



Canadore College

5-Year Energy Conservation and Demand Management Plan

July 2019

Prepared in co-operation with:



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Our Commitment to Energy Conservation



June 1, 2019

In the spirit of reducing the impact of rising energy costs, and in response to current regulatory requirements, Canadore College has developed a new 5-Year Energy Conservation and Demand Management (ECDM) Plan. This Plan outlines our progress against our original 2014 Plan as well as our planned conservation actions forward to 2024. This new plan and its related strategies and initiatives is supported by senior college management.

This new Energy Conservation and Demand Energy Management Plan (ECDM Plan) has been updated in response to Ontario Regulation 507/18 made under the Conservation and Energy Efficiency section of the Electricity Act, 1998, requiring all public agencies to prepare, publish and implement an ECDM Plan. Our ECDM Plan fulfils the reporting requirements of the above regulations and provides a framework to support continued energy and sustainability initiatives within the built environment, operations and programs. The Plan further identifies opportunities for continued energy conservation measures and sustainability initiatives to build on our existing plans and conservation efforts. Implementation of all initiatives is subject to future funding availability and budget approvals.

Our ECDM Management Plan has also been developed to address the fiscal, societal, and environmental costs and risks associated with energy consumption. Appropriate energy management will permit Canadore College to display leadership, improve the delivery of services, and enhance the overall quality of campus life.

Warmest Regards,

A handwritten signature in black ink, appearing to read "Richard W. Peters".

Richard W. Peters, CPA-CA
VP Finance, Corporate Services & International
Canadore College

Introduction

Background

Canadore College's Energy Conservation and Demand Management (ECDM) Plan was developed in response to Ontario Regulation 507/18 requiring all public sector organizations to complete an update to their original 2014 ECDM Plan by July 1, 2019. This comprehensive Plan is an effective method of identifying energy conservation opportunities, selectively implementing the best projects and then measuring their effectiveness. The Plan has been developed to protect the interests of our students and community and ensure that Canadore College obtains the best possible value from our operating budgets. In addition to meeting our regulatory obligations, the College believes that a strong commitment to energy conservation and a reduction of energy use is demonstrated evidence of our belief in becoming a more sustainable member of our community.

Purpose of the Plan

The 5-Year Energy Conservation and Demand Management Plan is designed to guide Canadore College towards a more energy-efficient future. The policies, practices and energy conservation measures identified illustrate the importance the College places on acting responsibly towards energy consumption through the wise use of resources in College operations.

To enhance our understanding of energy use and return on investment through conservation, this document contains a thorough review of the measures implemented since the creation of the original Plan, issued on July 1, 2014. Since then, the College has initiated several substantial energy projects, yielding significant savings results, including:

- Lighting retrofits
- HVAC and controls upgrades
- Building envelope improvements
- Water consuming devices retrofits

The above projects have resulted in an estimated annual savings of over \$400,000.

The wise and efficient use of energy are two low cost options for meeting energy demands. They also provide many other environmental, economic and social benefits, including reducing greenhouse gas (GHG) emissions, cost avoidance and savings. Along with the primary benefits, the responsible use of energy also promotes local economic development opportunities, energy system reliability, improved energy supply security and reduced-price volatility.

Following the path of our previous ECDM Plan, this document is a continuation of a process involving the:

- Integration of establishing and evaluating a baseline for performance to be measured against;
- Reviewing the effectiveness of previous conservation efforts while setting future performance goals and objectives;
- Continuous improvement through identification of energy conservation potential;
- Strategic alignment of improvement measure implementation and fiscal constraints; and,
- Evaluation, measurement and communication of results achieved.

The following report summarizes the significant efforts applied by the Canadore College Energy Conservation Team to create a Plan that can be implemented responsibly, over time, to create lasting results. The Plan takes advantage of internal expertise as well as all available external financial incentives and rebates currently being offered to support the implementation of energy savings ideas. The current energy picture for Canadore College and our future Vision, Goals and Objectives as shown in the Energy Conservation and Management Policy, are outlined. Our strategic focus areas are discussed in detail and our 5-year Action Plan is laid out on a project-by-project basis.

1.0 Historic Energy Performance

Historical Energy Usage

Effectively managing energy requires the creation of a robust energy monitoring strategy and establishing an accurate energy baseline is an essential first step in this process. This baseline assists 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. Canadore College, similar to many other campuses, relies on utility bills to establish this energy baseline.

To evaluate the effectiveness of the College’s previous energy conservation measures, the year 2013 was chosen as the base year for measurement; this aligns with the Ministry of Energy’s Regulation 507/18 requirements for reporting. Overall, the College’s consumption in 2013 was 19.6 million kWh of electricity and 2.7 million m³ of natural gas. This usage equates to spending \$2.5 million for electricity and \$688,000 for natural gas for the year (2013).

For comparative purposes, the raw energy consumption breakdowns by month since the original baseline for the College are as follows:

Figure 1-1 – Electricity Use (2013 – 2018)

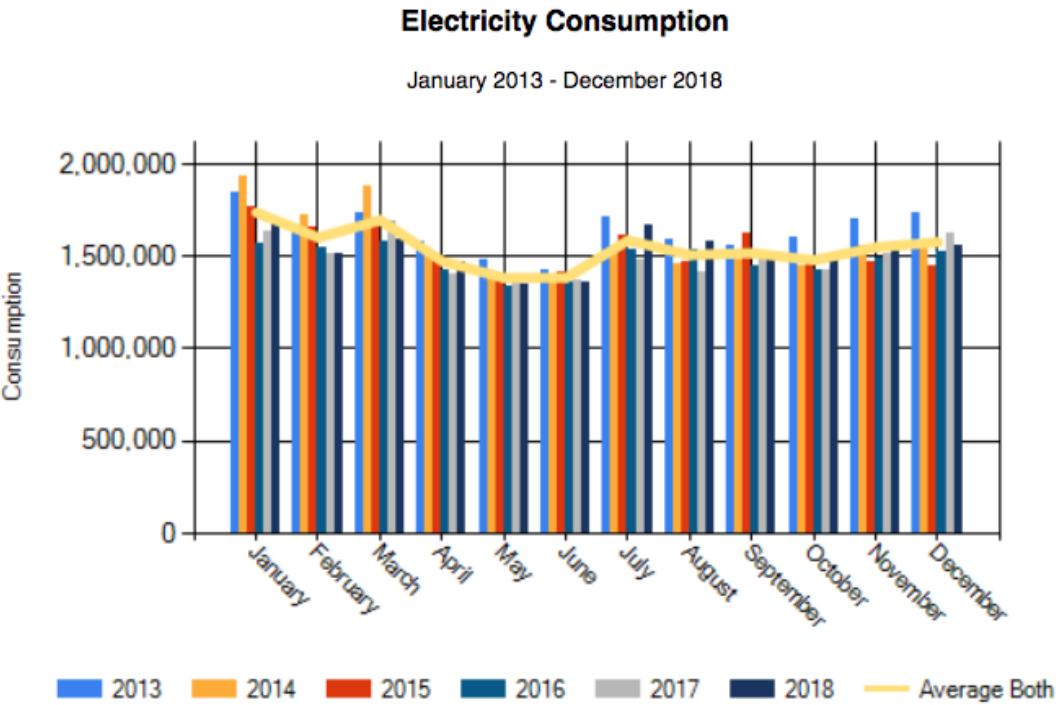
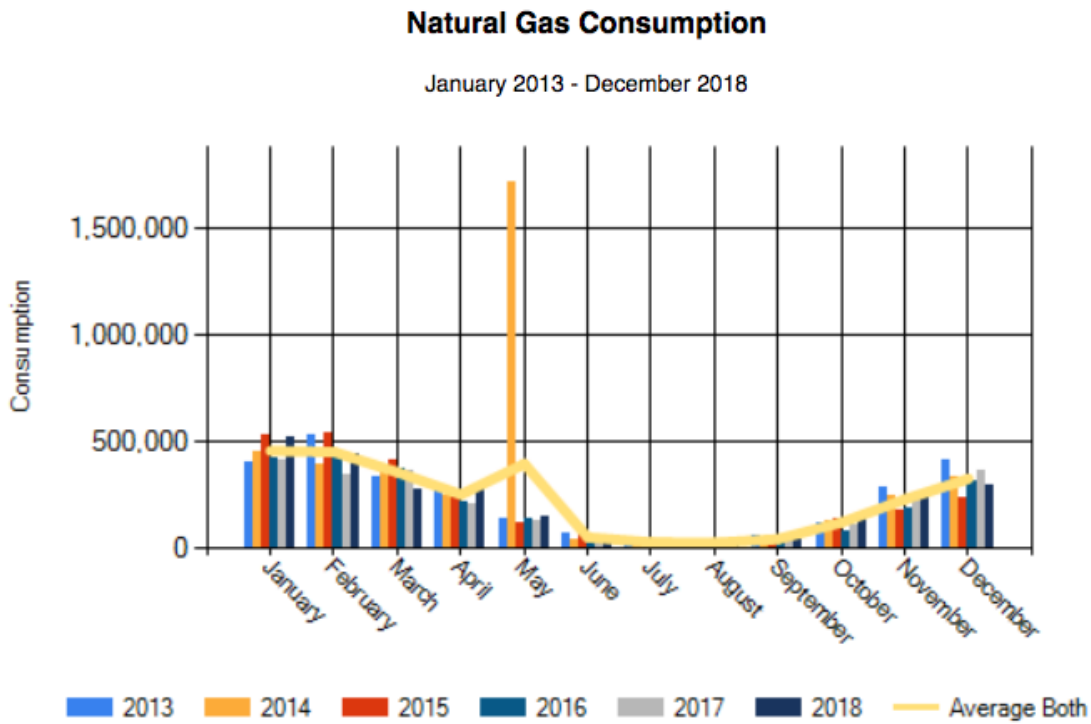


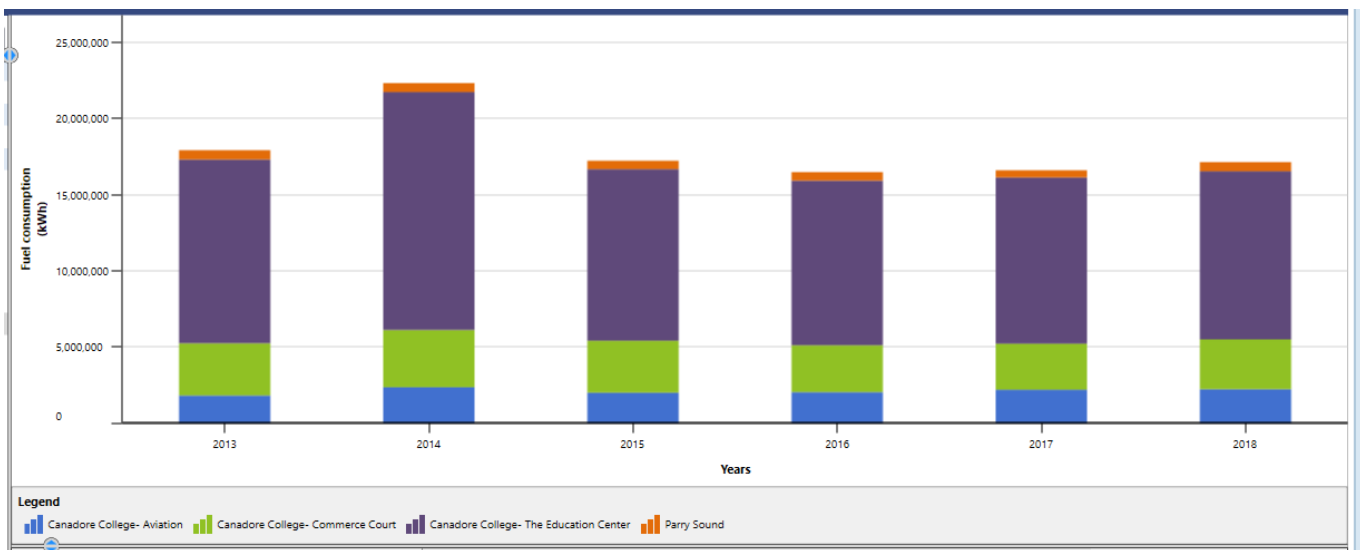
Figure 1-2 – Natural Gas Use (2013 – 2018)



** Note: May 2014 natural gas invoice was a make-up bill.

To better understand the College’s energy consumption pattern as a whole, the following equivalent kilowatt hours (ekWh) report was created using RETScreen’s Portfolio manager reporting system. Using ekWh’s allows for a comparison of total energy used (electricity and natural gas), providing an analysis of total energy usage for the College:

Figure 1-3 – ekWh Comparison (Fiscal 2012/2013 – 2017/2018)



The above chart illustrates that the College’s overall energy usage has dropped after an initial increase between 2013 and 2014. More importantly, the analysis shows that the College reduced its overall energy consumption from 4,478,293 ekWh in the base fiscal year (2013) to 4,283,140 ekWh in 2018. This represents a 4.4% reduction in overall energy usage, exceeding the College’s goal of a 2% reduction in overall energy usage.

Energy Conservation Project Successes

Since the creation of the last 5-Year ECDM Plan, the College has initiated significant investments in energy efficiency and energy-cost reduction. These projects include:

Figure 1-4 - Honeywell Project (Commencing May 2014 and completed Mar 2016)

Measure ID	Measure Description
Education Centre and Athletic Building	
Wing A	
A-L1	Gym lighting upgrade (Canadore space)
Wing B	
B-L2	Option 2: LED and T8 lighting (Canadore space)
Wings C and D - Canadore	
C-L2	Option 2: LED and T8 lighting (Wing C)
D-L1	T8 Lighting upgrade (Wing D)
C/D-M1	HVAC upgrade in Wings C and D
D-M2	UPS room ventilation upgrade
C-C1	Upgrade controls (AHU-3,4,5,6,7)
Wing G - Canadore	
G-L1	T8 Lighting upgrade
G-M1	Upgrade AHU-44 and 45
General Solutions	
GS-EN1	Building envelope at Education Centre-Canadore
GS-W2	Replace plumbing fixtures in wings C,B L3,D,G - Canadore
GS-IT1	IT power management -Canadore
Aviation Building	
AVI-C1	Upgrade controls (AHU-8, HRV-1&2)
AVI-EN1	Building envelope

Commerce Court	
CC-C1	Upgrade controls (AHU-14-18,23,41,43,47,60)
CC-C2	New controls for ICAMP
CC-W1	Efficient plumbing fixtures

The Honeywell project carries an annual savings guarantee of \$391,131 commencing in June 2016 and increasing over the term to \$835,615 in the year ending May 2041. For the first two verified years of the project, total savings were \$1,185,373 plus construction period savings. This is higher than the original savings projections. In year 2 the energy savings were 571 kW demand reduction, 2.6 million kWh, 82,857 m³ of gas, and 5,953 m³ of water.

2.0 Energy Conservation and Management Policy

Our Commitment

Canadore College remains committed to allocating the necessary resources to develop and implement a strategic Energy Conservation and Demand Management (ECDM) Plan that will reduce energy consumption and its related environmental impact. As an organization, we value the notion of efficient operations and creating a more sustainable community.

We are committed to managing energy responsibly and will use energy efficiency practices throughout our facilities, operations and equipment wherever it is cost effective to do so.

Our Vision

Canadore College endeavours to minimize energy consumption, related costs, and carbon emissions by continuously improving its energy management practices without compromising the level of service delivery to the school community.

Our Goals and Objectives

As part of our 2019 ECDM Plan, the College created several strategic avenues to achieve specific goals and targets with regards to energy management. We have re-examined our past objectives and are re-committing to this updated version.

1. Reduce energy intensity in College facilities by 5% by 2024. This is in addition to reductions achieved between 2013 and 2018.
2. Enhance our culture of conservation through training and outreach to staff, students, and facility users. Through this training employees will have the appropriate knowledge and training to be empowered to reduce energy consumption.
3. Expand upon our comprehensive energy management policy and practices by enhancing key existing business practices to include energy efficiency standards and energy management best practices.
4. Expand our monitoring and tracking program for energy use by providing access to our energy management system to make energy consumption visible to everyone in the College and support facility/management decision-making.
5. Deliver energy cost savings through the identification and implementation of processes, programs and projects that will reduce energy consumption.
 - Re-assess and benchmark the top energy consuming facilities across the College. (2019)
 - Review previously identified energy savings opportunities by reviewing past energy audits and plan to renew energy audits and analysis of the capital asset renewal program. (Ongoing)

- Review and/or enhance standard operating and maintenance procedures to include energy conservation best practices. (Ongoing)
- Seek funding for energy-related projects from various sources to enhance the payback and reduce implementation costs. (Ongoing)

Strategic Action Plan

To achieve our new ECDM Plan, the College will employ three strategic actions designed to ensure a positive outcome over the next 5 years. These key strategies support the delivery of our Goals and Objectives.

Strategy 1. Policies and Practices

Develop policies and practices that support the energy conservation effort and show leadership and commitment within the College community.

- Energy Management Team: Roles, Responsibilities and Accountability

Strategy 2. Education, Awareness & Outreach

Provide the guidance, leadership and framework necessary to empower employees and develop a culture of conservation.

- Energy Skills Training Program
- Energy Awareness Training
- Outreach, Engagement and Recognition Programs
- Feedback System for Employee Suggestions
- Employee Brainstorming Sessions

Strategy 3. Energy Conservation Action Plan and Energy Information Management

Continually identify and deliver energy conservation processes, programs and projects in all areas of the College. Demonstrate sound operating and maintenance practices to complement the energy efficiencies implemented through the capital asset renewal program. Employ a robust Energy Information Management System to ensure that all conservation activities are measured and verified to ensure the College receives and maintains specified energy reductions and savings.

Energy Conservation Action Plan

- Key facility energy audits
- Asset renewal plan and energy conservation project delivery
- Standard facility operations procedure review

Energy Information Management

- Maintenance of the online energy monitoring and reporting system (electricity, natural gas and fuels)
- Regular Energy Use Review presentations for the community, council, accountable staff and energy users
- Energy bill verification and rate optimization
- Reporting requirements for Regulation 507/18 (formerly 397/11)

- Consistent updates and review of key performance indicators (KPIs)/benchmarking
- Standardize and implement project measurement and verification

3.0 STRATEGY 1: Energy Management Practices

Canadore College has implemented essential practices, including key personnel deployment, to ensure a strong focus on energy management and savings. These efforts remain a key component of our renewed ECDM Plan.

The Energy Management Team: Roles and Responsibilities

Energy Champion: Manager, Facilities and Building Services

The Energy Champion is ultimately responsible for creating budgets, securing spending authority and resources for the program. This role is responsible for setting and/or legitimizing the program's high-level goals and objectives, keeping track of major project activities and approving resources and funding for the team and its approved projects.

The Energy Champion has direct knowledge of the organization's major energy-using systems and is responsible for developing and maintaining the focus for the Energy Management Team. The Energy Champion coordinates meetings, sets agendas, and delegates and manages tasks related to the Energy Management Team. This role helps create the vision for the program and will help the program to maintain momentum, particularly when any barriers arise.

Energy Leader: Facilities Operation Co-ordinator

The Energy Leader is responsible for ensuring that the monitoring and tracking systems for energy are accurate, up-to-date and available for use by College employees. The Energy Leader should have a technical background and is responsible for supporting and reporting on the technical aspects of the energy projects at all facilities. This role may also lead energy conservation projects as the project manager.

Canadore College Energy Management Team

The Energy Management Team functions on a strategic level to set expectations for each of the facilities, develop metrics for tracking overall energy improvement, and build accountability for energy management activities. In addition, this cross-functional team has direct responsibility for the consumption of energy within their respective departments. As a group, the team supports and monitors the energy management initiatives (processes, programs, and projects) at the various facilities and across the College.

Actions: Continue to seek cross-departmental membership and support for the Energy Management Team. Regularly review the objectives of the ECDM Plan and program to ensure implementation of new savings ideas as well as maintain the positive momentum built over the past 5 years.

4.0 STRATEGY 2: Education, Awareness and Outreach

The College's Management Team recognizes the value of Education, Awareness and Outreach as key areas to create a culture of conversation. This will be achieved by raising awareness, understanding and general knowledge amongst staff regarding energy spending, usage and conservation. The College will use a combination of program engagement, direct awareness marketing and hands-on training to enhance our energy reduction efforts to support the achievement of our energy conservation goals and objectives. As well, energy will continue to be a regular agenda item at staff meetings to solicit new ideas for reduction of energy use, promote continued awareness of the cost of energy and ensure that energy conservation remains a key consideration for all College staff.

The Education, Awareness and Outreach program provides guidance, leadership and the framework to empower staff and foster our culture of conservation. The program informs the organization of current energy use, operational practices as well as improvement opportunities, while ensuring that all employees have an opportunity to remain informed of the College's energy reduction efforts. This continued practice will foster the greatest possible impact of education and awareness.

The program is comprised of the following focus areas:

Energy Skills Training Program

The Energy Skills Training Program is a vehicle for employees to develop a general awareness and understanding of current energy use within the College as well as skills to identify opportunities for improvement. The Training Program combines both general knowledge training and hands-on experience to gain maximum benefit.

Employee Brainstorming Sessions are an important part of the Energy Skills Training Program and are encouraged during the Energy Management Team meetings to generate new ideas for energy conservation. As regular users and managers of College facilities, our staff and students are our most valuable resources to both generate and implement our energy conservation strategies.

Outreach, Engagement, Recognition and Energy Awareness Training Program

The College will continue to engage all users of facilities and recognizes that this is essential to the continued success of the energy management program. Our energy program will continue to employ a comprehensive approach to both engaging employees and recognizing the efforts of College staff who provide important support and ideas.

The Energy Awareness Training Program has been developed to provide consistent energy conservation messaging throughout all departments using Community-Based Social Marketing (CBSM) techniques to engage all users of College facilities. Specific methods used to date include conservation tips, eye-catching posters,

College intranet messaging and other relevant marketing tools. It is the intention of this program to expand our ability and focus to enable the College to become a 'clearinghouse' of information for staff, students and facility users to discover ideas and incentives to improve their own energy usage practices.

Feedback System for Employee Suggestions

Canadore College will create a feedback system to encourage all facility users to provide input and ideas. The suggestions submitted will be forwarded to the Energy Management Team to ensure a prompt response. The Energy Management Team can engage relevant employees to ensure that all suggestions are captured and explored.

Actions: Review available energy training opportunities both generally (i.e. all staff) and for specific departments. Establish and maintain at least annual Outreach and Engagement efforts to keep energy conservation 'top-of-mind' for staff and stakeholders.

5.0 STRATEGY 3: Energy Conservation Activities and Information Management

Energy Conservation Action Plan

The Energy Conservation Action Plan (Appendix A) forms the blueprint for implementing energy conservation and cost saving measures. The College has created a list of potential projects based on previous facility energy audits. The attached action plans have been created to guide this process based on a prioritized implementation schedule. All available incentives and funding sources will be explored to minimize the implementation cost of each measure. In addition to the measures shown, the College anticipates that further energy audits, completed over the next 5 years, will augment the list of available energy conservation measures.

Appendix A show a year-by-year implementation strategy. In all, the measures will include:

- Electrical system upgrades
- Monitoring and targeting programs
- Building envelope and roofing improvements
- HVAC retrofits and controls upgrades
- LED lighting retrofits

Additional measures will be added as funding becomes available on an annual basis. In general terms, our actions are expected to yield the following results:

- Education, Awareness and Outreach: 1-2% annual energy savings
- On-going regular reviews of consumption and baselines: 0.5 to 1% annual energy savings
- Re/retro Commissioning: 2-7% annual energy savings within the facilities where it is implemented (estimated to be 1% overall potential total annual savings)

Actions: Maintain a schedule of energy consumption reviews, energy audit renewals and re/retro-commissioning reports to ensure that our list of measures is up-to-date and that previous measures are still functional and providing savings. Perform periodic reviews of available incentives and stay up-to-date on potential sources of funding to offset the implementation costs of the proposed future measures. Review the list of measures at least annually and update as necessary.

Energy Information Management

Online Energy Monitoring and Reporting System

Canadore College has implemented a system for managing and reporting on its energy consumption (electricity, natural gas, fuels) and water. The motivation for this effort is the notion that "you can't manage what you are not aware of". By making our energy usage visual, and keeping the information up-to-date, all personnel with access to the information can benefit from understanding the nature of energy use in the College, as well as the impact their actions or inactions have

on the College's overall energy cost and budgeting. This information is also key in evaluating the potential of new conservation projects as well as measuring the effectiveness of initiatives already taken.

Actions: Continue to gather and upload energy data into the Energy Information Management System regularly and analyze the data for patterns and savings opportunities.

Energy Management Presentations for the Staff, Students and Energy Users

To gain traction for the initiatives within this Plan and ensure that the College reaches its stated reduction targets, it is imperative that information regarding energy usage and cost, as well as the College's energy conservation plans and projects, are well understood and top of mind of everyone from front-line employees to senior department heads. This broad awareness will lead to additional buy-in and support for the College's continued efforts to reduce its energy usage and spending.

Actions: Make energy a key topic at staff and senior management meetings as well as provide an update on energy use and conservation to senior management, at least annually.

Key Performance Indicators (KPI's) and Monitoring and Verification

To ensure momentum continues, and Canadore College receives value-for-money with regards to its energy conservation efforts, a rigorous program of establishing KPI's and then monitoring and verifying ongoing savings is an essential element of this Plan. By establishing agreed upon KPI's and then performing regular and frequent monitoring, not only will College personnel be able to verify that savings expected from various projects is achieved, but that the savings continue for the duration of the project or retrofit's useful life. This practice will protect the College's investments as well as provide transparency and support for successful savings initiatives

Actions: Review all conservation initiatives to understand the most appropriate monitoring and verification process. Review the project savings at pre-defined regular intervals and report outcomes to senior management.

Bill Verification and Rate Optimization

A consistent, periodic review of the College's energy invoices is important to ensure that rates and recorded consumption values on energy bills is accurate. This ensures that the invoices presented by utilities are correct and are providing appropriate and relevant data to the College's Energy Management Platforms.

Actions: Perform regular rationalization check on monthly invoices and conduct at least annual detailed billing reviews to ensure accuracy.

Ongoing Ontario Regulation 507/18 Reporting

In addition to completing this Plan, Canadore College is required to submit annual energy consumption and greenhouse gas emissions templates to the appropriate Ministry of Energy portal. Gathering and recording monthly energy invoices are necessary to complete these reports.

Actions: Complete all required regulatory reporting by July 1 of each year.

APPENDIX A: Energy Conservation Action Plan Measures Summary

Canadore College Energy Conservation Investments - 2014 to 2023

	2014 - 2015	2015 - 2016	2016 - 2017	2017 - 2018	2018 - 2019	2019-2020	2020-2021	2021-2022	2022-2023
Ceiling Retrofit Project	884,019.00								
D Wing Generator	9,063.00								
Lot #10 LED Lighting		2,462.00							
Small Reno - Shipping/Receiving Air Lock		3,025.00							
Energy Monitoring Targeting Program			49,726.00		30,610.00				
Natural Gas Service Upgrade			17,514.00		74,215.00				
Facilities - Construction in Progress			384,970.00	723,078.00	275,714.00				
CEC Direct - Roofing			1,753,804.00						
CEC Shared - Roofing			667,062.00	16,852.00					
CEC Shared - HVAC			820,613.00						
CCC Direct - Roofing			1,232,713.00						
CCC Direct - HVAC			647,419.00	10,005.00					
D-Wing Generator				56,089.00		2,482.00			
Cafeteria Electrical Sub-Switch				6,580.00					
Weaver Seating - Dancy Electric				326,550.00					
CCC Transformer Removal				6,904.00					
GHG - College Drive Windows				380,312.00					
GHG - College Drive Door Replacement				242,376.00					
GHG - CCC - Door Replacements				39,203.00					
GHG - Replace HVAC #44 & #45				214,220.00					
GHG - Updated Building Controls TEC & AV				97,741.00					
Pond/Dam Rehabilitation - Designed Roofing					188,572.00				
D Wing Generator						200,000.00			
CCC - Transformer Removal						15,000.00			
Cafeteria Washrooms						50,000.00			
Lot #10 - LED Lighting						75,000.00			
Sub Station - Monestary							400,000.00		
TEC Electrical Panels						75,000.00		75,000.00	
Isolation Valve for TEC							20,000.00		
Hot Water Tank - HW Storage Tank							150,000.00		
Main Vault Electrical Air CCT Breaker Testing & Recalibration							25,000.00		
Electric Heat - Radiant - Boilers							50,000.00	50,000.00	50,000.00
Astrological Controllers - lighting Control							10,000.00	10,000.00	10,000.00
Window & Doors - B, C, D, G Wings							75,000.00	75,000.00	75,000.00
Lights above Ceiling - CCC						15,000.00	15,000.00	15,000.00	15,000.00
Parking Lots Lighting - All Campuses					15,000.00	15,000.00	50,000.00	50,000.00	50,000.00
Capacitator Banks for Power Factor					50,000.00	50,000.00	10,000.00	10,000.00	10,000.00
Shading on Doors & Windows							10,000.00	10,000.00	10,000.00
Exhaust Fan - 3rd Floor D Wing							35,000.00		
TOTAL ANNUAL INVESTMENT	893,082.00	5,487.00	5,573,821.00	2,119,910.00	634,111.00	482,482.00	925,000.00	295,000.00	220,000.00