

Five Year Conservation and Demand Management Plan

September 1, 2013 – August 31, 2018

Superior North Catholic
District School Board

Prepared June 2014 by:





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1 EXECUTIVE SUMMARY

The Ontario Provincial Government has committed to help public agencies better understand and manage their energy consumption. As part of this commitment, **Ontario Regulation 397/11** under the **Green Energy Act 2009** requires public agencies, including municipalities, municipal service boards, school boards, universities, colleges and hospitals to report on their energy consumption and greenhouse gas (GHG) emissions annually beginning in 2013, and to develop and implement energy Conservation and Demand Management (CDM) Plans starting in 2014.

The purpose of the Superior North Catholic District School Board (SNCD SB) energy Conservation and Demand Management Plan is to develop a framework for Superior North Catholic District School Board to understand the historical impact of its operations on greenhouse gas (GHG) emissions, and to take action by setting GHG reduction targets. The first objective of this report was the development of an energy Conservation and Demand Management Plan that addressed the facets of energy consumption in the School Board. This included the development of a GHG emissions inventory, benchmarking Superior North Catholic District School Board's existing energy intensity performance relative to other School Boards, identifying potential energy efficiency projects, and establishing a GHG emissions reduction target. This strategic approach to energy management ("energy Conservation and Demand Management Plan") supports Superior North Catholic District School Board's **Strategic Plan 2011-2014** and **Director's Report 2013**.

Energy efficiency and the wise use of energy are two of the lowest cost options for meeting energy demands, while providing many other environmental, economic and social benefits, including reducing greenhouse gas (GHG) emissions, cost avoidance and savings. Along with the aforementioned benefits, energy efficiencies and the wise use of energy also promote local economic development opportunities, energy system reliability, improved energy supply security, and reduced price volatility.

There are a variety of low cost/no cost initiatives available to Superior North Catholic District School Board, which can jump-start energy consumption and dollar savings. Simple actions such as turning lights and appliances off, shutting off heaters in the summer, establishing efficient usage times, efficient production requirements, and many other actions can result in energy savings. Such actions, along with energy efficient capital and operating process improvements and project implementation, are key components which are outlined within the energy Conservation and Demand Management Plan (CDM Plan).

This CDM Plan is the culmination of a non-linear process involving the:

- Integration of establishing a baseline for performance to be measured against,
- Setting of future performance goals and objectives,

- Continuous improvement through identification of energy conservation potential,
- Strategic alignment of measure implementation and fiscal constraints, and
- Evaluation, measurement and communication of results achieved.

This CDM Plan contains three perspectives: historical, current and future. It looks at “what we have done”, “what we are doing”, and “what are we planning to do”.

2 KEY COMPONENTS

The Big Picture

Sustainability is a concept which meets the needs of the present without compromising the ability of future generations to meet their own needs. This is sometimes referred to as the “triple bottom line”.

- Environmental Sustainability: Managing the effects of human activity so that it does not permanently harm the natural environment.
- Economic Sustainability: Managing the financial transactions associated with human activities so that they can be sustained over the long term without incurring unacceptable human hardship.
- Social/Cultural Sustainability: Allowing human activity to proceed in such a way that social relationships between people and the many different cultures around the world are not adversely affected or irreversibly degraded.

An energy Conservation and Demand Management Plan is the sum of measures planned and carried out to achieve the objective of using the minimal possible energy while maintaining the comfort levels (in offices or dwellings) and production rates (in factories). It can be applied to any process or building where energy use is required. To make an efficient use of the energy and, as a consequence, to save it, the actions are focused on:

- Energy Conservation,
- Energy Recovery,
- Energy Substitution,
- Corporate Goals and Objectives, and
- Corporate Fiscal Management.

Analysis and Benchmarking

It is important to recognize the value of benchmarking and comparison as a starting point. By examining the School Board’s current energy consumption patterns and comparing them with others, a better understanding of the opportunities and the pitfalls of energy conservation and sustainability planning as experienced by other public agencies is gained. This exposure, combined with the information gleaned from the energy audits, will allow SNCDSB to focus on strategies that have been proven successful elsewhere and can be tailored to the unique nature of the School Board.

It is apparent that energy conservation is being considered and implemented in most Public Sectors across Ontario and Canada. As well, the insights gained through their experiences with energy conservation can be used as a springboard to further the SNCDSB’s sustainability strategies to encompass both operational and policy improvements. Many public agencies are taking their understanding of environmental issues

and conservation beyond energy consumption and recycling, by addressing the more complex issues of water management, heat island effect, and light pollution, to name a few.

Regulatory Requirements

Under Ontario Regulation 397/11 (Part of the **Green Energy Act**, 2009), all public sector agencies must now comply with mandatory reporting requirements. By 2013, all energy consumption at School Board facilities will have to be recorded and submitted to the Ministry annually. By 2014, the requirements become more stringent as the School Board will have to submit a CDM Plan, which encompasses measures taken to date with results, as well as a five year plan for further energy conservation measures to be implemented. SNCDSB is well positioned to meet this requirement as audits have been completed at most facilities, resulting in a compiled list of energy reduction projects, some of which are already implemented. The full list is reviewed throughout this Plan while the implementation program is outlined later in this report. This Plan itself is meant to serve as SNCDSB's CDM Plan and will help assist SNCDSB to meet all of its mandatory reporting requirements.

Key Factors and Constraints

It is important to both SNCDSB's future and to its image in the public at large to understand the value of a comprehensive CDM Plan. Many people around the world are beginning to embrace the notion that the earth's environment and precious resources need to be conserved. However, the necessary changes will not happen overnight. To be successful, a comprehensive energy management plan should embrace long-term thinking, taking advantage of "low hanging fruit" to achieve immediate cost savings which will be redirected to more complex projects involving higher initial costs with larger net benefits.

Public agencies should realize that each of their circumstances is unique and may not lend themselves to 'boiler plate' solutions used in many private sector segments. Those who have met their goals have utilized the advantages of the unique physical and non-physical attributes of their facilities, including green power generation on large flat roofs and community gardens on their large properties. While it is easy to be focused on the larger solutions, even seemingly small efforts can make a major long-term impact on the overall goal. A good example of this is Energy Awareness training which encourages Staff to take simple and effective actions such as turning off lights and computers when not in use.

Ongoing professional development is also a key factor in the success of a CDM Plan to ensure that Staff Members understand their role in the greater goal. The CDM Plan and accompanying education should be a required part of their daily activities.

While realities of budget restrictions are an important consideration in any planning activity, it is possible to achieve energy savings while adhering to the financial constraints of a publicly-funded School Board system. It is clear that new technology and ideology changes have produced continued operational cost

reductions while improving indoor comfort and environmental sustainability. These cost saving projects can often fund themselves by avoiding the use of previously allocated funds. As long as the savings are reinvested, these improvements can continue for the foreseeable future, ensuring a sustainable process. Many industries have had environmental programs running for over a decade and continue to hit their 3%-5% intensity reduction goals without sacrificing product quality.

3 HISTORICAL ENERGY MANAGEMENT

Historically, SNCDSB has addressed Energy Conservation and Demand Management on a project-by-project basis through the activities of the Manger of Operations. Capital projects were implemented based on equipment’s expected useful life or in response to equipment emergency breakdowns. Utility savings, realized as a result of the implementation of these individual projects, have not historically been uniquely reported formally, but have been considered as a component of general operations. Thus, they have been reported through utility expenses in the Accounting System. Sustainability and long-term energy reduction goals, through this CDM Plan, will become integral components of the business reporting system.

Utility costs were viewed as a fixed overhead cost. The management of these costs relied on an exception-based investigation approach. In other words, utility costs were only reviewed if a utility bill was much higher, or lower, than typical.

In 2011/2012, SNCDSB embarked upon a strategic energy assessment. The purpose of this assessment was to identify and analyze potential energy conservation and demand management opportunities. These efforts have been instrumental in assisting SNCDSB in aligning the CDM Plan with the School Board’s **Strategic Plan 2011-2014** and **Director’s Report 2013**.

Historical Energy Reduction Projects Summary		
Year	Facility	Action Taken
2011	Our Lady of Lourdes	Classroom Ventilators Upgraded
	Holy Saviour	Classroom Ventilators Upgraded Install Controls
2012	St. Joseph	Lighting Upgrade, T12 to T8
	St. Brigid	Lighting Upgrade, T12 to T8 Gymnasium Lighting Upgrade, T12 to T5
2012	St. Brigid	Install HVAC Controls
2013	Our Lady of Fatima	Install HVAC Controls Classroom Heating Distribution System Upgrade

4 CURRENT STATE OF CORPORATE ENERGY

Energy Data Management

While SNCDSB has an admirable history of managing its energy consumption, the Ontario government has required an increase in School Board energy management practices. This has resulted in the need to enhance current practices and develop new approaches. To meet this need, SNCDSB will design a comprehensive program for collecting and analyzing monthly energy billing information, and ensuring Staff is informed about energy consumption. This effort will produce an energy costs and consumption database that will be used for monitoring excessive variations, targeting facility follow-up evaluations, and highlighting areas that could be candidates for improved conservation. These monitoring enhancements will improve SNCDSB's understanding of the bottom line impact of energy management.

Energy Supply Management

SNCDSB has currently adopted a strategy of procuring its electricity from Hydro One Networks Inc. The School Board has chosen to contract its natural gas through Union Gas Limited. The School Board has chosen to contract its fuel oil through Bluewave Energy and Davidson Fuels. This procurement strategy is reviewed annually during the budgeting process.

Energy Use in Facilities

SNCDSB Staff Members have retained a great deal of knowledge with regard to their facility's energy use. This knowledge base has been enhanced by a series of comprehensive audits completed at the SNCDSB's facilities. Through the deployment of energy management software, SNCDSB Staff will be equipped with the information necessary to make effective energy management decisions. This will make it possible to implement an effective energy procurement process, pursue appropriate capital projects, and implement successful conservation and demand management programs.

Equipment Efficiency

SNCDSB has pursued many measures to improve the energy efficiency of the School Board's equipment. Some of these measures include:

- Heating and cooling equipment retrofits,
- Building envelope improvements,
- Electrical systems upgrade, and
- The pursuit of the feasibility of solar thermal and solar photovoltaic applications.

As the understanding of corporate energy consumption improves, SNCDSB Staff will be equipped with the knowledge necessary to make informed decisions. This improved understanding will also reveal how

simple actions like commissioning and maintenance procedures can improve existing equipment efficiencies.

Organizational Integration

Day to day management of energy has been primarily the responsibility of the SNCDSB Manger of Operations. Current practices will be enhanced with future plans including:

- The creation of an interdepartmental energy management team,
- Improved energy monitoring and feedback, and
- Interactive energy training and awareness.

Staff across all departments will be given the necessary tools to address corporate energy concerns such as budgeting, procurement, conservation, and generation.

Prior to the development of the CDM Plan, VIP assessed SNCDSB's energy management practices. This assessment was completed by speaking to SNCDSB Staff and reviewing relevant School Board material. Upon completion of this review, VIP determined that SNCDSB had provided Staff Members with a mandate to pursue proper energy management, and through SNCDSB Staff ingenuity, SNCDSB was able to direct resources to energy management. However, VIP also noted that if SNCDSB is to achieve the Ministry's mandate, it will require the development of this CDM Plan that will address SNCDSB's energy management needs.

5 CURRENT ENERGY CONCERNS

Environmental, societal, and fiscal pressures accentuate the need for an energy Conservation and Demand Management Plan (CDM Plan).

Environmental

Concerns surrounding energy consumption with regard to climate change and air pollution have been well documented. Since 1990, Ontario's greenhouse gas emissions have increased 14%. The Government of Ontario estimates that 75% of Ontario's greenhouse gas emissions are associated with the consumption of fossil fuels for energy purposes. Increased smog and air pollution are also connected to the consumption of energy. Ontario's electricity generation is the Province's second largest source of sulfur dioxide and the third largest source of nitrogen oxides. These pollutants can cause irreparable harm to human health.

Societal

The 2003 Blackout heightened societal concerns surrounding the stability and security of our energy supply. Energy has been imbedded into most societal practices. If energy consumption is not managed appropriately, the frequency of energy interruption and the subsequent societal disruption will increase.

Fiscal

The fossil fuels traditionally used for the generation of energy are no longer financially accessible or environmentally acceptable. This has resulted in the promotion of renewable energy generation which comes with an additional expense. Energy costs are also anticipated to increase as Ontario's existing energy infrastructure is taken off-line or refurbished. Coming off of the lows of the 2009 recession, national electricity and natural gas prices are 27% and 21% greater than they were at the start of the decade. It is not anticipated that this upward trend will be altered in the short to medium future. The Province of Ontario has recently projected an annual 3.5% to 7.9% increase in electricity costs over the next 20 years. Natural gas is also projected to trend upward.

Similar to many School Boards in Ontario, SNCDSB is currently in a consistent enrollment situation. It is anticipated that the enrollment will continue to be stable in the next few years and be relatively constant for a period of time. As SNCDSB stabilizes its student capacity, so will the School Board's environmental, societal and fiscal energy concerns. SNCDSB recognizes that proper energy management must be pursued if these concerns are to be addressed.

6 SCOPE OF THE CDM PLAN

The Superior North Catholic District School Board (SNCD SB) is rooted in the belief that education should meet the needs of the whole child: heart, mind and soul. Our mission is to provide authentic Catholic education through a commitment to gospel values, active partnerships, and the celebration of excellence. Together we value the presence of God in each person and an inclusive Catholic culture that instills compassion.

Located in North-Western Ontario, SNCD SB spans a large geographic area and is surrounded by breathtaking landscapes and a wide variety of wildlife. Our nine schools (Kindergarten to Grade 8) are well equipped with electronic educational tools, such as interactive white boards, iPads, and laptops. Our teachers and staff are provided with quality professional development, helping us meet the needs of our students.

Superior North Catholic District School Board Facilities - General Information								
Building Name	Operation Type	Address	City	Postal Code	Total Floor Area (m ²)	Average Hours per week	Swimming Pool (Y/N)	Number of Portables
Board Office	Administrative facilities	21 Simcoe Plaza	Terrace Bay	P0T 2W0	446	43	N	0
Holy Angels	School	210 Winnipeg Street	Schreiber	P0T 2S0	1,745	48	N	0
Holy Saviour	School	23 Penn Lake Road	Marathon	P0T 2E0	3,586	48	N	0
Our Lady of Fatima	School	113 Indian Road.	Longlac	P0T 2A0	4,319	48	N	0
Our Lady of Lourdes	School	7 Flicker Avenue	Manitouwadge	P0T 2B1	3,079	48	N	0
St. Edward	School	121 Greenmantle Drive	Nipigon	P0T 2J0	2,261	48	N	0
St. Hilary	School	200 Salls Street	Red Rock	P0T 2P0	1,283	48	N	0
St. Joseph	School	308 Fourth Street NE	Geraldton	P0T 1M0	2,718	48	N	0
St. Martin	School	17 Cartier Drive	Terrace Bay	P0T 2W0	2,314	48	N	0
					21,751			

7 ENERGY BASELINE AND CURRENT ENERGY PERFORMANCE

Effectively managing energy requires implementing appropriate energy monitoring procedures. The establishment of an accurate energy baseline is essential in this process. It will assist with energy conservation and greenhouse gas reduction target setting, energy procurement and budgeting, bill verification, energy awareness, and the selection and assessment of potential energy projects. SNCDSB, like many School Boards, relies on its utility bills to establish its energy baseline.

BASELINE PERFORMANCE (2011/2012)

SNCDSB has elected to utilize the consumption data from 2011/2012 to represent its baseline energy consumption performance.

Superior North Catholic District School Board Facilities -2011/2012 Energy						
Building Name	Total Electricity Consumption (kWh)	Total Natural Gas Consumption (m ³)	Fuel Oil 1&2 Consumption (litres)	GHG Emissions (kg)	Energy Intensity (ekWh/ft ²)	Energy Intensity (GJ/m ²)
Board Office	60,508	-	-	4,841	13	0.49
Holy Angels	158,189	-	-	12,655	8	0.33
Holy Saviour	358,685	-	13,677	65,997	13	0.51
Our Lady of Fatima	325,141	53,942	-	127,996	19	0.75
Our Lady of Lourdes	118,847	-	32,805	98,980	14	0.55
St. Edward	101,941	34,810	-	73,968	19	0.75
St. Hilary	95,961	34,810	-	73,489	34	1.31
St. Joseph	228,968	67,288	-	145,533	32	1.25
St. Martin	560,133	-	-	44,811	22	0.87
	2,008,373	190,850	46,482	648,270	19	0.76

CURRENT PERFORMANCE (2012/2013)

It is imperative to understand the energy characteristics of each facility. By understanding these values, baselines can be established and future retrofits and improvements to the buildings can be monitored and tracked to ensure that the intended benefits are fully realized. SNCDSB's most recent energy consumption inventory was completed in 2012/2013. This inventory took into account the electricity and natural gas consumption of SNCDSB facilities. In 2012/2013, SNCDSB's total energy use, including electricity and natural gas, was 4,690,303 equivalent kilowatt hours (ekWh). This total consisted of 1,504,830 kWh of electricity, 211,220 m³ of natural gas, which is equivalent to 2,244,799 ekWh, and 87,279 Litres of fuel oil, which is equivalent to 940,674 ekWh. The 2012/2013 combined total cost of electricity, natural gas and fuel oil was \$ 518,341.

Superior North Catholic District School Board Facilities - 2012/2013 Energy

Building Name	Total Electricity Consumption (kWh)	Total Natural Gas Consumption (m ³)	Fuel Oil 1&2 Consumption (litres)	GHG Emissions (kg)	Energy Intensity (ekWh/ft ²)	Energy Intensity (GJ/m ²)
Board Office	82,528	-		6,602	17	0.67
Holy Angels	96,521	-	26,885	81,048	21	0.80
Holy Saviour	222,903	-		17,832	6	0.22
Our Lady of Fatima	311,858	63,957		145,867	21	0.83
Our Lady of Lourdes	146,794	-	60,394	176,462	24	0.93
St. Edward	49,384	44,434		87,959	21	0.83
St. Hilary	49,903	27,092		55,213	24	0.95
St. Joseph	237,170	75,737		162,164	36	1.38
St. Martin	307,769	-		24,622	12	0.48
	1,504,830	211,220	87,279	757,770	20	0.79

In all, SNCDSB has increased its energy intensity from 2011 to 2012 indicating a slight degradation in energy utilization from 0.76 GJ/m² to 0.79 GJ/m².

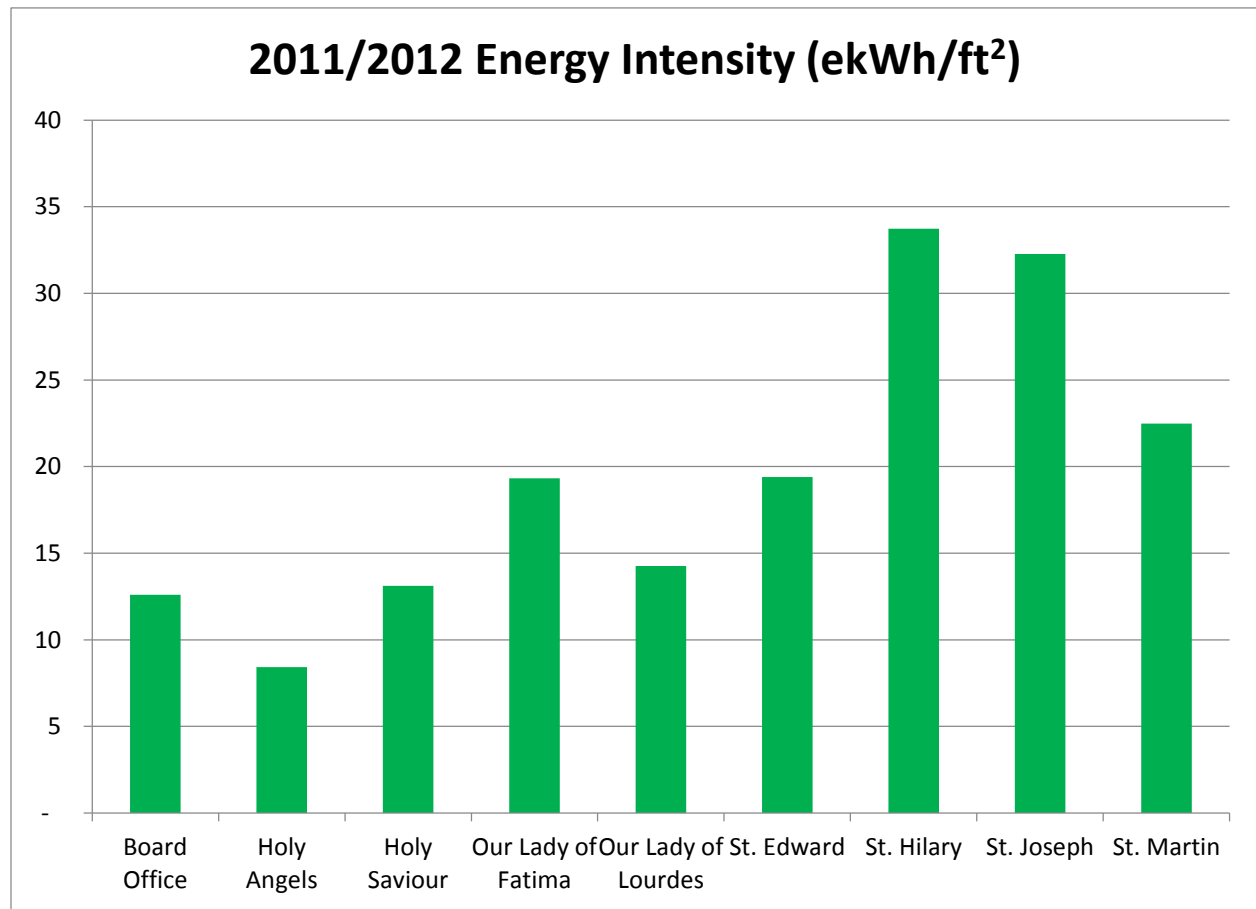
BENCHMARKING

Market Sector

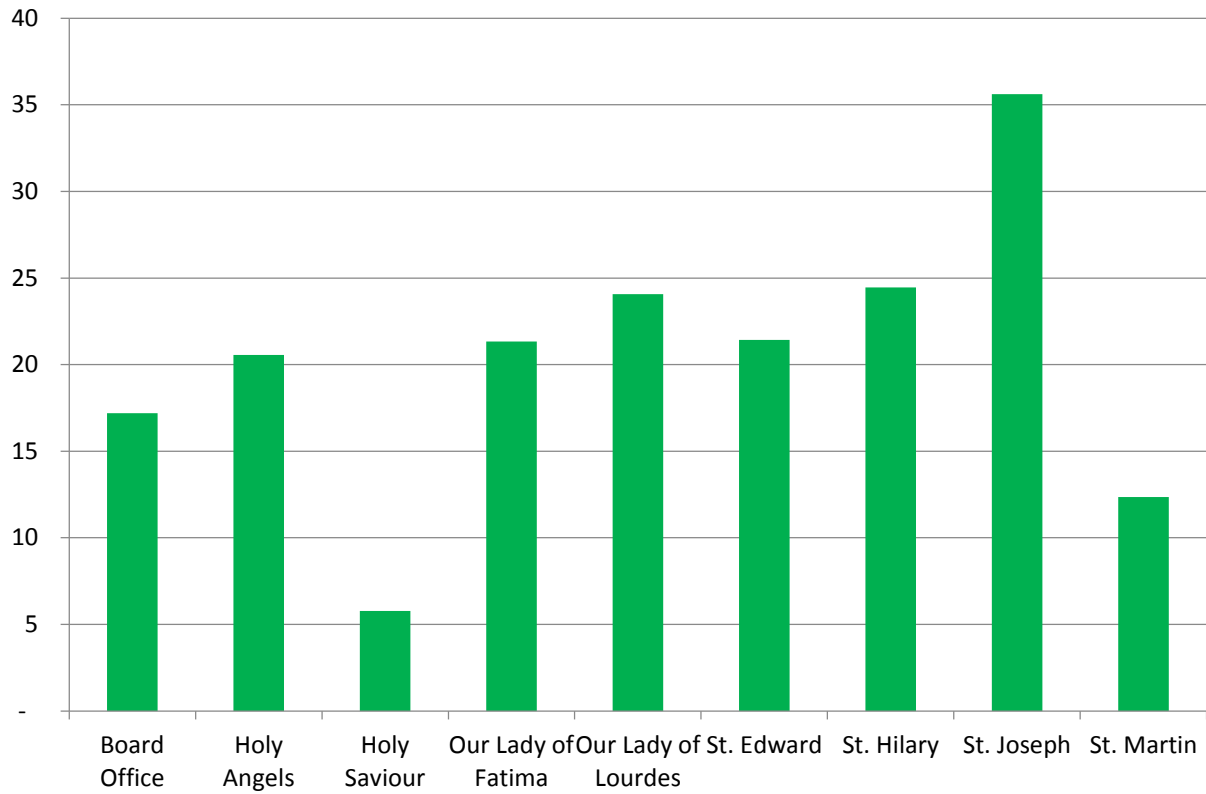
Energy Intensity (ekWh/ft ²)				
Sector	Minimum	Average	Maximum	No. of Organizations
School Board	13.0	19	41	70

SNCD SB's facilities have an average 20 ekWh/ft² energy intensity, on par with the industry average based on the Ministry of Energy's 2011 Public Sector Energy Consumption Data.

SNCD SB Facilities



2012/2013 Energy Intensity (ekWh/ft²)



8 MISSION AND VISION

Mission:

To ensure authentic Catholic Education to all through a commitment to gospel values, active partnerships and the celebration of excellence.

Vision:

To continue to be a spiritual community of learners who celebrate diversity and bear witness to Catholic values.

The CDM Plan has been developed to address the fiscal, societal, and environmental costs and risks associated with energy consumption. Proper energy management will allow SNCD SB to display leadership, improve the delivery of services, and enhance the overall quality of life with respect to the community and school environment.

This CDM Plan outlines key actions that must be pursued to make this vision a reality. The completion of these actions will assist SNCD SB to meet its energy conservation targets and its greenhouse gas emission reduction commitment. Achieving these goals will assist SNCD SB in securing a strong energy management reputation and will allow for cost savings that can benefit SNCD SB, its employees, and its students.

It is acknowledged that, for this vision to come to fruition, energy management at SNCD SB must become an inclusive process. Recognizing that energy affects everyone differently, this Plan was created to address a variety of energy related concerns, while capturing innovative and relevant actions that will lead to meaningful change.

This CDM Plan will allow energy management to be incorporated into all SNCD SB activities, including organizational and human resource procedures, procurement practices, financial management and investment decisions, and facility capital, operations, and maintenance.

Overview

This CDM Plan is designed to meet the current energy needs and obligations of SNCD SB. The intent is to guide SNCD SB in the development of an energy management foundation. This will be a living Plan that will evolve as SNCD SB's energy needs are revealed and better understood.

SNCD SB's approach to energy management is three pronged. It begins with:

- Elimination of waste,
- Improving efficiencies, and

- Optimizing energy supply.

Prior to pursuing these actions, SNCD SB must be aware of the facility and Staff behaviours that influence energy consumption. Once encapsulated, this knowledge must be dispersed throughout the organization, allowing for the development of a culture of sustainability.

An improved understanding of corporate energy consumption will require improvements in energy management and awareness. Energy awareness campaigns will strive to make energy a tangible asset that Staff Members can appreciate when it is being consumed or wasted. In addition to increasing energy awareness, this energy Plan will integrate energy efficiency into the capital and operational decision making of the organization.

9 GOALS AND OBJECTIVES

It is of critical importance to improve energy efficiency and reduce our operating costs. Equally important is displaying our commitment to the environment through the reduction of greenhouse gases, while improving our air quality. It is also important that these actions are carried out without adversely impacting SNCDsB's operations. All SNCDsB Staff will have an essential role in the success of this energy management Plan. It will be the responsibility of the Energy Management Team to ensure that energy management measures are properly communicated and effectively implemented. An Energy Mandate for SNCDsB has been developed and is an integral component of this CDM Plan.

SNCDsB's CDM Plan was completed to help support the following goals:

- Encourage reduced greenhouse gas emissions and energy consumption in the School Board by promoting built forms that create more sustainable, efficient, healthy, and livable school communities,
- Maximize the use of operational budgets by ensuring that School Board facilities are operating in as energy efficient manner as possible,
- Ensure that minimizing energy use is considered throughout the various aspects of SNCDsB's operations including purchasing where financially viable, and
- Recognize the importance of the input and participation of SNCDsB employees and students in supporting energy conservation and sustainability initiatives through education, awareness and training,
-

The primary objective of this Plan is to improve the management of SNCDsB's energy consumption. Part of this objective is setting a conservation target that will see SNCDsB reduce its 2011/2012 energy consumption by 3% by the end of 2017/2018. Recognizing that SNCDsB has a growing student enrollment, SNCDsB's energy conservation target will be intensity based. It is also the objective of this Plan to improve SNCDsB's understanding of energy consumption which is essential for SNCDsB to meet its corporate energy management goals.

Measurements of Success

The measurements of success will be based on a variety of indicators:

- Reaching the CDM Plan's energy conservation target,
- Assisting with the corporate greenhouse gas reduction target,
- Achieving the savings outlined in the Plan's budget section, and
- Imbedding energy management in SNCDsB's capital and operations decision making process.

Reporting Standards

The CDM Plan will allow for the monitoring and reporting that is necessary for SNCDSB to meet the regulatory requirements of the **Green Energy Act** and SNCDSB's greenhouse gas reduction targets. Regular energy monitoring and feedback to the Ministry and SNCDSB Management and Staff will improve knowledge and help make energy consumption a tangible asset, making possible appropriate behavioural changes. The intent of monitoring and reporting on energy consumption is to make energy management transparent and the consumer accountable. The Ministry will be provided with annual updates on the state of energy management at SNCDSB. Energy consumption feedback provided to Staff will be imbedded into SNCDSB's regular business.

10 ENERGY MANAGEMENT TEAM

Historically, SNCDSB addressed Energy Conservation and Demand Management on a project-by-project basis through the activities of the Building Services Group. Strategic directives have been provided by the School Board's Trustees and the Senior Executive Team.

This CDM Plan outlines a commitment to integrate Energy Conservation and Demand Management into the operations of the School Board, as indicated in the covering letter from the Director of Education. Within the duration of the CDM Plan, CDM planned activities will become an integral component of the annual budgeting process. A collaborative effort will be undertaken to achieve this integration, involving:

- Internal Staff (which may include but will not be limited to Facilities Management, Finance, and Procurement),
- Advisement from the Ministry of Energy and the Ministry of Education, and
- Consultations with Energy Management experts.

Currently, the energy management team at SNCDSB is comprised of:

- Manager of Operations
- Finance Manager
- Representatives from of our Co-Terminus Boards
 - Conseil scolaire de district catholique des Aurores boréales
 - Superior-Greenstone District School Board

11 FINANCIAL ASSESSMENT

The energy Conservation and Demand Management Plan's financial assessment philosophy is to treat fiscal resources as if they were energy assets. Therefore, financial investments follow the same three pronged approach used for the management of energy:

- Elimination of waste,
- Improving efficiencies, and
- Optimizing energy supply.

The initial cost and saving estimates for the proposed process improvements, program implementation, and projects are broken down as follows:

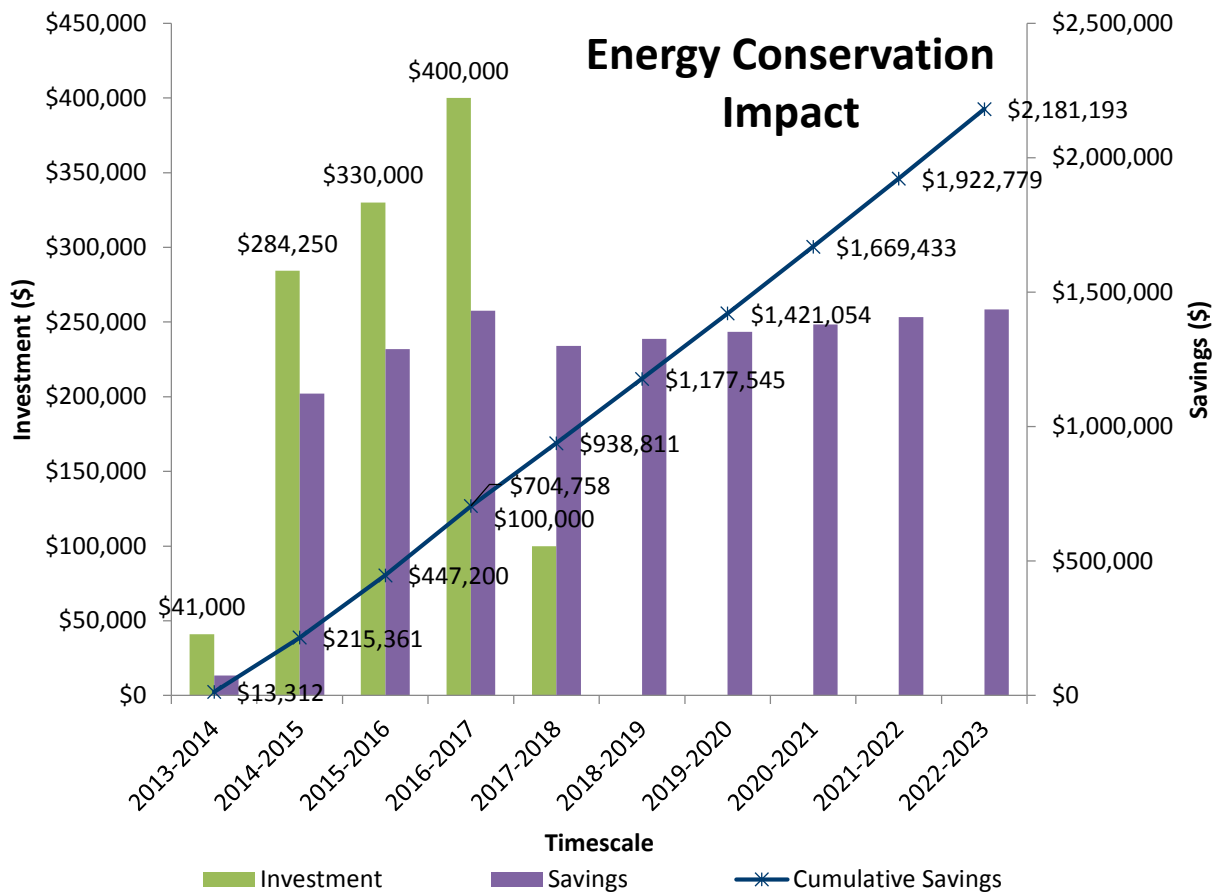
Superior North Catholic District School Board			
Opportunity	Annual Savings (\$)	Estimated Installation Cost (\$)	Payback Period (years)
Interior Lighting Upgrade	\$4,938	\$5,000	1.0
Exterior Lighting Upgrade	\$9,877	\$10,000	1.0
Occupancy Sensor Installation	\$14,815	\$10,000	0.7
Condensing Boiler	\$129,857	\$50,000	0.4
HVAC System Upgrades	\$15,714	\$99,250	6.3
Roof Replacements	\$62,337	\$670,000	10.7
Window Replacements	\$72,339	\$311,000	4.3

The listed costs and savings are for the inaugural year of a process, program, or project. If initiated and monitored effectively, it can be anticipated that these savings can be sustained. It should also be noted that the price of energy is anticipated to increase, whereas the costs of capital projects will likely decrease with advancements in technology. This could potentially lead to increased savings and decreased costs in the later years of the plan. The potential for avoided costs adds to the relevance of a plan of this nature.

This fiscal assessment does not take into account the economic benefits of achieving all of the corporate energy management goals. Due to the difficulty in quantifying the economic value of extended equipment longevity, improved comfort and productivity, and climate change mitigation, it should not be discounted.

12 CORPORATE ENERGY BUDGET

The following budget was derived from the planned actions within the CDM Plan. Each year's estimated cumulative savings have also been displayed in the figure below. These projected costs and savings do not consider the human resource expenditures.



Prior to requesting funding for energy actions, SNCDSB will consult with utility representatives and/or energy consultants, allowing SNCDSB to schedule project launch dates in parallel with applicable incentive funding programs. The projects may be moved forward or delayed based on changes to incentive programs as well as changes to the CDM Plan. However, SNCDSB will not make significant alterations to the Plan in a quest for incentive funding. This is not a prudent approach to planning. Actions will be pursued only when they coincide with the SNCDSB's objectives and are appropriate to be pursued at that time.

As SNCDSB continues to evolve and its energy needs become greater, it will be essential to reassess and clarify, as necessary, the financial indicators that are applied to investment analysis and prioritization of proposed energy projects. Energy efficiency projects must be weighted appropriately relative to other

investment needs. There will also be a need to develop procedures for the annual allocation of capital resources for energy efficiency measures in the capital budget.

13 ENERGY MANAGEMENT ACTIONS

The economic feasibility of proposed actions played a large role in the prioritization of the processes, programs, and projects. Equally important in this prioritization exercise was the evaluation of SNCD SB's internal capacity to complete the proposed initiatives. Recognizing the need to develop SNCD SB's internal capacity, the initial years of the Plan focus heavily on processes and programs. The implementation of the recommended processes and programs will result in an improved understanding and awareness of energy consumption. This will allow for improved decision making and greater success with future energy projects (See **Appendix C** for the CDM Plan timeline). As these actions are completed, the Energy Management Team will meet to discuss monitoring results and how they can be used to enhance the Plan. The CDM Plan is intended to be a living document. Anticipated improvements in knowledge and capacity will result in enhancement of the proposed actions.

Annual Reporting

An Annual Conservation and Demand Management Plan Update Report will be provided that details SNCD SB's activities and results relating to this Energy Conservation and Demand Management (CDM) Plan. The Report will describe the CDM Plan related activities that have happened in the previous year and will focus on linking actions to results. In addition, the Report will take a forward view of the upcoming year to lay out the roadmap and identify any changes or adjustments that should be considered based on what the current market conditions are. The overarching goal of the report is to make the 5 year CDM Plan a living document that is reviewed and updated on a yearly basis.

Future Energy Projects

Energy projects at SNCD SB were evaluated prior to the development of the CDM Plan. SNCD SB Staff Members have advocated for some ambitious energy initiatives that were investigated and determined to be not feasible for a variety of reasons. It is anticipated that as SNCD SB grows and energy management practices improve, these actions will be reassessed.

Future Energy Reduction Projects Summary	
Year	Actions Planned
2014	Interior Lighting Upgrade Window Replacements
2015	Exterior Lighting Upgrade Occupancy Sensor Installation Condensing Boiler HVAC System Upgrades
2016	Roof Replacements
2017	T.B.D.
2018	T.B.D.

Renewable Energy

Feasibility and promotion of renewable energy technologies were examined throughout the development of the CDM Plan. These technologies have been incorporated into the CDM Plan where it made sense to do so, strategically or fiscally. Currently, SNCDSB has one 10 kW solar voltaic system.

Purchasing Practices

Traditionally, purchasing practices in the public sector were designed to favour equipment or physical retrofits at the lowest cost in order to ensure the highest possible financial responsibility. As energy conservation best practices emerged, it was revealed that there is a major issue in doing this. Almost all wasteful energy consuming equipment is less expensive than their energy conserving counterparts. The practice in itself does not encourage energy efficiency, as most energy intensive alternatives such as standard efficiency motors are less costly than their higher efficiency counterparts. When dealing with energy intensive hardware, the initial capital cost is only a fraction (5%-10%) of the total lifecycle cost.

The practice of 'low bidder wins' purchasing limits the Staff when trying to make the right environmental decision. Making a specific amount of money available to include the conservation upgrades allows the School Board to take advantage of necessary investments in order to reduce their impact on the bottom line after the cost of purchase. For example, when purchasing a motor, all suppliers will specify standard efficiency motors. An energy smart buyer will know that 90%+ of the motor's lifecycle cost is in its energy use. Therefore, buying a premium efficiency motor at a small incremental cost has a payback of less than three years. Missing this opportunity translates into a long-term financial increase. In fact, the incremental cost between a less efficient and a more efficient alternative is often less than 5% of the capital cost. That 5% capital cost difference is often recuperated in less than three years. This allows Staff to make the right environmental decision based on industry best financial practices.

Energy Management and Information Systems

An Energy Management and Information System (EMIS) is an important element of a comprehensive Energy Management Program (EMP), as it helps to ensure that the full benefits of other energy conservation efforts are achieved and sustained. In fact, a quality EMIS can reduce energy use and cost by at least 5%. (Ref: Office of Energy Efficiency, National Resources Canada). Current industry and international standards, such as the International Performance Measurement & Verification Protocol (IPMVP), use an average of an 8%-10% reduction in energy consumption and costs. VIP Energy Services has documented a conservation average of 17% over customers served to date. However, in order to be as conservative as possible in its financial calculations, VIP generally uses NRCan's conservative numbers (5%) to ensure objectivity in the investment matter. The savings from an EMIS result from the following measured impacts:

- Early detection of poor performance,
- Support for optimal decision making,
- Effective performance reporting,
- Auditing of historical performance,
- Identification and justification of energy projects,
- Evidence of implementation success,
- Support for energy budgeting and accounting, and
- Provision of energy data to other systems (such as Building Automation Systems, BAS).

When looking at performance reports, an EMIS facilitates ensuring that upgrades or changes actually meet forecasted savings, as well as the quantification of losses or gains. However, it is important to note that placing meters to isolate individual retrofit projects determined by their scope is generally cost ineffective and typically does not allow incorporation of out-of-scope project factors that directly affect equipment performance.

A one-time, comprehensive metering solution allows for a much more cost effective view, while enabling accountability to 90% of the planned projects budgeted to date. Reporting can be the most essential part of this plan as multiple portions of the organization rely on this data to make periodic decisions. The Finance Team can use this information to verify billing accuracy and other potential costs, such as construction back-charges. Energy Conservation Managers generally look at this data for building performance, future opportunity and functional trending. Project Managers rely on this information to ensure that vendors are supplying and meeting contractual obligations. Collecting the information in any EMIS program is really only the first step, as the data must then be used to instigate change and push action. This can only be done through analysis and warning systems built on baseline information. In order

for an EMIS system to function properly, communication loops must also be established between departments in order for the maximum benefit to be realized.

Building Re-Commissioning

Building re-commissioning, or retro-commissioning, refers to the optimization of the current automation, controls and energy consuming systems. As buildings age, both the functionality of the equipment and the functions that they serve can undergo significant changes. A re-commissioning program generally focuses on ensuring that the equipment operations are modified to include any new or deleted duties. The following is a list of common problems found in re-commissioning projects that result in increased energy costs:

- Inefficient scheduling of HVAC equipment,
- Simultaneous heating and cooling,
- Economizer sequences not optimized,
- Incorrect airflow and water balance,
- Malfunctioning sensors or incorrect calibration,
- Fan VFD control overridden,
- Supply air static pressure set-points not optimized,
- Boiler controls not operating efficiently,
- Balancing dampers and valves not installed or installed in poor or unusable locations,
- Incorrectly piped water coils,
- Process or space classification changes (lab space to office, etc.),
- Incomplete or incorrect control component installation,
- Control sequence incorrectly implemented,
- Substituted control components,
- Incomplete installations (missing control valve, actuators, etc.), and
- Testing, adjusting, and balancing (TAB) not completed or only partially completed.

National Resources Canada (NRCan) has published several guidelines for costing and expected returns from re-commissioning projects. Building re-commissioning is an increasingly important practice, not only from an energy standpoint, but also from a comfort and safety perspective as well. The more complex building controls and ventilation become, the more risk there is that one or more components will fail or deliver incorrect measurements.

Current practices in re-commissioning indicate that the cost to complete these initiatives is between \$2.90 and \$4.50/m². Expected savings from the projects are typically between \$1.00 and \$4.00/m², depending upon the starting efficiency of the building, thus creating very attractive paybacks in this area.

Energy and Resource Awareness (ERA) Programs

Independent studies done by organizations such as Natural Resources Canada (NRCAN) show that initiatives directed at Staff and facility users, in particular ERA Programs, can lead to significant savings on their own. In fact, NRCAN reports indicate that dedicated, consistent Energy Awareness Programs are proven to be the most effective way to reduce energy usage with no capital costs and minor operational expenses. A conservative estimate of savings for an effective ERA Program can be as high as 5% -7% of annual utilities spending.

An effective ERA Program is designed to assist organizations to attain energy savings by promoting a fundamental shift in the personal philosophies of Staff and facility users towards reducing their energy use. The Program utilizes community-based social marketing to develop influential communication materials and in-house displays that are carefully designed to inform and motivate employees to effectively decrease energy consumption. In many cases, an ERA Program has proven to be the most effective way to lower energy usage without any capital costs and minimal operational expenses. A typical ERA Program would include features such as:

- A detailed ERA Program written plan including a GANTT chart,
- The creation of a program email address for suggestions and concerns and access to ERA experts to answer questions,
- A customized identity and marketing program,
- Training and support for an Energy Steward Team,
- ERA displays with various relevant conservation themes, and
- Annual Marketing Effectiveness Reports and Feedback system.

A continuous and consistent ERA Program is not only an effective way to lower energy use within a facility, but can also serve to be an effective marketing tool to spread the word that the School Board is a community leader in energy conservation and environmental sustainability.

APPENDIX A

Energy Data

ENERGY CONSUMPTION

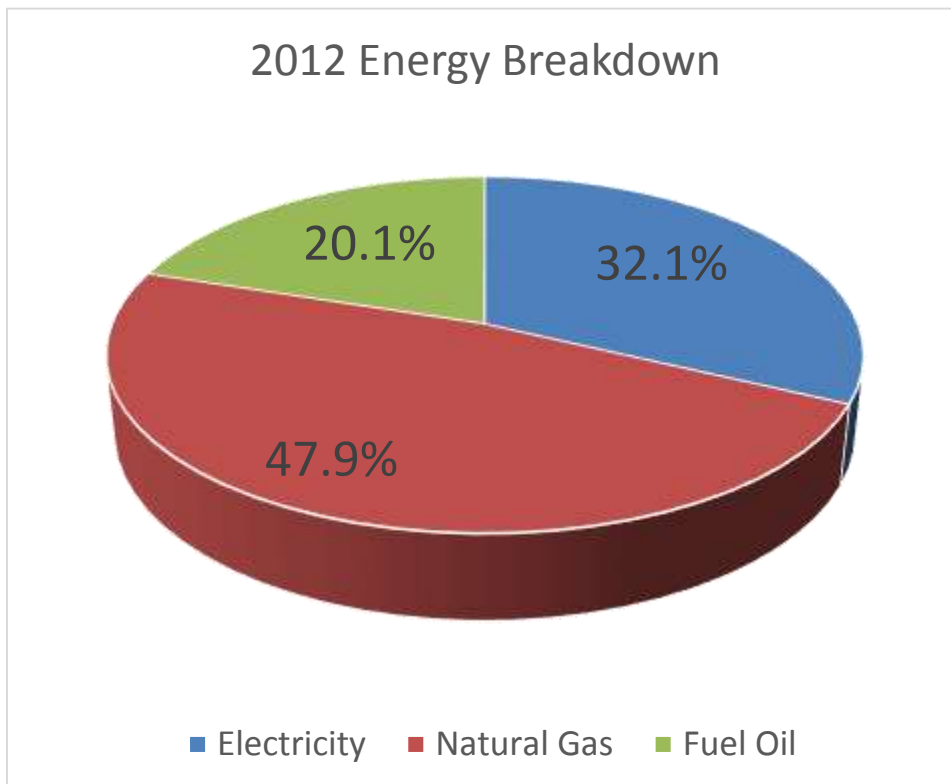
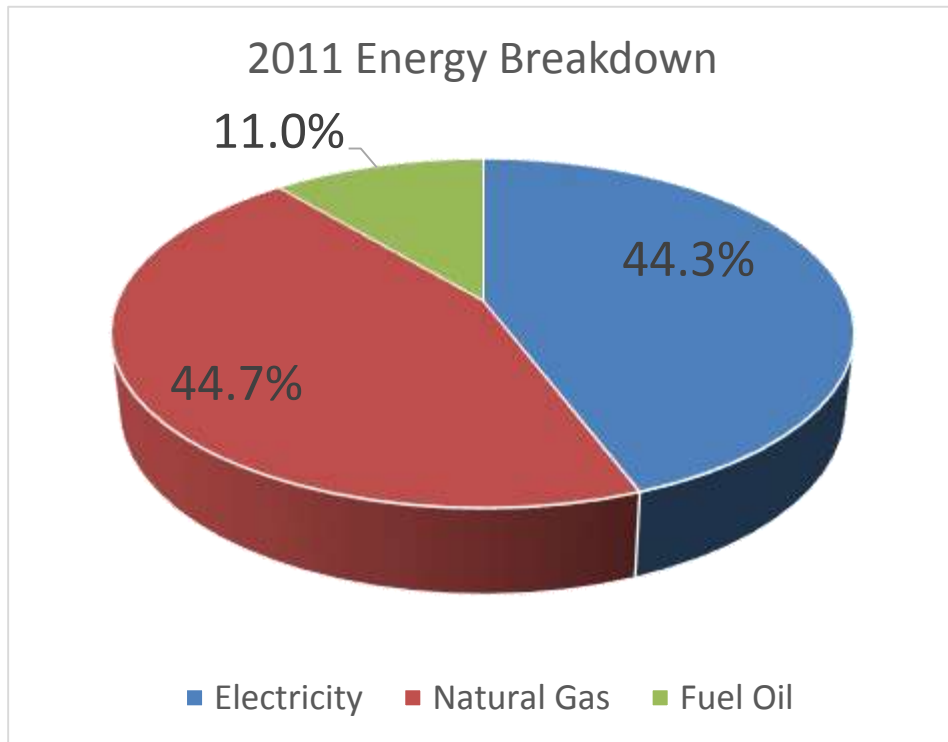
Superior North Catholic District School Board – Energy Consumption						
Building Name	2011 Electricity (kWh)	2011 Natural Gas (m³)	2011 Fuel Oil (Litre)	2012 Electricity (kWh)	2012 Natural Gas (m³)	2012 Fuel Oil (Litre)
Board Office	60,508	-	-	82,528	-	-
Holy Angels	158,189	-	-	96,521	-	26,885
Holy Saviour	358,685	-	13,677	222,903	-	-
Our Lady of Fatima	325,141	53,942	-	311,858	63,957	-
Our Lady of Lourdes	118,847	-	32,805	146,794	-	60,394
St. Edward	101,941	34,810	-	49,384	44,434	-
St. Hilary	95,961	34,810	-	49,903	27,092	-
St. Joseph	228,968	67,288	-	237,170	75,737	-
St. Martin	560,133	-	-	307,769	-	-
TOTAL	2,008,373	190,850	46,482	1,504,830	211,220	87,279

APPENDIX B

Energy Use Breakdown



ENERGY USE BREAKDOWN



APPENDIX C

Energy Conservation Measure Schedules

Superior North Catholic District School Board Energy Management Strategies

		Annual Energy Savings				Annual Cost Savings					Estimated Installation Costs					
EMS #	Opportunity	Electricity (kWh/yr)	Electricity Demand (kW/yr)	Natural Gas (m ³ /yr)	Water (m ³ /yr)	Electricity (\$)	Demand (\$)	Natural Gas (\$)	Water (\$)	Total Savings	Cost	Incentives	Cost with Incentives	Payback Period with Incentives (years)	Total Energy Savings (GJ/yr)	tCO ₂ e Savings
EMS 01	Interior Lighting Upgrade									\$4,938			\$5,000	1.0		
EMS 02	Exterior Lighting Upgrade									\$9,877			\$10,000	1.0		
EMS 03	Occupancy Sensor Installation									\$14,815			\$10,000	0.7		
EMS 04	Condensing Boiler									\$129,857			\$50,000	0.4		
EMS 05	HVAC System Upgrades									\$15,714			\$99,250	6.3		
EMS 06	Roof Replacements									\$62,337			\$670,000	10.7		
EMS 07	Window Replacements									\$72,339			\$311,000	4.3		
GRAND TOTAL										\$309,877			\$1,155,250	3.7		

