Halton District School Board - Energy Conservation and Demand Management Plan 2018/19 – 2022/23

June 12, 2019

Mission

Halton District School Board (HDSB) is guided by a Multi-Year Plan and Vision which sets direction and guides priorities at the Board. The Energy Conservation and Demand Management Plan (ECDMP) has been developed in alignment with the goals and objectives of the Multi-Year Plan. It is built on shared principles such as collaboration and continuous learning to enhance innovative practices for managing energy and to build awareness and engagement with occupants and staff.

HDSB is committed to energy efficiency through a balanced approach using sustainable practices. This supports the Board's Environmental Sustainability and Stewardship Policy and:

- All staff will use data to inform actions, validate decision-making and allocate resources.
- HDSB will provide and maintain facilities that are safe, accessible and engaging learning environments.
- HDSB will optimize resources and technology through innovative and creative opportunities and partnerships.

Goals and Objectives

The Board has established the following goals and objectives for the five-year Energy Conservation and Demand Management Plan:

- Increase awareness and direct involvement of occupants and staff across board departments in conservation management practices to reduce energy and water consumption
- Use Building Automation Systems (BAS) to monitor and control equipment as well as build awareness of operations in facility operators, staff and occupants
- Use continuous improvement approach to strategies and support initiatives to integrate best energy & water management practices into daily operations (e.g. monitoring, reporting)
- Use and enhance the facilities maintenance and renewal process of identifying, replacing, upgrading equipment. Use balanced approach for end-of-life system upgrades/replacements to higher efficiencies.
- Establish self-sustaining Internal Energy Fund to invest in energy efficiency and renewable energy projects. Project savings provide revolving funds for further investment.

- Strive to incorporate the most efficient systems and design in new school design to optimize use and operation, particularly as facility is used more by the community

Target

The Board has set an overall target of reducing its total energy use intensity (ekWh/ft2) by 10% from the baseline fiscal year 2017-2018 to 2022-2023.

The Board's objectives of occupant participation, using operational best practices and portfolio-wide efficiency upgrades will deliver increasing reductions over the five years. This integrated approach of engaging people and upgrading systems during scheduled maintenance and renewal cycles is underpinned by the objective of continuous improvement. The project savings will contribute to the Internal Energy Fund.

Five Year Energy Intensity Target

Energy Intensity Target*	FY2017-2018 (baseline)	FY2022-2023
ekWh/ft2	19.52	17.57
% decrease	-	10

* Energy intensity values are weather normalized to baseline FY 2013 to properly compare years.

Managing Energy at Halton District School Board

Funding and Planning

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

The Ministry announces each Board's funding allocation in March for the next school board Fiscal Year which runs from September 1st to August 31st. The Ministry does not provide boards with multi-year funding allocations.

As a result, while a board may have a five-year energy management strategy, the Board's ability to implement their strategy is dependent on the funding that's received for each of the five years covered by their plan.

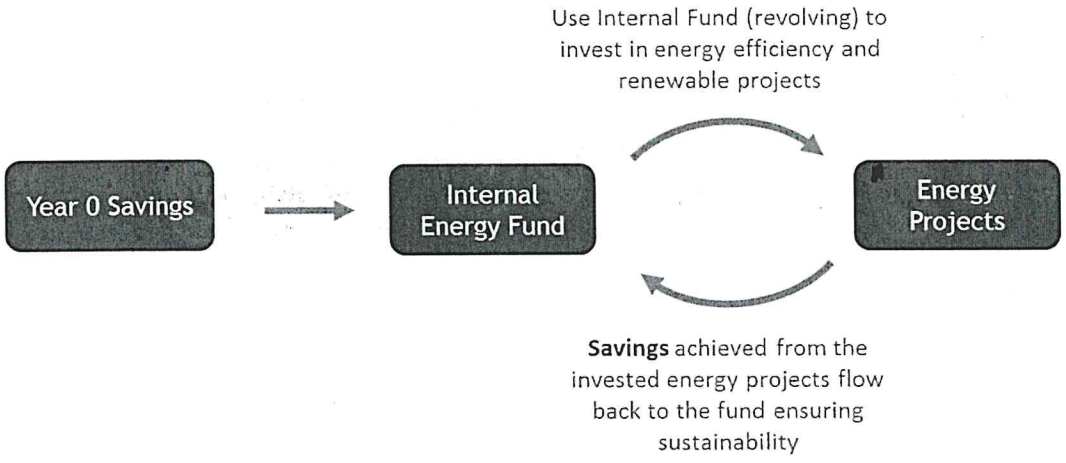
HDSB is addressing this funding unpredictability through the creation of an Internal Energy Fund. This self-funding approach will strengthen the Board's ability to select and implement energy efficiency and renewable energy projects from savings invested back into the fund.

In addition, the Board has a strategy of collaboration with various stakeholders who have an impact on project implementation and funding. To illustrate, the Board is collaborating with the Halton Environmental Network on projects and working on community energy programs with Halton Hills, Milton, Oakville, and Burlington in seeking multi-facility projects and other funding from sources like FCM, IESO, etc. These collaborations will address challenges such as misaligned objectives, capital priorities, and barriers associated with policies and practices to ensure economic and environmental objectives are met to the advantage of all stakeholders.

Internal Energy Fund – Funding Self-sufficiency

HDSB developed a model to fund energy efficiency and renewable energy projects through the creation of an Internal Energy Fund in 2019. This fund was created to help the Board reduce its reliance on unpredictable external funding for project investments, particularly long-term projects, which increase energy efficiency, while reducing operating costs. HDSB aims to become more self-sustaining to offset and/or decrease energy costs and the fund will help it become more self-reliant.

The Internal Energy Fund works as follows:



Standards

HDSB is developing and implementing an Administrative Procedure for Operational and Environmental Conditions. This will establish equipment operating guidelines such as temperature setpoints for facilities by season and during occupied/unoccupied states. Operating schedules of heating and cooling systems will be established and managed by the BAS for each facility and continuously monitored.

HDSB Information Technology (IT) Department is continuously looking at the impact of new technology on operations. Software which turns off of non-administrative computers at the end of the day, have been optimized. The use of remote support, which decreases the amount of physical travel to facilities,

has been increased and is a factor in the purchase of new technology. The energy use and lifespan of all equipment is part of the purchasing process for IT.

All schools in HDSB are encouraged and supported to participate in environmental sustainability programs such as EcoSchools, which build student and staff awareness of the impact of occupant behaviour on facility operations. School wide programs may involve energy audits, monitoring energy use, lights out and phantom energy campaigns.

Roles and Responsibilities

Energy efficiency has strong senior administration support at the Board. While the Board does not have a dedicated energy manager, its Energy and Environmental Specialist assumes the role in addition to other duties.

The Environmental Sustainability Specialist works across all departments and with both staff and students to develop policy and implement practices which address conservation and demand management behaviours.

The Environmental Management Team (EMT) is comprised of staff from various corporate departments (purchasing, planning, facility services, HR, IT), teachers, custodians, EAs, trustees, students, parents and community organizations. The Environmental Sustainability (chair) and Environment & Energy Specialists are part of the Team. The EMT's primary role with energy management and conservation is to build awareness of and connect initiatives happening within their respective areas.

The Facility Services department manages energy and water collaboratively. New school designs are reviewed by the entire team - energy, operations, maintenance/renewal and capital projects staff - with the objective of reaching balanced economic and environmental decisions within policy and funding constraints. Similar collaborations are used for renewable energy and major retrofit projects.

Projects/Measures

<u>Design/construction/retrofit</u>

The major projects planned for the five-year period are the following:

- LED Lighting retrofits
- Solar PV systems
- BAS upgrades
- Projects & initiatives as defined annually

Projects and initiatives will be determined on an annual basis by Facilities Services . The selection of measures and initiatives will be based on balancing capital and maintenance renewal requirements, feedback from facility occupants, EMT discussions and funding levels available in the Internal Energy Fund.

One example is when energy-using equipment is at the end of its life cycle, priority is given to high-efficiency replacement units when feasible.

Operations and maintenance

HDSB has an established routine maintenance & inspection schedule for all equipment which helps ensure systems operate as designed and efficiencies are maintained. In addition, the Building Automation System does not permit adjustments which eliminates "set-point drift", further keeping control of equipment from using more than intended.

Occupant behaviour

Facility occupants and other staff will become directly involved in monitoring and learning about energy consumption of their facilities. The objective is to have occupants become supporters of energy reduction measures and contribute to reduced consumption through their actions.

Renewable energy

HDSB currently has the following solar PV energy sites:

Name	Capacity (kW)	Estimated Annual Generation (kWh)
J.W. Boich PS	95	112,500
M.M.Robinson HS	10	12,000
Iroquois Ridge HS	10	12,000

The board is taking a balanced approach to renewable energy investments. Maintaining and upgrading existing systems are prioritized over renewable energy projects. The Internal Energy Fund model will allow the board to make decisions on new investments in energy efficiency and renewable energy projects.

Energy Procurement

The Board participates in a consortia arrangement to purchase electricity and other related services through the OECM's Strategic Electricity Management and Advisory Services program.

The Board also participates in a consortia arrangement to purchase natural gas through the Hamilton Consortium.

Demand Management

None of the Board's energy accounts are subject to coincident peak demand charges. Its monthly demand charges are mitigated via the BAS which is programmed such that during start-up the systems are sequenced to minimize the demand.

Tracking & Reporting

The Board will be implementing real-time utility consumption monitoring through the Building Automation System it is installing across its facilities. A proactive strategy will be used to identify and rectify consumption irregularities as they occur rather than react later. Currently all occupants and board staff can view the BAS to see real-time data. HDSB will be developing an intuitive dashboard to allow better understanding of what is going on in the building through simple graphs and other visualization tools.

Programs

HDSB has had schools enrolled in the EcoSchools program for many years. Currently there are 49 schools participating. The intent is to leverage these schools by building greater awareness of energy conservation with occupants.

As curriculum moves to incorporating real data and local/global issues, the provision of energy and water data for facilities will be expanded. Real-time utility consumption will build a clearer and more direct understanding of the impact of occupant actions on facility operations.

HDSB is also building an understanding of the impacts of site modifications (decreased paving, increased storm water management, increased canopy cover) on the energy use of facilities from decreased heat island effects, to better outdoor learning environments for students, to increased modal split (more walking/biking/school bus rides) for the journey to and from school.

Energy Efficiency Incentives

The Board applies to incentive programs to support the implementation of energy efficient projects on a regular basis. Since 2013, it's estimated that the board has received $90,000 in incentives from utility companies.

Review of Progress and Achievements in the Past Five Years: FY 2012-2013 – FY 2017-2018

Asset Portfolio

The following chart outlines the energy-related variables/metrics in the Board's asset portfolio that changed from the baseline year (FY 2012-13) to the end of the five-year reporting period (FY 2017-18).

	FY 2012-13 (Baseline)	FY 2017-18	Variance
Total Number of Buildings	110	116	6
Total Number of Portables/Portapaks	255	355	100
Total Floor Area	7,145,347	7,750,015	604,668
Average Operating Hours	40	40	0
Average Daily Enrolment	46,484	57,730	11,246

Energy Consumption Data

The chart below lists the "metered" consumption values in the common unit of ekWh.

Utility	Fiscal Year 2012-13 (Baseline)	Fiscal Year 2017-18 (Current)
Total Electricity (kWh)	56,924,200	61,339,440
Total Natural Gas (ekWh)	100,368,100	96,603,800
Total Heating Fuel (Type 1 and 2) (ekWh)	1,110,093	142,508

Notes:

- Metered (also known as "raw") consumption data does not take into consideration the impact of weather on energy usage and as a result it does not allow an accurate analysis of energy performance from one year to the next.
- Comparing energy consumption values from one year to another requires the use of weather normalized values as they take into consideration the impact of weather on energy performance consumption across multiple years.

Weather Normalized Values	Fiscal Year 2012-13 (Baseline Year)	Fiscal Year 2017-18 (most recent available data)
Total Energy Consumed (eKWh)	155,866,200	151,293,608
Energy Intensity (eKWh/ft2)	21.81	19.52

Review of Previous Energy Conservation Goals and Achievements

In 2014, the Board set annual energy conservation goals for the next five fiscal years. The following chart compares the Energy Intensity Conservation Goal with the Actual Energy Intensity reduced for over the five years to FY 2017-2018.

Fiscal Year	Conservation Goal		Actual Energy Savings	
	ekWh/ft2	%	ekWh/ft2	%
2013-14 to 2017-18	2.1	9.6	2.3	11

The chart below compares the 2014 Forecasted Cumulative Energy Intensity Conservation Goal with the Actual Cumulative Energy Intensity Reduced Savings.

		(ekWh/ft2)	Variance %
2014 Board Plan	Forecasted Cumulative Energy Intensity Conservation Goal FY 2013-14 to FY 2017-18	2.1	
	Forecasted Cumulative Energy Intensity Conservation Goal as a Percentage		9.6
FY 2017-18	Actual Cumulative Energy Intensity reduced between FY 2013-14 to FY 2017-18 - weather normalized	2.3	
Variance	2014 Forecasted Cumulative Conservation Goal and Actual Cumulative Energy Intensity reduced - weather normalized	0.2	
	% of Cumulative Energy Intensity Conservation Goal Achieved - weather normalized		109

Measures Implemented from FY 2012-13 to FY 2017-18

Total Investment during this period was $11.03M, primarily in retrofit projects, operations & maintenance. Energy efficiency investments included:

- Building Automation Systems upgrade
- High efficiency HVAC equipment upgrades
- LED Lighting retrofits
- Upgrades to building envelope including new windows, doors, and increased insulation within roofing systems

Note: Roofing amounts were not included in the above total as only the costs associated with increased insulation within the roofing system, which could not be extracted, warrant consideration as part of efficiency improvements.

New school designs incorporate the highest energy efficient systems and designs practical and are reviewed by the entire Facilities Services team.

Senior Management Review

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

Name

Title Superintendent Facility Services Halton District School Board.

Date June 27/19