



Energy Conservation and Demand Management Plan

2019-2024

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1. Introduction

Laurentian University is located on the territory of the Robinson-Huron Treaty of 1850, and recognizes its placement on the traditional lands of the Atikameksheng Anishnawbek and Wahnapiatae First Nations. Laurentian is committed to strengthening the foundation of knowledge in higher education and research to offer an outstanding university experience in English and French with a comprehensive approach to Indigenous education. Together with its federated partners, Laurentian University prepares leaders who bring innovative and intelligent solutions to local and global issues.

Laurentian University is located at the edge of Ontario's Near North, a region recognized for its remarkable environment (the south portion of the Boreal Shield ecozone) and its natural resources (especially water, minerals, and forests). Since its creation in the early 1960's, Laurentian University has been recognized worldwide for its environmental research, especially in the fields of water and freshwater ecosystems, restoration of industrially damaged ecosystems, Boreal Shield and Ontario's Far North ecosystems, and conservation. Laurentian is home to Canada Research Chairs in areas such as Environmental Microbiology, Environment, Cultures & Values, Stressed Aquatic Systems as well as Applied Evolutionary Ecology. Laurentian also has dedicated research centres for Evolutionary Ecology and Ethical Conservation, a Cooperative Freshwater Ecology Unit and the new Vale Living with Lakes Centre. Laurentian University is a signatory of the Talloires Declaration¹, the Council of Ontario Universities pledge create greener campuses², and was among the first universities in Canada to sign the Paris Pledge for Action³. Environmental responsibility is an important value at Laurentian University.

On January 1, 2019 a new regulation was introduced under the Electricity Act, 1998 titled O. Reg. 507/18: Broader Public Sector: Reporting and Conservation and Demand Management

¹ Talloires Declaration. Association of University Leaders for a Sustainable Future.
<http://ulsf.org/talloires-declaration/>

² Ontario Universities Committed to a Greener World.
<http://www.cou.on.ca/news/commentary---events/events/events-pdfs/committed-to-a-greener-world---a-pl-edge-from-execu>.

³ Paris Pledge for Action. UN Climate Change Conference COP21/CMP11.
<http://www.parispledgeforaction.org/>

Plans. This regulation replaces Ontario Regulation 397/11 titled Energy Conservation and Demand Management Plans and was enacted under the now repealed Green Energy Act, 2009. Under Ontario Regulation 507/18, all public agencies are required to report annually on energy use and greenhouse gas (GHG) emissions. The agencies are also required to prepare and make public updated five-year energy conservation and demand management plans (CDM). The first update is due in 2019. This CDM report is completed by Laurentian University to be in compliance with O. Reg. 507/18.

2. Conservation and Demand Management Results

2.1 Annual Energy Consumption

Under Ontario Regulation 507/18, all public agencies are required to report annually on energy use and greenhouse gas (GHG) emissions for the last year for which information is available for a full year.

On July 1, 2013, Laurentian University submitted the required baseline data for 2011. This data was submitted using the Ministry of Energy's Energy Consumption and Greenhouse Gas Emission Template. This report, along with the report containing data for subsequent years, can be found on the Laurentian University website (laurentian.ca/sustainability). Data reported for 2017, in compliance with Ontario Regulation 507/18 for the 2019 reporting year, is also available in Appendix A for convenience.

Discussions involving other Ontario Universities and the Ministry of Energy, Northern Development and Mines, through the Ontario Association of Physical Plant Administrators (OAPPA) Energy Committee, identified that most campuses are unable to monitor energy consumption for separate buildings on campus. This has been the case at Laurentian University as sub-metering was not yet installed for each building. As a result, electricity and natural gas consumption have been reported for the University campus as a whole for the 2017 report.

2.2 Previous Energy Conservation and Demand Management Plan Measures and Results

Under Ontario Regulation 397/11: Energy Conservation and Demand Management Plans, public agencies were required to prepare, publish, make available to the public and implement 5-year energy conservation and demand management plans beginning in 2014. A copy of the 2014-2019 Laurentian University Energy Conservation and Demand Management Plan can be found on the Laurentian University website (laurentian.ca/sustainability).

Under the new Ontario Regulation 507/18: Broader Public Sector: Energy Reporting and Conservation Demand Management Plans, new energy conservation and demand management plans must report on actual results of measures identified in previous energy conservation and demand management plans.

The following is a summary of the proposed measures identified in the 2014-2019 Energy Conservation and Demand Management Plan, and corresponding results to date.

| 2014-2019 Proposed Measure A: Evaluation of Energy Efficiency for All Facilities | |
|--|---|
| Desired Outcomes | 2019 Results |
| Sub-metering installed in all facilities for electricity, water, thermal and natural gas. | Through successful GGRP funding, sub-metering was installed and commissioned in all facilities for electricity, water, thermal and natural gas completed in March 2019. |
| Campus facility benchmarking completed (Energy Intensity Evaluation of consumption/occupied area). Monitoring and tracking over the next few years will enable staff to construct a more accurate baseline per building. | Data currently being recorded to facilitate energy intensity evaluations to benchmark appropriately with newly installed building-level sub-metering. |

| 2014-2019 Proposed Measure B: Energy Conservation Activities | |
|--|---|
| Desired Outcomes | 2019 Results |
| Reduction in consumption as measured by meters and invoices for electricity and natural gas. | Energy intensity as reported in compliance with the previous O. Reg. 397/11 has improved slightly at the McEwen School of Architecture, however construction activities and considerable growth at the Main Campus contributed to the increase in energy intensity. |

| | |
|---|---|
| <p>Identification and implementation of energy saving opportunities. Track and monitor energy use before and after energy saving projects</p> | <p>Multiple energy efficient lighting projects completed including: Exit signs, Fraser Stairwell, Great Hall, Fraser Auditorium, all outdoor lighting (parking lots, roadway, walk-way), Mechanical rooms, etc. and Building Automation system upgrades. Totalling over 150,000 kWh projected annual savings, supported by incentives through IESO. Water heaters, boilers, high-performance new construction and controls, natural gas retrofits supported by Union Gas incentives through EnerSmart Conservation Program.</p> |
|---|---|

| <p>2014-2019 Proposed Measure C: New and Existing Infrastructure Planning</p> | |
|--|---|
| <p>Desired Outcomes</p> | <p>2019 Results</p> |
| <p>Review projects for new and existing infrastructure to ensure incorporation of energy efficient technologies.</p> | <p>Design for new building construction is now mandated to be building to LEED Gold standards. Completed for three new buildings: McEwen School of Architecture (2016), Cliff Fielding Research, Innovation and Engineering Building (2018), Student Centre (2019).</p> |
| <p>Evaluate energy saving post-projects for existing infrastructure.</p> | <p>Data currently being recorded to facilitate energy savings with newly installed building-level sub-metering.</p> |

| <p>2014-2019 Proposed Measure D: Evaluation of Renewable Energy Technologies</p> | |
|---|---|
| <p>Desired Outcomes</p> | <p>2019 Results</p> |
| <p>Identification and evaluation of at least two renewable energy options</p> | <p>Evaluation and application for solar PV generation at both the Main Campus and McEwen School of Architecture through a partnership with Solar Power Network and the OPA 2015 Fit Program. While the main campus was not successfully awarded, the McEwen School of Architecture was successful. Evaluations are still underway for this collaboration.</p> <p>Evaluation and partnership with local utility, Greater Sudbury Utilities, for the installation of a Combined Heat and Power plant with district heating. Project was deemed unsuccessful with the introduction of the Fair Hydro Act, and the migration of the institution from Class B to Class A consumer.</p> <p>Solar PV and hot water generation was implemented at the new McEwen School of Architecture. The solar panels are meant to act as a demonstration for students and powers the</p> |

| | |
|--|--|
| | <p>motorized blinds within the facility as well as injecting hot water into the domestic hot water loop.</p> |
|--|--|

| <p>2014-2019 Proposed Measure E: Collaboration with External Partners (Local Utility Companies, Municipal/Provincial/National Sustainability Groups, etc.)</p> | |
|--|--|
| <p>Desired Outcomes</p> | <p>2019 Results</p> |
| <p>Identification and evaluation of energy saving incentives through Union Gas, municipality incentives, Ministry of Energy’s Business Incentive Database, Infrastructure Ontario, energy service companies (ESCO), etc.</p> | <p>As noted above, evaluation for the installation of combined heat and power plant with a partnership of the local utility GSU was evaluated. Evaluation of Energy Manager, as funded through IESO, SaveOnEnergy Program, however no successful candidates were identified in Sudbury. Multiple presentations have been received from vendors expressing collaboration interest through ESCO style contracts. Both Greater Sudbury Utility and Union Gas have been strong partners to help support energy saving projects and evaluations.</p> |
| <p>Affiliation with professional network such as Association for Advancement of Sustainability in Higher Education (AASHE), etc.</p> | <p>Laurentian University is a member of the Association for Advancement of Sustainability in Higher Education (AASHE). Laurentian University has been a presenter at AASHE, Ontario College and University Sustainability Professionals (OCUSP), and Canadian Association of University Business Officers (CAUBO) conferences on their experiential learning opportunities through the Office of Sustainability.</p> |

| <p>2014-2019 Proposed Measure F: Collaboration with Internal Partners (IT, Housing and Food Services, Student Unions, etc.)</p> | |
|--|--|
| <p>Desired Outcomes</p> | <p>2019 Results</p> |
| <p>Development, implementation and annual evaluation of plans aimed at energy conservation and awareness.</p> | <p>Sustainable procurement guideline circulated in 2015, identifying energy saving technology requirements. Earth Hour energy saving awareness campaigns held campus-wide. Multiple collaborations with student unions to develop awareness campaigns aimed at energy conservation, and sustainable behaviour.</p> |

| | |
|---|--|
| <p>Evaluation of reinstatement of President’s Action Committee on the Environment (PACE), or alternative forum.</p> | <p>Campus Sustainability Forums held to encourage faculty, staff, students, alumni and community partners to share thoughts and share best practices for improving environmental sustainability on campus. Laurentian Environmental Sustainability Committee instated November 2018 with faculty, staff and student members. Mandate: “This committee will exist to provide advice to senior leadership on environmental sustainability programs and policies on campus while assisting in the education, awareness and promotion of a campus wide culture of sustainability.”</p> |
|---|--|

| <p>2014-2019 Proposed Measure G: Increased Energy Awareness and Communication</p> | |
|--|--|
| <p>Desired Outcomes</p> | <p>2019 Results</p> |
| <p>Sustainability website developed.</p> | <p>Website developed and launched in 2014.</p> |
| <p>Increased presence in campus wide news pertaining to energy and sustainability initiatives.</p> | <p>Social Media account (Twitter) launched 2014 with over 500 followers.</p> |

In 2014, Laurentian University adopted an overarching goal to reduce overall energy intensity across campus by 5% (as compared to 2011 baseline) by 2017, and to foster a stronger sense of sustainability in Laurentian University’s organizational culture. As shown below for both sites, energy intensity as reported in compliance with the previous O. Reg. 397/11 has improved slightly at the McEwen School of Architecture. The Main Campus saw considerable growth, 17% additional sq.ft. from the period of 2011 to 2019, and the energy required to perform construction activities associated with this growth contributed to the increase in energy intensity. It is expected that the energy intensity for 2018 and subsequent reporting years will be lower in the absence of construction, and meet the desired energy intensity goals.

| Site | Baseline | | Evaluation | |
|--------------------------------------|----------|------------------------------------|------------|------------------------------------|
| | Year | Energy Intensity (eWh/HDD/sqft) | Year | Energy Intensity (eWh/HDD/sqft) |
| Laurentian University Main Campus | 2011 | 28.97 | 2017 | 31.36 |
| McEwen School of Architecture | 2013 | 33.99 | 2017 | 26.25 |

Appendix B is also included in this report to demonstrate progress and highlight successes towards fostering a stronger sense of sustainability in Laurentian University’s organizational culture.

3. Current and Proposed Measures

Public agencies are required to develop goals and objectives for conserving and otherwise reducing energy consumption and managing demand for energy. At Laurentian University, the Energy Conservation and Demand Management (ECDM) Plan is an evolving document built on various proposed technical, organizational and behavioural measures. The measures aimed at conservation are based on a number of factors including organizational gaps and needs, current consumption, available funding and incentives, existing infrastructure, new technologies, etc. Over the next 5 years Laurentian University aims to continue to reduce overall energy intensity across campus by 5% (as compared to 2011 baseline) by analyzing newly obtained energy data, planning for high yielding energy projects, investigating new technologies.

3.1 Current and Proposed Measures

The following proposed measures are aimed at achieving the qualitative and/or quantitative energy conservation goals described above.

| | Proposed Measure | Expected Results/Outcomes |
|---|--|--|
| A | Benchmarking Analysis and Prioritization | <ul style="list-style-type: none"> ● Laurentian has recently installed energy metering on most buildings. With this new information, an analysis and inventory of energy use and energy intensity per academic and administrative building will be conducted ● Prioritization of buildings per energy intensity |
| B | Building Energy Audits | <ul style="list-style-type: none"> ● Where funding is available, Level 1 ASHRAE Energy Audits of all mid to high priority buildings ● Where funding is available, Level 2 ASHRAE Energy Audits of all high priority buildings |
| C | Energy Project Plan and Implementation | <ul style="list-style-type: none"> ● Prioritized list of potential low-cost/no-cost changes identified in audits above ● Prioritized list of potential capital improvements with an initial estimate of potential costs and savings ● Implementation of the highest yielding projects (where funding is available) in terms of ROI, energy use reductions and GHG ● Identification and evaluation of at least one deep energy retrofit project |

| | | |
|---|---|---|
| D | Campus Master Plan | <ul style="list-style-type: none"> ● A renewed Campus Master Plan which continues to focus on: <ul style="list-style-type: none"> ○ Energy reduction and renewable energy generation ○ Stormwater management strategies ○ Optimizing passive approaches such as solar gain ○ Implementing transportation demand management strategies ○ Coordination with the ECDM to optimize efficient use of energy by all existing and new campus buildings, and to comply with all applicable regulations |
| E | New and Existing Infrastructure Planning | <ul style="list-style-type: none"> ● Review new construction and renovation projects to ensure incorporation of energy efficient technologies and strategies ● Ensure new construction is designed and built per LEED Gold standard (or approved alternative) without necessarily requiring to achieve true certification ● Identification and implementation of energy savings incentives through Union Gas, IESO, local utility., etc. |
| F | Evaluation of New Technologies Including Renewable Energy | <ul style="list-style-type: none"> ● Identification and evaluation of at least two renewable energy or new technology options |
| G | Increased Awareness and Communication | <ul style="list-style-type: none"> ● Increased awareness pertaining to energy saving initiatives |

3.2 Detailed Description of Proposed Measures

An evaluation of each proposed measure identifying cost and saving estimates, as well as estimated length of time a measure will be in place is discussed below.

A. Benchmarking Analysis and Prioritization

Description:

Through the provincial post-secondary Greenhouse Gas Campus Retrofits Program (GGRP) sub-meters for electricity, water, gas and thermal loading for shared boiler plants have been installed and commissioned. Laurentian will now be able to monitor in real-time the consumption at almost every building. This will enable the University to analyze energy use intensity per building, benchmark each building and create a

prioritized list of the highest energy users. Being able to determine energy use by building will also allow the University to strategically plan energy and GHG reducing projects. Another key outcome will be the monitoring of actual energy/GHG savings as applied at the building level versus the entire campus. An additional positive outcome of the installation of these meters will be the ability of students and faculty to access the data for various research projects should they wish. We will also now have the capability of creating an energy dashboard by building that can be viewed either online or through the monitors installed across the campus.

Costs/Savings:

The review of metering data, benchmarking facilities and prioritizing the highest energy users will not create additional direct costs or savings however it is a basic and fundamental requirement in order to move the energy conservation demand management plan forward and in order to understand energy use and to plan for future conservation measures.

Schedule:

Metering was installed in early 2019 and it is recommended that at least one year of data be collected before analysis. Analysis of this data can then take place in the spring and summer of 2020 with a completed prioritized list by the end of 2020 which can then be extended to specific systems in specific buildings.

B. Building Energy Audits

Description:

Laurentian University has over 188,000 gross square meters throughout various facilities. In order to take a systematic approach to decision-making as it relates to energy conservation measures, energy intensity and use (per building) must be identified and quantified per function. The identification of energy cost reduction opportunities must also be identified. Some of these opportunities may be no-cost solutions whereas some may require major capital investments. In order to accomplish this, building energy audits should be completed. ASHRAE (American Society of Heating, Refrigeration, and Air Conditioning Engineers) prescribe three levels of energy audits. The completion of level 1 audits is simple and quick and can be completed across most of the campus.

Level 2 audits would be more detailed and only completed on high priority facilities. At the end of the audit, a formal report would be issued outlining various projects and their scope, costs, savings and potential GHG reductions for future implementation.

Costs/Savings:

The completion of these audits will not create savings however it is a basic and fundamental requirement in order to move the energy conservation demand management plan forward and in order to understand energy use and to plan future conservation measures.

Schedule:

The completion of these audits will heavily depend on future funding opportunities. As there is no funding commitment in place, the planned completion date would be the end of this plan (2024) unless funding can be obtained sooner. If no funding is available, this measure could be at risk.

C. Energy Project Plan and Implementation

Description:

With the assumed completion of both A and B above, a list of projects can be compiled and presented for implementation. Projects could include lighting retrofits, HVAC retrofits, controls upgrades, re-commissioning, building envelope upgrades or other more unique solutions such as battery storage, renewables, or a central heating/cooling plant. The audits would compile a list of potential projects however it is also required that at least one deep energy retrofit project be identified and evaluated as part of this measure.

Costs/Savings:

Costs and savings of these projects are not known at this time. As the audits are completed, the projects can be better detailed with cost estimates and savings.

Schedule:

The completion time of these projects are not known at this time. As the audits are completed, the projects can be better detailed with completion dates based on funding availability.

D. Campus Master Plan

Description:

The Campus Master Plan plays an important role in shaping the evolution of the campus. Along with the Strategic Plan, it serves as a long term decision-making framework to guide the physical evolution of the campus. As such, the Campus Master Plan should figure prominently in the University's planning processes. It should be referred to at the outset of and during all development planning and design processes so that it can effectively influence the evolution of the design of the project. All decisions regarding the physical form and ongoing management of the campus should be consistent with, and make reference to, the Campus Master Plan. The Campus Master Plan was created in 2013 and is required to be validated and updated between now and the end of this plan (2024). One of the numerous guiding principles of the Campus Master Plan is to become sustainable, adaptable and resilient. The Campus Master Plan references the Energy Conservation Demand Management Plan and both plans should continue to be linked. The Campus Master Plan may simply be validated as it remains relevant or it may be amended in order to stay relevant. In terms of energy conservation and sustainability, the renewed Campus Master Plan would continue to focus on energy reduction and renewable energy generation, stormwater management strategies, optimizing passive approaches such as solar gain, implement transportation demand management strategies, and be coordinated with the ECDM as well as comply with all applicable regulations.

Costs/Savings:

The costs of this is unknown at this time. If the Campus Master Plan is validated with no change there would be no costs. If the Campus Master Plan requires amendment, there would be some costs to complete this as well as the required consultation and engagement process. There will be no direct savings from the Campus Master Plan and only indirect savings from its influence.

Schedule:

The renewal of the Campus Master Plan will heavily depend on future funding opportunities. As there is no funding commitment in place, the planned completion date would be the end of this plan (2024) unless funding can be obtained sooner. If no funding is available, this measure could be at risk.

E. New and Existing Infrastructure Planning**Description:**

As new projects are planned and implemented, whether it be new construction or renovation, a procedure will be injected in the planning and design process to ensure that energy efficiency and sustainability is considered at the onset of the project. New technologies and strategies will be considered including the use of renewables. New construction projects will be built to LEED standards (without necessarily requiring to achieve true certification in order to avoid costs) or an equivalent alternative standard (green globes, energy star, passive house, etc). Every project will also take advantage of existing incentives offered by organizations such as Union gas, IESO, the local utility, etc.

Costs/Savings:

The costs and savings affiliated with this is unknown at this time. As new projects are identified, a commitment shall be made to ensure energy efficiency and/or green standards form part of the project mandate.

Schedule:

The schedule or completion dates affiliated with this is unknown at this time and depend on future capital funding.

F. Evaluation of New Technologies including Renewable Energy**Description:**

Laurentian will continue to investigate and evaluate new technologies including the use of renewable energy. Over the last few years, Laurentian has investigated opportunities linked to solar PV, battery storage, combined heat and power co-generation, over-voltage control, laboratory airside control solutions, and others. In this measure, the

University will continue to research and identify two renewable energy or new technology solutions.

Costs/Savings:

The costs and savings affiliated with this is unknown at this time. A commitment will be made to evaluate at least two options. Further information on costs and saving will be issued once these options are evaluated.

Schedule:

The completion date or schedule affiliated with this is unknown at this time. A commitment will be made to evaluate at least two options. Further information on schedule will be issued once these options are evaluated.

G. Increased Energy Awareness and Communication

Description:

Per the Laurentian University approved Environmental Policy, the University will continue to: raise awareness among the community about Laurentian's environmental impact and activities; provide forums for the discussion and contribution of Laurentian's environmental sustainability agenda; and encourage individual and collective efforts throughout the community to make environmental sustainability a priority.

Laurentian University is committed to fostering a strong culture of sustainability. Laurentian has a diverse program offering related to environmental sustainability through the School of the Environment which offers programs in environmental studies, environmental science, études de l'environnement, science communication and archaeology. Laurentian also has a standing committee on environmental sustainability which tables issues and solutions to improve awareness and move the University sustainability agenda forward. In addition, the University is known globally as a leader in environmental remediation and research.

Costs/Savings:

The savings affiliated with this would be indirect mostly through improved general awareness making the direct savings unknown.

Schedule:

The Environmental Policy is ongoing and will be a continuous effort throughout the duration of the ECDMP.

4. Generation

4.1 Renewable Energy Generation

Renewable energy generation at Laurentian University is reviewed in this section, in addition to the amount of energy produced on an annual basis.

4.1.1 Ground Source Energy

The Vale Living with Lakes Centre is partially serviced with ground source heat pumps. Forty 120m wells are placed under the parking lot and are able to provide heating and cooling by absorbing heat from the ground into a glycol/water mix that is then transferred through a compressor. The specific amount of energy being produced is not known at this time.

4.1.2 Solar Energy

Solar hot water collectors have been installed at Vale Living with Lakes and the McEwen School of Architecture buildings. Both systems use evacuated tube solar collectors that absorb the heat of the sun and transfer the heat to the domestic hot water loop within the buildings. The heat is absorbed by the water prior to the domestic hot water tank thereby lowering the use of natural gas to heat the water. In the case of the McEwen School of Architecture the system is also used as a demonstration site for the students allowing them to track the generation of hot water, how much energy is produced and it also provides them with the data to determine the amount of natural gas that can be deferred from the production of the heat. This would also hold true to allow the students to calculate the GHG and NOx reductions as well. The specific amount of energy being produced is not known at this time.

The McEwen School of Architecture has been outfitted with a small array of photovoltaic panels that absorb the heat from the sun and turns the heat into electricity. This electricity is then stored within a series of batteries and is used to operate the window blinds within the building. Again the students are able to track the production and calculate the savings in electricity use and the deferred

GHG and NOx values. The amount of energy being produced is negligible by these photovoltaic panels.

4.1.3 Future Plans

There is much potential at the Laurentian University campuses to reduce reliance on energy that has traveled many miles to campus meters. The Laurentian University Main Campus has the ability to become an island within a city or at least a peninsula within the city. In order to get there however will take some serious critical thinking and planning. Laurentian University has a significant deferred maintenance backlog and inhibits the ability to plan long term financially. The potential for energy and greenhouse gas reduction at Laurentian is limitless but will take a fairly significant financial commitment to develop a fully researched and thought out Energy Master Plan creating guiding principles.

Laurentian University will continue the momentum to have all new buildings constructed to a LEED Gold minimum design standard. We will ensure that the systems being replaced and upgraded are not simply being replaced with like. As an example a recent boiler replacement project saw a 10 Mbtu boiler being replaced with a new 5 Mbtu unit that performed exceptionally well through one of the harshest winters on record with no occupant complaints.

With the recently completed Campus Metering Project, Laurentian will be able to track energy use by building enabling a better prioritization of energy saving projects. Laurentian will also continue to prioritize its students, providing access to live energy use data, and also the ability to use buildings and systems as living laboratories.


Faced with an aging infrastructure with a high Facility Condition Index multiple new technologies available to consider together with various methods for contract delivery it would be beneficial to undertake an Energy Master Plan. This Energy Master Plan would aid in directing and guiding decision making for the next 10 to 20 years. Energy planning should not be undertaken in isolation, building use, utilization, customer satisfaction, deferred maintenance, long term capital needs

all have to be considered and planned in order to avoid making quick non-strategic reactions to possible funding streams. To undertake a project that fits this criteria today only to find out two years later that the building really needs to be replaced is spending hard to find money frivolously. The Energy Master Plan would take into consideration many or all of these above criteria and would create a bold living document to move the institution forward.

5. Approval and Posting

In compliance with the requirements of O. Reg. 507/18, the 2019-2024 Laurentian University Conservation Management Management Plan can be found on the Laurentian University website (laurentian.ca/sustainability), Laurentian University Intranet Site (LUNET), as well as available to the public in various formats at the main campus, Facility Services Department.

In compliance with the requirements of O. Reg. 507/18, the 2019-2024 Laurentian University Conservation Management Management Plan has been approved by Laurentian University Senior Management.



Lorella Hayes, CPA, CA

Vice-President, Administration

Laurentian University

Appendix A - 2017 Institutional Summary of Energy Consumption and Greenhouse Gas Emissions

Laurentian University 2019 Report for Ontario Regulation 397/11 – Energy Conservation and Demand Management Plans

Overview

This document provides a brief background and summary of data reported under Ontario Regulation 397/11 – Energy Conservation and Demand Management Plans for Laurentian University. Results are presented using the Ministry of Energy’s Energy Consumptions and GHG Emissions template, along with corresponding information for all pertinent facilities operated by Laurentian University.

Background

On January 1st, 2012, the Energy Conservation and Demand Management Plans Regulation (O. Reg. 397/11) came into effect under the *Green Energy Act 2009*. Under this regulation, all broader public sector (BPS) organizations, including Universities, are required to:

By July 1, 2019 submit:

- Energy consumption and greenhouse gas (GHG) emissions for 2017
- Corresponding facility information

Results

Table 1 below summarizes the facilities at Laurentian University along with the total indoor floor area. Future sub-metering at all facilities will not only help to track consumption, but also provide the ability to analyze energy efficiency at each building. This is discussed in the Laurentian University ECDM.

Table 1: Summary of Laurentian University Facilities

| Confirm consecutive 12-month period | 01-2017 to 12-2017 | | | | |
|---|--|---------|-------------|--|--|
| Type of Public Agency (Sector): | Post-Secondary Educational Institution | | | | |
| Agency Sub-Sector | University | | | | |
| Organization Name | Laurentian University | | | | |
| Operation Name | Address | City | Postal Code | Total Floor Area of the Indoor (m ²) | |
| RD Parker | 935 Ramsey Lake Rd | Sudbury | P3E 2C6 | 13,022 | |
| Dining Assembly | 935 Ramsey Lake Rd | Sudbury | P3E 2C6 | 6,159 | |
| Classroom Building | 935 Ramsey Lake Rd | Sudbury | P3E 2C6 | 3,739 | |
| JN Desmarais Library | 935 Ramsey Lake Rd | Sudbury | P3E 2C6 | 11,831 | |
| Science I | 935 Ramsey Lake Rd | Sudbury | P3E 2C6 | 8,235 | |
| Science II | 935 Ramsey Lake Rd | Sudbury | P3E 2C6 | 18,867 | |
| Animal Care Facility | 935 Ramsey Lake Rd | Sudbury | P3E 2C6 | 512 | |
| Arboretum | 935 Ramsey Lake Rd | Sudbury | P3E 2C6 | 193 | |
| Arts Building | 935 Ramsey Lake Rd | Sudbury | P3E 2C6 | 5,391 | |
| Alphonse Raymond | 935 Ramsey Lake Rd | Sudbury | P3E 2C6 | 9,726 | |
| Daycare | 935 Ramsey Lake Rd | Sudbury | P3E 2C6 | 890 | |
| Education Building | 935 Ramsey Lake Rd | Sudbury | P3E 2C6 | 6,697 | |
| Ben Avery (including Active Living Ctr) | 935 Ramsey Lake Rd | Sudbury | P3E 2C6 | 15,823 | |
| NMR Lab | 935 Ramsey Lake Rd | Sudbury | P3E 2C6 | 96 | |
| Stadium | 935 Ramsey Lake Rd | Sudbury | P3E 2C6 | 821 | |
| Health Sciences Building | 935 Ramsey Lake Rd | Sudbury | P3E 2C6 | 2,868 | |
| School of Medicine (NOSM) | 935 Ramsey Lake Rd | Sudbury | P3E 2C6 | 6,313 | |
| Maintenance Building | 935 Ramsey Lake Rd | Sudbury | P3E 2C6 | 2,036 | |
| Portables (4 - Ben Avery, Midwifery) | 935 Ramsey Lake Rd | Sudbury | P3E 2C6 | 284 | |
| Living with Lakes | 935 Ramsey Lake Rd | Sudbury | P3E 2C6 | 2,125 | |
| Watershed Center | 935 Ramsey Lake Rd | Sudbury | P3E 2C6 | 518 | |
| University College Residence | 935 Ramsey Lake Rd | Sudbury | P3E 2C6 | 5,402 | |
| Single Student Residence | 935 Ramsey Lake Rd | Sudbury | P3E 2C6 | 11,364 | |
| Married Student Residence | 935 Ramsey Lake Rd | Sudbury | P3E 2C6 | 8,464 | |
| West Court Residence | 935 Ramsey Lake Rd | Sudbury | P3E 2C6 | 9,229 | |
| East Residence | 935 Ramsey Lake Rd | Sudbury | P3E 2C6 | 10,219 | |
| Thorneloe | 935 Ramsey Lake Rd | Sudbury | P3E 2C6 | 3,098 | |
| University of Sudbury | 935 Ramsey Lake Rd | Sudbury | P3E 2C6 | 10,024 | |
| Huntington | 935 Ramsey Lake Rd | Sudbury | P3E 2C6 | 5,238 | |
| Laurentian University Main Campus Total | | | | 179,185 | |
| Telegraph Building | 85 Elm Street | Sudbury | P3C 1T5 | 436 | |
| Workshop | 51 Elgin Street | Sudbury | P3C 1T5 | 925 | |
| Main Building | 85 Elm Street | Sudbury | P3C 1T5 | 5,214 | |
| Laurentian University School of Architecture Total | | | | 6,575 | |

Below, Table 2 contains a summary of Laurentian University’s energy consumption, GHG emissions and energy intensity for January 2017 through December 2017. The energy intensity data is critical for benchmarking and identifying opportunities for future energy efficiency and conservation initiatives.

Table2: Laurentian University 2017 Energy Consumption Summary

| | | | | |
|--|--|------------------------------------|---------------------------|-------------------------------------|
| Confirm consecutive 12-month period | 01-2017 to 12-2017 | | | |
| Type of Public Agency (Sector): | Post-Secondary Educational Institution | | | |
| Agency Sub-Sector | University | | | |
| Organization Name | Laurentian University | | | |
| Operation Name | Energy Type and Amount Purchased and Consumed | | GHG Emissions (Kg) | Energy Intensity (ekWh/sqft) |
| | Electricity (kWh) | Natural Gas (m³) | | |
| Laurentian University Main Campus | 21,924,232 | 3,627,977 | 7,638,389 | 31.36 |
| Laurentian University School of Architecture | 838,877 | 100,723 | 220,250 | 26.25 |

Summary

The data contained in this report ensures compliance with O. Reg. 397/11. In addition, through measurement, reporting and planning, Laurentian University demonstrates its commitment to continuously improving campus sustainability.

Appendix B - Highlights from the Office of Sustainability

Recent Environmental Sustainability Highlights at Laurentian University

- In 2009, the Laurentian University President and Vice-Chancellor signed the **Council of Ontario Universities pledge, Ontario Universities: Committed to a Greener World**. By signing this pledge Laurentian University accepted responsibility to: "to assist in finding solutions to the challenges of environmental sustainability; to share knowledge about sustainability and climate change; and to incorporate, wherever possible, principles of sustainability into our own operations".
- In 2014 Laurentian's first **Manager of Energy and Sustainability** was hired, the new **Office of Sustainability** was established and **School of the Environment** was created.
- In 2014 Laurentian University signed the **Talloires Declaration**, a ten-point action plan for incorporating sustainability and environmental literacy in teaching, research, operations and outreach along with over 400 colleges and universities in more than 40 countries. (September 2014)
- Laurentian University was among the first universities in Canada to sign the **Paris Pledge for Action**. The pledge is a commitment to work to reduce greenhouse gas emissions immediately, to meet or surpass the goals of the Paris Agreement adopted at the recent COP21 conference. (December 2015). In addition, the Office of Sustainability sent an **#EarthFlag** to the 2015 Paris Climate Change Conference – COP21. (September 2015)
- The Office of Sustainability has held **Campus Sustainability Forums** with topics like waste diversion and active transportation. These forums encourage faculty, staff, students, alumni and community partners to share thoughts and share best practices for improving environmental sustainability on campus.



| | |
|--|--|
| <p>Be part of positive change. Join our Campus Environmental Stewardship Movement.</p> | |
| <p>CAMPUS SUSTAINABILITY FORUM</p> <p>WASTE DIVERSION</p> <p>This forum will focus on the topic of waste diversion. Your input is valuable in contributing to continuous improvement on our campus.</p> <p>This roundtable discussion will highlight waste diversion initiatives across campus including recycling, compost and electronic waste. Have a good idea? Want to learn more? Come be a part of positive change on campus!</p> <p>Friday, Jan. 30, 2015 12:00 p.m. - 1:00 p.m. Senate Chambers Laurentian University</p> <p>Laurentian University Université Laurentienne laurentian.ca / sustainability @sustainabilityLU</p> | <p>CAMPUS SUSTAINABILITY FORUM</p> <p>ALTERNATIVE TRANSPORTATION</p> <p>This forum will focus on the topic of alternative transportation. Your input is valuable in contributing to continuous improvement on our campus.</p> <p>This roundtable discussion will highlight alternative transportation to and around campus. Have a good idea? Want to learn more?</p> <p>Friday, Feb. 5, 2016 12:00 p.m. - 1:00 p.m. Brenda Wallace Reading Room Laurentian University</p> <p>Laurentian University Office of Sustainability Bureau du développement durable UNIVERSITÉ LAURENTIENNE @sustainabilityLU</p> |

- A revised **Environmental Policy** approved by the Board of Governors in April 2016.
- New **Sustainable Procurement Guideline** circulated to staff in November 2015.

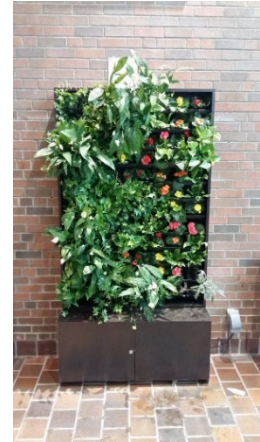


- In partnership with the Ramsey Lake Stewardship Committee, and 4th year Ecology students, the Office of Sustainability installed a **Rain Garden** to filter run-off from our campus before entering Ramsey Lake with a successful TD Friends of the Environment grant. (September 2015)

- The School of the Environment Student Association and the Office of Sustainability obtained a Project Impact grant (from the Coalition for a Liveable Sudbury) to install a **Green Wall** in the Fraser Lobby. (November 2016)

- The Office of Sustainability, along with Facility Services at Laurentian help to promote and maintain the **Voyageurs Community Garden**. (Established 2011)

- Recent construction on campus has included **Leadership in Energy and Environmental Design (LEED)** awarded buildings including the LEED Platinum Vale Living with Lakes Centre (2014) and the LEED Certified Ben Avery Active Living Centre (2013) and the multiple-award winning McEwen School of Architecture for its sustainable design and incorporation of wood. All new construction on campus will be designed and constructed to a minimum of **Leadership in Energy and Environmental Design (LEED) Silver Standard**. A recent example of this in action is the first **commuter shower** in the new Cliff Fielding Building (September 2018). **Bike parking and storage** are being incorporated into the design of the new Student Centre (September 2019).



- Laurentian became the first institution in the City of Greater Sudbury to adopt the municipality's residential composting program by adding **composting in residences**. Laurentian is the first university in the North to implement composting on such a large scale. In addition, the new main dining hall on campus is a **zero-waste cafeteria**. There are no disposable cups, paper plates or plastic cutlery; no pop cans or glass bottles to toss in the blue bin. Everything that is used to serve meals is washable, and anything that's left on the plates goes right into the compost. (September 2014)

- **Earth Hour** campaigns held campus-wide in collaboration with World Wildlife Fund Canada. (March 2015)

UNE HEURE POUR LA TERRE • EARTH HOUR

SAMEDI 28 MARS 2015 DE 20 H 30 À 21 H 30
SATURDAY, MARCH 28, 2015 FROM 8:30 P.M. TO 9:30 P.M.

Earth Hour is a worldwide event designed to raise awareness about energy conservation and the impact of humans on the environment.

Une heure pour la Terre est un événement mondial destiné à sensibiliser notre monde à l'importance de la conservation de l'énergie et aux répercussions des activités humaines sur l'environnement.

On Friday before you leave the campus, or in the minutes leading up to Earth Hour on campus, we suggest you get involved by doing the following:

Avant que vous ne partiez le vendredi 27 mars, ou dans les instants avant l'heure pour la Terre, voici quelques gestes que vous pouvez faire:

- Turn off the lights
- Unplug appliances and chargers (some electronic equipment and appliances continue to use electricity even when they are turned off. This is called phantom power)
- Tell your friends, professors, family and even strangers
- Use social media to promote Earth Hour
- Éteignez les lumières
- Débranchez les appareils et chargeurs (certains dispositifs et appareils électroniques continuent de consommer de l'électricité même lorsqu'ils sont éteints, on appelle cela l'alimentation fantôme)
- Parler de cet événement mondial à vos amis, à vos enseignants, aux membres de votre famille et même à des personnes que vous ne connaissez pas
- Utiliser les médias sociaux pour parler d'Une heure pour la Terre

Thank you for your participation! Merci de votre participation!



- In 2015 the Office of Sustainability and Residence Life partnered to create a **Move-Out Campaign**. This campaign helps students moving out of residences divert waste from landfills by donating unwanted clothing to the Diabetes Association, food to the Laurentian Student Foodbank and household items to the Sudbury Jarrett Value Centre. The program has grown substantially over the last three years avoiding waste to the landfill by recycling, repurposing and donating, while also saving resources and staff time cleaning suites through the summer.



Laurentian Residence Move Out Campaign

THIS APRIL RECYCLE YOUR

Electronics **Clothing** **Non-Perishable Food Items**

Help us divert our waste from landfill sites by donating the items you no longer need! Just put your items into the bins *located in residence!* All items will be properly recycled or donated to those in need!

Locations:

- SSR Mid Desk
- UC Study Room
- West Residence Lobby
- East Residence Basement Lobby

Avoid fees from leftover stuff!

SEE SOMETHING YOU NEED? TAKE IT!

#LUgreenmoveout

@sustainableLU @enactusul

enactus

Office of Sustainability

Office of Development & Planning

CHALLENGE EXISTENCE

Questions: sustainability@laurentian.ca

- In 2016, Laurentian University Pension Investment Policies were reviewed to ensure compliance to the Financial Services Commission of Ontario new **Environmental, Social and Governance (ESG) Factors**. All Laurentian University Pension Plan investment managers must incorporate ESG factors into their investment policies and procedures, and will have this documented in their respective plan’s statement of investment policies and procedures (SIPP). The University also ensured that Endowment and Long Term investment managers also followed the ESG factors.

- Established a new **Electronic Waste Depot** on campus. (March 2016)




Be part of positive change. Join our Campus Environmental Stewardship Movement.

E-WASTE RECYCLING

BRING YOUR ELECTRONIC WASTE TO THE TECH HUB

Drop off anything with a cord or battery!

Across from the Tech Hub (1st floor Arts Building) or email maintenance@laurentian.ca with quantity, type and detailed location.

Laurentian University Université Laurentienne

Office of Sustainability

TECH HUB CENTRE TECHNO

ES

Questions? Email us at: sustainability@laurentian.ca

To find an off-campus e-waste depot: Visit recycleyourelectronics.ca or greatersudbury.ca

- Laurentian participates annually in the **Sudbury Municipality, and Canada-Wide Campus Commuter Challenges**. These challenges promote active transportation and award institutions based on their greenhouse gas emissions avoided during the competitions. The Office of Sustainability provides rewards, free transit passes and more to participants.

- **Waste audits** have been conducted with students in several programs in the School of the Environment, and programs at Cambrian's Environmental Monitoring and Impact Assessment, Environmental Field Sampling Techniques diplomas.



- The Office of Sustainability co-supervised the **first two undergraduate thesis projects in the Environmental Studies program**. The first involved an **evaluation of our LEED Platinum Vale Living with Lakes Centre** to review its performance against design standards. The second included a campus-wide survey to understand transportation metrics for campus commuters to, and on campus. This data is being used to inform the first **Transportation Demand Management Plan** for the campus. (2015 and 2016)

- Through a student internship, a third year McEwan School of Architecture student recently audited high traffic common areas on campus and recommended **new waste receptacles and locations** to maximize waste diversion. (August 2016)



- Laurentian University is home to the first **bike repair station** in Sudbury. This was installed by the Office of Sustainability through funds collected from responsible electronic waste recycling on campus. (August 2016)

- The Office of Sustainability prepares annual performance reports including those for **Energy and Greenhouse Gas Emissions** and **Waste Diversion**. These can be found on the Office of Sustainability website: laurentian.ca/sustainability. Laurentian's first **Energy Conservation and Demand Management Plan** can also be found here.