Schools to believe in!

RENFREW COUNTY
CATHOLIC DISTRICT SCHOOL BOARD
499 Pembroke St. West, Pembroke, Ont., K8A 5P1

Energy Conservation and Demand Management Plan 2019-2024

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EDUCATION SECTOR BACKGROUND

FUNDING AND ENERGY MANAGEMENT PLANNING

All school boards receive 100% of their funding from the Ministry of Education.

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

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

ASSETS PORTFOLIOS AND ENERGY MANAGEMENT PLANNING

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

The following is a list of some of the 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/warehouse facility
  - Community Hubs
- Shared Site Use (For example: two or more boards share common areas and/or partnered with a municipality)
  - Libraries

- Lighted sports fields

Other Variables:

- Programs
  - Child care
  - Before/After School Programs
  - Summer School
  - Community Use
  - Outdoor ice rinks
- 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
- Other

PART 1: A REVIEW OF PROGRESS & ACHIEVEMENTS in the PAST FIVE YEARS

A. THE BOARD'S ASSET PROTFOLIO

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	22	20	2
Total Number of Portables/Portapaks	7	16	9
Total Floor Area	756822.06	723355.00	-33467.06
Average Operating Hours	35	35	0
Average Daily Enrolment	3612.13	4250.00	637.87
Other Relevant Changes in the Operation of Assets: • Total Floor Area Occupied by Child Care	0	18311	18311

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)	6993725.00	5850190.00
Total Natural Gas (ekWh)	6654123.00	7661055.00
Total Heating Fuel (Type 1 and 2) (ekWh)	423775.50	0.00
Total Heating Fuel (Type 4 and 6) (ekWh)	0.00	0.00
Total Propane (ekWh)	23478.89	132893.10
Total Wood (ekWh)	0.00	0.00
Total District Heat (ekWh)	0.00	0.00
Total District Cool (ekWh)	0.00	0.00

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

C. WEATHER NORMALIZED ENERGY CONSUMPTION VALUES

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

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 a 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 a 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/ft2).

[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)	13,755,720.00	13,396,880.00
Energy Intensity (eKWh/ft2)	18.18	18.52
Energy Intensity (eKWh/m2)	229.00	203.73

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	N/A	N/A	N/A	N/A	N/A	N/A
2014 to 2015	N/A	N/A	N/A	N/A	N/A	N/A
2015 to 2016	N/A	N/A	N/A	N/A	N/A	N/A
2016 to 2017	N/A	N/A	N/A	N/A	N/A	N/A
2017 to 2018	N/A	N/A	N/A	N/A	N/A	N/A

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 a 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 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 KNOW AS OBC)

When renovations 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 Source: Board's 2014 Plan (to be input by Board)	0.00		Do not write in this cell
Forecasted Cumulative Energy Intensity Conservation Goal as a Percentage Source: Board's 2014 Plan (to be input by Board)	Do not write in this cell	Do not write in this cell	0.00
Actual Cumulative Energy Intensity Reduced or Increased from Fiscal Year 2013 to 2014 through Fiscal Year 2017 to 2018 – Weather Normalized	0.34		Do not write in this cell
Variance between 2014 Forecast Cumulative Conservation Goal and Actual Cumulative Energy Intensity– Weather Normalized	-0.34		Do not write in this cell
% of Cumulative Energy Intensity Conservation Goal Achieved - Weather Normalized	Do not write in this cell	Do not write in this cell	0.00

F. MEASURES IMPLEMENTED FROM FISCAL YEAR 2012/13 TO FISCAL YEAR 2017/18

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: 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 2: ENERGY CONSERVATION and DEMAND MANAGEMENT PLAN for FISCAL YEAR 2018/19 to FISCAL YEAR 2023/24

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.

Background

The Board has undertaken to develop a framework for energy management and conservation that will reduce expenditures on energy utilities. Site-specific Energy Management Plans resulting from this framework are a Shared Responsibility and rely on everyone in the RCCDSB community taking personal responsibility and ownership for the success of this initiative.

The plan will respect the comfort of occupants while contributing to stewardship of financial resources and thereby student and staff success. The framework includes three documents: 1. Seasonal Energy Management Guidelines; 2. Operational Guidelines for Building Systems; and 3. Energy Conservation Guidelines for Students and Staff showing how staff and students can contribute to energy conservation. These are stand-alone resources that may be expanded as desired and incorporated into site-specific plans.

The Board is responsible for developing technical plans and programs to be incorporated into the design, maintenance and operations of our Board facilities. Schools and administrative departments will be responsible for encouraging and developing an energy conservation culture in the operation of classrooms, offices and equipment, including

computers. Roles and responsibilities are outlined for schools, and for administrative departments (Plant Services Department, Business Services Department, Information Technology, Child Care Operators, Community Use of School Users, etc.)

Principals will establish and chair a site-based or school-based Energy Management Committee to develop, implement, and sustain a comprehensive Facility Energy Management Plan. The Energy Management Committee membership will parallel that of the school's Health and Safety Committee.

There are two major components to successful energy management.

1. The Plant Services Department is responsible for operational interventions and projects that reduce energy consumption as well as working with schools (Caretakers and Principals) to implement the Seasonal Energy Management Guidelines and Operational Guidelines for Building Systems.
2. Through the Energy Management Committee, Principals are responsible for the behavioural component of this program and for promoting and building an energy management culture and practices for students and staff. Principals and staff are responsible for implementing energy conservation practices in accordance with the Energy Conservation Guideline for Students and Staff included in this document, as well as for locally developed initiatives in energy conservation and management.

1. 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
   - ☐ Contracted third party, or
   - ☐ None

2. 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 a board's energy use from the province's electricity grid and includes:

- Solar panels
- Wind Turbines, etc.

For a list of the Board's renewable energy projects, please refer to the **Calculating Energy Conservation Goals Fiscal Year 2019 to Fiscal Year 2023** explained in **Appendix A: Renewable Energy**.

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 B: 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 C: Operations and Maintenance.**

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 D: 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	1.28	4.06	34.12	1.11	1.08
ekW/m2	13.81	43.76	367.37	11.94	11.58
Percentage Decrease	6.94	21.99	184.62	6.00	5.82

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	41.65
ekWh/m2	448.47
Percentage Decrease	225.37

Considering the increasing utility prices, and a corresponding need to focus the use of scarce financial resources on Success for Students and Staff, the Plant Services Department has undertaken to develop a framework for energy management and conservation that will reduce expenditures on energy utilities.

With assistance from the Plant Services Department, Supervisory Officers and School Principals, we will use the framework in directing staff to develop specific site-based Energy Management Plans. Implementation of these plans will reduce energy consumption at school and at the Administration buildings. In this document, a reference to "School Principal" shall also include the Superintendent of Business Services at the Administrative Office. In the stewardship of energy resources staff will conserve scarce financial resources for important Board priorities related to students and staff. At the same time energy conservation will contribute to the preservation of the natural environment.

The framework relies on the multi-disciplinary, cross-functional approach, involving all school and administrative staff as well as students and authorized visitors to Board facilities. The framework relies on everyone in the Renfrew County Catholic District School Board community taking personal responsibility and ownership for the success of this initiative.

Energy Management Plans resulting from this framework are a Shared Responsibility that provide the opportunity for Servant Leadership to all staff and students.

The framework includes three documents: 1. Seasonal Energy Management Guidelines; 2. Operational Guidelines for Building Systems; and 3. Energy Conservation Guideline for Students and Staff showing how staff and students can contribute to energy conservation.

The contribution of unions, department staff, principals and supervisory officers in developing this framework for the stewardship of resources is greatly appreciated and reflects a community affirmation of common purpose and shared values across the Renfrew County Catholic District School Board.

Development, implementation and sustainability a comprehensive Energy Management Plan at schools and at the Administrative Buildings. The plan will respect the comfort of occupants while contributing to stewardship of financial resources and thereby contributing to student and staff success. The plan will promote the development of an organizational culture that sustains energy conservation practices throughout the Board.

The Plant Services Department is responsible for developing the technical operating plans and programs to be incorporated into the design, maintenance, and operation of Board facilities.

Schools and administrative will be responsible for encouraging and developing an energy conservation culture in the operation of classrooms, offices and equipment, including computers.

All schools and staff will be encouraged to incorporate energy conservation practices in day-to-day activities.

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.

SEASONAL ENERGY MANAGEMENT GUIDELINES

The Plant Services Department will organize and schedule HVAC systems to meet seasonal and operational guidelines contained in this document. It is recognized that to meet these guidelines heating and cooling set points may vary depending on the building orientation, occupant load, climatic conditions, as well as the degree and sophistication of the HVAC systems. Caretakers will inform the Plant Service Department where significant problems are encountered in meeting operational guidelines. The Plant Services Department will then investigate and help as required for repairs.

Operating parameters for Board facilities are as follows:

- In spring, summer and fall, heating and ventilating systems will be set to heat spaces that fall below 19 degrees Celsius (66 degrees Fahrenheit). With solar gain, body heat and heat gain from lights and equipment, room temperatures of 20-24 degrees should result (68-75 Fahrenheit).
- In winter, heating systems will be set to achieve 21 degrees Celsius (70 Fahrenheit).

Caretakers have the discretion to make adjustments to the building system by increasing or decreasing thermostats by 4 degrees Celsius.

Existing successful holiday and weekend shutdown practices of HVAC systems will continue.

The importance of introducing the concept of "free cooling" in the operation of buildings systems will be emphasized. At certain times of the year free cooling takes advantage of colder air and to reduce or avoid the use of air conditioning systems while at the same time improves indoor air quality and comfort especially in schools that do not have air conditioning.

HVAC systems will ne set back to 16 degrees Celsius (61 Fahrenheit) for heating and 35 degrees Celsius (95 Fahrenheit) for cooling when schools are unoccupied.

The opportunities for energy management benefits will vary across the Board depending on the mechanical systems that are incorporated into each facility and medium range weather forecasts. It is important that schedules and strategies are changed when a lengthy period of stable and predictable weather temperatures are forecasted.

Seasonal Opportunities for energy conservation and energy management by type of HVAC system are described in the Operational Guidelines for Building Systems included in this document.

The operational guidelines on the following pages describe some of the energy management strategies that may be employed in different seasonal periods depending on the sophistication of the facility HVAC systems. Depending on the occupancies and mechanical systems available, energy management strategies will be developed for each of these operating seasons.

OPERATIONAL GUIDELINES FOR BUILDING SYSTEMS by type of building system			
BUILDING SYSTEM	**SUMMER**	**LATE SUMMER-EARLY FALL**	**FALL**
Complete HVAC throughout Building	**Occupied** - supply ventilation and cooling for occupancy standard (24°C max) (75°F)	**Occupied** - supply ventilation, heating and cooling for occupancy standard (19°C to 24°C) (66°F to 75°F). Introduce "free cooling" strategies whenever possible.	
	Unoccupied - all systems will be set to achieve 16°C winter and 35°C summer set points (61°F to 95°F). All ventilation systems will be scheduled off.		
Heating, Ventilation and Partial A/C	**Occupied** - supply ventilation and cooling for 24°C (75°F) degrees maximum.	**Occupied** - supply ventilation heating and cooling for 19°C to 24°C temperatures (66°F to 75°F).	
	In non-air-conditioned areas, ventilation units will operate to maintain optimum indoor air temperature. Introduce "free cooling" strategies whenever possible.		
	Unoccupied - all systems will be set to achieve 16°C and 35°C set points (61°F to 95°F). All ventilation systems will be scheduled off.		
Heating, Ventilation Only	**Occupied** - ventilation units will operate (to maintain optimum indoor air temperature).	**Occupied** - ventilation units will operate (to maintain optimum indoor air temperature).	**Occupied** - heating and ventilation units will operate as required to heat spaces to 21°C (70°F).
	Introduce "free cooling" strategies whenever possible.		
	Unoccupied - all systems will be set to achieve 16°C set point (61°F) All ventilation systems will be scheduled off.		
Heating & Exhaust Only		**Occupied** - heating will operate as required to maintain optimum indoor air temperature.	**Occupied** - heating will operate to heat spaces to 21°C (70°F).
	Occupied - operate exhaust fans from 1/2 hour before occupancy to 1/2 hour after occupancy. Introduce "free cooling" strategies whenever possible.		
	Unoccupied - heating systems will be set to 16°C set point (61°F). All exhaust systems will be scheduled off.		

… continued

OPERATIONAL GUIDELINES FOR BUILDING SYSTEMS …cont'd				
BUILDING SYSTEM	**WINTER**	**LATE WINTER - EARLY SPRING**	**SPRING**	**LATE SPRING - EARLY SUMMER**
Complete HVAC throughout Building	**Occupied** - supply ventilation and heating for occupancy standard (21°C, 70°F).		**Occupied** - supply ventilation, heating and cooling for occupancy standard (19°C to 24°C) (66°F to 75°F). Introduce "free cooling" strategies whenever possible.	
	Unoccupied - all systems will be set to (16°C and 35°C set points) (61°F to 95°F). All ventilation systems will be scheduled off.			
Heating, Ventilation and Partial A/C	**Occupied** - supply ventilation and heating for occupancy standard (21°C to 24°C) (70°F to 75°F).	**Occupied** - supply ventilation, heating and cooling for occupancy standard (19°C to 24°C) (66°F to 75°F). Introduce "free cooling" strategies whenever possible.		
	Unoccupied - all systems will be set to 16°C and 35°C set points (61°F to 95°F). All ventilation systems will be scheduled off.			
Heating, Ventilation Only	**Occupied** - heating ventilation units will operate to heat spaces to 21°C (70°F)		**Occupied** - supply ventilation, heating and cooling for occupancy standard (19°C to 24°C) (66°F to 75°F). Introduce "free cooling" strategies whenever possible.	
	Unoccupied - all systems will be set to 16°C set point (61°F). All ventilation systems will be scheduled off.			
Heating & Exhaust Only	**Occupied** - heating will operate to heat spaces to 21°C (70°F) Operate exhaust fans for 1/2 hour before occupancy and 1/2 hour after occupancy.		**Occupied** - supply heating as required to occupancy standard (19° to 214C) (66°F to 75°F). Introduce "free cooling" using exhaust fans whenever possible.	
	Unoccupied - all systems will be set to achieve 16°C set point (61°F). All exhaust systems will be scheduled off.			

OPERATIONAL GUIDELINES FOR BUILDING SYSTEMS (by type of Mechanical Equipment)						
Outside Air Temperature	**Winter less than 7°C**		**Spring / Fall 7°C to 17°C**		**Summer greater than 17°C**	
Equipment	**Occupied**	**Unoccupied**	**Occupied**	**Unoccupied**	**Occupied**	**Unoccupied**
Boilers	on	on	As Req'd	off	off	off
Chillers	off	off	As Req'd	off	on	off
Make-up Air Units (outside air)	on	off	on	off	on	off
Air handling Units (supply & return)	21°C	16°C	19°C-24°C	off	24°C	off
Heat Pumps (water & air)	21°C	18°C	19°C-24°C	off	24°C	off
Fans (transfer & exhaust)	on	off	on	off	on	off
Heating units						
Entrance heaters	21°C	16°C	As req'd 19°C	16°C	off	off
Perimeter heaters	21°C	16°C	As req'd 19°C	16°C	off	off
Unit heaters	21°C	16°C	As req'd 19°C	16°C	off	off
Convention heaters	21°C	16°C	As req'd 19°C	off	off	off
Dust heaters	21°C	16°C	As req'd 19°C	off	off	off

Note: temperatures above are space temperatures.

The following are guidelines for all schools in conserving energy:

Do not run heating and cooling systems concurrently.

Unoccupied means the school is empty, except that it is not necessary to run large ventilation systems for smaller after-school occupancies.

Use every opportunity to avail of free cooling of spaces:

- Use make-up air units to provide cooling in Spring and Fall.
- Consider early morning ventilation with the supply, return & exhaust systems in the spring/fall to achieve optimum overall daily comfort conditions.
- Ensure mechanical system economizer equipment is working when the outdoor air conditions are suitable (7°-17°C).

- In all buildings, use natural ventilation (windows) when the outside air temperatures are appropriate (7° to 17°C). In these circumstances, heating and cooling systems will be off.

Parking lot and exterior lighting will be turned off during holiday and extended vacancy periods.

ENERGY CONSERVATION GUIDELINES FOR STUDENTS AND STAFF

- At recess, munch periods and when you are leaving your office or classroom during the work day, as well as at the end of the school/work day, turn off all lights classroom/office equipment if you are the last person leaving the room.
- Turn off all office equipment at the end of the work day. Do not leave equipment in sleep or idle mode.
- Turn off your room lights if you are away from your office/classroom for more than 10 minutes.
- Consider turning your computer off completely if you are away from your office/classroom for longer than 30 minutes.
- Consider turning off room lights when you are using computers.
- Only operate science laboratory fume hoods as necessary. Do not leave chemicals that require ventilation in fume hoods. Store this material in ventilated cabinets.
- In shops and laboratories and specialty rooms turn off all tools, electronic equipment, computers and monitors, printers etc. at the end of the school day.
- For other rooms, such as offices, meeting rooms, staff rooms, resource rooms, libraries, and supply rooms, turn off lights and equipment when the room is not occupied.
- In spring, summer and fall close curtains and blinds to reduce solar heat gain and reduce energy consumption.
- In early spring, late fall and winter, open curtains and blinds to obtain solar heat gain and reduce energy consumption.
- Keep exterior doors and portable doors shut.
- Keep windows closed during the heating season. If your room is overheating inform your caretaker who will adjust the thermostat, or will generate a Work Order for repairs to be done.
- If your school or work area is air-conditioned do not open windows when the system is running.

- If you do not have air-conditioning, open your windows when the outside temperature is lower than the indoor temperature. This is especially advantageous in the early morning. You may wish to close the windows as the temperature rises and close the curtains and blinds. …cont'd

- Do not run hot or cold water more than is required.

If the temperature is too hot or too cold in your work area it may be attributable to a malfunctioning thermostat or faulty equipment. Please ask your caretaker to investigate. Please do not change thermostat settings or adjust equipment. Your caretaker will obtain technical assistance if it is required.

In portable classrooms use the exhaust fans for air movement and comfort. Many of these fans are reversible and can be used to bring in colder outside air at anytime but especially in the late spring and early fall. You may use the fans at high speed to bring in, or exhaust air, before or between classes, and keep the fans on a low speed during the classes.

<u>Always Remember</u>

Each room in a building is unique. Expect solar heat gain from south and west facing rooms. There will be no solar gain from northern exposures. Prevailing winds, especially in winter will have an impact on how warm or cold a space will feel. Internal rooms with no exterior windows, rooms with large surface areas of glass, second story or higher-story rooms, distance from the heating systems, and surrounding landscape can all effect perceptions of comfort. Use blinds and curtains to assist in energy conservation and to manage your comfort level.

If there is a comfort concern, speak to your School Principal, or to your Health and Safety Representative. The caretaker, in consultation with the Principal and Supervisory Office will address the issue.

The guidelines and range of operational settings for HVAC systems under this initiative may not be how you set your heating and cooling systems at home. However, the settings are meant to conserve energy while maintaining a reasonably comfortable working environment. Some people will prefer warmer or colder settings to accommodate their personal preferences or personal metabolism. Please consider your clothing and wear a sweater to feel warmer, or lighter clothing to feel cooler.

B. ENVIRONMENTAL PROGRAMS

In Fiscal Year 2018 to 2019, schools within the Board participated in environmental programs.

1. Eco Schools:
   _0_ number of schools participate
2. Earth Care Schools:
   _0_ number of schools participate
3. Enbridge: The School Energy Challenge
   _0_ number of schools participate
4. Other: The School Energy Challenge
   The name of the program is _____
   _0_ Number of schools participate

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

   If yes, between Fiscal Year 2013 to 2014 and Fiscal Year 2017 to 2018, the Board has applied for $_49,603.67_ in incentive funding from different agencies to support the implementation of energy efficient projects.

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
   ☐ Other:
   Provide Name of Consortia: _____

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

☐ Yes ☒ No

If yes,

☐ Ontario Education Collaborative Marketplace's (also known as OECM) Natural Gas Management and Advisory Services
☐ Catholic School Board Services Association' (also known as CSBSA) Natural Gas Management and Advisory Services
☐ Other:
Provide Name of Consortia: _____

E. DEMAND MANAGEMENT

1. The Board uses the following method(s) to monitor electrical Demand:
   ☒ Invoices
   ☐ Real-time data
   ☐ Online data from the Local Distribution Company (LDC)
   ☐ Other:
   _____

2. The Board uses the following methodologies to cut down electrical Demand:
   ☐ Equipment scheduling
   ☐ Phased/staged use of equipment
   ☐ Demand-limit equipment
   ☒ Deferred start-up of large equipment (e.g. chiller start-up in spring)
   ☐ Other:
   _____

F. SENIOR MANAGEMENT APPROVAL OF THIS ENERGY CONSERVATION AND DEMAND MANAGEMENT PLAN

I confirm that Mary Lynn Schauer senior management has reviewed and approved this Energy Conservation and Demand Management Plan.

Full Name: **Ian Byce**

Job Title: **Assistant Manager of the Plant Services Department**

Date: **June 17, 2019**