



INTRODUCTION

Northern College's 5-Year Energy Conservation and Management Plan has been developed in compliance with Ontario Regulation 397/11 made under the Green Energy Act, 2009.

It is a living document that will continue to evolve and assist the College in its various environmental and sustainability initiatives. In addition, this 5-Year Plan will provide the college with a framework to identify opportunities for continued energy conservation measures and sustainability initiatives. Identified initiatives will be undertaken subject to the annual approval of capital and operating budgets and forecasts.

Required Elements of the Plan include:

1. Information on the annual energy consumption during the last year for which complete information is available for the full year.
2. The goals and objectives of the College to conserve and reduce energy consumption.
3. The proposed measures and plan for cost savings (estimates), and the estimated length of time these measures will be in place.
4. A report on any renewable energy generation facility operated by the College.
5. Confirmation that the plan is approved by Senior Management.
6. The plan is made publicly available.

The implementation of an Energy Conservation and Management Plan allows us to address the interconnected issues of energy use, infrastructure development, facility operations and sustainability. Northern College is committed to the on-going monitoring of our current energy practices.



EXECUTIVE SUMMARY

Northern College is a pillar of success for Northern Ontario, with four Northeastern Ontario campuses located in Timmins, Haileybury, Moosonee and Kirkland Lake comprising of over 635,000 square feet of gross floor area (GFA). With over 75 full-time, part-time, certificate, diploma, and apprenticeship programs and hundreds of in-class, web-based, and correspondence courses, Northern College serves approximately 1,900 full-time students and 6,400 part-time students including post-secondary education, academic upgrading, continuing education, apprenticeship and corporate training annually.

As an organization, Northern College is constantly working to obtain solutions to the challenges of environmental sustainability, and to identify, implement and commit to sustainability goals and practices in our operations.

Northern College is concerned about the environment and committed to environmental responsibility in its role as an employer, an educator and a community leader.

Northern College is committed to:

- *Developing environmentally responsible campus communities that are economically viable and reflect the values of the members.*
- *Increasing awareness of our greening and sustainability initiatives for both staff and students.*
- *Reviewing and monitoring our energy practices for efficiency improvements.*
- *Developing strategies and targets in order to reduce annual greenhouse gas emissions, electrical, oil and natural gas demand and water consumption; and measuring efficiencies attained.*
- *Incorporating sustainability and energy efficiency into future facility developments.*
- *Instilling sustainable development values in its graduates and employees, through research, teaching and operations.*



FACILITIES

TIMMINS CAMPUS

The Timmins Campus is home to Northern College's Centre of Excellence for Trades and Technology and student residence.

TIMMINS CAMPUS FACILITY	
Facility Name:	Northern College Timmins Campus
Address:	4715 Highway 101 E, South Porcupine, ON
Campus Gross Area (Sq. Ft)	~ 288,284
Residence Gross Area (Sq. Ft)	~ 34,820
Type of operation	Post-Secondary Education Institution
Average Operational Hours Per Week	100

TIMMINS CAMPUS ANNUAL ENERGY CONSUMPTION (2013)	
UTILITY	CONSUMPTION
ELECTRICITY	2,923,456 kWh
NATURAL GAS	388,806 m ³

TIMMINS RESIDENCE ANNUAL ENERGY CONSUMPTION (2013)	
UTILITY	CONSUMPTION
ELECTRICITY	294,744 kWh
NATURAL GAS	85,334 m ³

Existing Energy Conservation Measures:

- Transitioning to paperless forms, LED lighting for 24 hour bulbs, and T8 upgrades in classrooms and offices. Installation of vending controls and additional occupancy sensors
- Collaboration with the Anti-Hunger Coalition Timmins for the operation of community gardens.



FACILITIES

KIRKLAND LAKE CAMPUS

The School of Welding Engineering Technology at the Kirkland Lake Campus keeps building on its international reputation as a leader in the field of welding education and training.

KIRKLAND LAKE CAMPUS	
Facility Name:	Northern College Kirkland Lake Campus
Address:	140 Government Rd E, Kirkland Lake, ON
Gross Area (Sq. Ft)	~ 175,481
Type of operation	Post-Secondary Education Institution
Average Operational Hours Per Week	86

KIRKLAND LAKE CAMPUS ANNUAL ENERGY CONSUMPTION (2013)	
UTILITY	CONSUMPTION
ELECTRICITY	877,606 kWh
NATURAL GAS	261,226 m ³

Existing Energy Conservation Measures:

- LED lighting for 24 hour bulbs, and T8 upgrades in classrooms and offices, and auditorium upgrades. Installation of vending controls and occupancy sensors installed throughout the building. All drinking fountains outfitted as hydration stations to reduce bottle water consumption.
- As part of the Environmental Technician – Water and Wastewater Systems Operations Program, there is a Water Treatment Plant on campus. It supports applied research projects, and allows for controlled experimentation of various drinking water treatment regimens in a way that is not possible with actual municipal drinking water plants.



FACILITIES

HAILEYBURY CAMPUS

The Haileybury Campus is home to the world-renowned Haileybury School of Mines and state of the art Veterinary Sciences Centre.

HAILEYBURY CAMPUS FACILITY	
Facility Name:	Northern College Haileybury Campus
Address:	640 Latchford Street, Haileybury, ON
Campus Gross Area (Sq. Ft)	~ 91,147
Vet Science Center Gross Area (Sq. Ft)	~ 34,820
Type of operation	Post-Secondary Education Institution
Average Operational Hours Per Week	87

HAILEYBURY CAMPUS ANNUAL ENERGY CONSUMPTION (2013)	
UTILITY	CONSUMPTION
ELECTRICITY	798,424 kWh
NATURAL GAS	184,761 m ³

HAILEYBURY VET SCIENCE CENTRE ANNUAL ENERGY CONSUMPTION (2013)	
UTILITY	CONSUMPTION
ELECTRICITY	129,871 kWh
NATURAL GAS	41,125 m ³

Existing Energy Conservation Measures:

- Cafeteria services no longer sells bottled water and uses only biodegradable and recycled content containers. LED lighting for 24 hour bulbs, and T8 upgrades in classrooms and offices. Installation of vending controls and all drinking fountains outfitted as hydration stations.
- A good portion of fine paper is shredded and used in the Veterinary Science Centre animal cages.
- Enhanced recycling program, with over 50 additional recycling bins located throughout the campus.



FACILITIES

MOOSONEE CAMPUS

The James Bay Education Centre in Moosonee is linked to the Centre of Excellence for Trades and Technology at the Timmins Campus, providing high-skills training in technology, trades and apprenticeship programs to the James Bay coastal communities.

MOOSONEE CAMPUS	
Facility Name:	Northern College Moosonee Campus
Address:	First Ave Box 130, Moosonee, ON
Gross Area (Sq. Ft)	~ 50,400
Type of operation	Post-Secondary Education Institution
Average Operational Hours Per Week	84

Please note the campus heats with oil, and consumption is represented in litres.

MOOSONEE CAMPUS - ANNUAL ENERGY CONSUMPTION (2013)	
UTILITY	CONSUMPTION
ELECTRICITY	371,140 kWh
OIL	114,550 L

Existing Energy Conservation Measures:

- Use of video conferencing equipment to cut down on travel costs and reduce our carbon footprint.
- LED lighting for 24 hour bulbs, and T8 upgrades in classrooms and offices.



CURRENT CONSERVATION METHODS

Northern College is committed to increasing its efforts towards sustainable practices and energy savings and consumption. We are presently working at implementing retrofits to reduce annual electrical demand, energy and water consumption.

The table below represents our current conservation methods in practice at our campuses.

Conservation Measure	Timmins Campus	Haileybury Campus	Kirkland Lake Campus	Moosonee Campus
T8 Fluorescent lighting	x	x	x	x
Parking LED lighting	x	x		
Building envelope upgrade				
New rooftop units	x	x		
Building Automation System (BAS)	x	x	x	
Energy VR system		x		
Variable Frequency Drives (VFD) on motors			x	
Heat recovery wheels		x		
Low Flow Plumbing Fixtures	x			
High Performance Roofing	x	x	x	
Automated Lighting Controls	x	x	x	x
Power Factor Correction		x	x	

* With the remote location of our Moosonee Campus, shipping and travel logistics play a huge role in our ability to update the current building.

PROPOSED CONSERVATION INITIATIVES

The table below displays several retrofits and upgrades that we have completed and those proposed measures we seek to implement over the next five years.

TABLE 1.1 PROPOSED CONSERVATION INITIATIVES				
PROPOSED MEASURE	CAMPUS	Estimated Project Cost (\$)	Estimated Energy Savings (\$)	Estimated Energy Savings/Year
COMPLETED INITIATIVES				
T8 LIGHTING RETROFIT	Timmins, Kirkland Lake, Haileybury, Moosonee	\$30,850*	\$34,860*	185,081 kWh*
OCCUPANCY CONTROLS	Timmins, Moosonee, Haileybury, Kirkland Lake	\$5,290*	\$1,000*	5,835 kWh*
VENDING CONTROLS	Kirkland Lake, Timmins, Haileybury, Moosonee	\$4,830*	\$3,150*	30,630 kWh*
PROPOSED INITIATIVES				
REPAIR OUTDOOR AIR LINKS (Main Induction System)	Haileybury	\$15,250	\$7,040	27,400 m3
LOW FLOW SHOWERS	Timmins , Haileybury	\$22,480	\$3,980	9,220 m3 509,950 Gal
VARIABLE FREQUENCY DRIVE PUMP CONTROL	Kirkland Lake, Haileybury Moosonee	\$37,840	\$11,180	101,650 kWh
RE-COMMISSION BUILDING AUTOMATION SYSTEMS	Kirkland Lake, Timmins, Moosonee, Haileybury	\$27,250	\$7,000	37,400 kWh
VARIABLE FREQUENCY DRIVE FANS	Kirkland Lake, Haileybury	\$24,380	\$5,680	56,230 kWh
REMOVE REDUNDANT HVAC	Kirkland Lake, Haileybury	\$10,140	\$2,220	14,000 kWh 1,600 m3
MOTION FLUSH TANK	Timmins, Haileybury, Moosonee	\$19,500	\$4,160	504,300 Gal
LED EXIT SIGNS	Kirkland Lake, Timmins, Haileybury	\$20,520	\$2,520	14,520 kWh
RE-COMMISSION EXTERIOR LIGHTING CONTROLS	Timmins, Haileybury	\$1,050	\$1,650	11,780 kWh
HEAT PUMP DOMESTIC HOT WATER HEATERS	Timmins, Moosonee	\$10,720	\$1,290	12,800 kWh
DAYLIGHT CONTROLS	Kirkland Lake, Timmins, Haileybury, Moosonee	\$14,670	\$1,690	16,190 kWh
HIGH EFFICIENCY CLOTHES WASHER	Timmins Student Residence	\$940	\$170	1360 kWh
REPLACE HIGH INTENSITY DISCHARGE LIGHTING	Timmins, Moosonee	\$16,610	\$1,400	2250 m3
LED WALLPACKS	Timmins, Haileybury, Kirkland Lake	\$33,050	\$34,860	315,420 kWh

*Table 1.1 – *A portion of energy savings is instant. Payback varies from apx. 0.5 to 13 years as indicated in Appendix 1. Data for proposed conservation initiatives is based on the Energy Audit conducted by Dialog Design Consultants in 2014.*

**See Appendix 1 for detailed information on completed retrofits.*

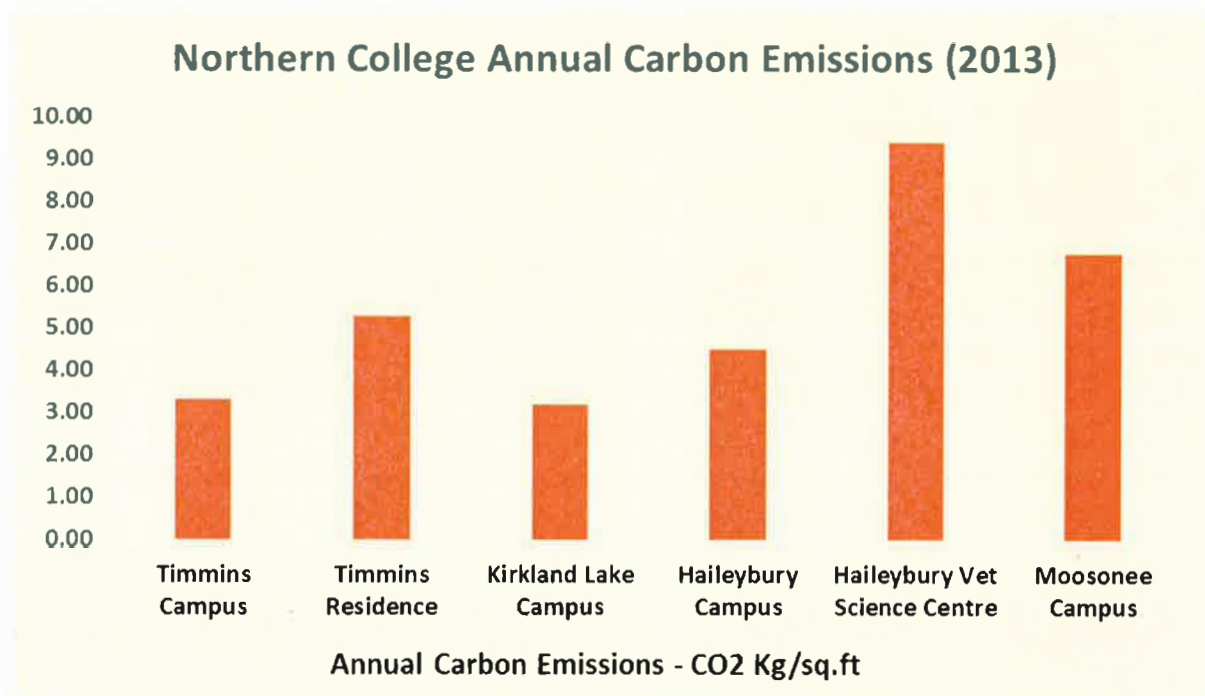
GREENHOUSE GAS EMISSIONS

Northern College is committed to reducing its emissions and carbon footprint on the planet. We recognize the importance of reviewing our practices to optimize our facility operations and thereby work towards reducing our impact on the environment.

Factors that influence energy consumption can include:

- Unusual weather conditions.
- An increase/decrease in unit energy cost by suppliers.

2013 GREENHOUSE GAS EMISSIONS			
Annual Electricity Consumption		Annual Gas Consumption	Annual GHG
Campus	KWh	M3 or Liters (Moosonee Only)	Tonnes of CO2
Timmins Campus	2,923,456	388,806	95
Timmins Residence	294,744	85,334	18
Kirkland Lake	877,606	261,226	56
Haileybury Campus	798,424	184,761	41
Haileybury Vet Science	129,871	41,125	87
Moosonee	371,140	114,550 Liters	34
TOTAL			331



ENERGY UTILIZATION INDEX

Energy Use Intensity (EUI) is the measurement used to size up a building's energy performance. It represents the energy consumed by a building relative to its size and is defined as total energy consumed (expressed in Gigajoules, GJ) divided by total floor area (expressed in square meters, m²).

Converting gas and electricity into a common measurement allows facilities to be easily compared. In this case, we are comparing our facility to the industry average for Ontario Community Colleges and CEGEPs derived from Natural Resources Canada's 2008 Commercial & Institutional Consumption of Energy Survey Report. The average Energy Intensity for **Ontario** Community Colleges and CEGEPs is **0.95 (GJ/m²)**.

Facility	EUI (GJ/m ²)	Comparison to Industry Average
Timmins Campus	0.93	This campus has an EUI that is LESS than the Ontario College average

Facility	EUI (GJ/m ²)	Comparison to Industry Average
Timmins Residence	1.31	This campus has an EUI that is slightly higher than the Ontario College average

Facility	EUI (GJ/m ²)	Comparison to Industry Average
Kirkland Lake Campus	0.79	This campus has an EUI that is LESS than the Ontario College average

Facility	EUI (GJ/m ²)	Comparison to Industry Average
Haileybury Campus	1.15	This campus has an EUI that is slightly higher than the Ontario College average

Facility	EUI (GJ/m ²)	Comparison to Industry Average
Haileybury Vet Science Centre	2.31	This campus has an EUI that is moderately higher than the Ontario College average

Facility	EUI (GJ/m ²)	Comparison to Industry Average
Moosonee Campus	1.23	This campus has an EUI that is slightly higher than the Ontario College average

Two out of six Northern College facilities are operating below the Ontario College average provided in the 2008 Commercial & Institutional Consumption of Energy Survey Report, with the additional four facilities operating nominally higher than the average.

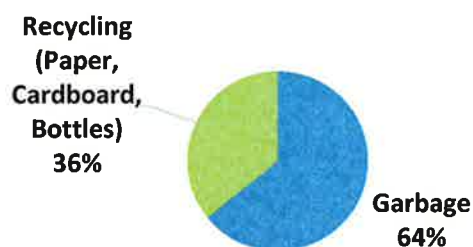
CURRENT RECYCLING EFFORTS

TIMMINS CAMPUS

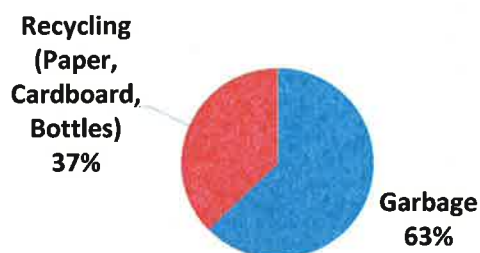
With a successful recycling and a waste management system in place, including the implementation of annual waste audits at two of our largest campuses—Timmins and Haileybury, we are looking to continue this success by implementing the audit at our Kirkland Lake campus by 2017. Using the audits, we are able to measure our success, and build upon our sustainability practices.

As part of a larger greening initiative, Northern College aims to increase its recycling efforts between 2-10% each year during the 2014-2019 period. Using the Timmins Campus 2013 as a baseline for our recycling efforts, we have already succeeded in increasing our recycling output by 2% in 2015. With a commitment to increasing our greening awareness programs in 2016, we are confident that our recycling efforts will reflect this campaign and our amounts of waste diversion will thus increase.

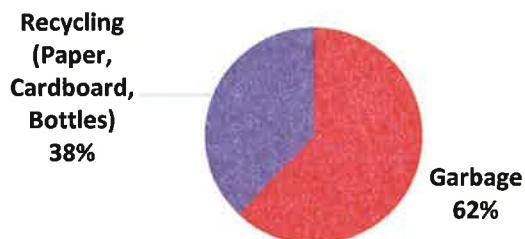
2013 TIMMINS WASTE AUDIT



2014 TIMMINS WASTE AUDIT



2015 TIMMINS WASTE AUDIT



SUSTAINABILITY PRACTICES

PROCUREMENT / PURCHASING

Northern College has committed to the use of environmentally friendly and energy efficient materials and strategies. Purchasing preference is given to environmentally friendly and energy efficient goods and services, wherever possible, and without compromising overall best value. (i.e; vehicles, equipment and technology).

Some of our current practices include:

- Support or use recycled, reusable, refillable, non-toxic, biodegradable, compostable, phosphate-free, low volatile organic compound (VOC) and low-waste materials/packaging.
- Certain contracts and tenders have built into them a clause to supply only materials of recycled content.
- At present, we purchase only 100% recycled paper towels, paper, and have tendered out our student marketing material to be exclusively printed on recycable materials.

TRANSPORTATION

Northern College encourages alternatives to conventional vehicle use and is committed to promoting these initiatives through on-going development and planning.

Some of our current practices include:

- Encouraging car-pooling for inter-campus travel by staff, faculty, and administration.
- Using video conferencing equipment for meetings.

PRINTING

In an effort to encourage students and staff to reduce the amount of printing, Northern College's current practices include:

- Encouraging staff to use duplex printing, view items through email, use online fillable forms, use scrap paper as notepads and utilize digital note taking.
- Implementing print quotas and charges in an effort to reduce student printing.
- Committing to paperless office solutions including electronic file storage and record keeping, and electronic submission and grading of assignments as much as possible.

MORE...GOING GREEN!

Northern College, through their 2016 Greening Initiative, plans on re-establishing its Environmental Sustainability Committee to continue to evolve in its environmental strategies at all campuses.

The committee's role includes:

- Providing a forum for discussion of greening and sustainability issues of interest to the College community.
- Develop and recommend environmental procedures and policies to College administration.
- Serve as a two-way communication link between the College Community (students, staff, and faculty) and College administration.

ON-GOING DEVELOPMENTS

- Continuing efforts by the Plant & Property Department to see huge gains in energy efficiency, particularly through the introduction of improved lighting systems and automated controls.
- The installation of hydration stations to help reduce the amount of plastic water bottles used.
- Electronic waste recycling.
- Re-using of cellphones, computers and other electronics.
- Education of "lights off".
- Encourage the use of reusable mugs for drinks.
- On-going waste audits.
- The installation of vending controls.
- T8 lighting retrofit.
- LED lighting for 24 hour bulbs.
- The installation of additional occupancy sensors.



CLOSING COMMENTS

We consider Northern College an exemplary source of education and an integral part of the local community. The key to this relationship is being able to use our facilities efficiently and effectively to maximize our ability to provide the highest quality of education while integrating environmental stewardship into all aspects of facility operations.

On behalf of the Senior Management Team here at Northern College, we approve this Conservation and Demand Management Plan.



Fred Gibbons, President & CEO

Date

APPENDICES

TABLE 1.1 (APPENDIX 1)

COMPLETED INITIATIVES

PROPOSED MEASURE	CAMPUS	Estimated Project Cost (\$)	Estimated Energy Savings (\$)	Estimated Energy Savings/Year	DESCRIPTION
T8 LIGHTING RETROFIT	Timmins, Kirkland Lake Haileybury Moosonee	\$30,850	\$34,860 ¹	185,081 kWh ²	<p><i>T8 Retrofit across all campuses is at 99% completion.</i></p> <ol style="list-style-type: none"> Estimated energy savings are based on estimate by Dialog Audit. Does not include instant incentive payback of \$10,000 from Hydro One SaveONEnergy Incentive Program. Approximate payback determined by Dialog Audit is 0.5 years. Estimated Energy Savings is based on estimate by Hydro One SaveONEnergy Program Incentive Consultant "CLEAResult". Long term estimated energy savings (kWh) can be determined more accurately on next year's Hydro billing cycle. <ul style="list-style-type: none"> Timmins Bulb Retrofit: 2500 bulbs Kirkland Lake Bulb Retrofit: 2500 bulbs Haileybury Bulb Retrofit: 1500 bulbs Moosonee Bulb Retrofit: 840 bulbs <p><i>Total: 10,000 bulbs retrofitted</i></p>
OCCUPANCY CONTROLS	Timmins Moosonee Haileybury Kirkland Lake	\$5,290	\$1,000 ³	5,835 kWh ⁴	<p><i>Occupancy Control retrofit across all campuses is at 100% completion.</i></p> <ol style="list-style-type: none"> Based on estimated incentive payback of \$1,000 from Hydro One SaveONEnergy Incentive Program. Approximate payback determined by Dialog Audit is 13 years. Estimated Energy Savings is based on estimate by Hydro One SaveONEnergy Program Incentive Consultant "CLEAResult". <ul style="list-style-type: none"> Timmins Retrofit: 10 controls Kirkland Lake Retrofit: 5 controls Haileybury Retrofit: 5 controls Moosonee Retrofit: 5 controls <p><i>Total: 25 occupancy controls retrofitted</i></p>

APPENDICES

TABLE 1.1 (APPENDIX 1)

COMPLETED INITIATIVES

PROPOSED MEASURE	CAMPUS	Estimated Project Cost (\$)	Estimated Energy Savings (\$)	Estimated Energy Savings/Year	DESCRIPTION
VENDING CONTROLS	Kirkland Lake Timmins Haileybury	\$4,830	\$3,150 ⁵	30,630 kWh ⁶	<p><i>Vending Control Retrofit across all campuses is at 100% completion.</i></p> <ol style="list-style-type: none"> 1. Estimated energy savings are based on estimate by Dialog Audit. Approximate payback determined by Dialog Audit is 1 year. 2. Estimated Energy Savings is based on Dialog Audit. <ul style="list-style-type: none"> • Timmins Vending Retrofit: 7 units • Kirkland Vending Retrofit: 5 units • Haileybury Vending Retrofit: 5 units <p>*Moosonee Vending Machine did not require upgrade as unit was outfitted with up-to-date, energy efficient controls</p> <p><i>Total: 17 vending controls retrofitted</i></p>