East Church St	Waterford	N0E1Y0	14760.13	Square feet
West Lynn PS	School	18 Parker Dr	Simcoe	N3Y1A1	28815.63	Square feet
Woodman Drive	School	51 Woodman Dr	Brantford	N3S4K3	22417.98	Square feet

3.0 ENERGY CONSUMPTION DATA FOR THE BOARD

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

Utility:	Fiscal Year 2011-2012 (Baseline)	Fiscal Year 2012-2013 (Current)
Total Electricity (kWh)	24,167,195.95	25,417,427.16
Total Natural Gas (m3)	4,068,912.57	4,592,544.34
Total Prone (L)	20,730.00	23,650
Others	N/A	N/A

The values below are raw data

	Fiscal Year 2011-2012 (Baseline)	Fiscal Year 2012-2013 (Current)
Total Energy Consumed (ekWh)	67,282,028.13	74,623,700.81

3.1 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)
 - Libraries
 - Lighted sports fields

- 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

4.0 ENERGY CONSERVATION GOAL

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

Fiscal Year	2013-2014 (ekWh/m ²)	2014-2015 (ekWh/m ²)	2015-2016 (ekWh/m ²)	2016-2017 (ekWh/m ²)	2017-2018 (ekWh/m ²)
Conservation Goals	0.56	1.36	1.81	1.13	2.19

	Fiscal Years: 2013-2018 (ekWh/m ²)
Cumulative Conservation Goal	18.11

5.0 ENERGY MANAGEMENT STRATEGIES

Energy management strategies fall into three key categories:

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

5.1 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.

The Board's energy management plan for the next five years includes the design/construction/retrofit strategies (see charts below).

5.2 Operations and Maintenance

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

The Board's energy management plan for the next five years includes operation and maintenance strategies (see charts below).

5.3 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.

The Board's energy management plan for the next five years includes the occupant strategies (see charts below).

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					
Solar water					
Wind Turbine					
Biomass					
Other					

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	\$40,000.00	39,506	\$ 125,000	123,457	\$ 200,000	197,531	\$ 35,000	34,568	\$ 25,000	24,691	1,377,778
Daylight Sensors	10	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Outdoor Lighting	15	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Occupancy Sensors	10	\$ 1,000	1,481	\$ -	-	\$ -	-	\$ -	-	\$ -	-	7,407
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	\$ -	-	\$ -	-	\$ 60,000	103,886	\$ -	-	\$ 165,000	285,686	597,344
High Efficiency Boilers (condensing)	15	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
High-efficiency boiler burners	10	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Geothermal	15	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Heat recovery/enthalpy wheels	30	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Economizers	15	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Energy efficient HVAC systems	30	\$ -	-	\$ -	-	\$ -	-	\$170,000.00	26,916	\$65,000.00	10,291	64,123
Energy efficient Rooftop units	15	\$ 125,000	49,478	\$ -	-	\$ -	-	\$ -	-	\$ -	-	247,390
High Efficiency Domestic Hot Water	15	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$125,000.00	256,878	256,878
Efficient Chillers and Controls	25	\$ -	-	\$150,000.00	11,111	\$ -	-	\$ -	-	\$ -	-	44,444
High-efficiency motors	20	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
VFD	15	\$ -	-	\$50,000.00	91,236	\$50,000.00	91,236	\$50,000.00	91,236	\$ -	-	821,121
Demand Ventilation	10	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$30,000.00	71,248	71,248
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	\$ -	-	\$2,000.00	1,583	\$ -	-	\$ -	-	\$ -	-	6,333
Building Automation Systems - Upgrade	10	\$ -	-	\$120,000.00	94,998	\$150,000.00	118,747	\$150,000.00	118,747	\$ -	-	973,727
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	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
New Roof	25	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
New Windows	30	\$10,000.00	2,326	\$25,000.00	5,815	\$ -	-	\$ -	-	\$ -	-	34,890
Treatments	10	\$20,000.00	37,216	\$20,000.00	37,216	\$20,000.00	37,216	\$ 20,000	37,216	\$20,000.00	37,216	558,243
Shading Devices	30	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Other (Describe)		\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Design, Construction and Retrofit Strategies Total		\$ 196,000	130,008	\$ 492,000	365,416	\$ 480,000	548,616	\$ 425,000	308,683	\$ 430,000	686,012	5,060,929

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	\$ 10,000	23,749	\$ -	-	\$ -	-	\$ -	-	\$ -	-	118,747
Day and Night Temperature Guidelines for all Schools		10	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Night time blackout of sites	Interior	10	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
	Exterior	10	\$ -	-	\$ 15,000	15,873	\$ -	-	\$ -	-	\$ -	-	63,492
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	\$ 40,000	475	\$ -	-	\$ -	-	\$ -	-	\$ -	-	2,375
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	\$ -	-	\$ 13,000	37,785	\$ 10,000	29,065	\$ 10,000	29,065	\$ 10,000	29,065	325,529
Other (Describe)			\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Operations and Maintenance Strategies Total			\$ 50,000	24,224	\$ 28,000	53,658	\$ 10,000	29,065	\$ 10,000	29,065	\$ 10,000	29,065	510,144

\$ 0.135 = cost of 1 ekWh electricity
\$ 0.0334 = cost of 1 ekWh natural gas
0.0955 m³ = 1 ekWh
\$0.35 = cost of 1 m³ of natural gas

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 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	\$ -	-	\$ 5,000	59	\$ 5,000	59	\$ 5,000	59	\$ 5,000	59	594
Building Automation Training (site specific)	3	\$ -	-	\$ 2,000	21,193	\$ 2,000	21,193	\$ 2,000	21,193	\$ 2,000	21,193	211,932
Ongoing training and awareness programs for energy conservation	5	\$ 15,000	12,015	\$ 15,000	12,015	\$ 15,000	12,015	\$ 15,000	12,015	\$ 15,000	12,015	180,227
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	\$ 50,000	594	\$ 5,000	59	\$ 5,000	59	\$ 5,000	59	\$ 5,000	59	3,562
Participate in environmental programs, such as EcoSchools, Earthcare	1	\$ 20,000	32,040	\$ 20,000	32,040	\$ 20,000	32,040	\$ 20,000	32,040	\$ 20,000	32,040	480,606
Other tools (Define)		\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-
Occupant Behaviour Strategies Total		\$ 85,000	44,649	\$ 47,000	65,367	\$ 47,000	65,367	\$ 47,000	65,367	\$ 47,000	65,367	876,921

\$0.135 = cost of 1 ekWh electricity

\$0.0334 = cost of 1 ekWh natural gas

0.0955 m³ = 1 ekWh

\$0.35 = cost of 1 m³ of natural gas

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

	FY2013
Total Building Area (includes portables) (m²)	356,041
Total Building Area (includes portables) (ft²)	3,832,521
Energy Consumption for the board (ekWh)	70,623,701

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 B; Design, Construction and Retrofit Strategies Total	\$ 196,000	130,008	\$ 492,000	365,416	\$ 480,000	548,616	\$ 425,000	308,683	\$ 430,000	686,012	5,060,929
Appendix C; Operations and Maintenance Strategies Total	\$ 50,000	24,224	\$ 28,000	53,658	\$ 10,000	29,065	\$ 10,000	29,065	\$ 10,000	29,065	510,144
Appendix D; Occupant Behaviour Strategies Total	\$ 85,000	44,649	\$ 47,000	65,367	\$ 47,000	65,367	\$ 47,000	65,367	\$ 47,000	65,367	876,921
TOTAL	\$ 331,000	198,882	\$ 567,000	484,441	\$ 537,000	643,049	\$ 482,000	403,116	\$ 487,000	780,444	6,447,993
Percentage reduction		0		1		1		1		1	1.826013902
Conservation Goal (ekWh/m²)		0.56		1.36		1.81		1.13		2.19	18.11
Conservation Goal (ekWh/ft²)		0.051893143		0.12640269		0.167787327		0.105182872		0.203637288	1.682441488

6.0 ENVIRONMENTAL EDUCATION

6.1 Policy

In support of environmental sustainability and environmental education, the Grand Erie District School board has developed a number of policies and procedures. These include the following:

- Policy SO18: Environmental Education and Stewardship
available online at:
<http://www.granderie.ca/Board/BoardMeetings/AgendasMinutes/Documents/SO18%20Environmental%20Education%20Stewardship.pdf>
- Procedure FT10: Green School Construction and Renovation
available online at:
<http://www.granderie.ca/Board/Bylaws%2c%20Policies%20and%20Procedures/Documents/FT10%20green%20school%20construction.pdf>
- Policy FT117: Green School Construction and Renovation
available online at:
<http://www.granderie.ca/Board/Bylaws%2c%20Policies%20and%20Procedures/Documents/FT117%20green%20school%20construction.pdf>
- Policy and Procedure on Environmental Standards in Maintenance (pending approval)
- Policy and Procedure on Environmental Standards in Operations (pending approval)

6.2 EcoSchools

The Grand Erie District School Board began implementing the Ontario EcoSchools program in September 2009 with one secondary school; they have since expanded the program to 19 certifying Ontario EcoSchools in the 2011-2012 school year or 25% of Grand Erie District School Boards certified as an EcoSchool.

Ontario EcoSchools is an environmental education and certification program for grades K-12 that helps school communities develop both ecological literacy and environmental practices to become environmentally responsible citizens and reduce the environmental footprint of schools (www.ontarioecoschools.org). The Ontario EcoSchools program not only emphasizes, reflects and supports the Ontario Curriculum in Environmental Education, but also encourages students to become involved and take a lead in reducing our environmental impact. The program focuses on the areas of: Ecological Literacy, Waste Minimization, Energy Conservation, School Ground Greening and Environmental Stewardship. Further, statistics have proven that EcoSchools use less energy per square meter than non-EcoSchools within the Board. Ontario EcoSchools is 100% free and has been developed by schools for schools. Its purpose is to promote ecological literacy for students, provide leadership opportunities, establish environmentally friendly practices

within the school and provides an opportunity for assessment and celebration.

The Facility Services has committed to providing each certified EcoSchool with a water filling station paid for and installed through the Facility Services budget. The Ontario EcoSchool Program provides the certified school with a plaque and a seal indicating the certification level of Bronze, Silver, and Gold. These are just tools that we use to recognize the staff and students for their hard work and their efforts.

	Bronze	Silver	Gold
Number of GEDSB Certified EcoSchools	4	10	5

	Elementary Schools	Secondary School
Number of GEDSB Certified EcoSchools	15	4

7.0 ENERGY EFFICIENT INCENTIVES

In an effort to reduce our environmental footprint, Facility Services has focused on lighting retrofits and upgrades. Through the Ontario Power Authority (OPA)'s saveONenergy program, multiple incentives programs are available, which the GEDSB has participated in.

The first program is the Small Business Lighting Program. Through this program, smaller peak demand schools (less than 50kW) were granted a \$1,000 incentive in lighting upgrades and a free energy audit. This program allowed Facility Services to retrofit over 65 exit signs from incandescent lights to *light-emitting diode* (LED) lights. Surprisingly this is an annual savings of approximately 15,372.8 kilowatt hour (kWh) or \$25 per sign, resulting in over \$1,600 of annual savings. This program also allowed Facility Services to replace 190 T12 lights remaining within these 15 locations. Replacing T12s with T8s typically provide energy savings greater than 40% while improving the quality of lighting. Any remaining incandescent bulbs were also replaced with compact fluorescent lights (CFLs) at these select locations. Over 66 CFLs were installed for a potential savings of 7,835 kWh or approximately \$850 annually. Therefore, just through this initiative and opportunity through the OPA, the Grand Erie District School Board was able to reduce their energy consumption by nearly 53207.8 kWh (or 53 mWh). Although this is just a small step in the energy conservation portfolio, it is certainly a start.

The other saveONenergy programs will allow the GEDSB to retrofit existing equipment with high efficiency equipment and for installing new controls for up to 50% of the project costs. Incentives are paid out per unit type installed. This could include upgrades to lighting, motors, unitary A/C, etc. Upon the approved funding, the Grand Erie District School Board will be seeking incentives from the Retrofit Program for the installation of variable speed drives on pumps, cooling towers and rooftop units at a number of secondary schools. Incentives will be obtained in order to replace the remaining T12 ballasts and bulbs from within all GEDSB sites, practically from the Education

Centre and Facility Services. This will significantly reduce energy consumption and the associated costs.

8.0 ENERGY PROCUREMENT

The Grand Erie District School Board participates in a consortium arrangement to purchase natural gas with a number of other school boards. This is the CSBSA (Catholic School Boards Service Association) Natural Gas Consortia.

9.0 DEMAND MANAGEMENT

As part of the Board's energy saving initiatives, the Grand Erie District School Board committed to the installation and use of a Building Automation System throughout its elementary, secondary and administration sites. To date, TACanada (TAC) has installed thousands of sensors, actuators and controllers in order to make our buildings as comfortable, productive, safe, and energy efficient as possible.

The BAS allows for extensive monitoring and management of the GEDSB's energy use, including demand and power factor. Sensors and controllers not only allow for real time performance data to be gathered, sorted and summarized but also allows Facility Services personnel to manage when the system may be turned off or put on setback.

Measurements and evaluations of electrical demand and consumption are captured in real time 15 minute intervals. This data has the ability to be viewed on a graph or archived in spreadsheets for later viewing. This allows Facility Services to effectively monitor the conditions within the school by identifying and understanding usage patterns, understand rates and billing, identify and troubleshoot abnormalities and peaks in energy consumption.

Temperature controls in each classroom and many other central areas of schools allow occupants to customize their environment within allowable parameters. Classroom and central area lighting are all integrated within the BAS to shut off after fifteen minutes of inactivity within the space. The BAS allows Facility Services to schedule and program when equipment should and should not be operating in order to maximize energy conservation.

10.0 APPROVAL

Senior Management Approval of this Energy Conservation and Demand Management Plan

I confirm that Grand Erie District School Board's senior management has reviewed and approved this Energy Conservation and Demand Management Plan.

Tom Oldham,
Manager of Facility Services

June 27, 2014