



District School Board of Niagara

Energy Conservation and Demand Management Plan

2023/2024 – 2027/2028



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Executive Summary

The District School Board of Niagara's (DSBN) "Energy Conservation and Demand Management Plan 2023/2024-2027/28 fully complies with Ontario's O.Reg 25/23 Broader Public Sector; Energy Reporting and Conservation and Demand Management Plans. This report signifies our third consecutive five-year term devoted to energy conservation and demand management building on our initial plan from the 2013/2014 – 2017/18 period.

The DSBN remains steadfast in its commitment to enhancing energy efficiency across our 104 facilities, which are used daily by over 4,300 staff and more than 40,000 students. Despite the challenges posed by the global COVID-19 pandemic, which necessitated stringent ventilation protocols that resulted in increased energy demands, we adapted and persevered to ensure our buildings met the mandated ventilation protocols implemented to combat COVID-19. These measures included higher fresh air ventilation rates, extended mechanical system run times, the installation of over 2,300 HEPA filtration units operating a minimum of 16 hours daily, and a significant increase in air-exchange rates across all facilities, leading to increased energy use.

In response to these pressures, DSBN executed numerous energy conservation projects to target pre-pandemic energy conservation levels. These efforts resulted in substantial annual utility cost savings of \$449,000. When combined with utility-provided incentives totaling \$892,000, our energy management initiatives have generated an impressive \$1.3 million in value during this reporting term. Looking ahead to the next five years, we have set an ambitious goal to reduce weather-normalized Energy Use Intensity (EUI) by 5%, acknowledging the continued higher fresh air rates in many of our facilities. We are developing and implementing projects to optimize ventilation and mechanical systems, ensuring compliance with fresh air requirements while maximizing energy efficiency.

Our ongoing capital and operational projects, driven by a strong commitment to sustainability and natural resource conservation, will further reduce energy usage in DSBN facilities. This philosophy, alongside a focus on preventative maintenance and best operational practices, will continue to deliver utility cost savings, reduce greenhouse gas emissions, and provide exceptional indoor learning environments.

Education Sector Background

Funding and Energy Management Planning

Each year school boards receive approximately \$1.4 billion school renewal funding from the province. In addition, school boards may receive time-limited funds over this period.

The Ministry typically announces each Board's funding allocations, for the upcoming school board Fiscal Year (September 1st to August 31st), in March-April.

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.

Asset 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 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/warehouse facility
 - Community Hubs
- Shared Site Use (For example: two or more boards share common areas and/or partnered with a municipality)
 - Swimming pools
 - Libraries
 - Lighted sports fields
 - Sports domes

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

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 2017/2018 to the end of the five-year reporting period Fiscal Year 2022/2023.

Table 1: Board's Asset Portfolio

Key Metrics	Fiscal Year 2017/2018 (Baseline Year)	Fiscal Year 2022/2023	Variance
Total Number of Buildings	113	104	-9
Total Number of Portables/Portapaks	64	112	48
Total Floor Area (ft ²)	6,151,942	5,866,093	-285,849
Average Operating Hours	61	80	19
Average Daily Enrolment	37,614	40,773	3,159
% of Total Floor Area Air Conditioned	18	19	1
Number of Facilities with Mechanical Ventilation	90	104	14

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).

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

Table 2: Metered Usage Values

Utility	Fiscal Year 2017/2018 (Baseline year)	Fiscal Year 2022/2023
Total Electricity (kWh)	29,993,846	28,709,056
Total Natural Gas (ekWh)	80,600,400	71,769,208
Total Propane (ekWh)	179,560	184,150

C. Weather Normalized Energy Consumption Values

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

To demonstrate the affect 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 2017 to 2018	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
HDD	3,989	4,196	3,837	3,696	3,799	3,611
CDD	432	334	415	392	340	267

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.

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.

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 6 and 7), and newly implemented programs (refer to the Note to Readers on pages 11 and 12) which will greatly impact energy consumption.

As a result, weather normalized Energy Intensity⁴ 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/m²).

Table 4: Weather Normalized Values

Weather Normalized Values	Fiscal Year 2017/2018 (Baseline Year)	Fiscal Year 2022/2023 (Most Recent Data Available)
Total Energy Consumed (ekWh)	108,666,042	107,696,088
Energy Intensity (ekWh/ft ²)	17.66	18.50
Energy Intensity (ekWh/m ²)	190.13	199.1
Total GHG Emissions (kgCO ₂)	15,196,873	15,319,296
Emissions Intensity (kgCO ₂ /m ²)	26.88	26.80

D. Review of Previous Energy Conservation Goals and Achievements

In 2019, 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. The DSBN's conservation goal as stated in the 2019 Conservation and Demand Management Plan was to reduce weather normalized energy intensity (ekWh/ft²) by 5% over five years. This goal is reflected in the Goal Percentage in Table 5 below.

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

Fiscal Year	Energy Intensity Conservation Goal (ekWh/ft ²)	Energy Intensity Conservation Goal (ekWh/m ²)	Conservation Goal Percentage	Actual Energy Intensity Reduction (ekWh/ft ²)	Actual Energy Intensity Reduction (ekWh/m ²)	Actual Energy Percentage
2018/2019	0.17	1.7	1.0	1.0	11.2	5.9
2019/2020	0.17	1.7	1.0	0.5	5.7	3.2
2020/2021	0.17	1.7	1.0	-0.6	-6.4	-3.7
2021/2022	0.17	1.7	1.0	-1.7	-18.8	-10.5
2022/2023	0.17	1.7	1.0	-0.1	-0.8	-0.4

The Actual Energy Percentage column in Table 5 illustrates the impact of the COVID-19 pandemic on the DSBN's progress toward its stated five-year conservation goal. Initially, DSBN exceeded expectations in the first two years of the five-year period, achieving a total energy savings of 9.1%, nearly doubling the stated goal for that period. However, these gains were reversed during the two most impactful years of the pandemic resulting in a 14.2% increase in energy usage. Factors contributing to this increase are details in the "Note to Readers" section.

As the COVID-19 pandemic was brought under control, and restrictions on facility management decisions relaxed, year five demonstrates a return to equilibrium with only a 0.4% increase in energy usage compared with the baseline period of 2017/2018. Due to thoughtful and system-wide decision making at the DSBN, the increase in energy use wrought by the COVID-19 pandemic has been reversed. The DSBN continues its journey to reduced energy consumption and utility costs into the next five-year reporting period.

NOTE TO READERS:

It is important to note that the conservation goals depicted in the chart above were projected in Spring 2019 under the assumption of consistent operational parameters from FY2019 through FY2023. However, the onset of the pandemic in early 202 drastically altered school operations and consequently affected energy consumption patterns. Due to these substantial operational changes occurring from one fiscal year to the next between FY2019 and FY2023, conducting an apple-to-apple comparison of Energy Intensity (ekWh/ft² – the quantity of energy consumed per area) is not feasible.

The section that follows details the factors that influenced DSBN's energy consumption regarding the COVID-19 pandemic:

Pandemic

When analyzing year-over-year figures, it is important to acknowledge that FY2020 values reflect lower consumption due to school closures prompted by the pandemic from March 2020 to June 2020. During this period, the sector experienced a 16% decrease in electricity consumption and a 3% decrease in natural gas consumption. The disparity in percentage reductions between the two utilities can be attributed to natural gas primarily being used for heating, with reduced demand during the milder weather months of April, May, and June.

Additionally, the temporary suspension of community use of schools, before/after school programs, childcare programs, continuing education, and summer school programs contributed to decreased demand for ventilation and lighting in most facilities.

Conversely, enrollment increases—nearly a 10% rise over the five-year period—have necessitated additional learning spaces, leading to a corresponding rise in portfolio-wide energy consumption. The use of portable classrooms has notably increased by 75% over the same period, and all portable classrooms are equipped with air conditioning, significantly boosting electricity demand for space cooling purposes.

Ventilation and Filtration

In consultation with the Office of the Chief Medical Officer of Health, the Ministry of Labour, Immigration, Training and Skills Development and others, school boards have been expected to continue to build on established practices to optimize air quality to support healthy and safe learning environments for students and staff.

Many of these new recommendations/requirements can impact utility consumption. For instance, the implementation of standalone HEPA filtration units has impacted energy consumption, primarily electricity.

The DSBN implemented significant adjustment to its ventilation and filtration strategy in response to the COVID-19 pandemic:

1. Increased ventilation (intake of fresh air): The DSBN made system-wide modifications to the minimum outdoor air damper positions for all Air Handling Units (AHUs) and unit ventilators. Minimum damper positions for AHUs were adjusted from 15%-20% to 50% and for unit ventilators from 10%-15% to 35%. These changes are not part of all Building Automation System (BAS) recommissioning projects, incorporating testing and balancing reports to align with ASHRAE-calculated standards.
2. Elevated filtration standards: All DSBN ventilation equipment was adapted to accommodate MERV-13 filters. The higher filtration efficiency of MERV-13 filters also increases fan power energy consumption and equipment maintenance costs. The DSBN continues to explore ways of improving indoor air quality by reducing the maintenance and energy consumption costs of utilizing MERV-13 filters.
3. Extended HVAC operational hours: Prior to the pandemic, DSBN ventilation systems typically operated until early evening (approximately 6PM). In accordance with Ministry of Education guidelines during the pandemic, HVAC schedules were extended until the last occupant left the building, typically 11pm. This extension has significantly impacted energy consumption at DSBN facilities. Adjustments to outdoor air damper positions between 6pm and 11pm aim to offset some of this increased scheduling, and the DSBN continues to explore way to offset this increased energy consumption.
4. Increased air changes per hour: To enhance air circulation in DSBN facilities, 2,300 air filtration units equipped with HEPA filters were installed in 2020/2021. These units operated for a minimum of 16 hours daily to reduce the viral load in occupied spaces. Extensive electrical system changes were undertaken to ensure that facilities could run these additional pieces of ventilation equipment. They also contributed to the increase energy consumption of all DSBN facilities.

In addition to the pandemic-related factors outlined above, there are several other factors that regularly impact a board's ability to achieve their conservation goals, including:

Before and After School Programs

Before-School and After-School Programs need a facility's Heating, Ventilation, and Air Conditioning (also known as HVAC) system to operate for an extended period of time on a daily basis, which increases the overall energy intensity.

Community Use of Schools

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, has increased over time. 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

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 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 and there is an increased desire for schools to have air conditioning. Air conditioning significantly increases a facility's energy use, specifically electricity consumption.

Compliance with current Ontario Building Code (also known 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 current 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 2019 Forecasted Cumulative Energy Intensity Conservation Goal with the Actual Cumulative Energy Intensity Reduced Savings.

Table 6: Cumulative Energy Intensity Goal from Fiscal Year 2018/2019 through Fiscal Year 2022/2023

Cumulative Energy Intensity	(ekWh/ft ²)	(ekWh/m ²)	Variance
Forecasted Cumulative Energy Intensity Conservation Goal of Fiscal Year 2018/2019 through Fiscal Year 2022/2023	0.85	9.0	
Forecasted Cumulative Energy Intensity Conservation Goal as a Percentage			5.0%
Actual Cumulative Energy Intensity Reduced or Increased from Fiscal Year 2018/2019 through Fiscal Year 2022/2023 – Weather Normalized	-0.83	-9.0	
Variance between 2018 Forecast Cumulative Conservation Goal and Actual Cumulative Energy Intensity– Weather Normalized	-1.68	-18.0	
% of Cumulative Energy Intensity Conservation Goal Achieved - Weather Normalized			-5.4%

F. Measures Implemented from Fiscal Year 2018/2019 to Fiscal Year 2022/2023

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 II: Investments in Energy Management Strategies – Fiscal Year 2018/2019 to Fiscal Year 2022/2023**. Here is the list of sheets:

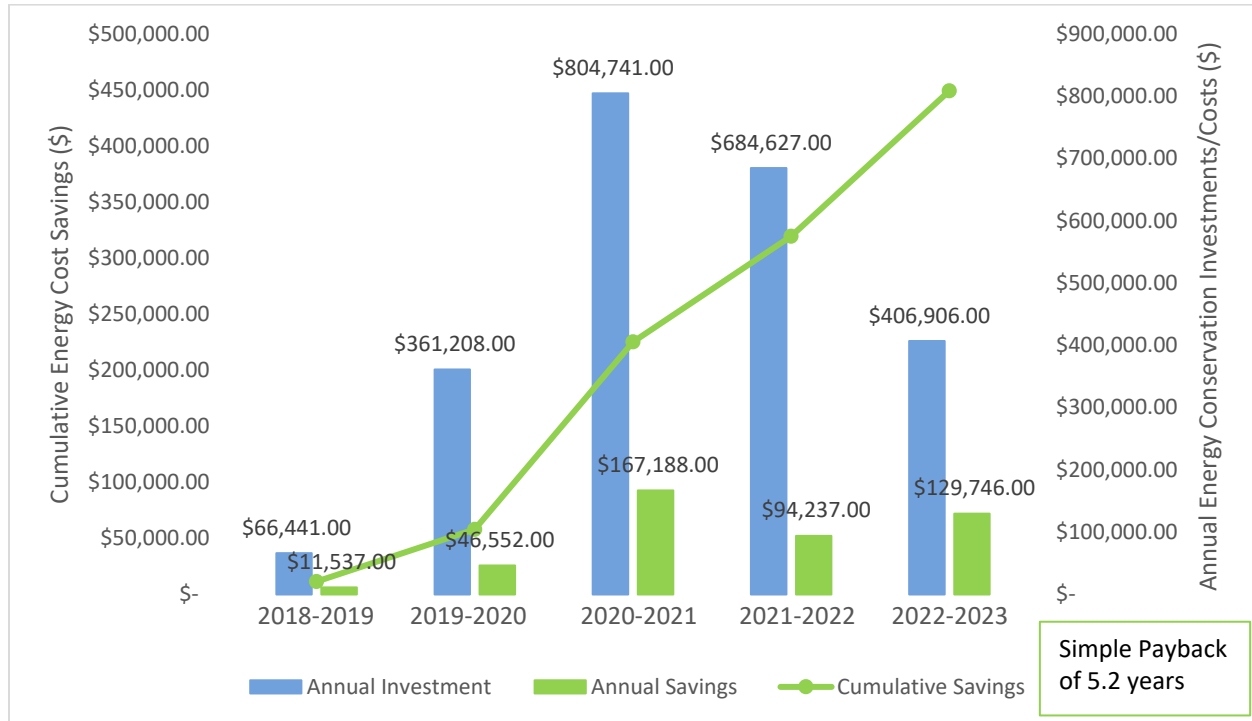
1. Design, Construction and Retrofit Investments
2. Operations and Maintenance Investments
3. Occupant Behaviour Investments
4. Summary of All Investment Types

Additional measures were implemented by DSBN through activities targeted by the Energy Officer with the express purpose of addressing the board's energy conservation goal of a 5% reduction in energy intensity by 2022/2023. A list of these projects, their costs, energy savings, energy cost savings, and simple payback can be found in **Appendix III: DSBN Energy Conservation Measures - Fiscal Year 2018/2019 – Fiscal Year 2022/2023**. These measures are also summarized in the below graph.

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 measure the related actual energy savings achieved.

Graph 1: DSBN Energy Conservation Measures (2018/2019 - 2022/2023)



Some highlights of the achievements in energy efficiency from the 2018/2019 – 2022/2023 period include:

- 1) All elementary gymnasium lighting converted to LED fixtures with occupancy sensors and manual dimming. This will allow energy savings and improve lighting for presentations and performances.
- 2) Participation in Enbridge Gas's "Run It Right" program resulted in the implementation of a significant number of building recommissioning opportunities including improving air infiltration at windows and doors, and reduced schedules for boiler circulation pumps.
- 3) Standardizing water meter sizes for elementary and secondary schools, in collaboration with the DSBN's on-going water consumption monitoring program, resulted in significant water utility cost savings
- 4) The installation of new Building Automation Systems, and the recommissioning of existing systems, resulted in improved indoor air quality and reduced operational energy use and costs. Most impactful was the reduction in natural gas consumption for space heating.

Part II: Energy Conservation and Demand Management Plan for Fiscal Year 2023/2024 to Fiscal Year 2027/2028

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

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

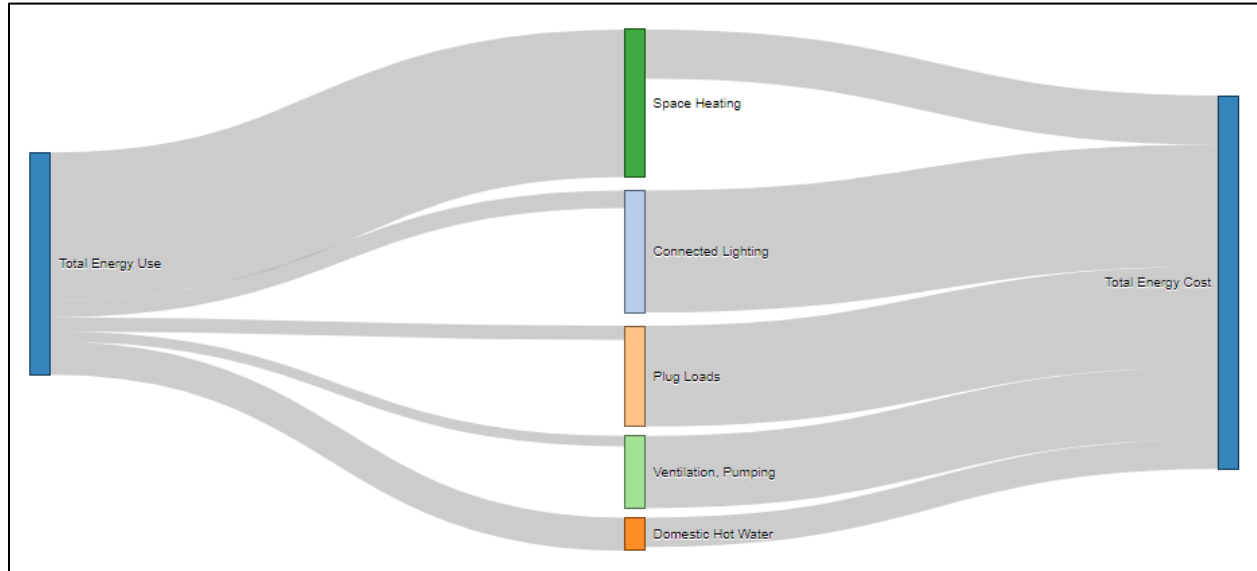
Background

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

The DSBN has been guided by a philosophy centred on reducing the consumption of natural resources through energy efficiency programs, raising awareness, and strategic capital investments. While, simultaneously, reducing the burden of long-term operating and maintenance costs at the lowest possible capital investment by utilizing strategic planning and purchasing, and capitalizing on utility-provided retrofit incentives. This philosophy has resulted in providing simple and concise energy efficiency projects which encompass improvements at all DSBN facilities.

The following diagram demonstrates the energy and cost flows for a typical DSBN facility. It helps to simplify the planning process for new energy efficiency programs by visualizing which major facility systems use the most energy versus which systems have the highest operating costs. In all energy efficiency and conservation programs, the trade-off between reducing energy use and energy costs needs to be examined to find the optimal balance for capital and operational investment dollars.

Figure 1: Typical DSBN Facility Flow Diagram⁵



2. The Board has an energy management position which includes the following options.



In-house including:

- Full time X
- Part time
- Shared job function



Contracted third party, or



None

3. Energy Management Strategies

Energy management strategies fall into three key categories:

- Design/Construction/Retrofit
- Operations and Maintenance
- Occupant Behaviour

⁵ Sankey from Excel: acknowledgement for d3.js and sankey diagram to Mike Bostok

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 **Appendix IV: Calculating Energy Conservation Goals - Fiscal Year 2023/2024 to Fiscal Year 2027/2028, Appendix B: Design, Construction, and Retrofit.**

Some highlights of Design/Construction/Retrofit projects/programs over the next five years include:

- Continued investment in high-performance ventilation systems, including additional Building Automation System installations.
- Continued investment as identified in the multi-year capital plan
- Converting existing atmospheric hydronic boilers to condensing hydronic boilers.
- Further investment in recommissioning of Building Automation Systems to improve indoor air quality and energy efficiency.

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 **Appendix IV: Calculating Energy Conservation Goals - Fiscal Year 2023/2024 to Fiscal Year 2027/2028, Appendix C: Operations and Maintenance.**

Some highlights of Operations and Maintenance projects/programs over the next five years include:

- A commitment to the Energy Calculator as introduced by the VFA
- Improving new school design guidelines to enable greater control over building mechanical systems.
- Cleaning building radiator heating systems and ensuring valves and thermostats are working properly.

Occupant Behaviour

Definition

Strategies that the Board uses to educate 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 **Appendix IV: Calculating Energy Conservation Goals - Fiscal Year 2023/2024 to Fiscal Year 2027/2028, Appendix D: Occupant Behaviour**.

Some highlights of Occupancy Behaviour programs over the next five years include:

- Continuing the use of RETScreen Expert energy management software to set benchmarks and complete project analysis for on-going energy efficiency programs.
- Improving control over building system schedules to improve indoor air quality for community use permit holders.

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 2023/2024	Fiscal Year 2024/2025	Fiscal Year 2025/2026	Fiscal Year 2026/2027	Fiscal Year 2027/2028
ekWh/ft ²	0.19	0.19	0.19	0.19	0.19
ekWh/m ²	2	2	2	2	2
Percentage Decrease	1	1	1	1	1

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 2023/2024 through Fiscal Year 2027/2028
ekWh/ft ²	0.95
ekWh/m ²	10
Percentage Decrease	5

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

In Fiscal Year 2022 to 2023, schools within the Board participated in environmental programs.

1. Eco Schools:

20 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 2017/2018 and Fiscal Year 2022/2023, the Board has applied for \$1,019,533 in incentive funding from different agencies to support the implementation of energy efficient projects.

2. The Board uses external resources, such as IESO Service Representatives and / or Enbridge Service Representatives, to apply for incentives.

☒ Yes

☐ No



IESO Service Representative



Enbridge Service Representative

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:

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
☐ Other:

3. The Board participates in a consortia arrangement to purchase alternative utilities (propane).

- ☐ Yes ☒ No

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)

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

I confirm that (District School Board of Niagara senior management has reviewed and approved this Energy Conservation and Demand Management Plan.

Full Name: Stacy Veld

Job Title: Associate Director of Education -
Corporate Services

Date: July 1, 2024

Appendix I:
Energy Consumption and Greenhouse
Gas Emissions – Fiscal Year 2022/2023

Energy Consumption and Greenhouse Gas Emissions Reporting - for 2023																	
Confirm consecutive 12-mth period (mth-yr to mth-yr)		Sept/2022 - Aug/2023															
Sector		School Board															
Agency Sub-sector		School Board															
Organization Name		District School Board Of Niagara															
Property Name	Address 1	City	Postal Code	Property GFA - Self-Reported (m²)	Primary Property Type - Self Selected	Weekly Average Hours	Number of Portables	Natural Gas Use (GJ)	Propane Use (GJ)	Site Energy Use (GJ)	Source Energy Use (GJ)	Site EUI (GJ/m²)	Source EUI (GJ/m²)	Total (Location-Based) GHG Emissions (Metric Tons CO2e)	Total (Location-Based) GHG Emissions Intensity (kgCO2e/m²)	Electricity Use - Grid Purchase (kWh)	Electricity Use - Grid Purchase (GJ)
A K Wigg PS	1337 Haist St	Fonthill	L0S 1E0	2668.8	K-12 School	60.0	1	1481	Not Available	1953.9	2435.3	0.73	0.91	78.1	29.3	131379.1	472.9
A N Myer SS	6338 O'Neil St	Niagara Falls	L2J 1M7	13993.8	K-12 School	80.0	0	7451.4	Not Available	10372.4	13243.9	0.74	0.94	397.4	28.3	811422.9	2921
Alternative Pathways Centre	1A Caroline St	St. Catharines	L2T 3E9	2658.5	K-12 School	60.0	0	2235	Not Available	2589	3016.9	0.97	1.13	115.1	43.3	98338.2	354
Applewood PS	130 Woodrow St	St. Catharines	L2P 3T7	1921.2	K-12 School	85.0	0	518.7	Not Available	967.2	1370.5	0.5	0.71	29.6	15.4	124580	448.5
Beamsville District SS	4317 Central Ave	Beamsville	L0R 1B0	17488.5	K-12 School	85.0	0	9555	Not Available	12135.7	14850.9	0.69	0.85	500.5	28.6	716888.9	2580.7
Burleigh Hill PS	15 Burleigh Hill Dr	St. Catharines	L2T 2V6	2092.4	K-12 School	85.0	0	1558.3	Not Available	1825	2139.8	0.87	1.02	80.4	38.4	74082.6	266.7
Caistor Central PS	1794 Regional Rd 6	Caistor Centre	L0R 1E0	2383.9	K-12 School	60.0	0	1657	Not Available	2157.6	2672.5	0.91	1.12	87.2	36.6	139060	500.6
Carleton PS	1 Carlton Park Dr	St. Catharines	L2M 4M9	3702.4	K-12 School	60.0	0	2242.4	Not Available	2717.8	3246.8	0.73	0.88	116.4	31.5	132038.3	475.3
Central PS	10 Livingston Ave	Grimsby	L3M 1K7	5264.4	K-12 School	85.0	5	2256	Not Available	3150.6	4028.5	0.6	0.77	120.4	22.9	248511.6	894.6
Cherrywood Acres PS	4635 Pettit Ave	Niagara Falls	L2E 6L4	2340.7	K-12 School	85.0	0	1744.3	Not Available	2148.1	2587.9	0.92	1.11	90.8	38.8	112173.7	403.8
Connaught PS	28 Prince St	St. Catharines	L2R 3X7	5270.1	K-12 School	85.0	0	2656.8	Not Available	3178.9	3771.7	0.6	0.72	137.6	26.1	145052.2	522.2
Crossroads PS	1350 Niagara Stone Rd	Niagara-On-The-Lake	L0S 1J0	5246.6	K-12 School	85.0	0	2282	Not Available	3317.5	4313.9	0.63	0.82	122.8	23.4	287655.3	1035.5
Dalewood PS	61 Duncan Dr	St. Catharines	L2N 3P3	3836.9	K-12 School	60.0	0	2434.1	Not Available	2890.6	3415.5	0.75	0.89	125.9	32.8	126802	456.5
DeWitt Carter PS	435 Fares St	Port Colborne	L3K 1X4	5054.3	K-12 School	60.0	0	1981.8	Not Available	2495	3039.8	0.49	0.6	103.6	20.5	142545.6	513.1
Diamond Trail PS	315 Southworth St S	Welland	L3B 1Z8	4173.5	K-12 School	85.0	4	1089.1	Not Available	2316.9	3401.3	0.54	0.79	64.3	14.9	341068.9	1227.8
DSBN Academy	130 Louth St	St. Catharines	L2S 2T4	12863.4	K-12 School	85.0	0	6785.2	Not Available	10220.4	13478.8	0.79	1.05	367.9	28.6	954275.9	3435.3
E I McCulley PS	16 Berkley Dr	St. Catharines	L2M 6B8	2243.5	K-12 School	85.0	1	1180.4	Not Available	1982.6	2719.2	0.88	1.21	65.6	29.2	222843.7	802.2
E L Crossley SS	350 Hwy 20	Fonthill	L0S 1E0	16510.3	K-12 School	80.0	0	9662.9	Not Available	12630.6	15673.7	0.77	0.95	508.9	30.8	824415.9	2967.8
Eastdale SS	170 Wellington St	Welland	L3B 1B3	11391.8	K-12 School	80.0	0	5976.9	Not Available	7757.7	9594.4	0.68	0.84	314.4	27.6	494680	1780.8
Eden HS	535 Lake St, Bldg 1	St. Catharines	L2N 4H7	13849.4	K-12 School	85.0	0	5381.4	Not Available	8584	11565	0.62	0.84	295.5	21.3	889644.3	3202.6
Edith Cavell PS	1 Monck St	St. Catharines	L2S 1L5	3981.3	K-12 School	85.0	0	2589.3	Not Available	3141.6	3755.3	0.79	0.94	134.5	33.8	153413.7	552.3
Education Centre	191 Carlton St	St. Catharines	L2R 7P4	7281.2	Office	60.0	0	836.4	Not Available	3689.4	6107.6	0.51	0.84	64.2	8.8	792529.2	2853
Ferndale PS	35 Ferndale Ave	St. Catharines	L2P 1V8	4120.9	K-12 School	60.0	0	2801.6	Not Available	3294.2	3871.1	0.8	0.94	144.7	35.1	136833.4	492.6
Fitch Street PS	164 Fitch St	Welland	L3C 4V5	3188.5	K-12 School	60.0	4	1822.7	Not Available	2321.1	2844.1	0.7	0.85	95.5	28.7	138446.8	498.4
Forestview PS	8406 Forestview Blvd	Niagara Falls	L2H 0B9	5564.7	K-12 School	85.0	0	2869	Not Available	4065.8	5231.3	0.63	0.82	153.6	24	332462.2	1196.8
Gainsborough PS	5459 Hwy 20	St. Ann's	L0R 1Y0	2895.5	K-12 School	60.0	0	2097.6	Not Available	2761.9	3439.1	0.95	1.19	110.6	38.2	184524.6	664.3
Garrison Road PS	1110 Garrison Rd	Fort Erie	L2A 1N9	4557.5	K-12 School	60.0	1	2512.6	Not Available	3319.8	4140.5	0.74	0.92	132.6	29.6	224218	807.2
Glendale PS	24 Farnham Ave	Welland	L3C 3R1	2087.6	K-12 School	60.0	0	1226.7	Not Available	1493.4	1788.3	0.72	0.86	63.7	30.5	74079.7	266.7
Glynn A Green PS	1353 Pelham St	Fonthill	L0S 1E0	4128	K-12 School	60.0	1	2251.5	Not Available	2917.5	3605.4	0.69	0.85	118.4	27.9	185020.3	666
Gordon PS	468 Thorold Rd W	Welland	L3C 3W6	3326.3	K-12 School	60.0	6	1656.8	Not Available	2427.7	3167	0.73	0.95	89.3	26.8	214147.9	770.9
Governor Simcoe SS	15 Glenview Ave	St. Catharines	L2N 2Z7	12467.8	K-12 School	85.0	0	4874.3	Not Available	8461.2	11730.7	0.68	0.94	273	21.9	996382.9	3586.8
Gracefield PS	117 Bayview Dr	St. Catharines	L2N 4Z7	1885.6	K-12 School	85.0	0	1005.4	Not Available	1330.5	1660.7	0.71	0.88	53.1	28.1	90317	325.1
Grand Avenue PS	14 Grand Ave	Grimsby	L3M 2R7	3393.3	K-12 School	85.0	0	1353.1	Not Available	2021.2	2656.9	0.6	0.78	73.2	21.6	185590	668.1
Grapeview PS	106 First St Louth	St. Catharines	L2R 6P9	5007.3	K-12 School	85.0	0	2275.7	Not Available	4615.5	6694.1	0.92	1.34	132.6	26.5	649969.4	2339.8
Greater Fort Erie SS	1640 Garrison Rd	Fort Erie	L2A 5M4	10962.8	K-12 School	85.0	4	3423.4	Not Available	6061.4	8456.4	0.55	0.77	192.6	17.6	732813.9	2638
Greendale PS	5504 Montrose Rd	Niagara Falls	L2H 1K7	2584.5	K-12 School	85.0	1	1762	Not Available	2237.3	2737.6	0.84	1.03	92.3	34.7	132032	475.3
Grimsby SS	5 Boulton Ave	Grimsby	L3M 1H6	14614.8	K-12 School	85.0	4	7789.5	Not Available	10685.2	13556	0.72	0.91	414.2	27.8	804401.9	2895.7
Harriet Tubman PS	84 Henry St.	St. Catharines	L2R 5V4	5576.4	K-12 School	85.0	2	984.9	Not Available	1881.2	2684.2	0.34	0.48	56.5	10.1	248965	896.2
Heximer Avenue PS	6727 Heximer Ave	Niagara Falls	L2G 4T1	2666.6	K-12 School	60.0	0	1743	Not Available	2058.3	2424.6	0.77	0.91	90.1	33.8	87604.5	315.4
Jacob Beam PS	4300 William St	Beamsville	L0R 1B0	2925.5	K-12 School	60.0	0	2085.1	Not Available	2537.5	3038.2	0.87	1.04	108.3	37	125694.7	452.5
James Morden PS	7112 Dorchester Rd	Niagara Falls	L2G 5V6	3558.7	K-12 School	60.0	0	2008.7	Not Available	2587.8	3189.1	0.73	0.9	105.5	29.6	160885.4	579.2
Jeanne Sauve PS	91 Bunting Rd	St. Catharines	L2P 3G8	9525.1	K-12 School	85.0	0	4578.9	Not Available	6860	9028	0.72	0.95	248	26	633656	2281.1
John Brant PS	143 Ridge Rd	Ridgeway	L0S 1N0	5204.8	K-12 School	85.0	4	1164.5	Not Available	2005.9	2774.1	0.39	0.53	65.1	12.5	233735.9	841.4
John Marshall PS	3910 St James Ave	Niagara Falls	L2J 2R3	2991.9	K-12 School	60.0	0	1673.4	Not Available	2114.3	2580.7	0.71	0.86	87.6	29.3	122482.7	440.9
Kate S. Durdan PS	6855 Kalar Rd	Niagara Falls	L2H 2T3	9185	K-12 School	60.0	18	2537	Not Available	4787	6806.7	0.53	0.75	145.1	16	625016.4	2250
Lakeview PS	33 Olive St	Grimsby	L3M 2B9	3831.5	K-12 School	85.0	0	2341.5	Not Available	2781	3286.3	0.71	0.84	121.1	31	122099.1	439.5

Laura Secord SS	349 Niagara St	St. Catharines	L2M 4V9	10520.5	K-12 School	85.0	0	4627.6	Not Available	7027.3	9296.8	0.67	0.88	251.3	23.9	666610.9	2399.7
Lifetime Learning Centre	535 Lake St. Bldg 2	St. Catharines	L2N 4H7	2133.8	K-12 School	80.0	0	842.1	Not Available	842.1	892.6	0.39	0.42	42.3	19.8	Not Available	Not Available
Lincoln Centennial PS	348 Scott St	St. Catharines	L2N 1J5	3095.2	K-12 School	60.0	0	1909.7	Not Available	2447.6	3008.5	0.79	0.97	100.2	32.4	149403.9	537.8
Lockview PS	505 Bunting Rd	St. Catharines	L2M 3A9	3210.6	K-12 School	85.0	0	1675.4	Not Available	2180.1	2699.5	0.68	0.84	88.2	27.5	140189.3	504.7
Martha Cullimore PS	3155 St Andrew Ave	Niagara Falls	L2J 2R7	2268.9	K-12 School	60.0	0	1317.4	Not Available	1582.7	1881.9	0.7	0.83	68.3	30.1	73695	265.3
McKay PS	320 Fielden Ave	Port Colborne	L3K 4T7	4030.7	K-12 School	80.0	0	3151	Not Available	3649.7	4252.7	0.91	1.05	162.3	40.3	138537.7	498.7
Nelles PS	118 Main St E	Grimsby	L3M 1N8	3696.9	K-12 School	85.0	3	1831.9	Not Available	2731.1	3587.2	0.77	1.01	99.1	27.9	249761.9	899.1
Oakridge PS	1 Marsdale Dr	St. Catharines	L2T 3R7	3050.9	K-12 School	60.0	4	1516.5	Not Available	2079.5	2637.8	0.57	0.73	80.6	22.2	156389.9	563
Oakwood PS	255 Omer Ave	Port Colborne	L3K 3Z1	2284.4	K-12 School	60.0	0	1473.2	Not Available	1732.8	2036.6	0.76	0.89	76.1	33.3	72097.2	259.5
Ontario PS	550 Allanburg Rd	Thorold	L2V 1A8	2562.7	K-12 School	60.0	2	1614.2	Not Available	2394.5	3139	0.88	1.16	87.2	32.2	216756.2	780.3
Orchard Park PS	3691 Dorchester Rd	Niagara Falls	L2J 3A6	3135.1	K-12 School	60.0	0	1873.6	Not Available	2530.9	3188.9	0.81	1.02	99.3	31.7	182597.2	657.3
Park PS	217 Main St E	Grimsby	L3M 1P5	1535.4	K-12 School	85.0	0	1134.9	Not Available	1353.4	1602.9	0.88	1.04	58.8	38.3	60705.7	218.5
Parnall PS	507 Geneva St	St. Catharines	L2N 2H7	3303.9	K-12 School	85.0	0	2768.1	Not Available	3346.6	3992.9	1.01	1.21	143.7	43.5	160704.4	578.5
Peace Bridge PS	105 Torrance St	Fort Erie	L2A 2C1	3523.9	K-12 School	60.0	3	2586.8	Not Available	3293.8	4035.7	0.99	1.21	135.6	40.6	196387.6	707
Pine Grove PS	690 Lake St	St. Catharines	L2N 4J5	3608.3	K-12 School	85.0	2	1912.4	Not Available	2537.6	3171.3	0.69	0.86	101	27.4	173676	625.2
Plymouth PS	111 First St	Welland	L3B 4S1	3210.3	K-12 School	60.0	1	1905.4	Not Available	2402.1	2928.7	0.73	0.89	99.7	30.4	137973.6	496.7
Port Colborne HS	211 Elgin St	Port Colborne	L3K 3K4	18601.5	K-12 School	80.0	0	10657.3	Not Available	12635.2	14916.3	0.68	0.8	551.2	29.6	549436.9	1977.9
Port Weller PS	273 Parnell Rd	St. Catharines	L2M 1W4	2674.7	K-12 School	85.0	0	1921.2	Not Available	2324.4	2774.3	0.87	1.04	99.7	37.3	112007.5	403.2
Power Glen PS	34 Westland St	St. Catharines	L2S 4C1	4100.7	K-12 School	85.0	0	1795.7	Not Available	2630	3430.2	0.64	0.84	96.8	23.6	231757	834.3
Prince of Wales PS (SC)	95 Facer St	St. Catharines	L2M 5J6	3153.3	K-12 School	60.0	0	1552.9	Not Available	2017.3	2495.9	0.62	0.77	81.7	25.1	129006.3	464.4
Prince of Wales PS (TH)	40 Pine St	Thorold	L2V 3L4	3775.4	K-12 School	60.0	0	1028.4	Not Available	1617.7	2168.6	0.43	0.57	56.3	14.9	163706.3	589.3
Prince Philip PS (NF)	3112 Dorchester Rd	Niagara Falls	L2J 2Z7	3367.1	K-12 School	60.0	8	1974.7	Not Available	2701.3	3422.9	0.79	1	104.9	30.5	201845.5	726.6
Prince Philip PS (SC)	600 Vine St	St. Catharines	L2M 3V1	3579.9	K-12 School	60.0	0	580.2	Not Available	1069.7	1510.8	0.3	0.42	33	9.2	135976	489.5
Princess Elizabeth PS	330 Schotfield Ave	Welland	L3B 1P2	3261.3	K-12 School	85.0	7	1817.8	Not Available	2617.9	3391	0.75	0.98	97.6	28.1	222237.3	800
Princess Margaret PS	6624 Culp St	Niagara Falls	L2G 2C4	5947.3	K-12 School	85.0	0	4674.4	Not Available	5589.2	6628.9	0.94	1.11	242.1	40.7	254117.3	914.8
Quaker Road PS	333 Quaker Rd	Welland	L3C 3G7	3901.7	K-12 School	60.0	10	1343	Not Available	2326.2	3222.9	0.53	0.73	75.2	17.1	273129.3	983.2
Richmond Street PS	153 Richmond St	Thorold	L2V 3H3	5004.1	K-12 School	85.0	0	1673.9	Not Available	2266.9	2859.6	0.45	0.57	88.8	17.7	164742.8	593
River View PS	3300 Cattell Dr	Niagara Falls	L2G 6M9	3174.4	K-12 School	60.0	2	1663.7	Not Available	2179.3	2707	0.69	0.85	87.7	27.6	143221.9	515.6
Ross PS	358 Niagara St	Welland	L3C 1K9	4182.5	K-12 School	60.0	2	1243.8	Not Available	1783.9	2306.7	0.43	0.55	66.7	16	150016.1	540
Senator Gibson PS	4944 John St	Beamsville	L0R 1B6	4662.3	K-12 School	85.0	0	1964.6	Not Available	2866.4	3732.8	0.62	0.81	105.8	23	250502.5	901.8
Simcoe Street PS	4760 Simcoe St	Niagara Falls	L2E 1V6	3169.9	K-12 School	60.0	0	1862.9	Not Available	2326.9	2823.9	0.73	0.89	97.3	30.7	128915.1	464.1
Sir Winston Churchill SS	101 Glen Morris Dr	St. Catharines	L2T 2N1	11248.3	K-12 School	85.0	1	4877.1	Not Available	7340.8	9678.4	0.66	0.87	264.4	23.7	684402.9	2463.7
Smith PS	18 Oakes Rd N	Grimsby	L3M 4B1	2972.2	K-12 School	60.0	4	1188.5	Not Available	1869.4	2505.8	0.64	0.86	65.1	22.4	189124	680.8
Smithville PS	260 Canborough St	Smithville	L0R 2A0	5671.4	K-12 School	80.0	0	2643.1	Not Available	3535.1	4434	0.62	0.78	139.8	24.7	247783.7	892
St Davids PS	1344 York Rd	St. Davids	L0S 1P0	3333.1	K-12 School	85.0	3	1237.7	Not Available	1954.5	2623.6	0.59	0.79	67.8	20.3	199109	716.8
St. Catharines Collegiate	34 Catherine St	St. Catharines	L2R 5E7	21320.4	K-12 School	85.0	0	11451.3	Not Available	15030.7	18688.6	0.71	0.88	603.6	28.3	994316.7	3579.4
St. Catharines Service Centre	9 Wright St	St. Catharines	L2P 3J3	2298.4	Office	60.0	0	701.5	Not Available	1115	1500.2	0.48	0.65	38.5	16.7	114849.4	413.4
St. Johns Adventure Campus	2984 Holland Rd RR#1 Rd	Fonthill	L0S 1E0	308.3	K-12 School	40.0	0	Not Available	148.8	204	249.8	0.66	0.81	9.5	30.9	15334.2	55.2
Stamford Collegiate SS	5775 Drummond Rd	Niagara Falls	L2G 4L2	13860.4	K-12 School	85.0	0	5173.4	Not Available	7464.3	9676.1	0.54	0.7	277.9	20	636387.3	2290.9
Steele Street PS	214 Steele St	Port Colborne	L3K 4X7	3538.5	K-12 School	60.0	0	588.2	Not Available	1107.3	1573.4	0.31	0.44	33.6	9.5	144196.3	519.1
Stevensville PS	3521 Main St E	Stevensville	L0S 1S0	3609.9	K-12 School	60.0	0	1659.4	Not Available	2472.5	3247	0.68	0.9	89.8	24.9	225879	813.1
Sven H Dohnberg Centre	535 Lake St. Bldg 3 St	St. Catharines	L2N 4H7	534.3	Other - Education	80.0	0	276.1	Not Available	276.1	292.6	0.52	0.55	13.9	26	Not Available	Not Available
Thorold SS	50 Ormond St N	Thorold	L2V 1Z1	12225.6	K-12 School	80.0	0	5102.2	Not Available	7077.2	9022.5	0.58	0.74	271.9	22.2	548623	1975
Twenty Valley PS	4057 Victoria Ave	Vineland	L0R 2C0	4683	K-12 School	85.0	2	1149.1	Not Available	1955	2692.9	0.41	0.57	64	13.5	223882	805.9
Valley Way PS	5315 Valley Way	Niagara Falls	L2E 1X4	1915.5	K-12 School	85.0	2	1103.6	Not Available	1538.8	1966.3	0.75	0.96	58.9	28.6	120893.9	435.2
Victoria PS	5635 Heritage Dr	Niagara Falls	L2J 4B3	1832.6	K-12 School	60.0	0	706.3	Not Available	949.4	1193.5	0.52	0.65	37.4	20.4	67514	243
Walker Living Campus	1 Taylor R Rd	Niagara-on-the-Lake	L0S 1J0	966.3	K-12 School	10.0	0	Not Available	512.7	628.5	724.6	0.65	0.75	32.3	33.4	32153.8	115.7
Welland Centennial SS	240 Thorold Rd W	Welland	L3C 3W2	13515.8	K-12 School	85.0	0	9079.3	Not Available	12352.1	15613.3	0.91	1.15	481.9	35.6	909161.9	3272.8
Welland Service Centre	120 Federal Rd	Welland	L3B 3P2	968.7	Office	60.0	0	434.5	Not Available	565.2	699.8	0.58	0.72	22.9	23.6	36313.2	130.7
Wellington Heights PS	9 Alsop Ave	Fenwick	L0S 1E0	3107.8	K-12 School	85.0	1	1237.8	Not Available	1792.6	2327.4	0.56	0.73	66.5	20.9	154124	554.8

Westdale PS	130 Rykert St	St. Catharines	L2S 2B4	3910.6	K-12 School	85.0	0	1792.2	Not Available	2336.9	2896.5	0.6	0.75	94.3	24.3	151310.2	544.7
Westlane SS	5960 Pitton Rd	Niagara Falls	L2H 1T5	13224.4	K-12 School	85.0	3	7223.1	Not Available	9880.2	12518.9	0.74	0.93	383.8	28.6	738107.9	2657.1
Westmount PS	73 Ann St W	Thorold	L2V 2J8	2174.2	K-12 School	85.0	0	1761.2	Not Available	2101.7	2490.1	0.97	1.15	91.2	41.9	94599.2	340.5
William E Brown PS	31870 Lee St	Wainfleet	L0S 1V0	2330.5	K-12 School	60.0	0	12.2	Not Available	278	499.4	0.12	0.21	2.7	1.2	73844.7	265.8
William Hamilton Merritt PS	114 Linwell Rd	St. Catharines	L2N 6N8	3035.5	K-12 School	60.0	0	1230.1	Not Available	1685.4	2137.2	0.56	0.7	65.4	21.5	126500	455.4
Winger PS	53220 Winger Rd	Wainfleet	L0S 1V0	2437.4	K-12 School	60.0	0	748.7	Not Available	2374.1	3768.2	0.97	1.55	50.3	20.6	451542.7	1625.5
Woodland PS	1511 7th St Louth	St. Catharines	L2R 6P9	2509	K-12 School	85.0	0	2162.5	Not Available	2586.6	3068.4	1.03	1.22	112	44.6	117826	424.2

Appendix II:
Investments in Energy Management Strategies
– Fiscal Year 2018/2019 to Fiscal Year
2022/2023

Investments in Energy Management Strategies

Press TAB to moveto input area. Press UP or DOWN ARROW in column A to read through the document.

Design, Construction and Retrofit Strategies

	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023
Lighting / Electrical	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 (D5020, D502001, D502003, D502004)	\$ 808,882	\$ 429,325	\$ -	\$ 846,493	\$ 587,707
Outdoor Lighting (D502004)	\$ 36,435	\$ 12,507	\$ -	\$ -	\$ -
Occupancy Sensors (D5021, D5022)	\$ -	\$ -	\$ -	\$ -	\$ -
Daylight Harvesting	\$ -	\$ -	\$ -	\$ -	\$ -
Dimming Switches					
Other (Describe)					

	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023
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) (D3020, D302001, D302002)	\$ -	\$ -	\$ -	\$ -	\$ -
High-efficiency Boilers (condensing) (D3020, D302001, D302002)	\$ -	\$ 389,942	\$ 206,461	\$ 1,763,247	\$ 446,760
High-efficiency Boiler Burners (D3020)	\$ 746,176	\$ -	\$ -	\$ -	\$ -
Geothermal (D302099)	\$ -	\$ -	\$ -	\$ -	\$ -
Heat Recovery/Enthalpy Wheels (D3090)	\$ -	\$ -	\$ -	\$ -	\$ -
Economizers (D306002)	\$ -	\$ -	\$ -	\$ -	\$ -
Energy Efficient HVAC systems (D3050,D3040)	\$ 3,097,307	\$ 792,959	\$ 3,490,743	\$ 7,943,077	\$ 14,205,362
Energy Efficient Rooftop Units (D302098)	\$ -	\$ 361,638	\$ 34,297	\$ -	\$ 3,923
High Efficiency Domestic Hot Water (D2020)	\$ -	\$ 34,673	\$ 13,382	\$ -	\$ -
Efficient Chillers and Controls (D3030, D303011, D303012)	\$ -	\$ -	\$ -	\$ -	\$ -
High-efficiency Motors (D304007, D303011)	\$ -	\$ -	\$ -	\$ -	\$ 30,000
VFD (D302056)	\$ -	\$ -	\$ -	\$ -	\$ -
Demand Ventilation (D3040)	\$ -	\$ -	\$ -	\$ -	\$ -
Entrance Heater Controls (D302099)	\$ -	\$ -	\$ -	\$ -	\$ -
Destratification Fans (D3090)					
Other (Describe)	\$ -	\$ -	\$ -	\$ -	\$ -

	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023
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 (D3060)	\$ -	\$ -	\$ 13,376	\$ 69,678	\$ -
Building Automation Systems - Upgrade (D3060)	\$ -	\$ 12,709	\$ -	\$ -	\$ 128,634
Real-time energy data for operators to identify and diagnose building issues					
Voltage Harmonizers (D501001)					
Other (Describe)	\$ -	\$ -	\$ -	\$ -	\$ -

	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023
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 (B302006, B2020, B3021)	\$ -	\$ -	\$ -	\$ -	\$ -
Increased Wall Insulation (B2010)	\$ 190,054	\$ 47,502	\$ -	\$ -	\$ -
New Roof (B3010, B3020)	\$ 2,321,176	\$ 2,557,685	\$ 2,486,152	\$ 2,545,440	\$ 5,580,654
New Windows (B2020)	\$ 317,743	\$ 271,292	\$ 390,619	\$ -	\$ -
Treatments	\$ -	\$ -	\$ -	\$ -	\$ -
Shading Devices	\$ -	\$ -	\$ -	\$ -	\$ -
Other (Describe)	\$ -	\$ -	\$ -	\$ -	\$ -
Total Investment in Design, Construction and Retrofit Strategies	\$ 7,517,773	\$ 4,910,232	\$ 6,635,033	\$ 13,167,933	\$ 20,983,044

Investments in Energy Management Strategies

Operations and Maintenance Strategies

	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023
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	\$ -	\$ -	\$ -	\$ -	\$ -
Preventative Maintenance (re-commissioning, coil cleaning, filter changes)	\$ 131,074	\$ 158,346	\$ 518,039	\$ 365,658	\$ 672,256
Daylight Harvesting (servicing)	\$ -	\$ -	\$ -	\$ -	\$ -
Demand Ventilation (servicing)	\$ -	\$ -	\$ -	\$ -	\$ -
Water Leak Detection System	\$ 21,000	\$ 12,000	\$ 9,000	\$ 95,000	\$ 9,000
Other (Describe)	\$ -	\$ -	\$ -	\$ -	\$ -

	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023
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	\$ -	\$ -	\$ -	\$ -	\$ -
Other (Describe)					
Total Investment in Operations and Maintenance Strategies	\$ 152,074	\$ 170,346	\$ 527,039	\$ 460,658	\$ 681,256

Investments in Energy Management Strategies

Occupant Behaviour Strategies

	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023
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	\$ -	\$ -	\$ -	\$ -	\$ -
Building Automation Training (site specific)	\$ -	\$ -	\$ 2,000	\$ 2,000	\$ 2,000
Ongoing Training and Awareness Programs for Energy Conservation	\$ -	\$ -	\$ -	\$ -	\$ -
Provide Detailed Information on Building Operational Costs	\$ -	\$ -	\$ -	\$ -	\$ -
Board policy to limit appliances brought (space heater, mini fridge, coffee machine) into the workspace					
Provide Detailed Information on Energy Consumption (e.g. via the Utility Consumption Database or other database)	\$ -	\$ -	\$ -	\$ -	\$ -
Participate in Environmental Programs, such as EcoSchools, Earthcare	\$ -	\$ -	\$ -	\$ -	\$ -
Other tools (Define)	\$ -	\$ -	\$ -	\$ -	\$ -
Total Investment in Occupant Behaviour Strategies	\$ -	\$ -	\$ 2,000	\$ 2,000	\$ 2,000

Investments in Energy Management Strategies						
Summary of Investment by Type						
	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	2018/2019-2022/2023
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	\$ 7,517,773	\$ 4,910,232	\$ 6,635,030	\$ 13,167,935	\$ 20,983,040	53,214,010
Operations and Maintenance Investments Total	\$ 152,074	\$ 170,346	\$ 527,039	\$ 460,658	\$ 681,256	1,991,373
Occupant Behaviour Investments Total	\$ -	\$ -	\$ 2,000	\$ 2,000	\$ 2,000	6,000
Total Investment Per Fiscal Year	\$ 7,669,847	\$ 5,080,578	\$ 7,164,069	\$ 13,630,593	\$ 21,666,296	55,211,383

Appendix III:
DSBN Energy Conservation Measures –
Fiscal Year 2018/2019 to Fiscal Year 2022/2023

ECM Database

Fiscal Year 2019-2023									
General				Finance	Energy & Cost Savings				
Facility	Municipality	Measure Name	Date of Installation/ Completion	Cost with Incentive (\$)	Demand Savings (kW)	Energy Savings (kWh)	Natural Gas Savings (m3)	Annual Cost Savings (\$)	Payback (Years)
Grand Ave. PS	Grimsby	Gym Lighting Retrofit	Aug-20	\$10,610	3.9	13,788.6	-	\$1,907.83	5.56
Jacob Beam PS	Beamsville	Gym Lighting Retrofit	Feb-20	\$10,450	3.4	9,020.0	-	\$1,246.19	8.39
Lakeview PS	Grimsby	Gym Lighting Retrofit	Aug-20	\$12,230	2.7	7,120.0	-	\$1,327.58	9.21
Nelles PS	Grimsby	Gym Lighting Retrofit	Aug-20	\$8,690	8.7	30,656.6	-	\$4,244.53	2.05
Senator Gibson PS	Lincoln	Gym Lighting Retrofit	Aug-20	\$12,230	3.1	11,130.6	-	\$1,520.91	8.04
Smith PS	Grimsby	Gym Lighting Retrofit	Aug-20	\$12,230	3.3	8,755.0	-	\$1,290.68	9.48
Ferndale PS	St. Catharines	Interior Lighting Retrofit	Sep-20	\$206,078	29.7	88,142.0	-	\$12,897.14	15.98
Burleigh Hill PS	St. Catharines	Urinal Controls - Timer Adjustments	Mar-20	\$0	-	-	4.5	\$3,200.02	0.00
St. Davids PS	NOTL	Interior Lighting Retrofit	Sep-20	\$138,499	18.4	60,327.0	-	\$7,758.73	17.85
Prince of Wales PS SC	St. Catharines	Gym Lighting Retrofit	Aug-20	\$12,620	8.2	33,454.4	-	\$1,759.88	-
Burleigh Hill PS	St. Catharines	Run It Right - FY2020	Aug-20	\$0	-	-	2,200.0	\$573.61	0.00
Cherrywood Acres PS	Niagara Falls	Run It Right - FY2020	Aug-20	\$0	-	-	979.0	\$255.26	0.00
Eastdale SS	Welland	Run It Right - FY2020	Aug-20	\$0	-	-	7,503.0	\$1,956.28	0.00
Edith Cavell PS	St. Catharines	Run It Right - FY2020	Aug-20	\$3,389	-	-	5,456.0	\$1,422.56	2.38
Gainsborough	Lincoln	Run It Right - FY2020	Aug-20	\$0	-	-	2,355.0	\$614.03	0.00
Garrison Rd. PS	Fort Erie	Run It Right - FY2020	Aug-20	\$0	-	-	1,690.0	\$440.64	0.00
Gordon PS	Welland	Run It Right - FY2020	Aug-20	\$0	-	-	3,153.0	\$822.09	0.00
Grand Ave. PS	Grimsby	Run It Right - FY2020	Aug-20	\$0	-	-	1,846.0	\$481.31	0.00
Grimsby SS	Grimsby	Run It Right - FY2020	Aug-20	\$0	-	-	4,329.0	\$1,128.72	0.00
Jacob Beam PS	Beamsville	Run It Right - FY2020	Aug-20	\$0	-	-	2,648.0	\$690.42	0.00
John Marshall PS	Niagara Falls	Run It Right - FY2020	Aug-20	\$0	-	-	922.0	\$240.40	0.00
Orchard Park PS	Niagara Falls	Run It Right - FY2020	Aug-20	\$0	-	-	1,156.0	\$301.41	0.00
Parnall PS	St. Catharines	Run It Right - FY2020	Aug-20	\$0	-	-	2,916.0	\$760.30	0.00
Plymouth PS	Welland	Run It Right - FY2020	Aug-20	\$622	-	-	4,270.0	\$1,113.33	0.56
Port Weller PS	St. Catharines	Run It Right - FY2020	Aug-20	\$0	-	-	1,242.0	\$323.83	0.00
Princess Elizabeth PS	Welland	Run It Right - FY2020	Aug-20	\$0	-	-	2,121.0	\$553.02	0.00
Princess Margaret PS	Niagara Falls	Run It Right - FY2020	Aug-20	\$0	-	-	5,373.0	\$1,400.92	0.00
Stevensville PS	Fort Erie	Run It Right - FY2020	Aug-20	\$0	-	-	1,030.0	\$268.56	0.00
Westmount PS	St. Catharines	Run It Right - FY2020	Aug-20	\$0	-	-	1,123.0	\$292.80	0.00
Applewood PS	St. Catharines	Boiler Retrofit	Sep-20	-	-	-	9,337.0	\$2,434.47	-
Quaker Rd. PS	Welland	Boiler Retrofit	Sep-20	-	-	-	18,649.0	\$4,862.42	-
Jacob Beam PS	Beamsville	Interior Lighting Retrofit	Feb-21	-	-	-	-	\$909.85	-
Woodland PS	St. Catharines	Interior Lighting Retrofit	Feb-21	-	-	-	-	\$847.51	-
Applewood PS	St. Catharines	Gym Lighting Retrofit	Dec-21	\$14,192	-	11,654.0	-	\$1,992.58	7.12
Burleigh Hill PS	St. Catharines	Gym Lighting Retrofit	Dec-21	\$15,562	-	6,236.0	-	\$1,066.22	14.60
Connaught PS	St. Catharines	Gym Lighting Retrofit	Dec-21	\$15,562	0.8	7,872.0	-	\$975.57	15.95
Carleton PS	St. Catharines	Gym Lighting Retrofit	Dec-21	\$15,562	-	6,043.0	-	\$1,033.22	15.06
Edith Cavell PS	St. Catharines	Gym Lighting Retrofit	Dec-21	\$15,562	-	7,287.0	-	\$1,245.92	12.49
Eden HS	St. Catharines	Gym Lighting Retrofit	Dec-21	\$12,482	7.6	32,567.0	-	\$4,342.37	2.87
El McCulley PS	St. Catharines	Gym Lighting Retrofit	Dec-21	\$15,562	0.4	4,335.0	-	\$533.37	29.18
Gracefield PS	St. Catharines	Gym Lighting Retrofit	Dec-21	\$15,562	-	9,378.0	-	\$1,603.43	9.71
Grapeview PS	St. Catharines	Gym Lighting Retrofit	Dec-21	\$14,388	1.5	14,300.0	-	\$1,731.90	8.31
Lincoln Centennial PS	St. Catharines	Gym Lighting Retrofit	Dec-21	\$14,388	-	6,875.0	-	\$1,175.48	12.24
Lockview PS	St. Catharines	Gym Lighting Retrofit	Dec-21	\$14,388	-	6,762.0	-	\$1,156.16	12.44
Power Glen PS	St. Catharines	Gym Lighting Retrofit	Dec-21	\$14,388	1.1	10,543.0	-	\$1,276.32	11.27
Parnall PS	St. Catharines	Gym Lighting Retrofit	Dec-21	\$14,388	-	9,267.0	-	\$1,584.46	9.08
Port Weller PS	St. Catharines	Gym Lighting Retrofit	Dec-21	\$13,228	-	10,867.0	-	\$1,858.02	7.12
Woodland PS	St. Catharines	Gym Lighting Retrofit	Dec-21	\$14,388	-	6,810.0	-	\$1,164.36	12.36
Westdale PS	St. Catharines	Gym Lighting Retrofit	Dec-21	\$14,388	-	7,899.0	-	\$1,350.56	10.65
William H Merritt PS	St. Catharines	Gym Lighting Retrofit	Dec-21	\$14,388	-	7,346.0	-	\$1,256.01	11.46
Glynn A Green PS	Fonthill	Interior Lighting Retrofit	Sep-21	\$172,999	-	65,758.0	-	\$11,781.09	14.68
Port Colborne HS	Port Colborne	Interior Lighting Retrofit	Feb-22	\$169,413	43.9	114,118.9	-	\$18,448.21	9.18
Senator Gibson PS	Lincoln	Interior Lighting Retrofit	Sep-21	\$156,670	30.8	98,280.0	-	\$13,789.93	11.36
St. Catharines Collegiate	St. Catharines	Green Migration Program	Jun-21	\$12,289	-	204,804.0	72,642.0	\$42,553.40	0.29
Sir Winston Churchill SS	St. Catharines	Green Migration Program	Jun-21	\$24,422	-	30,174.0	32,055.0	\$12,087.60	2.02
DSBN Academy	St. Catharines	Green Migration Program	Jun-21	\$20,567	-	206,136.0	67,958.0	\$41,425.12	0.50
Beamsville District SS	Beamsville	Run It Right - FY2021	Oct-21	\$26,089	-	-	22,836.0	\$6,222.36	4.19
Caistor Central PS	Lincoln	Run It Right - FY2021	Oct-21	\$80	-	-	3,246.0	\$884.47	0.09
Carleton PS	St. Catharines	Run It Right - FY2021	Oct-21	\$3,597	-	-	2,437.0	\$664.04	5.42
E I McCulley PS	St. Catharines	Run It Right - FY2021	Oct-21	\$31,235	-	-	5,746.0	\$1,565.67	19.95
Eden HS	St. Catharines	Run It Right - FY2021	Oct-21	\$11,255	-	-	11,192.0	\$3,049.60	3.69
Ferndale PS	St. Catharines	Run It Right - FY2021	Oct-21	\$1,822	-	-	5,227.0	\$1,424.26	1.28
Glendale PS	Welland	Run It Right - FY2021	Oct-21	\$2,501	-	-	4,038.0	\$1,100.28	2.27
Governor Simcoe SS	St. Catharines	Run It Right - FY2021	Oct-21	\$7,465	-	-	15,182.0	\$4,136.80	1.80
Greendale PS	Niagara Falls	Run It Right - FY2021	Oct-21	\$4,064	-	-	4,513.0	\$1,229.70	3.30
James Morden PS	Niagara Falls	Run It Right - FY2021	Oct-21	\$6,103	-	-	6,831.0	\$1,861.31	3.28
Lincoln Centennial PS	St. Catharines	Run It Right - FY2021	Oct-21	\$541	-	-	3,235.0	\$881.47	0.61
Martha Cullimore PS	Niagara Falls	Run It Right - FY2021	Oct-21	\$1,073	-	-	3,430.0	\$934.61	1.15
McKay PS	Port Colborne	Run It Right - FY2021	Oct-21	\$0	-	-	5,605.0	\$1,527.25	0.00
Ontario PS	Thorold	Run It Right - FY2021	Oct-21	\$3,773	-	-	1,036.0	\$282.29	13.37

Power Glen PS	St. Catharines	Run It Right - FY2021	Oct-21	\$3,118	-	-	1,660.0	\$452.32	6.89
Prince of Wales PS (SC)	St. Catharines	Run It Right - FY2021	Oct-21	\$945	-	-	6,956.0	\$1,895.37	0.50
Prince Philip PS (NF)	Niagara Falls	Run It Right - FY2021	Oct-21	\$3,562	-	-	2,807.0	\$764.85	4.66
River View PS	Niagara Falls	Run It Right - FY2021	Oct-21	\$1,940	-	-	6,181.0	\$1,684.20	1.15
St Davids PS	NOTL	Run It Right - FY2021	Oct-21	\$0	-	-	3,305.0	\$900.55	0.00
Thorold SS	Thorold	Run It Right - FY2021	Oct-21	\$5,407	-	-	10,999.0	\$2,997.01	1.80
Connaught PS	St. Catharines	Green Migration Program	Nov-21	\$31,080	-	-	9,532.0	\$7,722.28	4.02
El McCulley PS	St. Catharines	Green Migration Program	Nov-21	\$39,893	-	-	-	\$5,125.00	7.78
Power Glen PS	St. Catharines	Green Migration Program	Nov-21	\$39,893	-	-	-	\$5,125.00	7.78
Parnall PS	St. Catharines	Green Migration Program	Nov-21	\$30,359	-	-	11,333.0	\$8,213.02	3.70
Gainsborough	Lincoln	Boiler Retrofit	Oct-21	-	-	-	22,095.0	\$6,020.89	-
Valley Way PS	Niagara Falls	Boiler Retrofit	Oct-21	-	-	-	18,510.0	\$5,043.98	-
Ontario PS	Thorold	Interior Lighting Retrofit	Jun-22	\$16,030	3.8	10,585.5	-	\$1,547.15	10.36
John Brant PS	Port Colborne	Interior Lighting Retrofit	Jun-22	\$27,401	4.2	11,469.4	-	\$1,870.10	14.65
Connaught PS	St. Catharines	Interior Lighting Retrofit	Sep-22	\$191,523	25.4	95,460.1	-	\$13,320.02	12.76
Heximer PS	Niagara Falls	Interior Lighting Retrofit	Sep-22	\$193,877	10.4	41,920.2	-	\$5,791.63	21.58
Caistor Central PS	Caistor Centre	Gym Lighting Retrofit	Dec-22	\$0	4.0	-	-	\$1,779.34	0.00
Crossroads PS	NOTL	Gym Lighting Retrofit	Dec-22	\$20,702	8.5	-	-	\$3,514.24	5.89
DeWitt Carter PS	Port Colborne	Gym Lighting Retrofit	Dec-22	\$11,376	3.3	-	-	\$1,584.25	7.18
Garrison Rd. PS	Fort Erie	Gym Lighting Retrofit	Dec-22	\$12,268	7.7	-	-	\$3,729.00	3.29
John Marshall PS	Niagara Falls	Gym Lighting Retrofit	Dec-22	\$12,217	4.3	-	-	\$1,898.57	6.43
Martha Cullimore PS	Niagara Falls	Gym Lighting Retrofit	Dec-22	\$11,120	2.4	-	-	\$1,048.62	10.60
Oakwood PS	Port Colborne	Gym Lighting Retrofit	Dec-22	\$12,083	2.1	-	-	\$1,039.16	11.63
Ontario PS	Thorold	Gym Lighting Retrofit	Dec-22	\$11,943	3.6	-	-	\$1,674.54	7.13
Orchard Park PS	Niagara Falls	Gym Lighting Retrofit	Dec-22	\$13,340	3.9	-	-	\$1,777.05	7.51
Prince Philip PS NF	Niagara Falls	Gym Lighting Retrofit	Dec-22	\$11,845	3.8	-	-	\$1,732.06	6.84
Steele St PS	Port Colborne	Gym Lighting Retrofit	Dec-22	\$11,770	2.9	-	-	\$1,401.90	8.40
Stevensville PS	Stevensville	Gym Lighting Retrofit	Dec-22	\$12,728	4.5	-	-	\$2,230.77	5.71
Valley Way PS	Niagara Falls	Gym Lighting Retrofit	Dec-22	\$11,830	2.4	-	-	\$1,048.62	11.28
Victoria PS	Niagara Falls	Gym Lighting Retrofit	Dec-22	\$11,305	1.3	-	-	\$554.84	20.38
Eden HS	St. Catharines	Gym Lighting Retrofit	Dec-22	\$12,453	4.1	-	-	\$1,847.17	6.74
John Brant PS	Ridgeway	Water Meter Downsizing	Aug-22	\$6,591	-	-	-	\$6,565.80	1.00
Forestview PS	Niagara Falls	Water Meter Downsizing	Aug-22	\$6,591	-	-	-	\$8,142.12	0.81
Stamford Collegiate	Niagara Falls	Water Meter Downsizing	Aug-22	\$6,591	-	-	-	\$5,021.76	1.31
DSBN Academy	St. Catharines	Water Meter Downsizing	Aug-22	\$6,591	-	-	-	\$5,065.70	1.30
El McCulley PS	St. Catharines	Water Meter Downsizing	Aug-22	\$6,591	-	-	-	\$3,059.64	2.15
Governor Simcoe SS	St. Catharines	Water Meter Downsizing	Aug-22	\$6,591	-	-	-	\$1,255.70	5.25
Oakridge PS	St. Catharines	Water Meter Downsizing	Aug-22	\$6,591	-	-	-	\$2,959.62	2.23
Pine Grove PS	St. Catharines	Water Meter Downsizing	Aug-22	\$6,591	-	-	-	\$3,074.16	2.14
Westdale PS	St. Catharines	Water Meter Downsizing	Aug-22	\$6,591	-	-	-	\$2,959.62	2.23
William H Merritt PS	St. Catharines	Water Meter Downsizing	Aug-22	\$6,591	-	-	-	\$2,959.62	2.23
El McCulley PS	St. Catharines	Exterior Lighting Retrofit	Aug-22	-	-	-	-	\$775.70	-
Ross PS	Welland	Lighting Retrofit / HVAC Upgrade	Sep-22	-	5.5	19,187.2	-	\$3,094.10	-
Princess Margaret PS	Niagara Falls	Lighting Retrofit / HVAC Upgrade	Sep-22	-	38.8	64,760.1	-	\$11,036.62	-
Ferndale PS	St. Catharines	Lighting Retrofit / HVAC Upgrade	Sep-22	-	10.4	14,981.9	-	\$2,698.59	-
McKay PS	Port Colborne	BAS Install	Sep-23	-	-	-	17,621.0	\$4,801.38	-
Glynn A Green PS	Pelham	Boiler + BAS Install	Sep-23	-	-	-	24,816.0	\$6,761.88	-
Greendale PS	Niagara Falls	BAS Install	Sep-23	-	-	-	2,714.0	\$739.51	-
Thorold SS	Thorold	BAS Install	Sep-23	-	-	-	8,613.0	\$2,346.87	-
Richmond St. PS	Thorold	Boiler + BAS Install	Sep-23	-	-	-	7,841.0	\$2,136.52	-
Caistor Central PS	Caistor Centre	BAS Install	Sep-23	-	-	-	7,239.0	\$1,972.49	-
Smithville PS	Smithville	BAS Install	Sep-23	-	-	-	5,821.0	\$1,586.11	-
Ferndale PS	St. Catharines	BAS Install	Sep-23	-	-	-	4,891.0	\$1,332.70	-
Princess Margaret PS	Niagara Falls	BAS Install	Sep-23	-	-	-	8,341.0	\$2,272.76	-
AK Wigg PS	Fonthill	BAS Install	Sep-23	-	-	-	2,921.0	\$795.92	-
All Sites	All	Portable Lighting Retrofit	Oct-22	\$105,000	36.3	68,216.0	-	\$11,000.40	9.55
Stamford Collegiate	Niagara Falls	Building Recommissioning	Mar-23	\$59,018	-	-	31,088.0	\$8,470.87	6.97

Conservation Measure Cost	Savings (kW)	Savings (MWh)	Savings (m3)	Annual Cost Avoidance	Average Project Payback
\$2,323,921.69	361.21	1474.29	2333.76	\$449,262.31	5.98

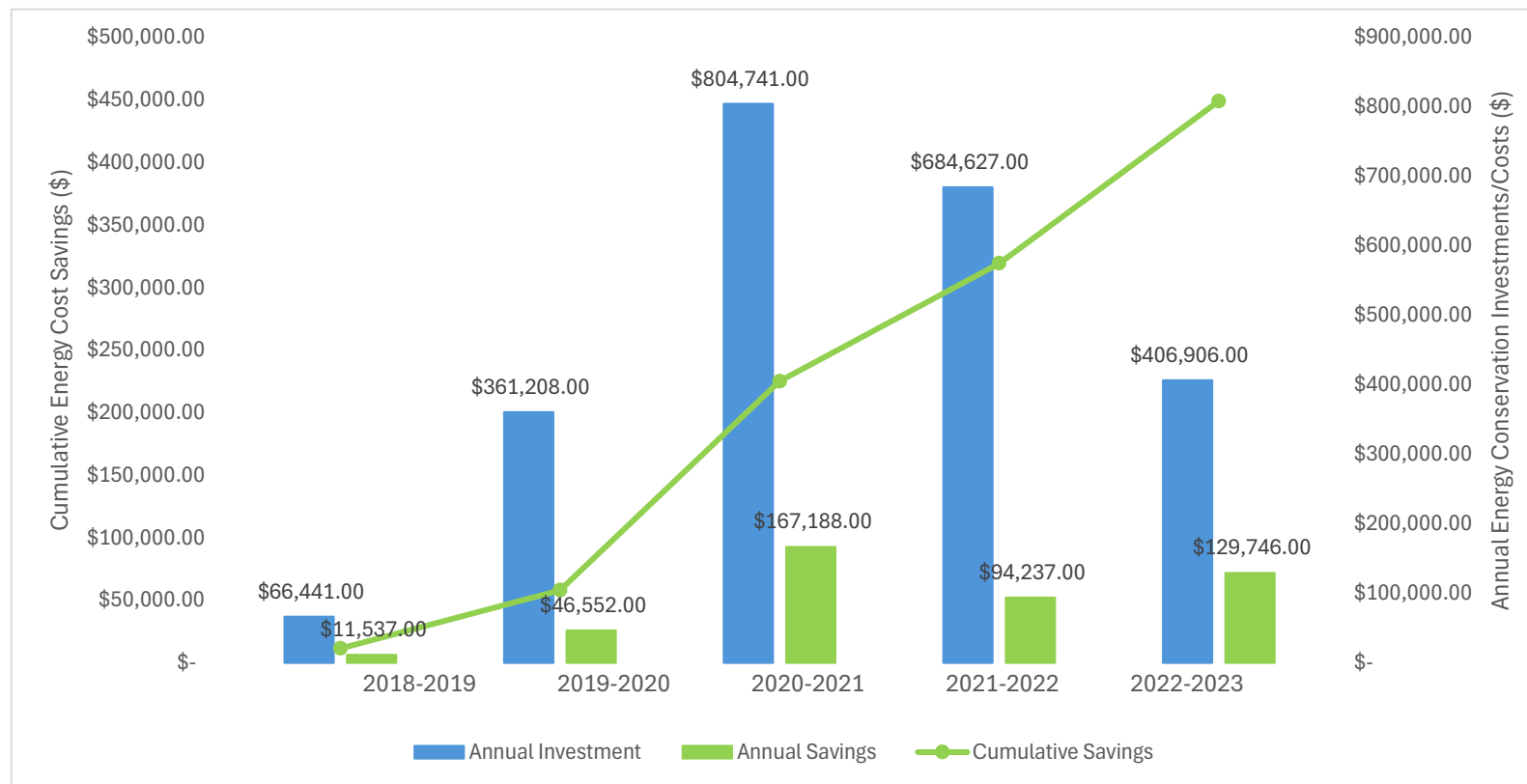
Savings (kg CO2)
42,814.61

Natural Gas
1 m3 = 1.921 kg CO2e
Electricity
1 kWh = 0.026 kg CO2e

		Annual Investment	Annual Savings	Cumulative Savings
FY19	2018-2019	\$ 66,441.00	\$ 11,537.00	\$ 11,537.00
FY20	2019-2020	\$ 361,208.00	\$ 46,552.00	\$ 58,089.00
FY21	2020-2021	\$ 804,741.00	\$ 167,188.00	\$ 225,277.00
FY22	2021-2022	\$ 684,627.00	\$ 94,237.00	\$ 319,514.00
FY23	2022-2023	\$ 406,906.00	\$ 129,746.00	\$ 449,260.00

\$ 2,323,923.00 \$ 449,260.00

5.2 simple payback



Appendix IV:
Calculating Energy Conservation Goals –
Fiscal Year 2023/2024 to Fiscal Year
2027/2028

Design, Construction and Retrofit Strategies

Lighting	Quantity of Time that Measure will be in place (years)	2023-2024		2024-2025		2025-2026		2026-2027		2027-2028		2023/2024-2027/2028	Energy Payback Period	% related to Electricity	% related to Natural Gas
		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 (ekWh)	Estimated Total Accumulated Energy Savings (ekWh)			
High Efficiency Lighting Systems (D5020, D502001, D502003, D502004)	30	\$ 1,000,000	997,606	\$ 1,000,000	997,606	\$ 1,000,000	997,606	\$ 1,000,000	997,606	\$ 1,000,000	997,606	14,964,086	7	100	0
Outdoor Lighting (D502004)	30	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	7	100	0
Occupancy Sensors (D5021, D5022)	10	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	5	100	0
Other (Describe)		\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	0		100

H.V.A.C.	Quantity of Time that Measure will be in place (years)	2023-2024		2024-2025		2025-2026		2026-27		2027-2028		2023/24-2027/28	Energy Payback Period	% related to Electricity	% related to Natural Gas
		Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Total Accumulated Energy Savings (ekWh)			
Efficient Boilers (near condensing) (D3020, D302001, D302002)	30	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	15	5	95
High-efficiency Boilers (condensing) (D3020, D302001, D302002)	15	\$ 189,000	449,212	\$ 230,000	546,660	\$ 246,000	584,688	\$ 220,000	522,892	\$ 200,000	475,356	7,707,903	10	5	95
High-efficiency Boiler Burners (D3020)	10	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	5	5	95
Geothermal (D302099)	25	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	35	100	0
Heat Recovery/Enthalpy Wheels (D3090)	20	\$ 236,250	508,800	\$ 287,500	619,174	\$ 307,500	662,247	\$ 275,000	592,254	\$ 250,000	538,412	8,730,357	8	20	80
Economizers (D306002)	15	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	7.5	50	50
Energy Efficient HVAC systems (D3050,D3040)	35	\$ 807,975	119,732	\$ 983,250	145,706	\$ 1,051,650	155,842	\$ 940,500	139,371	\$ 855,000	126,701	2,054,456	75	50	50
Energy Efficient Rooftop Units (D302098)	25	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	30	50	50
High Efficiency Domestic Hot Water (D2020)	10	\$ 94,500	179,254	\$ 115,000	218,139	\$ 123,000	233,314	\$ 110,000	208,655	\$ 100,000	189,686	3,075,766	10	15	85
Efficient Chillers and Controls (D3030, D303011, D303012)	25	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	100	100	0
High-efficiency Motors (D304007, D303011)	20	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	10	100	0
VFD (D302056)	10	\$ 113,400	194,531	\$ 138,000	236,731	\$ 147,600	253,200	\$ 132,000	226,439	\$ 120,000	205,853	3,337,913	5	75	25
Demand Ventilation (D3040)	15	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	5	50	50
Entrance Heater Controls (D302099)	20	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	5	50	50
Destratification Fans (D3090)	10	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	7	100	0
Other (Describe)		\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	0		100

Controls	Quantity of Time that Measure will be in place	2023-2024		2024-2025		2025-2026		2026-27		2027-2028		2023/24-2027/28	Energy Payback Period	% related to Electricity	% related to Natural Gas
		Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Total Accumulated Energy Savings (ekWh)			
Building Automation Systems - New (D3060)	15	\$ 661,500	490,133	\$ 805,000	596,458	\$ 861,000	637,951	\$ 770,000	570,525	\$ 700,000	518,659	8,410,055	15	50	50
Building Automation Systems - Upgrade (D3060)	15	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	15	50	50
Real-time energy data for operators to identify and diagnose building issues	10	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	3	50	50
Voltage Harmonizers (D501001)	15	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	7	100	0
Other (Describe)		\$ -	-	\$ -	-	\$ -	-	\$ -	-		-	-	0		100

Building Envelope	Quantity of Time that Measure will be in place	2023-2024		2024-2025		2025-2026		2026-27		2027-2028		2023/24-2027/28	Energy Payback Period	% related to Electricity	% related to Natural Gas
		Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Total Accumulated Energy Savings (ekWh)			
Glazing (B302006, B2020, B3021)	30	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	80	20	80
Increased Wall Insulation (B2010)	50	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	40	20	80
New Roof (B3010, B3020)	22	\$ 4,000,000	344,584	\$ 4,500,000	387,657	\$ 4,500,000	387,657	\$ 4,500,000	387,657	\$ 4,500,000	387,657	5,599,489	200	20	80
New Windows (B2020)	32	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	80	20	80
Treatments	10	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	10	20	80
Shading Devices	30	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	20	100	0
Other (Describe)		\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	0		100

Design, Construction & Retrofit Strategies Total	Quantity of Time that Measure will be in place	2023-2024		2024-2025		2025-2026		2026-27		2027-2028		2023/24-2027/28			
		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		\$ 7,102,625	3,283,851	\$ 8,058,750	3,748,131	\$ 8,236,750	3,912,505	\$ 7,947,500	3,645,398	\$ 7,725,000	3,439,931	53,880,025			

Keys	
colour: yellow	= Default value
colour: blue	= Calculated Value
\$0.1432	= cost of 1 ekWh electricity
0.0368	= cost of 1 ekWh natural gas
0.0955	m³ = 1 ekWh (as per NRCan conversion table)
\$0.3848	= cost of 1 m³ of natural gas

Calculating Energy Conservation Goals for FY 2019 to FY 2023

Press TAB to move to input area. Press UP or DOWN ARROW in column A to read through the document.

Operations and Maintenance Strategies

		2023-2024		2024-2025		2025-2026		2026-2027		2027-2028		2023/2024-2027/2028			
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) (D3020, D3030, D3040)	3	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	5	50	50
HVAC Optimization (coil cleaning, re-calibration of equipment) (D3020)	3	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	2	50	50
Commissioning (retro and re)	10		-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	10	50	50
Other (Describe)		\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	0		100

		2023-2024		2024-2025		2025-2026		2026-27		2027-2028		2023/24-2027/28			
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	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	1000	50	50
Other (Describe)		\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	0		100

		2023-2024		2024-2025		2025-2026		2026-27		2027-2028		2023/24-2027/28			
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		\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-			

Keys	
\$0.1432	= cost of 1 ekWh electricity
\$0.0368	= cost of 1 ekWh natural gas
0.0955	m³ = 1 ekWh
\$0.3848	= cost of 1 m³ of natural gas

Press TAB to move to input area. Press UP or DOWN ARROW in column A to read through the document.

Occupant Behaviour Strategies

Training and Education	Quantity of Time that Measure will be in place (years)	2023-2024		2024-2025		2025-2026		2026-2027		2027-2028		2023/2024-2027/2028	Energy Payback Period	% related to Electricity	% related to Natural Gas
		Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost of Implementation	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Total Accumulated Energy Savings (ekWh)			
Building Operator Training	3	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	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	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	5	90	10
Other Tools (Define)		\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	0		100
Occupant Behaviour Strategies Total		\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-			

Keys	
\$0.1432	= cost of 1 ekWh electricity
\$ 0.0368	= cost of 1 ekWh natural gas
0.0955	m³ = 1 ekWh
\$0.3848	= cost of 1 m³ of natural gas

End of worksheet.

Calculating Energy Conservation Goals for FY 2019 to FY 2023

Press TAB to move to input area. Press UP or DOWN ARROW in column A to read through the document.

Conservation Goal

FY 2023		
Total Building Area (includes portables) (m²)	540,909	Enter from UCD. - use square meters 1 ft² = 0.0929 m²
Total Building Area (includes portables) (ft²)	5,822,286	
Energy Consumption for the board (ekWh)	107,696,088	

	2023-2024		2024-2025		2025-2026		2026-2027		2027-2028		2023/2024-2027/2028
	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	\$ 7,102,625	3,283,851	\$ 8,058,750	3,748,131	\$ 8,236,750	3,912,505	\$ 7,947,500	3,645,398	\$ 7,725,000	3,439,931	53,880,025
Appendix C: Operations and Maintenance Strategies Total	\$ -	0	\$ -	0	\$ -	0	\$ -	0	\$ -	0	0
Appendix D: Occupant Behaviour Strategies Total	\$ -	0	\$ -	0	\$ -	0	\$ -	0	\$ -	0	0
TOTAL	\$ 7,102,625	3,283,851	\$ 8,058,750	3,748,131	\$ 8,236,750	3,912,505	\$ 7,947,500	3,645,398	\$ 7,725,000	3,439,931	53,880,025
Percentage reduction		3.05		3.48		3.63		3.38		3.19	16.74
Conservation Goal (ekWh/m²)		6.07		6.93		7.23		6.74		6.36	33.33
Conservation Goal (ekWh/ft²)		0.56		0.64		0.67		0.63		0.59	3.10
	Note		Note		Note		Note		Note		
	Check the total in cell B15 to confirm validity of estimated amount to be spent during that year		Check the total in cell D15 to confirm validity of estimated amount to be spent during that year		Check the total in cell F15 to confirm validity of estimated amount to be spent during that year		Check the total in cell H15 to confirm validity of estimated amount to be spent during that year		Check the total in cell J15 to confirm validity of estimated amount to be spent during that year		

End of worksheet.