Windsor-Essex Catholic District School Board

Energy Conservation and Demand Management Plan

July 1, 2019

WINDSOR-ESSEX CATHOLIC DISTRICT SCHOOL BOARD

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Education Sector Background

Funding and Energy Management Planning

The Windsor-Essex Catholic District School Board receives 100% funding from the Ministry of Education.

Normally, the Ministry announces the Board's funding assignment in March for the next Fiscal Year (September 1st to August 31st). The Ministry gives funding only on a year-by-year basis.

While the Board may have a five-year energy management strategy, the ability to implement the strategy depends on the funding that's received for each of the five years covered by their plan.

Asset Portfolios and Energy Management Planning

The education sector is unique in that the Board's asset portfolio can experience important changes that crucially impact the Board's energy consumption over a five-year period.

The following is a list of some of the most common variables and metrics that change in the education sector.

Facility Variables:

- Construction
  - Year built
  - Number of floors
  - Orientation of the building
- Building Area
  - Major additions
  - Sites sold/closed/demolished/leased
  - Portables
    - Installed
    - Removed
  - Areas under construction
- Equipment/Systems
  - Age
  - Type of technology
  - Lifecycle

    - Percentage of air-conditioned space
- Site Use
    - Elementary school
    - Secondary school
    - Administrative building
    - Maintenance facility
    - Community Hubs

Other Variables:

- Programs
    - Child care
    - Before/After School Programs
    - Summer School
    - Community Use
- Occupancy
    - Significant increase or decrease in number of students
    - Significant increase in the hours of operation
    - New programs being added to a site
- Air Conditioning
    - Significant increase in air-conditioned space
    - Portables

WINDSOR-ESSEX CATHOLIC DISTRICT SCHOOL BOARD

PART I: A REVIEW OF PROGRESS & ACHIEVEMENTS in the PAST FIVE YEARS

A. The Board's Asset Portfolio

The following table outlines the energy-related variables and metrics in the Board's asset portfolio that changed from the baseline Fiscal Year 2012 to 2013 to the end of the five-year reporting period Fiscal Year 2017 to 2018.

Table 1: Board's Asset Portfolio

Key Metrics	(Baseline Year) Fiscal Year 2012 to 2013	Fiscal Year 2017 to 2018	Variance
Total Number of Buildings	55	49	↓ 6
Total Number of Portables/Portapaks	86	63	↓ 23
Total Floor Area	273,553 m^2	261,699 m^2	↓ 11,854
Average Operating Hours	42 hrs	42 hrs	0
Average Daily Enrolment	21,047	20,051	↓ 996
Community Use Hours	41,398	56,624	↑ 15,226

B. Energy Usage Data for the Board

The following table lists the "metered"[1] consumption values in the common unit of Equivalent Kilowatt Hours (ekWh) and Kilowatt Hours (kWh).

Table 2: Metered Usage Values

Utility	Fiscal Year 2012 to 2013 (Baseline year)	Fiscal Year 2017 to 2018
Total Electricity (kWh)	21,809,040	23,290,170
Total Natural Gas (ekWh)	35,098,200	35,604,990

C. Weather Normalized Energy Consumption Values

In Ontario, 25% to 35% of energy consumption for a facility is affected by weather.

1 Metered consumption is the quantity of energy used and does not include a loss adjustment value (the quantity of energy lost in transmission).

To demonstrate the effect of weather, the following table shows the Weighted Average Heating Degree Days (HDD)[2] and Cooling Degree Days (CDD)[3] for the six most common Environment Canada weather stations in the Ontario education sector.

Table 3: Ontario Degree-days

Ontario Degree Days	Fiscal Year 2012 to 2013	Fiscal Year 2013 to 2014	Fiscal Year 2014 to 2015	Fiscal Year 2015 to 2016	Fiscal Year 2016 to 2017	Fiscal Year 2017 to 2018
HDD	3698	4285	4091	3355	3583	3989
CDD	289	217	271	462	303	432

The best way to compare energy usage values from one year to another is to use weather normalized values as they take into consideration the impact of weather on energy performance and allows an “apple-to-apple” comparison of consumption across multiple years.

However, a straight comparison of Total Energy Consumed between one or more years does not take into consideration changes in the Board’s asset portfolio, such as changes in buildings’ features (refer to the Facility Variables listed on pages 5 and 6), and newly implemented programs (refer to the Note to Readers on pages 10-12) which will greatly impact energy consumption.

As a result, weather normalized Energy Intensity[4] is the most accurate measurement that allows the evaluation of the Board’s energy use from one year to another as it cancels out any change in floor area. The unit of measurement used is either equivalent kilowatt hours per square foot (ekWh/ft2) or equivalent kilowatt hours per square metre (ekWh/m2).

[2] Heating Degree Day (HDD) is a measure used to quantify the impact of cold weather on energy use. In the data above, HDD are the number of degrees that a day's average temperature is below 18C (the balance point), the temperature at which most buildings need to be heated.
[3] Cooling Degree Day (CDD) is a measure used to quantify the impact of hot weather on energy use. In the data above, CDD are the number of degrees that a day’s average temperature is above 18C, the temperature at which most buildings need to be cooled. It should be noted that not all buildings have air conditioning and some building have partial air conditioning. The UCD only applies CDD to meters that demonstrate an increase in consumption due to air conditioning.
4 Energy Intensity (known as EI) is the quantity of total energy consumed divided by the total floor area. EI is typically expressed as equivalent kilowatt hours per square foot (ekWh/ft2), gigajoule per square metre (GJ /m2), etc., depending on the user’s preference.

Table 4: Weather Normalized Values

Weather Normalized Values	Fiscal Year 2012 to 2013 (Baseline Year)	Fiscal Year 2017 to 2018 (Most Recent Data Available)
Total Energy Consumed (ekWh)	55,924,600	55,222,190
Energy Intensity (eKWh/ft2)	18.73	19.12
Energy Intensity (eKWh/m2)	201.63	205.86

D. Review of Previous Energy Conservation Goals and Achievements

In 2014, the Board set annual energy conservation goals for the following five fiscal years. The following table compares the Energy Intensity Conservation Goal with the Actual Energy Intensity Reduced for each year.

Table 5: Comparison of Energy Intensity Conservation Goal and Actual Energy Intensity Reduced

Fiscal Year	Conservation Goal ekWh/ft2	Conservation Goal ekWh/m2	Conservation Goal Percentage	Actual Energy Savings ekWh/ft2	Actual Energy Savings ekWh/m2	Actual Energy Percentage
2013 to 2014	0.18	1.93	0.93 %	0.68	7.35	-3.64 %
2014 to 2015	0.22	2.36	1.13 %	-0.56	-6.00	2.87 %
2015 to 2016	0.40	4.35	2.09 %	0.94	10.10	-4.97 %
2016 to 2017	0.27	2.88	1.38 %	0.18	1.89	-0.89 %
2017 to 2018	0.20	2.18	1.05 %	-0.85	-9.10	4.23 %

NOTE TO READERS:

The Conservation Goals were forecasted in Spring 2014. Since then several factors, which impact energy use, have been introduced to the education sector that may either raise or limit the Board's ability to make the forecasted Conservation Goals.

Some of these factors include:

Full Day Kindergarten (also known as FDK)

The introduction of FDK created many new spaces through new additions or major renovations of existing facilities. The result was more floor area and sometimes more energy-intensive designs due to factors such as:

- Higher ventilation requirements,
- Use of air conditioning, etc.

These factors increase the energy intensity of a building. Under FDK, spaces for more than 470,000 new students were added to the education sector.

Before and After School Programs

These programs were implemented to help the introduction of FDK spaces. However, Before-School and After-School Programs need a facility's Heating, Conditioning, and Air Conditioning (also known as HVAC) system to operate for an extended period of time on a daily basis, which will increase the overall energy intensity.

Community Use of Schools

The Ministry of Education introduced funding to all school boards, so they can make school space more affordable for use after hours. Both indoor and outdoor school space is available to not-for-profit community groups at reduced rates, outside of regular school hours. The use of spaces in schools, typically gymnasiums and libraries, increased to maximum usage. The use of these spaces during non-school hours requires a facility's HVAC system to operate for an extended period of time on a daily basis, which will increase the overall energy intensity.

Community Hubs

In 2016, the Ministry of Education introduced funding for boards to carry out Community Hubs within their asset portfolios. As a result, many schools now offer a greater range of:

- events (cultural),
- programs (arts, recreation, childcare), and
- services (health, family resource centres).

The dramatic increase in community use means that many schools now run from 6:00 a.m. until 11:00 p.m. during weekdays and are open many times on weekends. The use of these spaces during non-school hours requires a facility's HVAC system to operate for an extended period of time on a daily basis, which will increase the overall energy intensity.

Air Conditioning

Historically, schools have not had air conditioning, or it has been a minimal space in the facility. However, with changing weather patterns, "shoulder seasons" such as May, June and September are experiencing higher than normal temperatures. Parents are demanding that schools have air conditioning. Air conditioning significantly increases a facility's energy use.

Compliance with current Ontario Building Code (also known as OBC)

When renovations occur or an addition is built onto an existing school, in-place equipment such as HVAC systems, lighting etc., may be required to meet up-to-date OBC standards which may result in increased energy use.

For example under the OBC, buildings built today have increased ventilation requirements, meaning more outside air is brought into a facility. As a result, HVAC systems need to work longer to heat or cool the outdoor air to bring it to the same temperature as the standard indoor temperature for the building.

E. Cumulative Energy Conservation Goal

The following table compares the 2014 Forecasted Cumulative Energy Intensity Conservation Goal with the Actual Cumulative Energy Intensity Reduced Savings.

Table 6: Cumulative Energy Intensity Goal from Fiscal Year 2013 to 2014 through Fiscal Year 2017 to 2018

Cumulative Energy Intensity	(ekWh/ft2)	(ekWh/m2)	Variance
Forecasted. Cumulative Energy Intensity Conservation Goal of Fiscal Year 2013 to 2014 through Fiscal Year 2017 to 2018	3.72	40.06	-
Forecasted Cumulative Energy Intensity Conservation Goal as a Percentage	-	-	3.85%
Actual Cumulative Energy Intensity Reduced or Increased from Fiscal Year 2013 to 2014 through Fiscal Year 2017 to 2018 – Weather Normalized	0.39	4.23	-
Variance between 2014 Forecast Cumulative Conservation Goal and Actual Cumulative Energy Intensity– Weather Normalized	-4.11	-44.29	-
% of Cumulative Energy Intensity Conservation Goal Achieved - Weather Normalized	-	-	-10.55%

F. Measures Implemented from Fiscal Year 2012 to 2013 to Fiscal Year 2017 to 2018

A list of the measures implemented, the related costs, and the fiscal year that the measure was implemented within the Board are outlined in **Appendix E: Investments**

in Energy Efficiency between Fiscal Year 2013 and Fiscal Year 2018. Here is the list of sheets:

1. Design, Construction and Retrofit Investments
2. Operations and Maintenance Investments
3. Occupant Behaviour Investments
4. Renewable Energy Investments
5. Summary of All Investment Types

NOTE TO READERS:

Important Consideration - It takes a minimum of one full year after an energy management strategy has been implemented before an evaluation can figure out the related actual energy savings achieved.

PART II – ENERGY CONSERVATION and DEMAND MANAGEMENT PLAN for FISCAL YEAR 2018 to 2019 to FISCAL YEAR 2023 to 2024

Part II outlines the board's plan to reduce energy consumption through renewable energy and energy management strategies including:

1. Design, Construction and Retrofit;
2. Operations and Maintenance; and lastly
3. Occupant Behavior.

1. To date the Board's energy management strategy has included the following:

Design, Construction and Retrofit

Lighting

To date the Board has converted interior and exterior lighting to LED at seven (7) schools. The Board is currently in the process of converting four (4) schools interior lighting to LED and two (2) schools exterior lighting to LED.

Controls

The Board has upgraded the controls systems at three (3) schools to allow for improved control over equipment and minimize energy consumption.

Building Envelope

The Board continually evaluates and replaces sections of roofs, exterior doors and windows to improve the insulation of our buildings.

HVAC (Heating, Ventilation, and Air Conditioning)

The Board has upgraded boilers, chillers, heat pumps, and hot water tanks with more efficient equipment to minimize energy consumption.

Operations and Maintenance

The Board will implement the following temperature settings:

Season	Occupied Set Point	Unoccupied Set Point
Heating	70°F / 21°C	64°F / 17.5°C
Heating (Gym)	68°F / 20°C	64°F / 17.5°C
Cooling	74°F / 23°C	80°F / 26.5°C
Cooling (Gym)	70°F / 21°C	80°F / 26.5°C

The occupied temperature set point shall be operational from 6 am – 4 pm. The unoccupied set point temperature shall be operational from 4 pm – 6 am. These temperatures can be programmed differently when there are community use events in gymnasiums, auditoriums, or classrooms. Implementing these new temperature set points will allow the Board to better manage humidity, temperature and utility costs for the schools.

The Board has developed PM (Preventative Maintenance) strategies for HVAC equipment to ensure they are operating optimally. This reduces stress on the equipment so it will last longer and operate efficiently.

When new equipment is required to replace equipment past its useful life or for a new application, the energy efficiency rating of the equipment is part of the decision making process for purchasing the equipment.

Occupant Behaviour

The Board strives to educate its staff, students and community users on the importance of strategies to reduce energy consumption. This includes: turning off lights and computer monitors, reporting leaky faucets and motors or fans that are not working properly. Via the CMMS (Computerized Maintenance Management System) eBase, the Board is able to track and repair equipment in a timely fashion.

The Board is committed to environmental education and it is supported via the Board's *Administrative Procedure: PR SC 19 Environmental Education and Policy SC: 19 Environmental Education* found in **Appendix F: Environmental Education**.

The Board's Energy Conservation Goals:

- To increase student knowledge and develop skills and perspectives that foster environmental stewardship of God's creation.

- To provide a safe and comfortable workplace and learning environment while reducing energy costs and the overall operating costs of the Board.
- The Board will comply with the applicable legal regulations related to the environment and environmental reporting.
- The Board will continually seek out new technologies to further reduce energy consumption in Board facilities and activities.
- The Board will expand the use of environmentally friendly products in all facets of the Board's operations.
- The Board will continue to utilize the UCD (Utility Consumption Database) to monitor energy usage and yearly review and revise the energy objectives and targets.
- The Board will provide training and education to staff and students to implement the energy conservation goals.
- The Board will provide regular updates on the status of the goals and objectives.

2. The Board has an energy management position which includes the following options.
   - ☒ In-house including:
     a. Full time
     b. Part time
     c. Shared job function – Technical Supervisor, Facilities Services
   - ☐ Contracted third party, or
   - ☐ None

The Board's Technical Supervisor of Facilities Services is a Certified Energy Manager recognized by the AEE (Association of Energy Engineers). This supervisor continually researches energy conservation incentive programs that the Board can utilize to reduce costs when implementing new equipment. This supervisor monitors the Board's energy consumption via the Utility Consumption Database. This data is used to determine which schools have the highest energy intensity and require focus to reduce consumption.

3. Energy Management Strategies

Energy management strategies fall into four key categories:

1. Renewable Energy
2. Design/Construction/Retrofit

3. Operations and Maintenance
4. Occupant Behaviour

Renewal Energy

Definition

Renewal energy is a strategy to cut down the Board's energy use from the province's electricity grid. Currently, the Board has two (2) 10 kW Solar PV Micro-Fit Systems Installations; one (1) at St. Pius X and one (1) at L.A. Desmarais. Each site has a hydro meter on the Solar PV system. The combined generation of the two sites is approximately 58,000 kWh per year. These two sites offset electricity costs for the two schools by approximately $18,500 per year.

The Board has one (1) solar domestic hot water system installed at St. Thomas of Villanova Secondary School.

The Board has one (1) stand alone non grid tied solar PV system with battery backup on Fighting Island that supports one portable for ecological and environmental learning.

The Board would like to invest in future renewable systems but it is uncertain due to funding. If funding is available, the Board is planning to invest in a solar project.

Design/Construction/Retrofit

Definition

Design, construction, and retrofit includes the original and ongoing intent of how a building and its systems are to work through the combination of disciplines such as architecture and engineering.

For the Board's relevant projects over the next five years, please refer to **Calculating Energy Conservation Goals Fiscal Year 2019 to Fiscal Year 2023, Appendix A: Design, Construction, and Retrofit.**

Operations and Maintenance

Definition

Operations and maintenance include the strategies the Board uses to make sure that the existing buildings and equipment performs at maximum efficiency. For the Board's relevant projects over the next five years, please refer to **Calculating Energy Conservation Goals Fiscal Year 2019 to Fiscal Year 2023, Appendix B: Operations and Maintenance.**

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Occupant Behaviour

Definition

Strategies that the Board uses to teach occupants, including staff, students and community users, with an emphasis on changing specific actions to reduce energy consumption. For the Board's relevant projects over the next five years, please refer to **Calculating Energy Conservation Goals Fiscal Year 2019 to Fiscal Year 2023, Appendix C: Occupant Behaviour.**

A. Future Energy Conservation Goals

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

Table 7: Annual Energy Intensity Conservation Goals

Annual Energy Intensity Conservation Goal	Fiscal Year 2018 to 2019	Fiscal Year 2019 to 2020	Fiscal Year 2020 to 2021	Fiscal Year 2021 to 2022	Fiscal Year 2022 to 2023
ekW/ft2	0.78	0.93	0.96	0.97	0.95
ekW/m2	8.43	9.97	10.35	10.39	10.2
Percentage Decrease	3.84 %	4.54 %	4.72 %	4.73 %	4.65 %

The following table shows the Board's Cumulative Energy Intensity Conservation Goal for the next five fiscal years.

Table 8: Cumulative Conservation Goal

Cumulative Conservation Goal	Fiscal Year 2018 to 2019 through Fiscal Year 2022 to 2023
ekWh/ft2	4.58
ekWh/m2	49.35
Percentage Decrease	22.48 %

For the Board's summary for next five years, please refer to **Calculating Energy Conservation Goals Fiscal Year 2019 to Fiscal Year 2023, Appendix D: Conservation Goals.**

NOTE TO READERS:
There are many factors that influence a board's ability to meet energy conservation goals. A list of some of these factors include, but are not limited to, in the following changes:

1. Changes in Programming

   For example:
   - Introduction of Before and After School Programs to schools meant that the number of hours that a facility's HVAC system operates daily was expanded by four or more hours per weekday to reflect the longer occupancy hours.

2. Changes to the Ontario Building Code

   For example:
   - Regular changes/updates to the Ontario Building Code can impact energy use. For example, an increase in levels of ventilation in newly constructed buildings or other requirements. As a result, more fresh air is brought into a school to meet the ventilation requirements throughout the day requires heating and cooling of the air (dependent on the season) to meet standard classroom temperatures.

3. Changes to School Board Funding Models

   - Forecasted Conservation Goals are based on current funding models being in place throughout the next five years.
   - All boards' funding is determined on an annual basis. Any changes to the funding model will impact forecasted values.

4. Changes in Technology

   - Forecasted Conservation Goals are based on current technologies and related energy savings. If new technologies become available, anticipated energy savings may increase.

B. Environmental Programs

An excellent tool to expand environmental stewardship is via the Ontario EcoSchools Program. This program is for K-12 schools and helps the school community develop both ecological literacy and environmental practices to become environmentally responsible citizens and reduce the environmental footprints of schools. The Board believes and supports this program by:

- Providing information to the principals, vice-principals and teachers about the EcoSchools program
- Interested teachers are EcoSchool champions for their school
- EcoSchool teams are created consisting of teachers, principals, vice-principals, students, support staff, and parents
- The EcoTeam conducts an Energy Conservation review of their school as per the EcoSchools Energy Conservation guide

- An action plan is developed from the EcoReview identifying priorities for the schools

A summary of the participating EcoSchools and their certification

School Year	Number of Schools Certification Status			
	Bronze	Silver	Gold	Total
2011-12	1	-	1	2
2012-13	1	-	-	1
2013-14	-	2	-	2
2014-15	3	3	3	9
2015-16	1	7	7	15
2016-17	1	8	6	15
2017-18	-	7	8	15
2018-19	3	6	11	20

As this program continues to grow energy savings will be realized at the schools. Some of the initiatives the Board's EcoSchools participate in are listed in the table below.

Summary of Environmental Initiatives at Elementary and Secondary Schools			
Cleanup Projects			
Beach Cleanup (Point Pelee)	School yard clean up	Little River Cleanup	Neighbourhood Cleanups
Creek Cleanup	Erie Shores Environmental Clean-up	Rose City Cleanup	Water Tributary cleanup- Ojibway
Watershed Protection – River Canard Cleanup			
Environment			
Bird Feeders	Teaching and Learning with Monarch Butterflies	Community Gardens	Community Leaf Raking
Composting	ERCA Green Space Projects	Gardening	Re-naturalized Grassland Area
School Grounds – water runoff management program	Sunflower Growing Contests	Vegetable decorating & growing contest	Bird house – Fighting Island
Facilities			
Energy – turn off lights	New Energy saving photocopiers	Outdoor classrooms	Waste management

Occupancy Sensors	Turn off computer monitors	Temperature set points and setbacks	Solar Panel – Off grid Fighting Island
National Sweater Day – lower the temperature in the schools			
Incentive Programs			
Green Apple Program – Metro	Greening our school yard – Pepsi Challenge	Personal Sustainability Program with Wal-Mart	Water Testing kits – TD Canada Trust
Pat on the Back Award – City of Windsor			
Reduce, Reuse, Recycle			
Can crushing	Electronics – paperless newsletters	Ink toner cartridge recycling	Juice jammers recycling
Paper conservation – limited number of photocopies	Paperless projects	Recycling teams	Tetra pouch recycling
Recycle used batteries and electronics	Recycle fluorescent lamps	Printing double sided	GOOS – Good On One Side Program
School Programs			
Costa Rica Enviro Research Station	EcoSchools	Enviro Works Products tested – display results in a Science Fair format	Environmental Job opportunities field trip
Green Team	STEM Incentives such as Climate Crusaders	UofW Landscape green home project	Water Festival
Field trips to Fighting Island	Planet Protector Academy		
Tree Planting			
Ambassadors Club	Creation of an ERCA Nature Centre	Developed back of school yard into conservation area	Native Tree Farm
Native tree nut collection program	Serenity Garden	Solz Family Forest	

C. Energy Efficiency 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 2013 to 2014 and Fiscal Year 2017 to 2018, the Board has applied for and received $39,000 in incentive funding from different agencies to support the implementation of energy efficient projects. There are numerous other projects in process that will utilize further incentive funding.

2. The Board uses the services of the sector's Incentive Programs Advisor (IPA).

   ☒ Yes ☐ No

D. Energy Procurement

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

   ☒ Yes ☐ No

   If yes,

   ☒ OECM's Strategic Electricity Management and Advisory Services

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

   ☒ Yes ☐ No

   The Board is a member of the Windsor-Essex Energy Consortium via Shell Energy North America (Canada) Inc.

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E. Demand Management

The Board reviews invoices from the Local Distribution Companies to review and monitor our electrical Demand. The usage trends and power factor are analysed to help identify high usage schools.

Electrical demand is reduced by following temperature set points for HVAC equipment and deferred start-up of large equipment such as chillers in the spring.

F. Senior Management Approval of this Energy Conservation and Demand Management Plan

I confirm that the Windsor-Essex Catholic District School Board senior management has reviewed and approved this Energy Conservation and Demand Management Plan.

Full Name: GARY MCKENZIE

Job Title: SENIOR MANAGER - FACILITIES SERVICES

Date: JUNE 19, 2019

Appendix A: Calculating Energy Conservation Goals for FY2019 to FY2023 Design Construction and Retrofit

Calculating Energy Conservation Goals for FY 2019 to FY 2023

Design, Construction and Retrofit Strategies

		2018-2019		2019-2020		2020-2021		2021-2022		2022-2023		2018/2019-2022/2023			
Lighting	**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 Saving (ekW)**	**Estimated Total Accumulated Energy Savings (ekWh)**	**Energy Payback Period**	**% related to Electricity**	**% related to Natural Gas**
High Efficiency Lighting Systems	15	$ 1,341,120	1,094,000	$ 400,000	326,531	$ 450,000	367,347	$ 450,000	367,347	$ 400,000	326,531	8,943,416	7	100	0
Outdoor Lighting	15	$ 94,454	98,940	$ 100,000	81,633	$ 50,000	40,816	$ 50,000	40,816	$ 50,000	40,816	916,138	7	100	0
Occupancy Sensors	10	$ -	-	$ -	-	$ -	-	$ -	-	$ -	-	-	5	100	0
Other (Describe)		$ -	-	$ -	-	$ -	-	$ -	-	$ -	-	-	0		100

		2018-2019		2019-2020		2020-2021		2021-2022		2022-2023		2018/2019-2022/2023			
H.V.A.C.	**Quantity of Time that Measure will be in place**	**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)**	**Energy Payback Period**	**% related to Electricity**	**% related to Natural Gas**
Efficient Boilers (near condensing)	30	$ -	-	$ -	-	$ -	-	$ -	-	$ -	-	-	15	5	95
High-efficiency Boilers (condensing)	15	$ -	-	$ 500,000	1,390,144	$ 500,000	1,390,144	$ 500,000	1,390,144	$ 500,000	1,390,144	13,901,439	10	5	95
High-efficiency Boiler Burners	10	$ -	-	$ -	-	$ -	-	$ -	-	$ -	-	-	5	5	95
Geothermal	20	$ -	-	$ -	-	$ -	-	$ -	-	$ -	-	-	25	100	0
Heat Recovery/Enthalpy Wheels	30	$ -	-	$ -	-	$ -	-	$ -	-	$ -	-	-	8	20	80
Economizers	15	$ -	-	$ -	-	$ -	-	$ -	-	$ -	-	-	7.5	50	50
Energy Efficient HVAC systems	30	$ 310,852	40,708	$ 200,000	26,189	$ 200,000	26,189	$ 200,000	26,189	$ 200,000	26,189	465,434	75	50	50
Energy Efficient Rooftop Units	15	$ 20,217	6,618	$ 500,000	163,680	$ 500,000	163,680	$ 500,000	163,680	$ 500,000	163,680	1,669,887	30	50	50
High Efficiency Domestic Hot Water	15	$ 58,804	116,208	$ 200,000	395,237	$ 200,000	395,237	$ 200,000	395,237	$ 200,000	395,237	4,533,418	10	15	85
Efficient Chillers and Controls	25	$ 33,168	1,894	$ 150,000	8,571	$ 150,000	8,571	$ 150,000	8,571	$ 150,000	8,571	95,191	100	100	0
High-efficiency Motors	20	$ -	-	$ -	-	$ -	-	$ -	-	$ -	-	-	10	100	0
VFD	15	$ -	-	$ -	-	$ -	-	$ -	-	$ -	-	-	5	75	25
Demand Ventilation	10	$ 365,000	7,16,918	$ -	-	$ -	-	$ -	-	$ -	-	3,584,581	5	50	50
Entrance Heater Controls	20	$ -	-	$ -	-	$ -	-	$ -	-	$ -	-	-	5	50	50
Destratification Fans	10	$ -	-	$ -	-	$ -	-	$ -	-	$ -	-	-	7	100	0
Other (Describe)		$ -	-	$ -	-	$ -	-	$ -	-	$ -	-	-	0	-	100

		2018-2019		2019-2020		2020-2021		2021-2022		2022-2023		2018/2019-2022/2023			
Controls	**Quantity of Time that Measure will be in place**	**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)**	**Energy Payback Period**	**% related to Electricity**	**% related to Natural Gas**
Building Automation Systems - New	10	$ -	-	$ 150,000	98,208	$ 150,000	98,208	$ 150,000	98,208	$ 150,000	98,208	982,077	15	50	50
Building Automation Systems - Upgrade	10	$ 18,000	11,846	$ -	-	$ -	-	$ -	-	$ -	-	59,230	15	50	50
Real-time energy data for operators to identify and diagnose building issues	10	$ -	-	$ -	-	$ -	-	$ -	-	$ -	-	-	3	50	50
Voltage Harmonizers	15	$ -	-	$ -	-	$ -	-	$ -	-	$ -	-	-	7	100	0
Other (Describe)		$ -	-	$ -	-	$ -	-	$ -	-		-	-	0		100

		2018-2019		2019-2020		2020-2021		2021-2022		2022-2023		2018/2019-2022/2023			
Building Envelope	**Quantity of Time that Measure will be in place**	**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)**	**Energy Payback Period**	**% related to Electricity**	**% related to Natural Gas**
Glazing	30	$ -	-	$ -	-	$ -	-	$ -	-	$ -	-	-	30	20	80
Increased Wall Insulation	50	$ 23,940	10,332	$ -	-	$ -	-	$ -	-	$ -	-	51,665	40	20	80
New Roof	25	$ 1,457,880	125,854	$ 1,500,000	129,489	$ 1,500,000	129,489	$ 1,500,000	129,489	$ 1,500,000	129,489	1,924,158	200	20	80
New Windows	30	$ 254,781	54,981	$ 200,000	43,165	$ 150,000	32,372	$ 200,000	43,165	$ 150,000	32,372	663,373	80	20	80
Treatments	10	$ -	-	$ -	-	$ -	-	$ -	-	$ -	-	-	10	20	80
Shading Devices	30	$ -	-	$ -	-	$ -	-	$ -	-	$ -	-	-	20	100	0
Other (Describe)		$ -	-		-	$ -	-	$ -	-	$ -	-	-	0		100

		2018-2019		2019-2020		2020-2021		2021-2022		2022-2023		2018/2019-2022/2023			
Design, Construction & Retrofit Strategies Total	**Quantity of Time that Measure will be in place**	**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)**			
Total		**$ 3,968,357**	**2,249,105**	**$ 3,900,000**	**2,662,844**	**$ 3,900,000**	**2,692,053**	**$ 3,900,000**	**2,662,844**	**$ 3,900,000**	**2,611,237**	**37,790,987**			

Appendix B: Calculating Energy Conservation Goals for FY2019 to FY2023 Operations and Maintenance

Calculating Energy Conservation Goals for FY 2019 to FY 2023

Operations and Maintenance Strategies

		2018-2019		2019-2020		2020-2021		2021-2022		2022-2023		2018/2019-2022/2023			
Policy and Planning	**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**	**Energy Payback Period**	**% related to Electricity**	**% related to Natural Gas**
New School Design/Construction Guidelines and Specifications	5	$ -	-	$ -	-	$ -	-	$ -	-	$ -	-	-	5	50	50
Day and Night Temperature Guidelines for all Schools	10	$ -	-	$ -	-	$ -	-	$ -	-	$ -	-	-	5	20	80
Nighttime Blackout of Sites - Interior	10	$ -	-	$ -	-	$ -	-	$ -	-	$ -	-	-	7	100	-
Nighttime Blackout of Sites - Exterior	10	$ -	-	$ -	-	$ -	-	$ -	-	$ -	-	-	7	100	-
Procures Only Energy Star Certified Appliances	5	$ -	-	$ -	-	$ -	-	$ -	-	$ -	-	-	5	100	-
Demand Ventilation (servicing)	3		-		-	$ 10,000	19,642	$ 10,000	19,642	$ 10,000	19,642	117,849	5	50	50
HVAC Optimization (coil cleaning, re-calibration of equipment)	3	$ -	-	$ -	-	$ 15,000	73,656	$ 15,000	73,656	$ 15,000	73,656	441,935	2	50	50
Commissioning (retro and re)	10	$ -	-	$ -	-	$ 20,000	19,642	$ 20,000	19,642	$ 20,000	19,642	117,849	10	50	50
Other (Describe)		$ -	-	$ -	-	$ -	-	$ -	-	$ -	-	-	0		100

		2018-2019		2019-2020		2020-2021		2021-2022		2022-2023		2018/2019-2022/2023			
Energy Audits	**Quantity of Time that Measure will be in place**	**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**	**Energy Payback Period**	**% related to Electricity**	**% related to Natural Gas**
Walk Through Audit	5	$ -	-	$ -	-	$ -	-	$ -	-	$ -	-	-	1000	50	50
Engineering Audit	5	$ -	-	$ -	-	$ 25,000	246	$ 25,000	246	$ 25,000	246	1,473	1000	50	50
Other (Describe)		$ -	-	$ -	-	$ -	-	$ -	-	$ -	-	-	0		100

		2018-2019		2019-2020		2020-2021		2021-2022		2022-2023		2018/2019-2022/2023
Operations and Maintenance Strategies Total	**Quantity of Time that Measure will be in place**	**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**
Total		$ -	-	$ -	-	$ 70,000	113,184	$ 70,000	113,184	$ 70,000	113,184	679,106

Keys	
$0.175	= cost of 1 ekWh electricity
$0.0287	= cost of 1 ekWh natural gas
0.0955	m^3 = 1 ekWh
$0.30	= cost of 1 m^3 of natural gas

End of worksheet.

Appendix C: Calculating Energy Conservation Goals for FY2019 to FY2023
Occupant Behaviour

Occupant Behaviour Strategies

		2018-2019		2019-2020		2020-2021		2021-2022		2022-2023		2018/2019-2022/2023			
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)**	**Energy Payback Period**	**% related to Electricity**	**% related to Natural Gas**
Building Operator Training	3	$ -	-	$ -	-	$ -	-	$ -	-	$ -	-	-	3	60	40
Energy Benchmarking Program	5	$ -	-	$ -	-	$ -	-	$ -	-	$ -	-	-	1000	50	50
Building Automation Training (site specific)	3	$ -	-	$ -	-	$ -	-	$ -	-	$ -	-	-	1	60	40
Ongoing Training and Awareness Programs for Energy Conservation	5	$ -	-	$ -	-	$ -	-	$ -	-	$ -	-	-	10	90	10
Detailed Information on Building Operational Costs	1	$ -	-	$ -	-	$ -	-	$ -	-	$ -	-	-	1000	50	50
Detailed Information on Energy Consumption (e.g. via the Utility Consumption Database or other database)	1	$ -	-	$ -	-	$ -	-	$ -	-	$ -	-	-	1000	50	50
Participate in Environmental Programs, such as EcoSchools, Earthcare	1	$ 10,000	12,472	$ 10,000	12,472	$ 10,000	12,472	$ 10,000	12,472	$ 10,000	12,472	187,073	5	90	10
Other Tools (Define)		$ -	-	$ -	-	$ -	-	$ -	-	$ -	-	-	0		100
Occupant Behaviour Strategies Total		**$ 10,000**	**12,472**	**$ 10,000**	**12,472**	**$ 10,000**	**12,472**	**$ 10,000**	**12,472**	**$ 10,000**	**12,472**	**187,073**			

Keys	
$0.175	= cost of 1 ekWh electricity
$0.0287	= cost of 1 ekWh natural gas
0.0955	m^3 = 1 ekWh
$0.30	= cost of 1 m^3 of natural gas

End of worksheet.

Appendix D: Calculating Energy Conservation Goals for FY2019 to FY2023 Summary

Calculating Energy Conservation Goals for FY 2019 to FY 2023

Conservation Goal

	FY 2018	
Total Building Area (includes portables) (m^2)	268,305	Enter from UCD. - use square meters
Total Building Area (includes portables) (ft^2)	2,888,013	Enter from UCD - use square feet
Energy Consumption for the board (ekWh)	58,895,160	Enter from UCD

1 ft^2 = 0.0929 m^2

	2018-2019		2019-2020		2020-2021		2021-2022		2022-2023		2018/2019-2022/2023
	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	$ 3,968,357	2,249,109	$ 3,900,000	2,662,844	$ 3,850,000	2,652,053	$ 3,900,000	2,662,844	$ 3,800,000	2,611,237	37,790,007
Appendix C: Operations and Maintenance Strategies Total	$ -	0	$ -	0	$ 70,000	113,184	$ 70,000	113,184	$ 70,000	113,184	679,106
Appendix D: Occupant Behaviour Strategies Total	$ 10,000	12,472	$ 10,000	12,472	$ 10,000	12,472	$ 10,000	12,472	$ 10,000	12,472	187,073
TOTAL	$ 3,978,357	2,261,581	$ 3,910,000	2,675,315	$ 3,930,000	2,777,709	$ 3,980,000	2,788,500	$ 3,880,000	2,736,893	38,656,186
Percentage reduction		3.8		4.5		4.7		4.7		4.6	22.48
Conservation Goal (ekWh/m^2)		8.4		9.9		10.3		10.3		10.2	49.35
Conservation Goal (ekWh/ft^2)		0.7		0.9		0.9		0.9		0.9	4.58

Appendix E: Investments in Energy Efficiency between Fiscal Year 2013 and Fiscal Year 2018

Investments in Energy Management Strategies

Design, Construction and Retrofit Strategies

	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
Lighting	**Investments in Energy Management Strategies**	**Investment in Energy Management Strategies**	**Investment in Energy Management Strategies**	**Investment in Energy Management Strategies**	**Investment in Energy Management Strategies**
High-efficiency Lighting Systems (T-8, T-5, CFL, LED ...)	$ 76,560		$ 143,293	$ 66,916	$ 1,079,176
Daylight Sensors					
Outdoor Lighting		$ 74,229	$ 38,789	$ 66,916	$ 135,622
Occupancy Sensors					
Daylight Harvesting					
Other (Describe)	$ -	$ -	$ -	$ -	$ -

	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
HVAC	**Investment in Energy Management Strategies**	**Investment in Energy Management Strategies**	**Investment in Energy Management Strategies**	**Investment in Energy Management Strategies**	**Investment in Energy Management Strategies**
Efficient Boilers (near condensing)	$ -	$ -	$ -	$ -	$ -
High-efficiency Boilers (condensing)	$ 201,205	$ 453,937	$ 33,198	$ 44,536	$ 65,605
High-efficiency Boiler Burners					$ -
Geothermal					$ -
Heat Recovery/Enthalpy Wheels					$ -
Economizers					$ -
Energy Efficient HVAC Systems	$ 66,869	$ 459,145	$ 362,971	$ 191,449	$ 739,385
Energy Efficient Rooftop Units				$ 14,297	$ 138,291
High-efficiency Domestic Hot Water					$ -
Efficient Chillers and Controls					
High-efficiency Motors					
VFD				$ 12,147	
Demand Ventilation					
Entrance Heater Controls	$ 3,936	$ 25,578	$ 65,999	$ 15,161	
Other (Describe)	$ -	$ -	$ -	$ -	$ -

	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
Controls	**Investment in Energy Management Strategies**	**Investment in Energy Management Strategies**	**Investment in Energy Management Strategies**	**Investment in Energy Management Strategies**	**Investment in Energy Management Strategies**
Building Automation Systems - New	$ -	$ 10,000	$ 219,402	$ 361,792	$ 344,822
Building Automation Systems - Upgrade	$ -	$ -			
Voltage Regulator	$ -	$ -	$ -	$ -	$ 103,176

	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
Building Envelope	**Investment in Energy Management Strategies**	**Investment in Energy Management Strategies**	**Investment in Energy Management Strategies**	**Investment in Energy Management Strategies**	**Investment in Energy Management Strategies**
Glazing	$ -	$ -	$ -	$ -	$ -
Increased Wall Insulation	$ -		$ -		$ 1,367
New Roof	$ 625,740	$ 1,031,799	$ 2,055,202	$ 1,575,137	$ 1,152,574
New Windows	$ 222,697	$ 92,089	$ 16,677	$ 25,620	$ 100,438
Treatments	$ -			$ -	
Shading Devices	$ -	$ 2,406		$ -	
Exterior Doors	$ -	$ 17,646	$ 24,727	$ -	$ 90,059
Total Investment in Design, Construction and Retrofit Strategies	**$ 1,197,007**	**$ 2,166,825**	**$ 2,960,258**	**$ 2,373,971**	**$ 3,950,515**

Investments in Energy Management Strategies

Operations and Maintenance Strategies

	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
Policy and Planning	**Investment in Energy Management Strategies**	**Investment in Energy Management Strategies**	**Investment in Energy Management Strategies**	**Investment in Energy Management Strategies**	**Investment in Energy Management Strategies**
New School Design/Construction Guidelines and Specifications	$ -	$ -	$ -	$ -	$ -
Day and Night Temperature Guidelines for all Schools	$ -	$ -	$ -	$ -	$ -
Nighttime Blackout of Sites - Interior	$ -	$ -	$ -	$ -	$ -
Nighttime Blackout of Sites - Exterior	$ -	$ -	$ -	$ -	$ -
Procures Only Energy Star Certified Appliances	$ -	$ -	$ -	$ -	$ -
Daylight Harvesting (servicing)	$ -	$ -	$ -	$ -	$ -
Demand Ventilation (servicing)	$ -	$ 6,000	$ -	$ -	$ -
Other (Describe)	$ -	$ -	$ -	$ -	$ -

	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
Energy Audits	**Investment in Energy Management Strategies**	**Investment in Energy Management Strategies**	**Investment in Energy Management Strategies**	**Investment in Energy Management Strategies**	**Investment in Energy Management Strategies**
Walk Through Audit	$ -	$ -	$ -	$ -	$ -
Engineering Audit	$ -	$ 29,646	$ -	$ -	$ -
Other (Describe)					
Total Investment in Operations and Maintenance Strategies	**$ -**	**$ 35,646**	**$ -**	**$ -**	**$ -**

Investments in Energy Management Strategies

Occupant Behaviour Strategies

	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
Training and Education	**Estimated Cost of Implementation**	**Estimated Cost of Implementation**	**Estimated Cost of Implementation**	**Estimated Cost of Implementation**	**Estimated Cost of Implementation**
Building Operator Training	$ -	$ -	$ -	$ -	$ -
NRCan Benchmarking Program	$ -	$ -	$ -	$ -	$ -
Building Automation Training (site specific)	$ -	$ -	$ -	$ -	$ -
Ongoing Training and Awareness Programs for Energy Conservation	$ -	$ -	$ -	$ -	$ -
Provide Detailed Information on Building Operational Costs	$ -	$ -	$ -	$ -	$ -
Provide Detailed Information on Energy Consumption (e.g. via the Utility Consumption Database or other database)	$ -	$ -	$ -	$ -	$ -
Participate in Environmental Programs, such as EcoSchools, Earthcare	$ 10,000	$ 14,500	$ 22,000	$ 22,000	$ 15,000
Other tools (Define)	$ -	$ -	$ -	$ -	$ -
Total Investment in Occupant Behaviour Strategies	**$ 10,000**	**$ 14,500**	**$ 22,000**	**$ 22,000**	**$ 15,000**

Investments in Energy Management Strategies

	Investment in Renewable Energy Technology ($)						
Type of Renewable Energy	**Fiscal Year 2013-2014**	**Fiscal Year 2014-2015**	**Fiscal Year 2015-2016**	**Fiscal Year 2016-2017**	**Fiscal Year 2017-2018**	**Number of systems added**	**Capacity Added (kW)**
Solar Photovoltaic	$ -	$ -	$ -	$ -	$ -		
Solar Air	$ -	$ -	$ -	$ -	$ -		
Solar Water	$ -	$ -	$ -	$ -	$ -		
Wind Turbine	$ -	$ -	$ -	$ -	$ -		
Biomass	$ -	$ -	$ -	$ -	$ -		
Other	$ -	$ -	$ -	$ -	$ -		
Total	$ -	$ -	$ -	$ -	$ -		

Investments in Energy Management Strategies

Summary of Investment by Type

	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2013/2014-2017/2018
Total Investments in Energy Management Strategies FY 2012-13 to FY 2017-18	**Investment in Energy Management Strategies**	**Investment in Energy Management Strategies**	**Investment in Energy Management Strategies**	**Investment in Energy Management Strategies**	**Investment in Energy Management Strategies**	**Total Investment in Energy Management Strategies**
Design, Construction and Retrofit Investments Total	$ 1,197,007	$ 2,166,829	$ 2,960,258	$ 2,373,971	$ 3,950,515	12,648,580
Operations and Maintenance Investments Total	$ -	$ 35,646	$ -	$ -	$ -	35,646
Occupant Behaviour Investments Total	$ 10,000	$ 14,500	$ 22,000	$ 22,000	$ 15,000	83,500
Renewable Energy Investments Total	$ -	$ -	$ -	$ -	$ -	0
Total Investment Per Fiscal Year	$ 1,207,007	$ 2,216,975	$ 2,982,258	$ 2,395,971	$ 3,965,515	12,767,726

Appendix F: Environmental Education

Windsor-Essex Catholic District School Board

Section: Schools

POLICY SC: 19
Environmental Education

NUMBER:	SC: 19
EFFECTIVE:	July 27, 2010
AMENDED:	
RELATED POLICIES:	See References
REPEALS:	
REVIEW DATE:	2017 - 2018

1.0 OBJECTIVE:

1.1 The purpose of this policy is to promote and support implementation and expansion of environmental education.

2.0 DEFINITIONS:

2.1 **Environmental Stewardship** is the philosophy and accompanying actions of valuing and protecting the environment as something held in trust for future generations. As stewards of God's creation, *Environmental Stewardship* is a moral responsibility to promote reverence of the sacredness of the earth and to encourage sustainability through the wise management of natural resources for the benefit of all.

2.2 **Environmental education** is education about the environment, for the environment, and in the environment that promotes an understanding of rich and active experience in, and an appreciation for the dynamic interactions of:

- The Earth's physical and biological systems
- The dependency of our social and economic systems on these natural systems
- The scientific and human dimensions of environmental issues
- The positive and negative consequences, both intended and unintended, of the interactions between human-created and natural systems.

2.3 **Environmental literacy** is an important outcome of stewardship and environmental education. An environmentally literate individual will have the knowledge and perspectives required to understand public issues and place them in a meaningful environmental context.

3.0 GUIDING PRINCIPLES:

3.1 The Windsor-Essex Catholic District School Board believes that stewardship of creation and protection of the planet is a fundamental Catholic social teaching and that an environmental education framework that consists of themes associated with teaching and learning, student engagement, community connections and environmental leadership will assist students in becoming future stewards of creation.

3.2 The Windsor-Essex Catholic District School Board is committed to delivering effective environmental education and modelling environmentally responsible practices by consistently considering the environmental impact of curriculum and operational decisions.

3.3 The Windsor-Essex Catholic District School Board encourages staff, students and the school community to advocate for and follow environmentally sustainable practices. As part of this commitment, the Board is dedicated to engaging youth through leadership opportunities and will nurture students' ability to affect positive change both locally and globally.

3.4 The Windsor-Essex Catholic District School Board is committed to exercising leadership in environmental education, environmental action and care of the environment. Environmental impact will be considered in decision-making, and concern for the quality of the natural environment will be reflected in the daily activities of students and staff.

4.0 SPECIFIC DIRECTIVES:

4.1 ***Catholic Teaching and Learning*** - Environmental education initiatives shall be designed to enable students to develop the knowledge and skills they need as steward's of God creation to be environmentally active and responsible citizens, and to apply their knowledge and skills cooperatively to effect long-term change.

4.2 ***Student Learning and Community Connections*** - Students must be active participants in shaping their future. Opportunities shall be created for students to address environmental issues in their homes, in their local communities or at the global level. Student engagement shall involve the active participation of all students in sustainable environmental practices, a strong student voice in decision-making, and involvement in the school and community in meaningful ways.

4.3 ***Environmental Leadership*** - The Board shall promote leadership and encouragement for community-based, system-based and school based programs, projects, and special events designed to promote environmental awareness and conservation. By exercising environmental responsibility in its operations, the Windsor-Essex Catholic District School Board can serve as a model for students and the broader community and can ensure coherence with the environmental messages conveyed by the curriculum.

4.4 An Environmental Education Committee will be struck with membership from across the system to provide leadership support to enhance student engagement and community involvement, and to enhance the integration of stewardship and environmentally responsible practices into management of resources, operations and facilities.

4.5 The Environmental Education Committee will develop and annually review, a system-level Environmental Plan. Concern for effects on the environment shall be reflected in all system-wide practices and procedures, including but not restricted to, curriculum development, capacity building, purchasing, waste management, maintenance and custodial services, and sites/facilities.

4.6 The requirements of this policy and associated administrative procedures will be incorporated into the development and implementation of strategies, programs and procedures to protect and conserve the environment, while ensuring that schools and workplace environments are safe and healthy.

5.0 RESPONSIBILITY:

5.1 As stewards of God's creation, environmental education is the responsibility of the entire education community.

5.2 The Director of Education/designate shall issue administrative procedures to support this policy.

5.3 The Director of Education shall assign responsibility for environmental education and sound environmental practices to appropriate supervisory personnel.

5.4 Trustees will make decisions based on a careful balance between fiscal responsibility and sensitivity to a sustainable environment.

6.0 REVIEW AND EVALUATION:

6.1 This policy shall be reviewed during the 2017 - 2018 policy review cycle.

7.0 REFERENCES:

Education Act, R.S.O. 1990 and its Regulations
Environmental Protection Act, R.S.O. 1990 and its Regulations

Acting Today, Shaping Tomorrow: A Policy Framework for Environmental Education in Ontario Schools (*Ministry of Education, 2009*)
Shaping Our Schools, Shaping Our Future - Environmental Education in Ontario Schools (*Report of the Working Group on the Environmental Education, Ministry of Education, 2007*)

Administrative Procedure Pr SC:19 Environmental Education

Windsor-Essex Catholic District School Board

Section: Schools

ADMINISTRATIVE PROCEDURE: PR SC: 19 Environmental Education

NUMBER:	PR SC: 19
EFFECTIVE:	July 27, 2010
AMENDED:	
RELATED POLICIES:	See References
REPEALS:	
REVIEW DATE:	2017 - 2018

1.0 OBJECTIVE:

1.1 The purpose of this administrative procedure is to support the requirements of the Board's Environmental Education Policy.

2.0 GUIDELINES:

2.1 **Environmental education** is education about the environment, for the environment, and in the environment that promotes an understanding of rich and active experience in, and an appreciation for the dynamic interactions of:

- The Earth's physical and biological systems
- The dependency of our social and economic systems on these natural systems
- The scientific and human dimensions of environmental issues
- The positive and negative consequences, both intended and unintended, of the interactions between human-created and natural systems.

To this end, the Board undertakes the following actions as standard practices generally categorized under Catholic Teaching and Learning; Student Engagement and Community Connections; and, Environmental Leadership.

2.2 **Catholic Teaching and Learning**

To increase student knowledge and develop skills and perspectives that foster environmental stewardship of God's creation, the Windsor-Essex Catholic District School Board shall:

i. Develop and maintain curriculum materials which invite students to discover that they are deeply related to the ecological and social system of our planet and that their concern for the fate of the earth is inherently a sacred concern. The connections among environmental issues, social justice concerns, consumerism and individualism will be recognized in curriculum.
ii. Ensure that all environmental education and practice are incorporated into the context and methodology of the instructional program in all divisions and subject areas, as appropriate, through the use of relevant curriculum resource documents.
iii. Support staff and students in linking environmental knowledge and related skills and activities to the teachings of diverse communities, including First Nations, Métis, and Inuit peoples, and to principles of responsible citizenship.

iv. Encourage schools to provide opportunities for students to acquire knowledge and skills related to environmental education in all subject areas.
v. Deepen students' connection to the natural world by expanding innovative interdisciplinary, experiential programs focussing on the environment.
vi. Promote environmental leadership and provide encouragement for community-based, system-based, and school-based programs, projects, and special events designed to enhance environmental awareness and action in regard to local and regional environmental issues.
vii Support schools in modeling and teaching environmental education through an integrated approach that promotes collaboration in the development of resources and activities.
vii Schools will provide opportunities for students to acquire knowledge and skills related to environmental education in all subject areas, and encourage them to apply their knowledge and skills to environmental issues (e.g., loss of biodiversity, climate change, waste reduction, and energy conservation) through action-based projects.
ix. Schools will develop learning opportunities that will help students understand underlying causes, the multiple dimensions, and the dynamic nature of environmental issues.
x. Students will be challenged to develop skills in systems thinking and futures thinking that they will need to become discerning, active citizens who are actively aware of their responsibilities toward environmental protection and stewardship of God's creation.

2.3 Student Engagement and Community Connections

To increase student engagement by fostering active participation in environmental projects and building links between schools and communities, the Board will:

i. Engage student leaders in the design and delivery of environmental education projects at the Board and school level.
ii. Support students on a system-wide basis, as they develop skills and act as decision-makers to effect positive environmental change.
iii. Share school and student projects across the Board that demonstrate engagement in environmental stewardship (e.g., science fair).
iv. Encourage Catholic School Councils to provide advice on the implementation of environmental education and to work with the larger educational community to promote environmental awareness and foster appropriate environmentally responsible practices.
v. In working with community partners to help extend engagement in and responsibility for environmental education to the broader community, share information about local resources that support environmental awareness and protection, energy conservation, waste management, protection of the biosphere, and outdoor education.

At the school level, students will be encouraged to enrich their learning, by:

vi. Using information technology to access resources, connect with others, and create communities that focus on environmental issues.

vii Addressing environmental issues in their homes, in their local communities, or at the global level.
vii For secondary students, considering ways of completing their community service requirements that involve addressing environmental issues in their communities, in a manner consistent with Board policy.
ix. Encouraging students to plan and participate in environmental education activities.

2.4 Environmental Leadership

The Board will promote leadership and encouragement for community-based, system-based, and school-based programs, projects, and special events designed to promote environmental awareness and conservation. In order to enhance the extent to which environmental education is integrated into Board policies, procedures, and strategic plan, the Board will:

i. Encourage staff to act as exemplar role models and endeavour to create climates in which positive environmental action has an increased value and a priority status within the classroom, school, on Board property and in the community.
ii. Create a system-wide Environmental Education Committee who will develop and annually review, a system-level Environmental Plan.
iii. Embed environmental education as a priority in the Board's long-term System Priorities and annual strategic planning.
iv. Develop and implement a plan for integrating sustainable environmental practices into the Board's operational services and similarly support schools in adopting environmentally responsible management practices that are consistent with Board policy.
v. Implement strategies, programs, and procedures to protect and conserve the environment, while ensuring that schools and workplace environments are safe and healthy.
vi. Develop environmentally responsible purchasing practices, while considering quality, price and service.
vii Encourage all stakeholders to adopt and promote environmentally appropriate practices.
vii Integrate in-service opportunities related to environmental education into staff development for all employee groups, in order to increase the capacity of staff to implement evidence-based environmental education programming, practices, and operations.

Schools will develop, using the Windsor-Essex Catholic District School Board Environmental Education Policy and the Board's Environmental Plan, local priorities focused on environmental education. Schools will encourage staff to develop knowledge and skills related to environmental education and responsible environmental practices as

well as encourage mentoring opportunities and sharing opportunities through existing networks.

2.5 **Environmental Plan**

i. The Environmental Education Committee will develop and annually review, a system-level Environmental Plan that will be communicated to stakeholders.

ii. The Environmental Plan will include specific goals, the strategies and actions required by the Board and schools to attain these goals, and a means of measuring progress towards achieving the annual goals.

The goals of the Environmental Plan will include, but are not restricted to:

A. Goal 1: As stewards of God's creation, by the end of Grade 12, students will acquire knowledge, skills, and perspectives that foster understanding of their fundamental connections to each other, to the world around them, and to all living things.

B. Goal 2: Increase student engagement by fostering active participation in environmental projects and building links between schools and communities.

C. Goal 3: Increase the capacity of system leaders to implement evidence-based environmental education programming, practices and operations.

3.0 REFERENCES:

Education Act, R.S.O. 1990 and its Regulations
Environmental Protection Act, R.S.O. 1990 and its Regulations

Acting Today, Shaping Tomorrow: A Policy Framework for Environmental Education in Ontario Schools (*Ministry of Education, 2009*)
Shaping Our Schools, Shaping Our Future - Environmental Education in Ontario Schools (*Report of the Working Group on the Environmental Education, Ministry of Education, 2007*)

Board Policy SC:19 Environmental Education