



Upper Grand

District School Board

Energy Conservation and Demand Management Plan

2014 - 2019

500 Victoria Road North
Guelph, Ontario

N1E 6K2

<http://www.ugdsb.on.ca>



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1 INTRODUCTION

1.1 Overview

In 2009, The Green Energy Act was passed. It highlighted that the Government of Ontario is committed to:

- *fostering the growth of renewable energy projects, which use cleaner sources of energy, and to removing barriers to and promoting opportunities for renewable energy projects and to promoting a green economy*
- *ensuring that the Government of Ontario and the broader public sector, including government-funded institutions, conserve energy and use energy efficiently in conducting their affairs.*
- *promoting and expanding energy conservation by all Ontarians and to encouraging all Ontarians to use energy efficiently.*

In 2011, Ontario Regulation 397/11 made under the Green Energy Act came into effect. This legislation outlines that all public agencies, including school boards “shall prepare, publish, make available to the public and implement Energy Conservation and Demand Management plans”.

The Upper Grand District School Board (UGDSB) is strongly committed to continue to support leadership in the development of knowledge, skills, perspectives, and practices in order to foster environmentally responsible citizens. In addition, the board is dedicated to expand current energy conservation initiatives by developing strategies to reduce energy consumption and greenhouse gas (GHG) emissions and to incorporate these values into students’ educational programs. This is summarized in the following vision statement issued by the Environmental Education Management Committee (EEMC):

EEMC Vision:

By the 2017-18 school year the Upper Grand District School Board will be a community leader in environmental stewardship and sustainability. Students and staff in all schools and board departments will work together and with our community partners to become environmentally responsible citizens in a safe, healthy and sustainable environment. We will do this through informed decision-making and by dedicating resources to the delivery of integrated environmental curriculum and programs, and in support of environmentally appropriate behaviour and operational practices.

1.2 Green Energy Act Reporting

Energy Consumption and Greenhouse Gas Emissions data

On or before July 1 of each year, every school board shall submit to the Minister and publish on its website their Energy Consumption and Greenhouse Gas Emissions data for operations conducted in the past year using the Ministry of Energy template.

Energy Conservation and Demand Management Plan

Energy Conservation and Demand Management plans require school boards to report on their energy consumption and set targets for reduction. The energy plan is composed of two parts as follows:

1. A summary of the public agency's annual energy consumption and greenhouse gas emissions for its operations.
2. A description of previous, current and proposed measures for conserving and otherwise reducing the amount of energy consumed by the public agency's operations and for managing the public agency's demand for energy, including a forecast of the expected results of current and proposed measures.

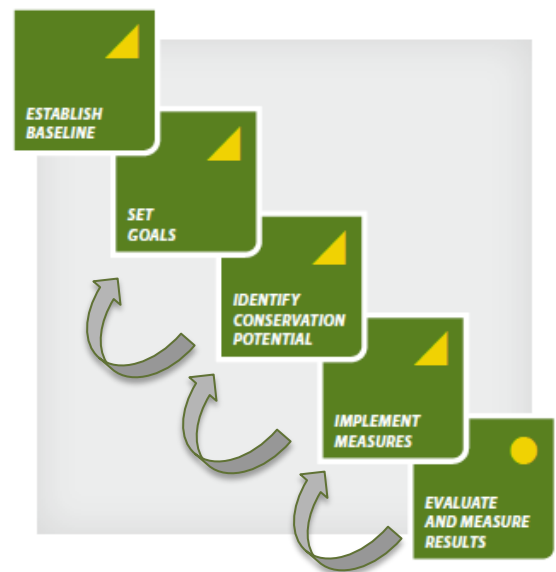
Note: Measures are the actions that are taken to save energy and to help achieve the goals and objectives of school boards as outlined in their energy plans. *A Guide to Preparing Conservation and Demand Management Plans* (Ontario Ministry of Energy) lists three main categories of Measures:

BEHAVIOURAL Measures: Staff engagement, culture change, etc.

TECHNICAL Measures: New builds, changes to existing builds, energy audits, etc.

ORGANIZATIONAL Measures: Policies, procedures, plans, etc.

The steps when developing Energy Conservation and Demand Management plans is to first gather data to establish a baseline, and then set goals toward energy conservation and demand practices. After subsequently identifying conservation potential, measures will be implemented. Throughout the process, as it is not linear, results will be evaluated, providing opportunity for reflection on projects that are working and initiatives that require a level of adjustment.



From: A Guide to Preparing Conservation and Demand Management Plans

As per Regulation 397/11 the energy plan will be in place for a length five years beginning July 1, 2014 and ending on June 30, 2019.

2 EDUCATION SECTOR BACKGROUND

2.1 Funding and Energy Management Planning

Publicly funded 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 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 they receive in each of the five years covered by their energy management plan.

2.2 Asset Portfolios and Energy Management Planning

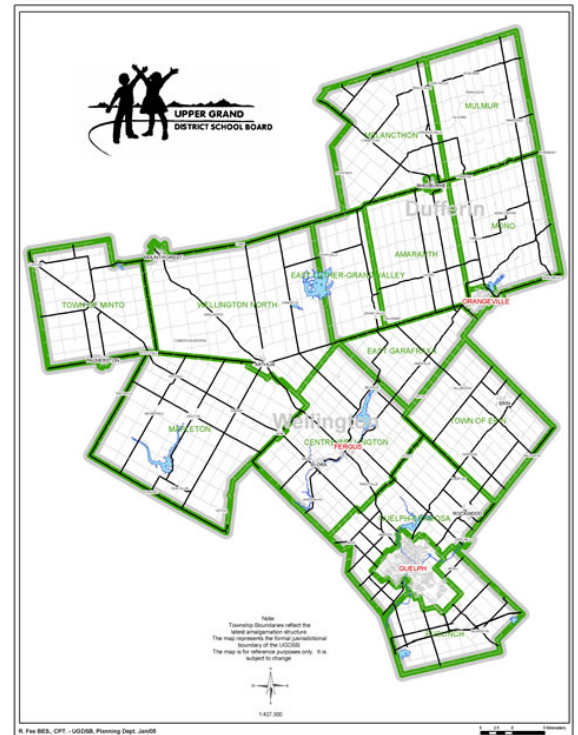
Energy consumption at a site can be impacted by a number of variables. The following lists provide education sector examples that may impact changes in consumption at a site from one year to the next. These examples will play a significant role in the Board’s assessment of energy management priorities.

Variables that may impact changes in consumption

Facility Variables	Other Variables
<ul style="list-style-type: none"> ● Year of Construction ● Building Area <ul style="list-style-type: none"> ▪ major additions ▪ sites sold ▪ portables (Installed/removed) ● Site Use <ul style="list-style-type: none"> ▪ elementary school ▪ secondary school ▪ administrative building ▪ maintenance/warehouse facility ● Share Use Sites <ul style="list-style-type: none"> ▪ swimming pools ▪ libraries ▪ lighted sports fields ▪ enclosed sports domes ● Equipment/Systems <ul style="list-style-type: none"> ▪ age ▪ type of technology ▪ lifecycle ▪ % air conditioned building area 	<ul style="list-style-type: none"> ● Programs <ul style="list-style-type: none"> ▪ day care ▪ before school programs ▪ after school programs ▪ summer school ▪ community use ● Occupancy <ul style="list-style-type: none"> ▪ significant increase or decrease in student population ▪ new programs being added to a site

2.3 About the UGDSB

The Upper Grand District school Board (UGDSB) serves approximately 32 000 students through 64 elementary schools, 11 secondary schools and 4 continuing education sites in the City of Guelph, County of Wellington and County of Dufferin. Over 3,000 dedicated teaching and support staff are aided by the contributions of caring volunteers and community partners. Two board offices, one in Orangeville and one in Guelph, serve as a base for board administration and operations.



3 ENERGY DATA

3.1 Energy Consumption for Upper Grand District School Board

Utility	Fiscal Year 2011-12	Fiscal Year 2012-13 (Current)
Total Electricity (kWh)	29 415 000 kWh	28 509 500 kWh
Total Natural Gas (m ³)	3 779 000 m ³	4 444 400 m ³
Total Heating Fuel (litres – L) (Type 1 and Type 2)	17 250 L	25 450 L
Total Heating Fuel (litres – L) (Type 3 and Type 4)	N/A	N/A
Total Propane (litres – L)	62 800 L	68 200 L

Raw Data	Fiscal Year 2011-12 (Baseline)	Fiscal Year 2012-13 (Current)
Total Energy Consumed (ekWh)	70 205 000 ekWh	76 500 000 ekWh
Energy Intensity (ekWh/m ²)	187.55 ekWh/m ²	199.83 ekWh/m ²

3.2 Energy Conservation Goal

The table below represents the following energy conservation goals that the Upper Grand District School Board has set for the next five fiscal years:

Energy conservation goals over five fiscal years

Fiscal Year	2013-14 (ekWh/m ²)	2014-15 (ekWh/m ²)	2015-16 (ekWh/m ²)	2016-17 (ekWh/m ²)	2017-18 (ekWh/m ²)
Conservation Goal	2.09	2.59	2.07	2.07	2.07

NOTE: the above values were calculated by totalling the values for each fiscal year from the charts entitled "Design, Construction and Retrofit Strategies" (Appendix A), "Operations and Maintenance Strategies" (Appendix B) and "Occupant Behaviour Strategies" (Appendix C).

Cumulative Conservation Goal

Goal	Fiscal Year 2013 to 2018 (ekWh/m ²)
Cumulative Conservation Goal	33.23

3.3 Renewable Energy

Renewable Energy Sources in the UGDSB:

Renewable Energy	Define	Number of systems in asset portfolio	Total Size (kW)	Total number of ekWh generated annually	Actual or Estimated
Solar photovoltaic	-	43	422 kW	450 000 ekWh	Estimated
Solar Air	-	3	-	35 000 ekWh	Estimated
Solar Water	-	1	-	13 800 ekWh	Estimated
Wind Turbine	teaching demo	1	13 kW	-	-
Biomass	teaching demo	1	-	-	-

4 ENERGY MANAGEMENT STRATEGIES

The UGDSB is committed to undertaking a variety of energy management projects and strategies in the following three areas:

4.1 Design/Construction/Retrofit

Definition

Design/construction/retrofit encompasses the original and ongoing intent of how a building and its systems are to perform as a whole through the integration of disciplines such as, architecture and engineering.

For the Board's relevant projects over the next five years, please refer to Appendix A.

4.2 Operations and Maintenance

Definition

Operations and maintenance includes the strategies the Board uses to ensure that the existing buildings and equipment perform at peak efficiency.

For the Board's relevant projects over the next five years, please refer to Appendix B.

4.3 Occupant Behaviour

Definition

Strategies that the Board uses to educate occupants, including staff, students and community users, with an emphasis in changing specific behaviours to reduce energy consumption.

For the Board's relevant projects over the next five years, please refer to Appendix C.

5 ENERGY PROCUREMENT AND DEMAND MANAGEMENT

5.1 Energy Efficient Incentives

The Upper Grand District School Board has applied to incentive programs to support the implementation of energy efficient projects. The Board has received funding for following initiatives: control systems, boilers, ERV's, motion sensors, rooftop units, hot water tanks, and toilets.

Between the fiscal year 2009-10 to present, the Board has received \$120 000 in incentive funding from various agencies to support the implementation of energy efficient projects. The UGDSB is dedicated to applying to incentive programs and will continue to investigate incentive programs with the help of the sector's Incentive Program Advisor in the future to help support our goals.

5.2 Energy Procurement

The Upper Grand District School Board participates in a consortium arrangement to purchase electricity from CSBSA (Catholic School Boards Services Association). For natural gas the Board participates in a consortium to purchase gas with the Hamilton-Wentworth School Board Gas Consortium which includes Wellington Catholic D.S.B., Hamilton D.S.B., Halton D.S.B., and Bluewater D.S.B.)

5.3 Demand Management

The Upper Grand District School Board uses several Local Distribution Companies (LDC) for electrical demand. The LDC’s utilized for electricity are:

- Orangeville Hydro
- Wellington North Power Inc.
- Westario Power Inc.
- Centre Wellington Hydro Ltd.
- Hydro One
- Guelph Hydro

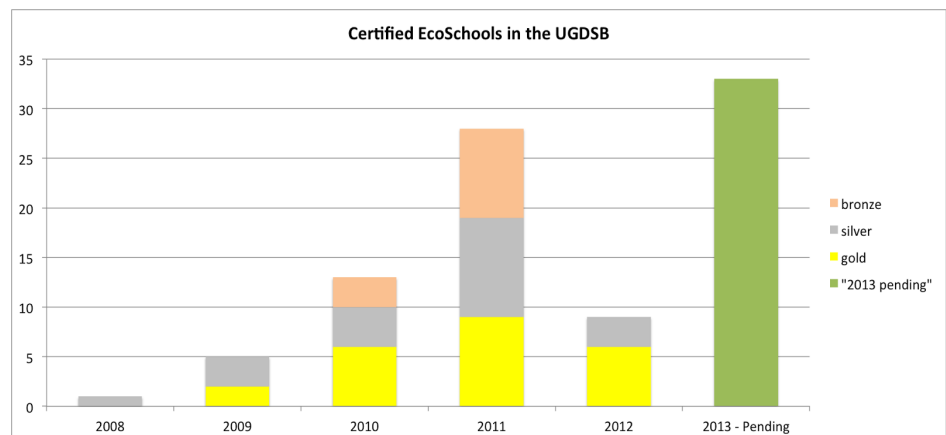
The Local Distribution Companies (LDC’s) for the Board explicitly state, in some cases, the Power Factor on each monthly bill. Some of the LDCs used by the Board provide a Power Factor on the utility bill.

6 ONGOING ENVIRONMENTAL PROGRAMS AND INITIATIVES

6.1 Environmental Programs

EcoSchools

The Upper Grand District School Board currently has 33 schools participating in the EcoSchool initiative for the 2013-2014 school year. Ontario EcoSchools is an environmental education and certification program for grades K-12 that helps school communities develop both ecological literacy and environmental practices to become environmentally responsible citizens and reduce the environmental footprint of schools. The key areas of focus and achievement are: Teamwork & Leadership, Energy Conservation, Waste Minimization, School Ground Greening and Curriculum, and Environmental Stewardship. The goal for the UGDSB is for all schools be EcoSchool certified by June 2019.



CELP

The Community Environmental Leadership Program (CELP) is semester-long, four credit grade 10 program taught at an outdoor education facility that focuses on enhancing environmental awareness and empowering student leadership in areas of environmental and social issues. Topics include reducing our environmental footprint and understanding how our energy consumption in all aspects of our lives impacts the earth. Students are also required to investigate and adopt an energy saving acts in their daily lives ranging from transportation methods to day-to-day behaviours.

Earthkeepers

Earthkeepers is a multi-day environmental education program for grade 5 students run at two UGDSB outdoor education facilities. A number of different learning stations help young people develop a personal relationship with the earth. Active, hands-on learning activities focus on the Earth's energy and material systems and our connections to, and serious impact on, these essential environment elements. Participants are encouraged to examine their personal lifestyle, committing themselves to individual pledges to use less energy and materials that will reduce their impact upon the earth. During the program, students work on earning 4 "keys" and become official level one Earthkeepers of the Natural World upon completion of follow-up activities at home and school.

Da Vinci

The da Vinci Arts & Science Environmental Leadership Program is a full semester grade 11 program that ties in science and the arts in a natural setting nestled amongst hiking trails, forests and ponds of the Arboretum at the University of Guelph. Students develop their leadership and interpersonal skills while experiencing a five-day wilderness canoe trip, leading an Eco Artist Elementary program, participating in various University Science labs, and creating their own art show. Throughout the program, current environmental issues and a focus on sustainable practices are emphasized.

EcoArtists

EcoArtists is a two-day environmental education program for grade 4 taught by da Vinci students at the Arboretum at the University of Guelph. Through a number of hands-on activities, students learn about biodiversity, habitats, and grassland, woodland and wetland ecosystems. Games, art projects and litterless lunches were used to demonstrate the importance of caring for our environment.

Headwaters

Founded in 2005 by Mike Elrick, Headwaters is a leadership program with a community and environmental focus that is offered to grade 12 students in the UGDSB. While in an experiential setting for a full semester, students further their global, local and self-awareness through various trips and real life experiences beyond the typical classroom setting. The Headwaters program is strongly oriented around energy awareness, sustainable solutions and expanding students' knowledge of environmental consequences due to the actions of humankind.

Island Lake Outdoor Education Centre

Island Lake Outdoor Education Centre is a partnership between the Upper Grand District School Board and the Credit Valley Conservation Authority. The UGDSB has an agreement with the CVCA to use its facilities at Island Lake Conservation Area, in Orangeville, for education programs. The centre is run by a teacher and volunteers, through the UGDSB program department, and offers programs to multiple grade levels programs to schools in the Dufferin region.

Program Department

The UGDSB has two curriculum leaders (one elementary and one secondary) whose portfolios contain an environmental education component. They work with teachers to develop and share lessons and curriculum resources that embedded environmental education into their classrooms. The curriculum leaders also plan school-based and community events and work with staff and students to provide meaningful ways to foster environmental stewardship and promote increased awareness of critical environmental issues including water conservation, waste management and energy conservation.

SHSM

The Specialist High Skills Major (SHSM) is a ministry-approved specialized program that allows students to focus their learning on a specific economic sector while meeting the requirements for the Ontario Secondary School Diploma (OSSD) and assists in their transition from secondary school to apprenticeship training, college, university, or the workplace. The SHSM Environment Program is based on nationally identified preparatory knowledge, skills and on the job learning opportunities focused within the field of environmental studies. Participating students will have opportunities to explore the Ontario Youth Apprenticeship Program (OYAP) and various post secondary educational opportunities.



In the UGDSB, the SHSM initiative is highly promoted and 8 high schools offer the Environment program.

Project Wild

Project WILD is a wildlife-focused conservation education program for K-12 educators and their students. The program links students and wildlife through its mission to provide wildlife-based conservation and environmental education that fosters responsible actions toward wildlife and related natural resources. Through the use of balanced curriculum materials and professional training workshops, Project WILD accomplishes its goal of developing awareness, knowledge, skills, and commitment.

This past year, training was offered to UGDSB teachers to learn how to use Project WILD materials and activities and embed environmental activities into their teaching practice.

6.2 Environmental Initiatives

Environmental Learning Centres

Environmental Learning Centres are classroom buildings or portables that have been designed to support lessons in energy conservation, renewable resources, and solar advantages of building position, natural processes and energy generation. The UGDSB currently has EcoClassrooms at 5 schools in diverse geographic locations throughout the board that are home to junior grade classes.

The first Environmental Learning Centre was built at Island Lake PS in Orangeville and is a straw bale insulated, wood framed building with plaster as the basic wall finish. Straw, used as insulation, demonstrates conservation and renewability. The replacement cycle of the straw is one year, the product is local, and the energy to produce it comes from the sun.

The majority of the windows face south to allow natural light into the building. Sunlight also penetrates to provide passive solar heat to the interior of the building in winter. Overhangs protect the classrooms from the heating effect of direct sunlight in the summer.

A rainwater cistern, visible in the rafters of the building, stores runoff from the roof. The water's potential energy provides the pressure required to flush the toilets in the building without pumping.



There is also an innovative solar to air heat source using recycled pop cans, and the building has a photovoltaic array to generate electricity.

Board-wide Annual Waste Audits

Ontario Schools are regulated by the Ontario Ministry of the Environment with respect to schools' waste management practices and are required to participate in and operate active waste minimization programs. Ontario Regulation 102/94 and 103/94 made under the Environmental Protection Act require that schools do the following:

1. A source separation program (i.e. recycling) be in place, have suitable and sufficient infrastructure, be promoted, used appropriately and actively.
2. Waste audits be conducted annually to determine the types and quantities of waste generated in your building.
3. A waste reduction work plan be developed based on the findings of the waste audits. This work plan sets goals and targets for a school to strive towards with respect to reducing its waste from one year to the next; the progress of this must be tracked from year to year.

In the UGDSB, every school conducts an annual waste audit, reviews their findings, and creates a school-specific Waste Minimization Action Plan.

Energy Management Position

The Upper Grand District School Board has recently established a full time Environmental Sustainability Lead position. Their role will be to implement the Energy Conservation and Demand Management plan along with the UGDSB Environmental Education Sustainability Action plan. This will involve building staff, student and community engagement and capacity and to effectively integrate environmental sustainability measures across the Board.

7 ENERGY CONSERVATION AND ENVIRONMENTAL GOALS

7.1 Overview

The Upper Grand District School Board is committed to establishing procedures and education to ensure the conservation of natural resources by all individuals within the system. Energy conservation measures have been planned in three distinct areas which are closely linked to align practice and beliefs. The three areas of change that will be of focus are:



From: Implementing an Energy Efficiency Awareness Program (NRCAN, 2012)

7.2 Previous Energy Conservation Initiatives

In late 2002, the Upper Grand District School Board procured the services of Ameresco Canada to conduct a full energy audit of all Board school and administration facilities to assess the energy usage of each school, and propose building upgrade measures to help reduce energy consumption. Phase One of the Board's energy strategy was to upgrade all building systems such as lighting, boilers, and control systems that could achieve an average simple payback of less than eight years. Approximately thirteen million dollars worth of energy upgrade work was conducted in 2003, 2004, and 2005 to complete these projects. Ameresco Canada was able to quantify the energy savings realized from the upgrades that were completed in the retrofit program.

Throughout the implementation of the Ameresco retrofit work, the Board created an Energy Management position within the Board who oversaw the implementation of the retrofit work, as

well as providing energy conservation information to staff and students throughout the Board. The staff and student energy training culminated in an Energy Conference that took place in December of 2004. Each school sent a number of representatives to the conference with a keynote address from Dr. David Suzuki.

Previous Energy Projects to Reduce Energy Consumption

Facility Upgrades	# Of Schools
The Board invested approximately \$4 million replacing outdated air handling units with more efficient units.	29
At a cost of approximately \$3.8 million, outdated or inefficient boilers were replaced.	21
Most building Automation Systems throughout the Board have been modernized to decrease energy usage.	All but 2
The Board has converted all lighting to T8 or better.	All
Motion sensor switches have been installed at many schools.	12
Windows replacements and other building envelope upgrades completed at various sites around the Board to reduce heat loss and lower energy usage at a cost of approximately \$3.5 million.	23

7.3 Organizational Goals

Organizational measures increase the extent to which environmental sustainability is integrated into school board policies, procedures, and strategic plans. The following are new and ongoing UGDSB organizational commitments:

- Environmental Education Policy #210
- Environmental Education listed as a priority in the board's strategic plan
- Environmental Education & Management Committee
- Energy Management Sub-Committee
- Environmental Communication Sub-Committee
- School Yard Greening Sub-Committee

- Environmentally responsible purchasing practices (e.g., Energy Star appliances)
- Board and School improvement plans (BIPSA and SIPSA) will include smart goals and targeted strategies that promote environmental sustainability and energy conservation.

7.4 Behavioural Goals

UGDSB Environmental Education Sustainability Action Plan 2014-2019

The Environmental Education Management Committee (EEMC) was established in September 2012 to take leadership in the development and ongoing monitoring and execution of a comprehensive environmental sustainability plan to support UGDSB Policy # 210. The composition of the committee includes trustees, school administrators, central board office staff, teachers and students. The committee was dedicated to bring life to the UGDSB environmental sustainability vision through the development of an Environmental Sustainability Action Plan which was based on recommendations for the Ministry document *Acting Today Shaping Tomorrow*. The five year staged implementation plan contains a sequential and realistic timeline for implementation in four main areas as depicted in the graphic below.



Many of the organizational, behavioural and technical/facility goals described in this document are embedded in the actions listed in the Environmental Sustainability Action Plan, as energy conservation and management initiatives closely overlap with environmental education initiatives.

Expand on current environmental programs

As described in section 6.1 of this document, the UGDSB is committed to continuing to promote and expand existing environmental programs such as CELP, Earthkeepers, da Vinci, EcoArtists, Headwaters, Island Lake Outdoor Education Centre, SHSM and Project WILD.

In addition, the program department will provide in-services, workshops, curriculum materials and networking opportunities and more for teachers to support them in providing students with enhanced environmental education experiences both in the classroom and outdoors.

Expand the EcoSchools program

The main goals of EcoSchools are to help schools reduce their energy consumption, minimize their waste, green their school grounds and teach staff and students to become more ecologically literate. The goal for the UGDSB is for all schools be EcoSchool certified by June 2019.

Expand and create new relationships with environmental Organizations

The UGDSB is committed to working with community agencies to extend the scope of environmental initiatives. Current partnerships have been forged with:

Active and Safe Routes to School	NeighbourWoods on the Grand
City of Guelph	Project Neutral
County of Dufferin Waste Services	Safe Drinking Water Foundation
Evergreen	Trees for Guelph
Focus on Nature	University of Guelph
Grand River Conservation Authority	Wellington Water Watchers
Green Legacy	Wellington-Dufferin-Guelph Public Health
Nature in the Neighbourhood	

Create new, board-wide ‘environmental standards of action’

In order to change culture and behaviours, the UGDSB will create environmental standards of action that all schools and board offices will follow in order to conserve energy and foster environmental stewardship. They include the following:

- ‘EcoTeams’ created at all locations to champion and monitor environmental initiatives
- Areas in front of vents are clear of furniture and paper.
- Computer monitors turned off when not in use & automatically put to sleep during non-use.
- Electronic methods (email, website, twitter, phone callout, etc.) used when communicating
- Faxes sent to a computer for electronic distribution, not printed.
- Lights are turned off by the last occupant when a room is empty
- Margins on documents set at "medium" or "narrow" to reduce pages printed
- Meetings are as paperless as possible

- On hot days, blinds/curtains are closed against the sun, but open in the winter to allow natural heating
- Paper and container recycling is put in proper bins
- Photocopying/printing is double-sided on both sides of paper (and set as default on computers).
- Printers, scanners, etc. put on standby when not in use & turned off at the end of the day.
- Reuse it/GOOS” boxes are available for half-used paper to be used on the other side
- Staff & students are encouraged to reduce waste by using reusable containers, cutlery, water bottles, mugs, etc.
- Staff assigned individual passcode for photocopiers.
- Staff trained on how to minimize photocopying.

Increase recognition, celebration and communication

Continue and enhance recognition of students and staff in the area of environmental and energy leadership (e.g., with awards such as: Everyday Hero Awards, Mike Elrick Award, Green Custodian Award, LSF Jack Layton Award for Youth Action in Sustainability, etc.). Increase board and community awareness of successes by creating a Communication Sub-committee to share and promote environmental education and conservation initiatives. Implement competitions, challenges, and contests to encourage and motivate staff and students.

7.5 Technical/Facility Goals

The Upper Grand District School Board’s ongoing energy management projects highlight a commitment to sustainability and the environment. The board is dedicated in working towards continually improving energy conservation standards. The following are new and ongoing UGDSB technical/facility commitments:

1. Continue with design, construction, retrofit, operations and maintenance strategies such as:

- High efficiency lighting systems
- Occupancy sensors
- High efficiency boilers
- Energy efficient rooftop units
- High efficiency domestic hot water
- Variable frequency drives (VFD)
- Demand ventilation
- Entrance heater controls
- Building automation systems
- New roofs
- New windows
- Walk through audits
- Engineering audits
- New school design/construction guidelines and specifications
- Procurement of Energy Star certified appliances

2. Increase the number of sites with automation systems and real-time energy data

Currently the board has a number of sites using different types of energy data measuring tools (e.g., Johnson controls, Carma web-based energy management system, etc.). Monitoring the general operation and maintenance of all heating, ventilation and air conditioning equipment is useful for operators to identify and diagnose building issues. In addition, providing schools with energy data may help reduce energy consumption if tied to awareness programs, curriculum, and school-wide challenges to educate and promote energy conservation.

3. Create day and night standard temperature guidelines for all schools and board offices

The creation of temperature guidelines will have a positive impact on energy usage. Education is required to help individuals understand the intent and importance of this initiative, and to provide steps that they can take to help maintain their comfort.

4. Use data to target facility improvements that will reduce energy consumption or use energy more efficiently

Undertake systematic, holistic surveys of a facility, aimed at establishing how energy is currently used (the why, when, how and where energy flows) and to identify areas of reduction, waste & potential savings.

5. Provide training and support for board staff

Training for building operators, as well as for operations and maintenance staff is key to the success of reaching technical/facility goals. For example, in-services on building automation, energy consumption reduction steps and awareness programs can all have a significant impact on saving energy in all board facilities.

Senior Management Approval of this Energy Conservation and Demand Management Plan

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

June 30, 2014

Martha Rogers
Director of Education

Date

Appendix A

Design, Construction and Retrofit Strategies												
Lighting	Quantity of Time that Measure will be in place (years)	2013-14		2014-15		2015-16		2016-17		2017-18		13/14-17/18
		Estimated Cost	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Total Accumulated Energy Savings (ekWh)
High Efficiency Lighting Systems	15	\$ 40,000	39,506	\$ 15,000	14,815	\$ 10,000	9,877	\$ 10,000	9,877	\$ 10,000	9,877	316,052
Occupancy Sensors	10	\$ 5,000	7,407	\$ 10,000	14,815	\$ 10,000	14,815	\$ 10,000	14,815	\$ 10,000	14,815	185,185
HVAC	Quantity of Time that Measure will be in place (years)	2013-14		2014-15		2015-16		2016-17		2017-18		13/14-17/18
		Estimated Cost	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Total Accumulated Energy Savings (ekWh)
High Efficiency Boilers (condensing)	15	\$ 160,000	415,544	\$ 160,000	415,544	\$ 160,000	415,544	\$ 160,000	415,544	\$ 160,000	415,544	6,233,160
Energy efficient Rooftop units	15	\$ 250,000	98,956	\$ 250,000	98,956	\$ 250,000	98,956	\$ 250,000	98,956	\$ 250,000	98,956	1,484,340
High Efficiency Domestic Hot Water	15	\$ 10,000	20,550	\$ 60,000	123,301	\$ 10,000	20,550	\$ 10,000	20,550	\$ 10,000	20,550	719,254
VFD	15	\$ 10,000	18,247	\$ 10,000	18,247	\$ 10,000	18,247	\$ 10,000	18,247	\$ 10,000	18,247	273,705
Demand Ventilation	10	\$ 10,000	23,749	\$ 10,000	23,749	\$ 10,000	23,749	\$ 10,000	23,749	\$ 10,000	23,749	356,235
Entrance Heater Controls	20	\$ 10,000	23,749	\$ 10,000	23,749	\$ 10,000	23,749	\$ 10,000	23,749	\$ 10,000	23,749	356,235
Controls	Quantity of Time that Measure will be in place (years)	2013-14		2014-15		2015-16		2016-17		2017-18		13/14-17/18
		Estimated Cost	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Total Accumulated Energy Savings (ekWh)
Building Automation Systems - Upgrade	10	\$ 100,000	79,165	\$ 150,000	118,747	\$ 100,000	79,165	\$ 100,000	79,165	\$ 100,000	79,165	1,345,803
Building Envelope	Quantity of Time that Measure will be in place (years)	2013-14		2014-15		2015-16		2016-17		2017-18		13/14-17/18
		Estimated Cost	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Total Accumulated Energy Savings (ekWh)
New Roof	25	\$ 100,000	9,304	\$ 750,000	69,780	\$ 250,000	23,260	\$ 250,000	23,260	\$ 250,000	23,260	465,200
New Windows	30	\$ 50,000	11,630	\$ 50,000	11,630	\$ 50,000	11,630	\$ 50,000	11,630	\$ 50,000	11,630	174,450
Total		\$ 745,000	747,807	\$1,475,000	933,333	\$ 870,000	739,542	\$ 870,000	739,542	\$ 870,000	739,542	11,909,619

Appendix B

Operations and Maintenance Strategies												
Energy Audits	Quantity of Time that Measure will be in place	2013-14		2014-15		2015-16		2016-17		2017-18		13/14-17/18
		Estimated Cost	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	\$ 10,000	119	\$ 10,000	119	\$ 10,000	119	\$ 10,000	119	\$ 10,000	119	1,785
Engineering Audit	5	\$ 10,000	119	\$ 10,000	119	\$ 10,000	119	\$ 10,000	119	\$ 10,000	119	1,785
Total		\$ 20,000	238	\$ 20,000	238.00	\$ 20,000	238	\$ 20,000	238	\$ 20,000	238	3,570

Appendix C

Occupant Behaviour Strategies												
Training and Education	Quantity of Time that Measure will be in place (years)	2013-14		2014-15		2015-16		2016-17		2017-18		13/14-17/18
		Estimated Cost	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Cost	Estimated Annual Energy Savings from all projects (ekWh)	Estimated Total Accumulated Energy Savings (ekWh)
Participate in environmental programs, such as EcoSchools, Earthcare	1	\$ 15,000	24,030	\$ 15,000	24,030	\$ 15,000	24,030	\$ 15,000	24,030	\$ 15,000	24,030	360,450
Total		\$ 15,000	24,030	\$ 15,000	24,030	\$ 15,000	24,030	\$ 15,000	24,030	\$ 15,000	24,030	360,450

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The slogan seen in the footer of this document: *Live Green. Learn Green. Go Green.* was written by Hannah L., who was the student winner of the UGDSB's 2014 environmental slogan contest.

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Conservation is the cleanest and least costly energy resource

Bob Chiarelli, Minister of Energy