

St. Lawrence University 2017-2018 Climate Action Work Plan

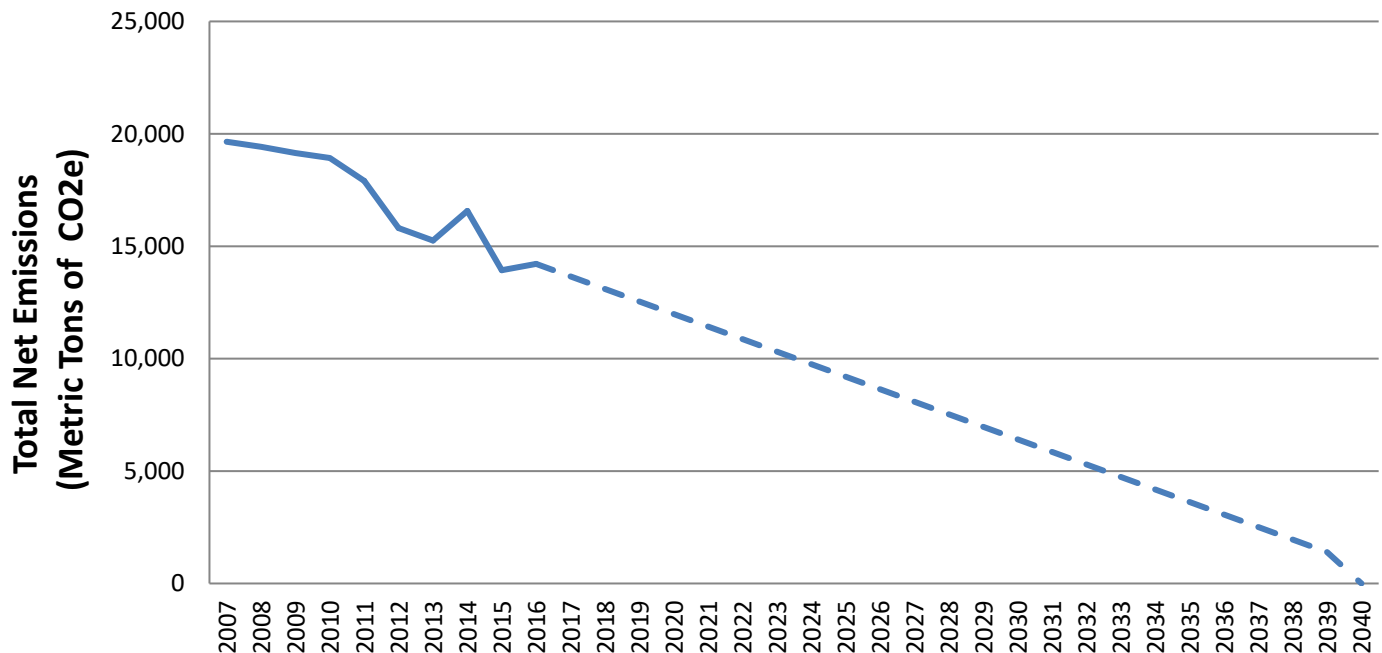
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Background

St. Lawrence developed a Climate Action Plan (CAP), in 2007, as a guidance document to support the University's signing of the American College and University Presidents' Climate Commitment (ACUPCC). In 2015, ACUPCC became known as Second Nature's Carbon Commitment. The CAP provides documentation and actions for the University to pursue in order to achieve climate neutrality, or net-zero emissions, by 2040. Figure 1 summarizes the University's net total emissions over the past decade while projecting the anticipated progress towards net zero emissions by 2040. The CAP is available online at green.stlawu.edu.

Figure 1 : University Net Emissions Timeline



In an effort to ensure that the CAP is an adaptable document the plan calls for the compilation of a work plan every 3-5 years. This time frame allows for the evaluation of new policies and technologies which have the potential to impact our climate neutrality progress. The work plans provide opportunities to assess progress, through measurement and verification, towards net-zero emissions. Additionally, each work plan reviews the effectiveness of previous Greenhouse Gas (GHG) reduction campaigns. The first work plan was released during the 2013-2014 academic year. This document represents the second work plan, capturing progress made since the previous work plan and identifying opportunities and actions to be considered during the 2017-2018 academic year. This document is meant to provide guidance to all members of the University as they consider the CAP goals in their planning, policy, purchasing, operations, and programming.

Compilation of this work plan was informed through collaboration with the Campus Committee on Sustainability and Climate Neutrality (CCSCN) which includes representatives from University students, faculty, staff, and administration. Production of this plan is a reflection of St. Lawrence's commitment to sustainability. Updates are accessible to all online at green.stlawu.edu. Specific questions or comments may be addressed to the University's Office of Sustainability.

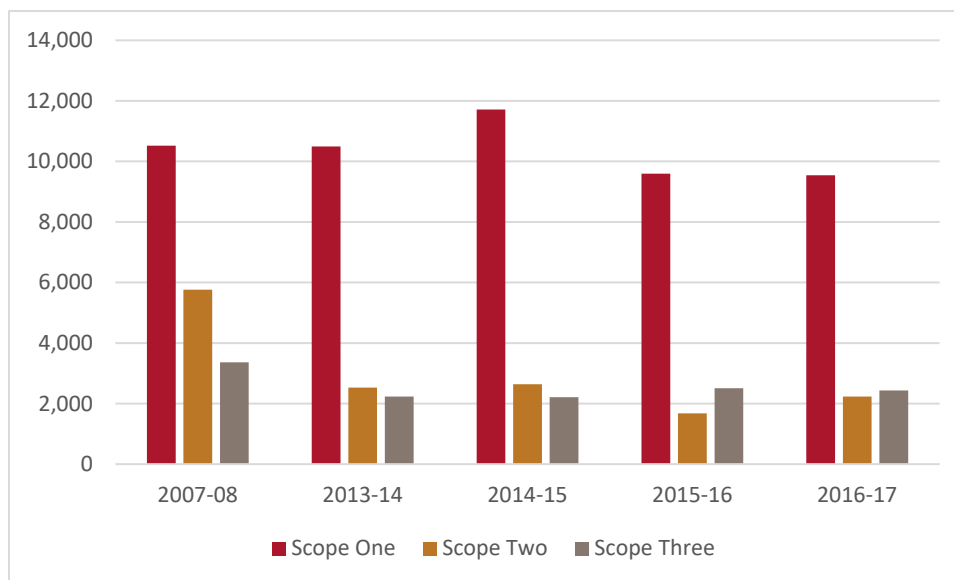
Greenhouse Gas Emissions

The CAP established 2007 as the baseline, or benchmark, year for University emissions of GHGs. Each iteration of the work plan provides a comparison of the most recent data set of emissions to the baseline year and to previous work plan iterations. All emission calculations were derived from the University of New Hampshire's Campus Carbon Calculator (CCC) with data inputs collected by Facilities Operations and the Office of Sustainability. Emissions are evaluated by pollutant type (i.e. methane (CH₄), nitrous oxide (N₂O) and carbon dioxide (CO₂)) and scope (i.e. scope 1, 2, or 3). All emissions are reported in metric tons of carbon dioxide equivalents (CO₂e). A detailed evaluation of the 2016-2017 GHG report is available in Appendix A.

Table 1: GHG Emissions, by scope, as reported in CO₂e

Source by Scope	2007-08	2013-14	2014-15	2015-16	2016-17
Scope One	10,518	10,492	11,717	9,593	9,544
Campus heating (central and decentralized)	9,828	9,850	10,909	8,977	8,883
Campus owned/operated vehicles	550	526	584	513	479
Agriculture (sheep/horses/fertilizer)	59	52	57	59	59
Refrigerants	81	64	168	44	123
Scope Two	5,765	2,528	2,640	1,676	2,235
Purchased electricity	5,765	3,019	3,122	2,994	3,188
RECs	0	-491	-482	-1,319	-953
Scope Three	3,365	2,234	2,214	2,510	2,436
University related travel	1,911	1,729	1,686	2,007	1,928
Solid waste	1,149	200	212	200	186
T&D Losses	305	305	315	302	322
Total Gross Emissions	19,648	15,745	17,053	15,097	15,167
Total Net Emissions:	19,648	15,254	16,571	13,778	14,215

Figure 2: GHG Emissions, by scope, as reported in CO₂e



Mitigation Projects to Date

Successfully Completed GHG Emissions Mitigation Projects: 2007-2013

The University began to prioritize efforts to reduce emissions associated with heat and electricity in 2007. Between 2007 and the first work plan, in 2013-2014, the University's efforts yielded an approximately 22% reduction in net GHG emissions through the following efforts:

- Insulation of steam pipes
 - Replaced 100% of direct buried piping with insulated (2 inch fiberglass insulation R-15) steam tunnels
- Increased efficiency of central heating plant
 - Reduced loss of condensate to a minimum of 10%
 - Reduced heating oil conditioning time span from 6 months to 4 months
- Reductions of University temperature set-points by two degrees
- Increased energy efficiency by Information Technology (IT)
 - IT replaces outdated equipment with more efficient equipment and consider sustainable practices and supply chain management when reviewing contracts. Technology industry standards are constantly evolving and driving more energy and material efficient computers, copiers, printers, phones, data centers, etc.
- Procurement of renewable-energy credits
 - 11.6 Million kWh from 2007-2013 (approximately 2.3 Million kWh per year)
- Changes in behavior (including turning off lights and computers, and reporting overheating)
- Purchase of two hybrid vehicles for the University fleet
- Designation of 70 acres of managed campus green space as no-mow zones
- Reduction in dining hall waste through tray removal and pre-consumer scrap composting

Successfully Completed GHG Emissions Mitigation Projects: 2014 – 2016

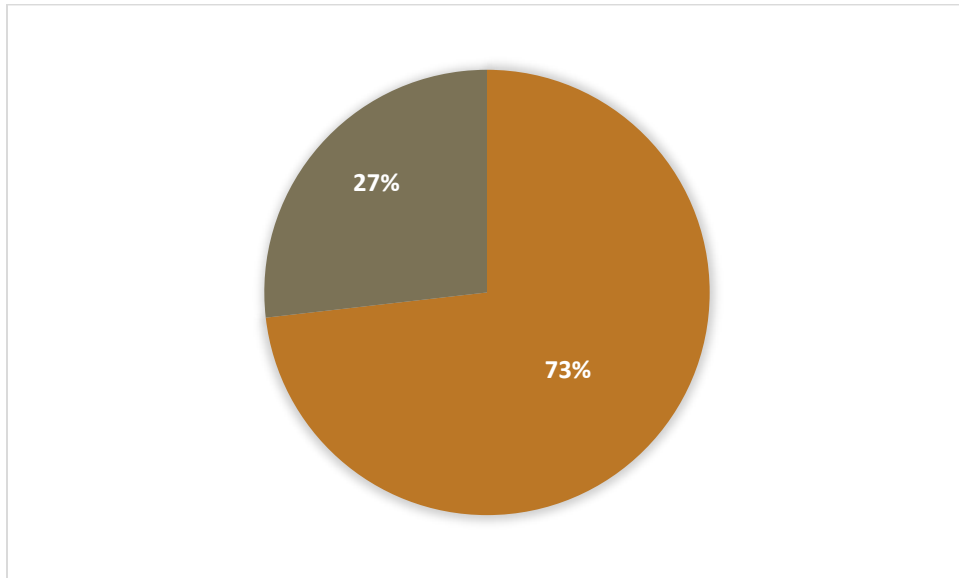
To date, the University has realized an approximately 27% reduction in net GHG emissions since 2007. The majority of the emissions reductions took place between 2007 and the first Climate Action Work Plan in 2013-14. Since the first work plan, 3 years ago, the University has realized an emissions reduction rate of approximately 6%. Appendix B contains a summary of the Key Performance Indicators (KPIs) used to evaluate the successes of the 2013-2014 work plan. The following efforts were successfully completed:

- Design and installation of a Geothermal Heating System
 - Kirk Douglas Hall features a geothermal system with the wells installed under the Quad
 - The building and geothermal system were designed to use approximately 29% less energy than code requirements (ASHRAE 90.1-2007)
- Use of Sustainable Building Principles the new residence hall
 - Kirk Douglas Hall was designed and constructed to LEED Silver Standards
- Adoption of Local Sources of Renewable Energy
 - The University purchased renewable energy certificates (RECs) for wind energy
 - 14.2 Million kWh (4.7 Million kWh per year)
 - The University finalized a power purchase agreement (PPA) for hydroelectricity generation at the Kings Mills Hydroelectric facility
 - The facility began to generate electricity in November of 2016. In the first six months of operation the facility produced 862,166 kWh.

- Supporting Alternative Fuel Vehicles
 - 2 Electric Vehicle Charging Stations were installed at the parking lot adjacent to the Newell Fieldhouse
 - Facilities Operations and Information Technology Services procured four electric utility vehicles to utilize in place of work trucks for intercampus travel
- Facilitating Curricula Change
 - The Sustainability Semester (2013-2015) provided the first opportunity for a sustainability-focused immersive learning experience
 - This program was modeled after the successes of the well-established Adirondack Semester and the Community Based Learning Programs
 - In 2017 the Sustainability Semester was relaunched as the Sustainability Program
 - The program allows students to join and participate in active sustainability learning through living-learning community on the University's Sustainability Farm
 - Courses from the First Year Program, Biology, Environmental Studies, Outdoor Studies, Performance and Communications Arts, etc. expanded collaborations within the community to create interdisciplinary immersive and hands-on sustainability learning experiences
 - Faculty leveraged community connections to highlight and enhance the environmental and cultural aspects of sustainability for students with partnering with local organizations such as Nature up North, Traditional Arts in Upstate New York, and the St. Lawrence County Cornell Cooperative Extension
 - Students, throughout their studies, have visited the University's Ecological Sustainable Landscape and other local properties to explore renewable energy technologies
 - St. Lawrence's sustainability professional, and member of the University's Campus Committee for Sustainability and Climate Neutrality (CCSCN), attended AASHE's Sustainability Across the Curriculum Leadership Workshop
- Promoting Behavior Change Campaigns
 - Sustainability educational materials are offered to residence halls online:
 - Recycling information
 - Room Energy Audits
 - Student Green Guide
 - During the fall semester University residence halls participate the "Negawatt" energy reduction competition
 - The Negawatt Challenge was an intercollegiate competition that encouraged students from the New York Six consortium of liberal arts colleges to reduce electricity consumption in their campus residence halls
 - In the 2014 spring semester the University reduced its electrical consumption by 5.2% (12,031 kWh)
 - During move-out students have the opportunity to participate in the "Stash it don't trash it" ReUse campaign
 - It is estimated that 10-15 tons of materials are collected and diverted from the landfill during this program
- Improve and Expand Communication tools
 - The University Green Pages, updated in 2017, provide transparency and access for all to the University's sustainability initiatives

- The University, when appropriate, issues official press releases related to sustainability accomplishments
- The University, during the term of the previous Work Plan, did not hold any campus wide forums

Figure 3: GHG Emissions Reductions Progress



The above pie chart depicts the overall progress the University has made towards net-zero carbon emissions. Since 2007, the University has reduced GHG emissions by 27%. An additional 73% of GHG emissions will need to be reduced or mitigated before 2040 to meet the net-zero carbon neutrality commitment.

Mitigation Goals

The 2017-2018 iteration of the work plan seeks to build upon St. Lawrence's progress towards climate neutrality through the exploration of technically and economically feasible opportunities to reduce emissions. This section of the plan presents a comprehensive set of actions derived from the CAP's Climate Neutrality Principals and identified by the CCSCN.

Academic Environment

Sustainability Internships/Fellowships

Internships and fellowships provide students with structured experiences related to their major and career goals. These opportunities provide unique professional growth experiences for our students. CCSCN and the Office of Sustainability should identify strategic opportunities within campus and the surrounding areas to provide sustainability focused internships and fellowships. The specific action items, or KPIs, for this opportunity include:

- CCSCN and the Office of Sustainability will collaborate with academic departments, career services, and local partners to identify, a minimum, of 5 new and viable internships/fellowships
- The effort will be measured by the total number of newly identified internship/fellowship opportunities offered as compared to the prior academic year

Campus as a Laboratory

The University could leverage our diverse campus to increase opportunities to expand utilization of the University's lands and assets as a sustainability laboratory. Through coordination, the University could use academic activities to enhance the use of campus operations as examples and projects in courses and research. Furthermore, we could use student and faculty research and teaching activities to inform and support the development of sustainable operations on campus. This goal strives to provide support to faculty and students to initiate collaboration with administration to use the University as a resource for hands-on-learning. Some previous successful examples include: the energy class performing life cycle analysis studies on University heating options, GIS courses mapping infrastructure, and environmental studies courses conducting timber inventories for carbon sequestration. CCSCN and the Office of Sustainability will pursue the following specific action items:

- Total campus population that participates in campus laboratory opportunities
 - (This includes students, faculty, and staff who currently use the campus as a laboratory)
- The number and description of new uses of campus as a laboratory
 - Number of academic departments involved
 - Number of Administrative/Auxiliary departments supporting/collaborating
- Utilization of existing spaces to encourage these opportunities
 - Sustainability Program: Continue on improving the transition of the sustainability semester into a year-long program
 - Elective courses that bring non-program students from campus out to the site
 - Use of the site by FYP and other courses
 - Use of ESL site for FYP and additional courses
 - Use of Wachmeister Field Station

- Investigate expansion opportunities of the Certified Interpretive Guide (CIG) Training as part of Sustainability Program and Sophomore Journey Grant

Built Environment

Lighting Efficiency Projects

High quality lighting is essential to supporting an effective learning and living environment. LED lighting provides occupants with high quality light that uses approximately 50% less energy than other lighting options.ⁱ LEDs have longer life cycles and more controllability (e.g. dimmable). As re-lamping projects arise, the University should investigate the feasibility of the deployment of LED technology. Conversion to LED only lighting provides an opportunity for the University to reduce scope 2 emissions. The Office of Sustainability and Facilities Operations will pursue the following the specific action items through an engineering survey method:

- Total number of areas (i.e. number of buildings and gross square footage) studied for LED feasibility
 - Study a minimum of 50% of the net square footage on campus
 - Prioritize areas with inefficient lighting (e.g. metal halides or T-12 fixtures)
- Identify the appropriate funding mechanism(s) to complete LED conversions
 - Investigate funding through the University capital process, external grant opportunities, or securing a contract with an Energy Service Company (ESCO)ⁱⁱ
- Conduct measurement and verification studies of the electricity usage reduction and avoided carbon emissions
 - Consider the number of areas and gross square footage where LED projects were completed
 - Percentage of net square footage converted to LED

Chemical Fume Hood Retro-Commissioning

Chemical fume hoods are found in laboratories in many science buildings. Fume hoods are utilized to constantly move large volumes of air out of the laboratory space, through a filtration system, to preserve occupant health and to maintain indoor air quality. A single chemical fume hood can use nearly the same amount of energy as 3.5 households every day.ⁱⁱⁱ The fume hoods in Johnson Hall of Science currently have an airflow of 100 cubic feet per minute (CFM); however, only 80-90 CFM is needed to achieve occupational health and safety standards. Retro-commissioning is the process of ensuring that a buildings operating systems are calibrated for optimal performance – i.e. using the minimum amount of energy for maximum system performance. The Environmental Health and Safety Department and Facilities Operations will pursue the following specific action items:

- Conduct a retro-commissioning process on all of Johnson Hall's fume hoods based on the best available ASHRAE/ANSI standards
- Recalibrate all fume hoods to reduce airflow without compromise to air quality
- Provide measurement and verification documentation (i.e. number of kWh reduced over 12 months) to demonstrate the energy savings coupled with this process

Solar Power Purchase Agreement

A Solar Power Purchase Agreement (PPA) is a financial agreement where between a developer and an entity who agrees to purchase the power. The developer designs, permits, finances, constructs, and operates a solar power system while the entity agrees to purchase power from the system, at a fixed rate, for a defined period of years. A solar PPA allows the University to procure clean energy without having to finance, insure, own, and maintain a system. This type of arrangement provides competitive energy pricing with no associated emissions. CCSCN, the Office of Sustainability, the Business Office and Facilities Operations will pursue the following specific action items:

- Investigate the potential for an on-site solar PPA project with a minimum of 1 MW capacity
 - Identify and select 2 to 3 suitable locations
 - Complete a preliminary analysis of solar potential for the suitable areas
 - Conduct a risk management study to identify potential environmental health and safety liabilities associated with an on-site project
 - Identify PPA partners and solicitation for requests for proposals (RFP)
- Provide learning opportunities, through course partnerships, for students to participate in the feasibility determination process

Design and Building Guidelines

Sustainably designed and built buildings offer a balance between environmental impacts, operational efficiencies, and occupant health and comfort considerations. Structures designed with sustainability considerations provide opportunities for the campus to adapt to our current needs without placing an unnecessary strain on resources that could impact future generations. The two newest additions to campus, Johnson Hall (LEED Gold Certified) and Kirk Douglas Hall, were built using the U.S. Green Building Council's LEED criteria.^{iv} The University is committed to continuing to incorporate sustainable design practices into all future projects on campus. Adopting and establishing a set of standards will allow St. Lawrence to facilitate a spectrum of positive outcomes to enhance the performance of our buildings while reducing our environmental impact in a cost-effective manner. The specific action items, or KPIs, for this opportunity include:

- The Office of Sustainability and Facilities Operations will work to develop of documented set of standards, based on best practices, for sustainable design a building guidelines

Energy Planning

Over the years, energy use has evolved from a simple overhead expenditure to a complex system requiring planning and management. Increasing commodity prices coupled with a concern for the environment have driven the University to adopt a comprehensive approach towards energy. St. Lawrence understands the importance of completing an analysis of current campus-wide energy use by building sector, projections of campus-wide energy use based on anticipated population and changing land use patterns, and analyses of energy savings potential via campus-appropriate policy and programmatic strategies. Through strategic planning and management the University can ensure that our campus is using the best available, and most cost effective, technology to provide an energy efficient infrastructure without any compromise community or environmental health. The energy master

plan, managed by the Office of Sustainability and Facilities Operations, will provide the following information by April 2018:

- An analysis of the University's Energy Use (Anticipated January 2018)
 - Consideration of the current energy consumption with the projected growth of the University (e.g. energy use intensity and energy use per enrollment)
 - Status and condition of energy assets (e.g. boilers, chillers, co-generation units)
 - Feasibility of alternative energy technologies
 - Solar, Geothermal, Biomass
- An inventory of building level energy efficiency (Anticipated April 2018)
 - Study and benchmark building energy performance
 - Develop economically viable energy improvement projects
 - Identify feasible funding mechanisms, including capital funding, grants, and ESCOs, to install the recommended energy improvement projects
- A study of energy system metering, measurements, and controls (Anticipated March 2018)
 - Development of a comprehensive inventory of all existing utility meters
 - Establish campus metering guidelines

Natural Environment

Natural Carbon Sequestration

With 1,000 acres, St. Lawrence, is land-rich and currently achieving some annual unmeasured carbon sequestration. The main campus alone has as an urban forest of 3,300 trees – which serve to capture already emitted carbon. Additionally, the campus also contains areas of undeveloped forested, wetland, and grassland areas which sequester carbon. There are opportunities, through academic pursuits, to conduct research to better quantify the carbon sequestration abilities of the land. The potential sequestration ability, of these lands, has the potential to help the University reduce our GHG emissions. Second Nature allows institutions of higher education to claim up to a 30% reduction of total carbon emissions from this method. ^v The Office of Sustainability and the Environmental Studies Department will pursue the following specific actions:

- Identify and complete an inventory of University parcel(s)
- Develop, or adopt, a protocol to measure and verify the carbon sequestration potential (i.e. annual tons of emissions sequestered) of the parcel(s)
- Identify and partner with a party to provide a peer review of the protocol

Operating Environment

Space Utilization

Resource management and infrastructure upgrades often lead to significant improvements in efficiencies. However, underutilized spaces (i.e. empty or below capacity) can effectively counteract the efficiencies achieved by the above efforts. Many institutions of higher education have started to consider space utilization as a portion of the efficiency equation.^{vi} Case studies have shown that spaces which serve multiple groups, rather than a particular group or function, consistently achieve higher utilization rates.^{vii} Effectively utilized spaces conserve resources, reduce emissions, and avoid

unnecessary asset operating costs. The Office of Sustainability will collaborate with Facilities Operations and ITS to pursue the follow specific action items through a survey method:

- Total number, and categorical description, of spaces studied (e.g. 10 classrooms in building “x”)
- Total amount of usable/conditioned net square feet studied
- Number and type of proposed scheduling changes to increase utilization
- Number and type of scheduling changes adopted
- Building energy performance measurement and verification of before and after scheduling changes

Organic Waste Diversion¹

Organic waste diversion (i.e. composting of food or yard waste) is a practice intended to reduce the amount of materials sent to the landfill. Keeping organic materials out of the landfill reduces the amount of methane emissions, a potent greenhouse gas, associated with an organization’s waste.^{viii} The University currently engages in pre-consumer organics diversion from Dana Dining and post-consumer organics diversion at the Northstar Café. Additionally, students have the option of requesting a compost bin at their place of residence. The collected organics are composted on-site. However, the University does not have the ability to provide industrial compost (i.e. get piles hot enough) to break down compostable tablewares. As of November 2017, there are no industrial compost facilities operating within St. Lawrence County. Increasing and improving organic waste diversion is achievable through enhancing education and improving infrastructure. The Office of Sustainability and Facilities Operations will pursue the following specific action items:

- Total quantity of organic waste diversion achieved (using 2015-16 as a baseline year)
 - Increase organic waste diversion tonnages by a minimum of 5 tons/school year
- Number and type of engagement efforts utilized
- The Office of Sustainability will work with the Grounds Department to identify best management practices and standard operating procedures for the expanded collection of organic waste
 - Including adding more capacity for post-consumer collection in strategic areas (i.e. student center)

Social Environment

Peer to Peer Education

Peer education is teaching and co-learning relationship between people who are equals (e.g. students teaching students). Peer education programs serve as a tool to improve services by spreading information throughout a community. These programs provide opportunities for campus community members to increase knowledge, sharpen skills, practice advocacy, and give back to community.^{ix}

¹ New York State released, in May 2017, the Methane Reduction Plan tasking the Department of Environmental Conservation with reducing future sources of methane emissions by diverting organic waste and reducing emissions from landfills.

Universities and colleges often times establish a peer to peer education program to engage the student population on issues related to sustainability – these programs are usually known as *eco-reps*.

Eco-reps roles vary based on each institutions unique culture. Common roles for eco-reps include planning and leading activities to educate others on sustainable behaviors and creating sustainability opportunities within the University's residential facilities. A Laurentian eco-rep program could be designed through the engagement of students associated with Thelmo, Residence Life (e.g. CAs), the Green House, or the Sustainability program. This program could aid in helping Laurentians gain a better understanding of sustainability at the University and how to connect these opportunities to their personal and aspiring professional lives. The eco-rep program could serve as a University incubator for leadership and could empower Laurentians to make more sustainable decisions. CCSCN and the Office of Sustainability will pursue the following specific action items:

- The facilitation of a stakeholder meeting to determine feasibility of this opportunity (i.e. is there sufficient interest to move forward?)
 - The metric determining feasibility will be based upon the number of students who express interest (i.e. 10% or more of the total student population)
- The collaborative development and establishment of goals and objectives for this opportunity (i.e. what are stakeholders hoping to achieve with this opportunity?)
- Develop and publish an engagement plan (i.e. how will we make this program success?)

Employee Professional Development

University employees play a crucial role in advancing sustainability. Employees possess a unique knowledge of campus facilities, grounds, and operations. They may identify issues and generate solutions that could improve aspects of campus and reduce our environmental footprint. However, not all employees are familiar with sustainability concepts. It is important to provide an opportunity for all employees to learn the basics about sustainability – i.e. what it means and why it is important. Establishing optional information sessions about sustainability creates opportunities to engage our faculty and staff. The specific action items, or KPIs, for this opportunity include

- The Office of Sustainability, with the support of CCSCN, will host a minimum of one campus-wide forum/presentation/training on sustainability topics per semester
- CCSCN, with the support of the Office of Sustainability, will engage with campus stakeholders to strengthen the University's visibility during the Annual Associated Colleges Sustainability Day
 - The metrics for increasing visibility include: a minimum of 5 faculty/staff speakers and 80% participation in round table discussions (including the president's luncheon)

ⁱ GE. "[8 Advantages of LED Lighting.](#)" Current, Powered by GE, Jan. 2016.

ⁱⁱ Buildings. "[Beware the Fine Print in Performance Contracts.](#)" June 2016.

ⁱⁱⁱ "Be Good in the Hood." *My Green Lab*, 2016, www.mygreenlab.org/be-good-in-the-hood.html.

^{iv} US Green Building Council. [LEED](#). May 2017.

^v Second Nature. "[Carbon Management & Greenhouse Gas Mitigation](#)." April 2017.

^{vi} APPA. [2013 APPA Thought Leaders: The Rising Cost of Higher Education](#). Rep. Alexandria: APPA Center for Facilities Research, 2013. *Thought Leaders Series*.

^{vii} Fancy, Brain, and Michael Chapman. "[Improving Campus Sustainability through Space Utilization](#)." *APPA: Facilities Manager* Mar.-Apr. 2017: 30-33.

^{viii} New York State. Department of Environmental Conservation. [Methane Reduction Plan](#). By Department of Environmental Conservation, Department of Public Service, Agriculture and Markets, Soil and Water Conservation Committee, and NYSERDA. May 2017.

^{ix} Rabinowitz, Phil. "[Section 8. Establishing a Peer Education Program](#)." *Chapter 24. Improving Services | Section 8. Establishing a Peer Education Program | Main Section | Community Tool Box*. Work Group for Community Health and Development at the University of Kansas.