



**ENERGY CONSERVATION AND
DEMAND MANAGEMENT PLAN
2024-2028**

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EDUCATION SECTOR BACKGROUND

A. 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.

B. 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
 - Childcare
 - 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 1: 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 to 2018 to the end of the five-year reporting period Fiscal Year 2022 to 2023.

Table 1: Board's Asset Portfolio

Key Metrics	Fiscal Year 2017-2018 (Baseline Year)	Fiscal Year 2022-2023	Variance
Total Number of Buildings	40	38	-2
Total number of Portables/Portapaks	27	16	-9
Total Floor Area (ft ²)	1,903,279.50	1,800,387.25	-102,892.25
Average Operating Hours	48	48	0
Average Daily Enrolment	9579.40	9,732.36	152.96
Percentage of Total Floor Area Air Conditioned	12	13	1

B. Energy Use 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 2017-2018 (Baseline Year)	Fiscal Year 2022-2023
Total Electricity (kWh)	12,086,850.00	11,761,325.00
Total Natural Gas (kWh)	22,118,640.00	15,627,361.33
Total Heating Fuel (Type 1 and 2) (ekWh)	550,323.50	355,996.84
Total Heating Fuel (Type 4 and 6) (ekWh)	N/A	N/A
Total Propane (ekWh)	347,830.10	355,122.71

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

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

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.

Cooling Degree Days (CDD)³ from the two closest Environment Canada weather stations (North Bay and Muskoka Airports) to our sites.

Table 3: Ontario Degree-days (Weather Stations: North Bay and Muskoka Airports)

Ontario Degree Days	Fiscal Year 2017-2018	Fiscal Year 2018-2019	Fiscal Year 2019-2020	Fiscal Year 2020-2021	Fiscal Year 2021-2022	Fiscal Year 2022-2023
HDD	4447	4793	4355	4107	4300	3953
CDD	391	272	339	301	254	241

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 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/ft²).

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)	35,612,258.56	28,239,623.44
Energy Intensity (ekWh/ft ²)	18.56	15.56
Energy Intensity (ekWh/m ²)	201.40	168.84
Total GHG Emissions (kgCO ₂)	4,585,460.00	3,403,421.25
Emissions Intensity (kgCO ₂ /ft ²)	2.41	1.89
Emissions Intensity (kgCO ₂ /m ²)	25.73	22.67

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.

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.

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

Fiscal Year	Conservation Goal (ekWh/ft ²)	Conservation Goal (ekWh/m ²)	Conservation Goal Percentage (%)	Actual Energy Savings (ekWh/ft ²)	Actual Energy Savings (ekWh/m ²)	Actual Energy Savings Percentage (%)
2018-2019	0.23	2.48	1.36	-1.81	-19.51	-9.80
2019-2020	0.59	6.34	3.48	1.69	18.19	8.32
2020-2021	1.27	13.67	7.51	1.39	14.94	7.45
2021-2022	0.41	4.46	2.45	0.81	8.75	4.72
2022-2023	0.87	9.41	5.17	0.32	3.48	1.97

Note to Readers:

When reviewing annual Actual Energy Savings and Actual Energy Percentage across the five (5) years in the chart above, the following should be considered:

1. Conservation goals in the above chart were forecast in Spring 2019 based on the assumption that operational parameters would remain consistent from FY2019 through FY2023. However, the pandemic that arrived in early 2020, significantly changed how schools operated and impacted their energy consumption.
2. As a result of significant operational changes from one year to the next from FY2019 to FY2023, an apple-to-apple comparison of Energy Intensity (ekWh/ft² – the quantity of energy consumed per area) is not possible.
 - a. Factors that reduced energy consumption include:
 - i. Temporary school closures in FY2020 and FY2021, due to the pandemic
 1. Boards with centralized Building Automation Systems (BAS) that could be remotely programmed to “unoccupied set points”, should show a reduction in consumption
 - ii. Temporary suspension of community use of schools, before/after school programs, childcare programs, continuing education and summer school programs for schools with these programs, the number of “occupied set point” operating hours would be significantly reduced
 - b. Factors that increased consumption include:
 - i. Implementation of new health and safety factors in FY2021 through FY2023 to address pandemic issues, such as:
 1. Increased ventilation (intake of fresh air),
 2. Increased filtration requirements

3. Expanded operating hours of HVAC equipment

A board's ability to achieve their 2019 forecasted Conservation Goals may be limited by some or all the above factors.

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

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

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.

Pandemic

When reviewing year-over-year value, it should be noted that FY2020 values will be lower as schools were closed due to the pandemic (March 2020 until June 2020). During that time, the sector saw a decrease of 16% in electricity consumption and 3% in natural gas consumption. The difference in the percentage for the two utilities, reflects that natural gas is primarily used for heating and April, May and June do not have the same heating demands due to weather.

In FY2021 consumption values were typically higher than FY2020, but due to limited occupancy as a result of the ongoing pandemic, lower than previous consumption levels.

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.

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 to 2019 through Fiscal Year 2022 to 2023

Cumulative Energy Intensity	(ekWh/ft ²)	(ekWh/m ²)	Variance
Forecasted Cumulative Energy Intensity Conservation Goal of Fiscal Year 2018 to 2019 through Fiscal Year 2022 to 2023	3.37	36.36	
Forecasted Cumulative Energy Intensity Conservation Goal as a Percentage			19.97
Actual Cumulative Energy Intensity Reduced or Increased from Fiscal Year 2018 to 2019 through Fiscal Year 2022 to 2023 – Weather Normalized	2.40	25.84	
Variance between 2019 Forecast Cumulative Conservation Goal and Actual Cumulative Energy Intensity– Weather Normalized	-0.97	-10.52	
% of Cumulative Energy Intensity Conservation Goal Achieved - Weather Normalized			71.15

F. Measures Implemented for Fiscal Year 2018 to 2019 to Fiscal Year 2022 to 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: Investments in Energy Efficiency between Fiscal Year 2019 and Fiscal Year 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

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.

PART 2: ENERGY CONSERVATION AND DEMAND MANAGEMENT PLAN FOR FISCAL YEAR 2022 TO 2023 TO FISCAL YEAR 2027 TO 2028

Part 2 outlines the board's plan to reduce energy consumption through energy management strategies, including:

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

Background

1. The Board has covered off the responsibilities of the energy management portfolio in-house as a shared job function of:
 - a. Manager of Capital Planning
 - b. Manager of Facilities and Operations
 - c. Facilities and Capital Planning Administrator
2. Energy Management Strategies
 - a. Design, Construction, and Retrofit
 - i. 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.
 - ii. For the Board's relevant projects over the next five years, please refer to **Calculating Energy Conservation Goals Fiscal Year 2023 to 2024 to Fiscal Year 2027 to 2028, Appendix B: Design, Construction, and Retrofit.**
 - b. Operations and Maintenance
 - i. Operations and maintenance include the strategies the Board uses to make sure that the existing buildings and equipment performs at maximum efficiency.
 - ii. For the Board's relevant projects over the next five years, please refer to **Calculating Energy Conservation Goals Fiscal Year 2023 to 2024 to Fiscal Year 2027 to 2028, Appendix C: Operations and Maintenance.**
 - c. Occupant Behaviour
 - i. 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.
 - ii. For the Board's relevant projects over the next five years, please refer to **Calculating Energy Conservation Goals Fiscal Year 2023 to 2024 to Fiscal Year 2027 to 2028, 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 2023-2024	Fiscal Year 2024-2025	Fiscal Year 2025-2026	Fiscal Year 2026-2027	Fiscal Year 2027-2028
ekWh/ft ²	2.82	1.18	1.09	1.39	3.55
ekWh/m ²	30.31	12.73	11.74	14.93	38.22
Percentage Decrease	14.23	5.98	5.51	7.01	17.95

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	10.03
ekWh/m ²	107.92
Percentage Decrease	50.69

B. Environmental Programs

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

1. Eco Schools:
 - 1 number of schools participate
2. Earth Care Schools:
 - 0 number of schools participate
3. Other: Green Schools Pilot Initiative
 - 1 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 2018 to 2019 and Fiscal Year 2022 to 2023, the Board has applied for \$150,285.15 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

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

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

Yes No

If yes,

OECM Natural Gas Management

Other: Twin Eagle Resource Management

3. The Board participates in a consortia arrangement to purchase alternative utilities (fuel oil, propane, wood, district heat, district cool).

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)

2. The Board uses the following methodologies to cut down electrical Demand:

- Equipment scheduling
- 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 the Near North District School Board senior management has reviewed and approved this Energy Conservation and Demand Management Plan.

Full Name: Seija Van Haesendonck

Job Title: Superintendent of Business

Date: June 28, 2024

NNDSB Energy Conservation and Demand Management Plan - FY 24-28
Investments in Energy Management Strategies
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)	\$ 447,125.74	\$ 18,480.68	\$ 132,843.02	\$ 167,722.70	\$ 8,224.13
Outdoor Lighting (D502004)	\$ -	\$ -	\$ -	\$ -	\$ -
Occupancy Sensors (D5021, D5022)	\$ -	\$ -	\$ -	\$ -	\$ -
Daylight Harvesting	\$ -	\$ -	\$ -	\$ -	\$ -
Dimming Switches	\$ -	\$ -	\$ -	\$ -	\$ -
Other (Generators)	\$ -	\$ 234,476.20	\$ 439,411.77	\$ 14,621.15	\$ -

	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)	\$ 33,427.94	\$ 247,794.01	\$ 52,234.84	\$ -	\$ -
High-efficiency Boilers (condensing) (D3020, D302001, D302002)	\$ -	\$ -	\$ -	\$ -	\$ 399,731.13
High-efficiency Boiler Burners (D3020)	\$ -	\$ -	\$ -	\$ -	\$ -
Geothermal (D302099)	\$ -	\$ -	\$ -	\$ -	\$ -
Heat Recovery/Enthalpy Wheels (D3090)	\$ -	\$ -	\$ -	\$ -	\$ -
Economizers (D306002)	\$ -	\$ -	\$ -	\$ -	\$ -
Energy Efficient HVAC systems (D3050,D3040)	\$ 230,586.52	\$ 723,780.43	\$ -	\$ 2,042,435.12	\$ 3,081,181.77
Energy Efficient Rooftop Units (D302098)	\$ -	\$ -	\$ 362,065.79	\$ 832,318.55	\$ 39,692.28
High Efficiency Domestic Hot Water (D2020)	\$ 343,511.41	\$ 102,278.75	\$ 13,710.45	\$ 57,297.47	\$ 41,573.21
Efficient Chillers and Controls (D3030, D303011, D303012)	\$ -	\$ -	\$ -	\$ -	\$ -
High-efficiency Motors (D304007, D303011)	\$ -	\$ -	\$ -	\$ -	\$ -
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)	\$ -	\$ -	\$ -	\$ -	\$ -
Building Automation Systems - Upgrade (D3060)	\$ -	\$ -	\$ -	\$ -	\$ -

NNDSB Energy Conservation and Demand Management Plan - FY 24-28
Investments in Energy Management Strategies
Design, Construction, and Retrofit Strategies

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)	\$ 70,638.24	\$ -	\$ -	\$ -	\$ -
New Roof (B3010, B3020)	\$ 936,331.08	\$ 749,081.91	\$ 189,199.62	\$ 151,298.45	\$ 233,566.87
New Windows (B2020)	\$ 364,892.03	\$ 43,326.57	\$ -	\$ -	\$ -
Treatments	\$ -	\$ -	\$ -	\$ -	\$ -
Shading Devices	\$ -	\$ -	\$ -	\$ -	\$ -
Other (Describe)	\$ -	\$ -	\$ -	\$ -	\$ -
Total Investment in Design, Construction and Retrofit Strategies	\$ 2,426,512.96	\$ 2,119,218.55	\$ 1,189,465.49	\$ 3,265,693.44	\$ 3,803,969.39

NNDSB Energy Conservation and Demand Management Plan - FY 24-28
Investments in Energy Management Strategies
Operations and Maintenance Strategies

	2018-2019	2019-20	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)	\$ 19,040.50	\$ 19,040.50	\$ 40,717.76	\$ 272,038.60	\$ 46,271.28
Daylight Harvesting (servicing)	\$ -	\$ -	\$ -	\$ -	\$ -
Demand Ventilation (servicing)	\$ 112,527.59	\$ 152,743.58	\$ 119,156.92	\$ 165,764.36	\$ 126,413.60
Water Leak Detection System	\$ -	\$ -	\$ -	\$ -	\$ -
Other (Describe)	\$ -	\$ -	\$ -	\$ -	\$ -

	2018-2019	2019-20	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	\$ 131,568.09	\$ 171,784.08	\$ 159,874.68	\$ 437,802.96	\$ 172,684.88

NNDSB Energy Conservation and Demand Management Plan - FY 24-28
Investments in Energy Management Strategies
Occupant Behaviour Strategies

	2018--2019	2019-20	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)	\$ -	\$ -	\$ -	\$ -	\$ -
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	\$ -	\$ -	\$ -	\$ -	\$ -

NNSB Energy Conservation and Demand Management Plan - FY 24-28
Investments in Energy Management Strategies
Summary by Type

	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	2018/19-2022/2023
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	\$ 2,426,513	\$ 2,119,219	\$ 1,189,465	\$ 3,265,693	\$ 3,803,969	12,804,860
Operations and Maintenance Investments Total	\$ 131,568	\$ 171,784	\$ 159,875	\$ 437,803	\$ 172,685	1,073,715
Occupant Behaviour Investments Total	\$ -	\$ -	\$ -	\$ -	\$ -	0
Renewable Energy Investments Total	\$ -	\$ -	\$ -	\$ -	\$ -	0
Total Investment Per Fiscal Year	\$ 2,558,081	\$ 2,291,003	\$ 1,349,340	\$ 3,703,496	\$ 3,976,654	13,878,575

NNOSB Energy Conservation and Demand Management Plan - FY 24-28
Calculating Energy Conservation Goals for FY 2024 to FY 2028
Design, Construction, and Retrofit Strategies

Measure	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)					
Lighting																	
High Efficiency Lighting Systems (D5020, D502001, D502003, D502004)	30	\$ -	-	\$ -	-	\$ -	-	\$ 460,931	420,212	\$ 276,729	252,283	\$ 1,709,082	1,558,102	3,323,305	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.																	
Efficient Boilers (near condensing) (D3020, D302001, D302002)	30	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	15	5	95
High-efficiency Boilers (condensing) (D3020, D302001, D302002)	15	\$ 1,573,290	3,482,470	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	17,412,352	10	5	95
High-efficiency Boiler Burners (D3020)	10	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	5	5	95
Geothermal (D302099)	25	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	35	100	0
Heat Recovery/Enthalpy Wheels (D3090)	20	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	8	20	80
Economizers (D306002)	15	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	7.5	50	50
Energy Efficient HVAC systems (D3050, D3040)	35	\$ -	-	\$ 4,095,307	557,162	\$ 521,622	70,966	\$ 3,483,018	473,861	\$ 871,705	118,595	\$ 3,507,865	75	50	50		
Energy Efficient Rooftop Units (D302098)	25	\$ 363,180	123,526	\$ 11,087	3,771	\$ 94,238	32,052	\$ 632,051	94,238	\$ 277,913	488,281	\$ 1,462,092	2,568,831	726,869	30	50	50
High Efficiency Domestic Hot Water (D3020)	10	\$ -	-	\$ 272,235	478,305	\$ 359,742	632,051	\$ -	-	\$ -	-	\$ -	-	7,354,764	10	15	85
Efficient Chillers and Controls (D3030, D303011, D303012)	25	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	100	100	0
High-efficiency Motors (D304007, D303011)	20	\$ -	-	\$ -	-	\$ -	-	\$ 55,191	35,202	\$ -	-	\$ -	-	105,605	10	100	0
VFD (D302056)	10	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	5	75	25
Demand Ventilation (D3040)	15	\$ -	-	\$ 102,441	209,055	\$ -	-	\$ -	-	\$ -	-	\$ 267,924	546,762	1,382,982	5	50	50
Entrance Heater Controls (D302099)	20	\$ -	-	\$ -	-	\$ 68,057	138,886	\$ -	-	\$ -	-	\$ 265,699	542,221	958,880	5	50	50
Dematification Fans (D3090)	10	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	7	100	0
Other (Describe)		\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	0		100
Controls																	
Building Automation Systems - New (D3060)	15	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	15	50	50
Building Automation Systems - Upgrade (D3060)	15	\$ -	-	\$ -	-	\$ -	-	\$ 373,316	253,946	\$ 697,900	474,743	\$ 962,636	474,743	962,636	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																	
Glazing (B30206, B2020, B3021)	30	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	80	20	80
Increased Wall Insulation (B2010)	50	\$ 242,261	96,462	\$ 648,681	258,289	\$ 127,088	50,603	\$ 715,478	284,886	\$ 2,237,054	2,237,054	\$ 2,237,054	2,237,054	40	20	80	
New Roof (B3010, B3020)	22	\$ 1,462,079	116,433	\$ -	-	\$ -	-	\$ 1,248,315	99,410	\$ -	-	\$ -	-	780,985	200	20	80
New Windows (B2020)	32	\$ 3,348,518	666,650	\$ 195,742	38,970	\$ -	-	\$ 304,488	60,620	\$ -	-	\$ -	-	3,610,372	80	20	80
Treatments	10	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	10	20	80
Shading Devices	30	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	20	100	0
Other (Describe)		\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	0		100
Design, Construction & Retrofit Strategies Total																	
Total		\$ 6,989,327	4,485,542	\$ 5,325,493	1,545,553	\$ 1,686,839	1,379,973	\$ 6,679,257	1,913,287	\$ 5,274,492	5,809,254	\$ 42,385,669					

NNDSSB Energy Conservation and Demand Management Plan - FY 24-28
 Calculating Energy Conservation Goals for FY 2024 to FY 2028
 Operations and Maintenance Strategies

Policy and Planning	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)				
New School Design/Construction Guidelines and Specifications	5	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	-	5	50	90
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, D304	3	\$ 130,206	265,716	\$ 130,206	265,716	\$ 130,206	265,716	\$ 130,206	265,716	\$ 130,206	265,716	3,985,739	5	50	90	
HVAC Optimization (coil cleaning, re-calibration of equipment) (D3020)	3	\$ 82,250	317,590	\$ 82,250	317,590	\$ 82,250	317,590	\$ 82,250	317,590	\$ 82,250	317,590	4,763,851	2	50	90	
Commissioning (retro and re)	10	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	-	10	50	90
Other (Describe)		\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	-	0		100

Energy Audits	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)				
Walk Through Audit	5	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	-	100	50	50
Engineering Audit	5	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	-	100	50	50
Other (Describe)		\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	-	0		100

Operations and Maintenance 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		\$ 192,456	583,306	\$ 192,456	583,306	\$ 192,456	583,306	\$ 192,456	583,306	\$ 192,456	583,306	6,769,590				

NDSB Energy Conservation and Demand Management Plan - FY 24-28
 Calculating Energy Conservation Goals for FY 2024 to FY 2028
 Occupant Behaviour Strategies

Training and Education	Quantity of Time that Measure will be in place (years)	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)	Energy Payback Period	% related to Electricity	% related to Natural Gas
Building Operator Training	3	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	3	60	40
Energy Benchmarking Program	5	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	1000	50	50
Building Automation Training (site specific)	3	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	1	60	40
Ongoing Training and Awareness Programs for Energy Conservation	5	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	10	90	10
Detailed Information on Building Operational Costs	1	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	1000	50	50
Detailed Information on Energy Consumption (e.g. via the Utility Consumption Database or other database)	1	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	1000	50	50
Participate in Environmental Programs, such as EcoSchools, Earthcare	1	\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	5	90	10
Other Tools (Define)		\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-	0		100
Occupant Behaviour Strategies Total		\$ -	-	\$ -	-	\$ -	-	\$ -	-	\$ -	-	-			

NNDSB Energy Conservation and Demand Management Plan - FY 24-28
Calculating Energy Conservation Goals for FY 2024 to FY 2028
Conservation Goals

	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)
Appendix B: Design, Construction and Retrofit Strategies Total	\$ 6,989,327	4,485,542	\$ 5,325,493	1,545,553	\$ 1,686,839	1,379,973	\$ 6,679,257	1,913,287	\$ 5,274,402	5,809,254	42,385,669
Appendix C: Operations and Maintenance Strategies Total	\$ 192,456	583,306	\$ 192,456	583,306	\$ 192,456	583,306	\$ 192,456	583,306	\$ 192,456	583,306	8,749,590
Appendix D: Occupant Behaviour Strategies Total	\$ -	0	\$ -	0	\$ -	0	\$ -	0	\$ -	0	0
TOTAL	\$ 7,181,783	5,068,848	\$ 5,517,949	2,128,859	\$ 1,879,295	1,963,279	\$ 6,871,713	2,496,594	\$ 5,466,858	6,392,560	51,135,259
Percentage reduction		14.23		5.98		5.51		7.01		17.95	50.69
Conservation Goal (ekWh/m ²)		30.31		12.73		11.74		14.93		38.22	107.92
Conservation Goal (ekWh/ft ²)		2.82		1.18		1.09		1.39		3.55	10.03