Queen's University

Sustainability Strategic Framework

Contents

Introduction

Queen's University is committed to sustainable practices – from planning and construction, to energy generation and consumption, to curriculum and research.

At Queen's, sustainability applies to individuals, the campus and our community. Actions reflect environmental, social and economic concerns and are consistent with the University's academic goals, research initiatives, and operational requirements.

International sustainability initiatives such as the Brundtland Report (1987), the Tallories Declaration (1990) and the Kyoto Protocol (1990) have raised awareness and attempted to direct fruitful action, it is

essential that Queen's University surpass these aspirations and pursue and achieve tangible targets within its scope for sustainability.

Queen's Sustainability Strategic Framework sets the direction for sustainability efforts carried out under the Queen's banner. It includes an agreed-to understanding of sustainability, Queen's stated values and objectives, a governance structure that stakeholders can channel concerns and suggestions through, and a process for translating ideas into sustainable actions.

The document is not intended to represent a static prescription of particular targets and actions. Instead, specific projects, initiatives and plans will develop independently but will rely on the terms established in this framework.

Queen's Sustainability Mission

> To ensure the long-term well-being of the Queen's University campus and community by creating a culture of sustainability that guides everyday activities to encourage conservation, innovation, and effective use of resources in facilities and operations, education and research, engagement and outreach.

Queen's University will support projects, implement policies and form partnerships to:

- Steadily and substantially decrease the campus environmental impact
- Enhance the curriculum and research opportunities related to sustainability
- Instil a sense of sustainability stewardship and conservation in staff, students, faculty and all who engage with the Queen's extended community.

Sustainability Defined

To unify our effort in this area, our community needs a shared understanding of what is meant by "sustainability."

At its most basic, sustainability refers to the survival of our planet and its life forms. The human community's ability to support itself into the future has become contentious as evidence mounts that many current practices are unsustainable (depleting non-renewable resources and polluting), ecosystems are being degraded (less diverse), natural resources are becoming depleted and the climate is changing, all with the consequences of undermining conditions for healthy living – today and into the future.

To bring better understanding to the concerns and begin the task of redressing the problems, the **Brundtland Report** suggests that sustainability requires, "meeting the needs of the present without compromising the ability of future generations to meet their own needs." This concept lays out a balancing act between our current generation's needs and future generation's needs.

This approach has evolved to represent a wider measure of a community's well-being – beyond a focus on environmental issues. A measure of a community's well-being, and indeed its sustainability, incorporates environmental along with social and economic considerations.

Environmental considerations range from global climate change to local water quality, while social considerations look at health, safety and cultural vibrancy. Economic considerations include community financial viability and life-cycle costing from extraction to disposal/decomposition.

Queen's takes a balanced approach to sustainability that includes environmental, social and economic aspects. Consideration is also given to our institution – age and conditions of facilities and infrastructure, operational requirements and mandate regarding academic excellence, innovation and social responsibility. Understandably, the pursuit of a sustainable campus must align with the capacity of the infrastructure while delivering core functions of education and research.

Strategic Framework

The framework sets out a system for future progress on sustainability, establishing:

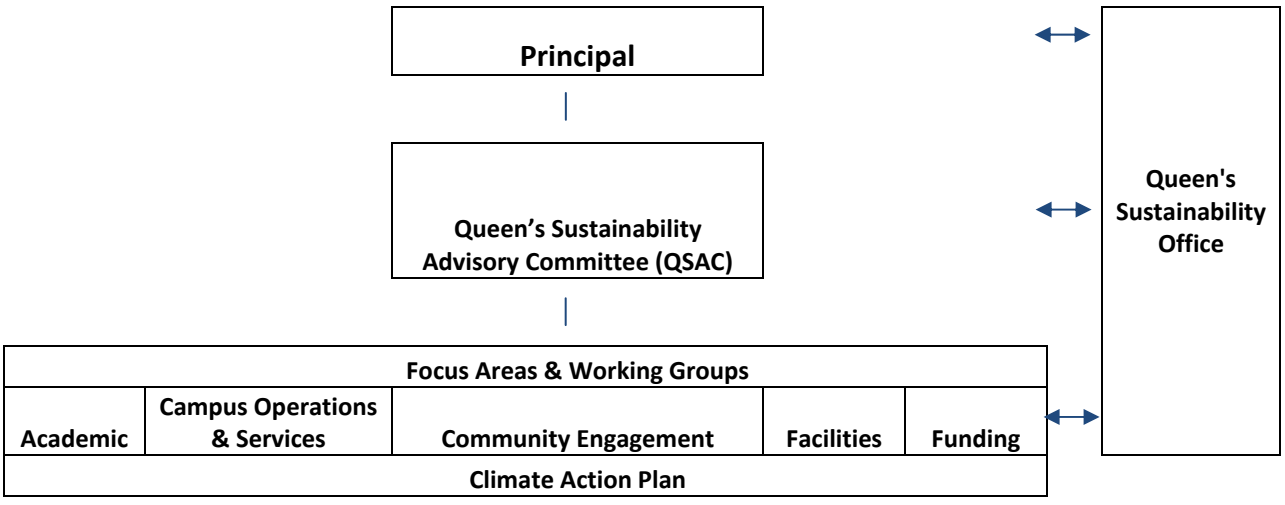
- An organizational structure
- A project exploration process
- Guiding principles.

Organizational Structure

The structure is designed to bring together students, faculty, staff and interested community stake holders to participate in campus sustainability through a system that:

- Provides cohesion to what is a wide-spread movement
- Is accessible to and inclusive of all Queen's community members
- Establishes a decision hierarchy.

Below is a visual representation of this structure, followed by descriptions of each section.



Principal
The Principal will seek the advice and consider the recommendations provided by QSAC. In the case where there is differing advice and alternative options, the Principal will assume the right of a final decision.

Queen's Sustainability Advisory Committee (QSAC)
The Committee, co-chaired by the Provost and VP (Academic) and VP (Finance & Administration) is responsible to further the campus sustainability agenda by advising on strategies and position, suggesting achievable goals and targets.

Focus Areas & Working Groups
Working groups focus on specific initiatives and/or plans under their respective categories and consist of a selection of committee members and other 'experts' as applicable. The work from each group is funnelled to QSAC for review.

Queen's Sustainability Office
Queen's Sustainability Office is the central agency and coordinates cohesion across sustainability initiatives and facilitates the work flow within the organizational structure. As a central voice for sustainability at Queen's, the office addresses campus sustainability issues, collects and disseminates information, enhances and promotes existing efforts and suggests and facilitates new initiatives, policy and strategy.

Project Exploration Process

Initiators complete a standard "Project Exploration Sheet" on-line and send it directly to the Queen's Sustainability Office. The project is rated against an established rubric to determine its applicability and feasibility (e.g., objectives; benefits; costs and funding; implementation and operations; detail and miscellaneous).

Depending on the scale of the project idea, the initiative will be brought forward for discussion by QSAC. The committee will determine how the project best fits with existing strategies and will make recommendations to proceed.

Queen's Sustainability Office will facilitate project implementation in conjunction with the appropriate department or office that has jurisdiction over the identified project scope, i.e. facility infrastructure updates reside in PPS, and server room efficiencies reside with ITS.

Guiding Principles

Academic - The ability to foster and encourage sustainability among all academic disciplines may be the university's single greatest contribution to a sustainable future. Values and behaviours that graduates adopt while at Queen's University can and will influence their actions and their future communities. Moreover, relevant research conducted at Queen's will offer solutions to current negative environmental impacts.

The university will strengthen and freely share research and teaching that addresses environmental issues in the sciences, social sciences, humanities, and professional schools.

Campus Operations & Services - The campus services category includes large-scale operations of procurement services, food services and waste management.

The university will provide the same high levels of service to its community while seeking ways to mitigate and improve the environmental impacts associated with the delivery of services.

Community Engagement - Community engagement supports campus sustainability through awareness and widespread action or participation. Many facilities' upgrades or research breakthroughs can have little effect unless properly promoted. Beyond a public relations exercise, these actions demonstrate common interests between town and gown and mutual benefit through cooperation.

The university will develop a culture of sustainability that permeates the community's everyday actions and decisions to encourage active participation in sustainability both on campus and beyond.

Facilities - The facilities portfolio ranges from buildings on campus to space use, and resource consumption to transportation methods. This range of equipment and infrastructure has the greatest single potential for direct reductions in the campus environmental impact.

The university will take every opportunity to reduce or eliminate the negative environmental impacts of its operations without compromising its high levels of service and academic standards.

Funding - Recognizing that a commitment to sustainability requires financial resources, the funding focus area will develop a way to leverage these resources to ensure that initiatives are financially sustainable.

The university will seek to integrate sustainability into the campus planning and financial processes to ensure resources match commitments.

Climate Action Plan - Climate change represents a very real and significant impact of humans on their natural world. Caused by the emission of greenhouse gases (GHG's), this accounting is a broad range measure that touches on many aspects of sustainability, from energy conservation to transportation, and from waste handling to procurement of goods.

The university will commit to a GHG reduction plan that will identify target reduction dates and strategies on campus in order to proportionately contribute

to global reductions, and encourage community members to take action beyond campus through research, education and daily activities.

Measuring Progress and Reporting

Measuring Progress

A way for measuring success is an integral element of this plan. A series of indicators will be used to monitor and chart progress. The chosen indicators have been selected both for their individual ability to quantify progress on specific sustainability objectives and when grouped together to provide a picture of the campus sustainability progress.

Measurement Category	Relation to Sustainability	Unit of Measure
Academic		
Sustainability-Focused Programs	measures the options available to students for intensive sustainability studies	list of programs
Sustainability-Related Courses	measures the options available to students for casual sustainability studies	list of courses
Faculty Involved in Sustainability Research	measures the uptake and breadth of sustainability research	list of faculty
Research Centres/Institutes/Groups	measures the uptake and breadth of sustainability research	list of research entities
Campus Operations & Services		
Organic/Local/Fair Trade Food	recognizes efforts to support sustainable food systems	percentage of dollars spent vs. total spend on all food
Office Paper	representative of a large-volume consumable good of which usage can be curtailed and mitigated	percentage of recycled content paper used vs. standard paper & paper consumed/campus population
Campus Fleet	measures the efforts to mitigate the environmental impacts of the campus fleet	percentage of campus fleet using alternative fuels or ultra-efficient vehicles
Waste Diversion Rate	measures efforts to reduce campus waste and divert from landfill	percentage of diverted waste
Sustainability Policies	recognizes efforts to formally administer campus sustainability	list of policies
Student/Employee Commute Modal Split	measures the campus community's uptake of alternative (to single-vehicle) transportation options	percentage of commuters using alternative modes of transportation

Community Engagement		
Employee Sustainability Training	indicates progress towards integrating sustainability into daily work routines	list of programs
Community Sustainability Partnerships	recognizes efforts that bring sustainability outside the borders of the campus	list of partnerships
Inter-Campus Collaboration on Sustainability	recognizes efforts to share sustainability best practices and gain wider information dissemination	list of partnerships
Student Sustainability Outreach Campaign	recognizes efforts towards promoting sustainable choices among students	list of programs
Facilities		
Electrical Energy Consumption	measures electrical energy conservation and efficiency efforts	GJ
Heating Energy Consumption	measures heating energy conservation and efficiency efforts	GJ
Renewable energy production	measures development of renewable energy production	GJ
Water consumption	measures water conservation and efficiency efforts	L
Funding		
Total Dollars Donated to Sustainability Initiatives	measures financial commitment to sustainability	$
Total Dollars Received Through Grants for Sustainability Initiatives	measures financial commitment to sustainability	$
Total Dollars Centrally Funded for Sustainability Initiatives	measures financial commitment to sustainability	$
Total Dollars Raised by Students for Sustainability Initiatives	measures financial commitment to sustainability	$
Climate Action Plan		
Greenhouse Gas Emissions Inventory (Scope 1, and 2)	measures the University's impact on climate change	tonnes CO_2e
Greenhouse Gas Emissions Reduction	measures the University's progress towards reducing its carbon footprint	tonnes CO_2e

Reporting

On an annual basis, Queen's Sustainability Office will provide a GHG inventory and a progress report on sustainability that summarizes the activities conducted during the past year and the results of the indicators.

Appendix A

The Innovation Parking Lot

The Innovation Parking Lot is a repository of ideas related to campus sustainability. The ideas represent various projects and initiatives identified as actions that could potentially contribute to the university's sustainability goals. These ideas represent possible initiatives rather than a specific commitment, as each action will need to be analyzed for feasibility before a decision to act can be made. While extensive, the list is not exhaustive and it is intended to be in flux. New ideas that are identified will be added and as existing ideas are analyzed and either pursued or not, they will be marked within the list.

Academic

Education

- Include sustainability education and awareness in orientation activities
- Require students to take courses introducing sustainability concepts
- Provide elective courses on sustainability concepts to all students
- Integrate sustainability concepts into existing courses
- Create new multidisciplinary and interdisciplinary courses with sustainability themes
- Enhance student-based campus projects
- Develop curriculum that uses outreach partnerships with local nonprofits and the community
- Establish a sustainability graduation requirement
- Include students and faculty on design committees for new buildings (or research projects intended to look at alternatives to new construction)
- Conduct the greenhouse gas inventory or campus environmental audit as a student or class project
- Develop student-faculty-facilities teams to research "deep efficiency" for existing buildings and renewable energy applications on campus
- Invite nationally renowned expert speakers on climate change and sustainability to campus
- Create student life residential environmental education initiatives such as "Eco-Reps," on campus sustainable living opportunities, etc.
- Provide subsidies for students to attend sustainability related conferences and workshops
- Establish pilot projects to determine the efficacy of alternative course material delivery methods, such electronic textbooks
- Queen's Sustainability Office to maintain a list of volunteer opportunities within the office
- Queen's Sustainability Office to maintain a list of research topics
- Create a student-administered award for faculty demonstrating excellence in sustainability
- Install innovative energy-conservation or renewable energy systems, and work with students and faculty to assess the effectiveness of these technologies to reduce greenhouse gas emissions.

Research

- Identify climate change research as a major institutional priority
- Make a priority commitment to hire new faculty with expertise and interest in climate change and sustainability
- Provide climate change and sustainability oriented research for students
- Connect research initiatives to the GHG emission challenges our campus is facing including the development of renewable energy technologies and local sources of bio-fuels, carbon neutral engine technologies for autos and aircraft, hyper-efficient building systems to make zero emissions, net-energy producing buildings the norm rather than a rare exception, etc.
- Establish fellowships or other financial support mechanisms for research related to climate change and sustainability
- Create new major research initiatives and academic centres in the area of climate change and sustainability
- Host a regional climate change conference

Campus Operations & Services

Food

- Grow fresh produce or herbs on site
- Reduce waste by implementing portion control procedures
- Provide meals that accommodate healthy as well as cultural eating practices
- Avoid meals-to-go in order to reduce packaging and containers
- Purchase fair-trade alternatives for goods like coffee, sugar, tea and cocoa
- Buy local, organic, seasonal food
- Encourage students and other consumers to eat foods that are lower on the food chain and therefore bear a lower carbon footprint (e.g., less meat) by offering education and signage about the carbon impacts of menu items
- Institute food donation and kitchen waste composting programs.
- Require vending machine contractors to use ENERGY STAR machines or to retrofit machines with energy setback controls
- Mandate recycling standards and requirements for locally produced food in your contracts with food service vendors
- Prepare food in more energy efficient kitchens by using energy-efficient and water-saving equipment

Procurement

- Ensure that appropriate consideration is given to the costs and benefits of environmentally friendly alternatives.
- Give preference, where items are of similar cost, to those that are manufactured with a high recycled content and/or to items which can be manufactured, used and disposed of in an environmentally friendly way.

- Favour suppliers that are committed to environmental improvement and use environmentally sustainable processes in their businesses.
- Ensure that supplier's environmental credentials are, as far as legally practicable, considered in the supplier appraisal process.
- Encourage internal purchasers to review their consumption of products and services, in order to reduce usage and adopt more environmentally friendly products, including the use of recycled products whenever possible
- Avoid the unnecessary use of hazardous materials and processes, and take all reasonable steps to prevent damage to either public or ecological health where such materials are in essential use.
- Avoid purchased apparel, including items with the university logo or trademark, or any other item from suppliers under investigations or being monitored by an external monitoring agency or third party for violating fair labour practice.
- Instead of purchasing virgin-fibre or partially recycled content paper, buy non chlorine-bleached office paper that has 100 percent post consumer recycled content
- Buy computers, appliances, and other equipment that operate with maximum energy efficiency and are compliant with the ENERGY STAR program.
- Evaluate products based on the full range of life-cycle factors, including durability, reusability, recycled content, hazardous material content, energy efficiency, packaging, and energy required to ship the product to your campus
- Buy locally produced goods and services to reduce emissions associated with transport
- Support 'cradle-to-cradle' sustainable product design by purchasing goods deliberately designed to be recycled and/or composted
- Promote education around the concepts and practices of climate change action and sustainability by engaging with suppliers throughout the supply chain

Transportation

- Buy only the most fuel efficient vehicles
- Implement a policy to reduce vehicle miles driven
- Implement a no-idling policy
- Match appropriate vehicles to their intended corresponding tasks, e.g. parking patrols may need only a sub-compact vehicle rather than a truck
- Include messaging with billing statements for campus parking permits
- Encourage the use of high efficiency vehicles when car/truck commuting is unavoidable, by providing premium parking spaces or reduced parking fees
- Better publicize existing public transit options
- Work with your regional transit authority to add public transit routes
- Encourage your regional transit authority to equip its busses with bike racks
- Stop building new parking lots
- Provide incentives for carpooling, e.g. priority parking, reduced parking fees, etc.

- Provide ride home service for alternative transportation users who miss their ride, have an emergency or special event etc.
- Establish bicycle-friendly campus policies that actively encourage and reward bicycling and don't penalize it (an example of the latter would be a policy that forbids students from locking their bikes to light poles or trees while not providing enough bicycle racks)
- Create an extensive and effective network of campus bike paths
- Install or increase the number of secure bike racks on campus
- Provide weather-protected bike racks and bicycle lockers
- Establish an on-campus bicycle repair shop and free air pump
- Create or join local bicycle sharing programs
- Work with local communities to improve and expand the network of local bike paths and bicycling safety
- Provide on-campus shower facilities for bicycle commuters
- Relax formal or informal dress codes to accommodate bicycle commuters
- Allow compressed work weeks, i.e. 4 ten-hour days/wk instead of 5 eight-hour days/wk to eliminate one commute per week
- Explore alternative course scheduling to reduce the number of days per week most students need to come to campus
- Prioritize energy efficient low carbon transportation planning in campus master plans
- Establish a program to allow or require students, faculty and staff to pay for their own commuting carbon offsets
- Provide shuttle service to nearby off-campus student housing developments, neighbourhoods and other common local campus community travel points
- Pay employees not to drive
- Provide free public transit passes or subsidize public transit fare
- Use vehicles which run on alternative fuels like electricity, bio-diesel or compressed natural gas whenever possible

Waste Reduction, Reuse and Recycling

- Set a policy that requires a minimum 50 percent diversion rate from landfill of the campus waste
- Institute a robust recycling program to which you continue to add new items for collection; for instance, expanding beyond paper, cardboard, plastic, metal, and glass to include batteries, tires, computers, fluorescent lights, and so forth.
- Maximize collection by making recycling easy and convenient, with bins that are co-located with trash cans and placed in all high-traffic, public locations as well as under every desk.
- Reduce all waste, especially paper, disposable items, and packaging materials.
- Establish programs to encourage the use of e-mail and double-sided printing.
- Reduce printed materials by transitioning to online phone directories and campus publications.
- Compost food and yard waste
- Institute campus recycling competitions

- Focus on source reduction and reuse of furniture, electronics, lab equipment and items left behind by students
- Establish swap shops to facilitate refurbishment and exchange of unwanted items
- Establish recycling and reuse standards for all new construction and renovation projects
- Enter into purchase agreements with manufactures willing to take back their product for reuse as the end of its useful life on campus

Community Engagement

Outreach & Awareness

- Facilities staff performance appraisals that evaluate staff on commitment to energy conservation
- Reward highly motivated staff who identify conservation opportunities and implement conservation measures
- Develop multi-faceted media campaigns to roll out new programs and initiatives
- Develop and maintain a campus energy dashboard or map
- Make selective use of sustainability events, either endorsing two or three pre-existing ones, or create your own campus sustainability day or summit
- Run contests and competitions like dorm or academic building energy competitions
- Celebrate, reward, and publicize research on climate change and sustainability
- Initiate service-learning and community service activities for students related to climate change and sustainability
- Encourage faculty to participate in public service activities that assist local governments, community organizations, businesses, and institutions to reduce GHG emissions and address climate change – and reward those activities when considering promotions or tenure
- Develop town-gown community climate partnerships or initiatives to mobilize community leaders and use campus intellectual, financial and leadership resources to move the surrounding community to address greenhouse gas emissions and sustainability
- Engage in the public policy process to lobby for policies at all levels of government that will make it easier for campuses to achieve their climate goals since deep cuts in GHG emissions will not be possible on or off campus unless there are broader societal shifts
- Challenge departments and buildings to reduce their energy consumption by an agreed to dollar amount, and if successful reward the participants with a portion of the dollar savings
- Develop programs to assist students, faculty and staff to upgrade their own residences through improved energy efficiency and better utilization of solar energy to reduce greenhouse gas emissions
- Make all outreach events and activities climate neutral and as sustainable as possible, and publicize your efforts in this area to encourage others to organize green events and activities as well
- Create a regional clean energy demonstration and resource centre to inspire, educate, and assist members of the wider community to use conservation, efficiency, and clean, renewable energy to improve energy affordability and comfort while reducing greenhouse gas emissions

- Convene an annual regional climate change summit

Facilities

Buildings and Green Space

- Optimize site selection in order to preserve green space and minimize transportation impacts
- Orient buildings to take maximum advantage of sunlight and micro-climate
- Design for a healthy indoor environment by using low or no VOC content in finishes and furnishings
- Require the use of environmentally friendly building materials and products, evaluating equipment and product options based on life-cycle analysis and embodied energy and greenhouse gas emissions.
- Recycle demolition and construction debris.
- Reduce lawn areas and the need for grass cutting, opting instead for native vegetation.
- Control the spread of parking lots and other paved surfaces that encourage more car and truck use and that increase greenhouse gas emissions through the depletion of natural habitat.
- When a new building is proposed, first determine whether there is a way to meet the alleged program needs for the building by reconfiguring and better utilizing existing space
- More aggressive scheduling including starting classes earlier, holding more of them in the evening, on Friday afternoons, or weekends can defer the need for a new building.
- Seek to maximize the use of campus facilities through seven-day campus programming and full use of facilities in summer months to reduce the need for additional built space.
- Increase distance learning opportunities to free classroom space.
- Introduce telecommuting and reduced workweek scheduling to decrease demand for additional office space.
- Use energy as efficiently as possible, by setting an energy-consumption-per-square-meter limit on new buildings and large scale renovations
- Use water as efficiently as possible, by setting a water-consumption-per-square-meter limit on new buildings and large scale renovations
- Seek 3rd party building certification from LEED, BREEAM, Architecture 2030 or other certifying body
- Maximize the use of renewable energy

Energy

- Ban on all incandescent bulbs and halogen lamps (the latter is also a safety issue)
- Restrict the use of portable space heaters
- Campus curtailment or shutdown periods when campus use is minimal
- Comprehensive implementation of no cost/low cost operational measures – e.g. temperature set-points, equipment run-times and building occupancy hours, etc. – that push the envelope, i.e. risk complaints – sliding scale temperature set points

- Require that all computers on campus have their power management features engaged and be shut off when offices are closed
- Assign energy costs to campus energy users or cost centres so that there are real dollar incentives for energy conservation for campus building occupants
- Use open windows and passive cooling when mechanical air conditioning is not needed
- Close all windows when air conditioning is in operation
- Re-commissioning all existing buildings periodically to optimize energy efficiency
- Prioritize projects that conserve energy and improve efficiency
- Permanently turning off/disconnecting unneeded light fixtures “De-lamping”
- Replace inefficient light fixtures or lamps with high efficiency fixtures/lamps “Re-lamping”
- Convert all exit lighting to LEDs or photo-luminescent signs that require no electricity
- Increase reliance on task lighting in order to decrease general illumination without adversely affecting productivity
- Improve lighting controls by using occupancy sensors, timers (stand alone or energy management system/EMS-interfaced,) daylight harvesting sensors and controls including simple photocells
- Require white or off-white wall paints for maximum light reflectivity – so adequate lighting levels can be achieved with minimum lighting wattage
- Operate AC equipment at peak efficiency (by adjusting water flow, load, condenser/evaporator water temps, etc.)
- Discontinue use of inefficient window units
- Reduce AC operating hours
- Replace old motors, pumps, and air handling units with high efficiency models
- Control motors serving fans and pumps with variable speed drives (VSDs)
- Operate VSDs at maximum acceptable turn-down; vary by time of day and occupancy; also vary by season
- Convert constant volume fan systems to variable air volume (VAV)
- Completely close outside air dampers during morning warm-up cycle
- Reduce outside air ventilation rates consistent with actual occupancy through the use of variable speed drives, modulated outside air damper settings, CO2 sensors, and demand control ventilation
- Turn off 100% outside air ventilating systems (fume hoods) whenever possible, e.g. in teaching labs whenever classes are not in session; shut down or slow down related supply fans
- Do not oversize fume hoods
- Eliminate unneeded fume hoods by using ventilated storage cabinets instead of fume hoods for chemical storage
- Retrofit constant volume fume hood ventilation systems to variable air volume
- Retrofit conventional fume hoods with low-flow hoods and reduce outside air volumes
- Employ heat recovery systems like run around loops, heat wheels, heat pipes, desiccant wheels and air-to-air heat exchangers

- Install pool covers (these significantly reduce the evaporation of pool water – reducing pool heating and boiler loads as well as outside air ventilation and space heating requirements; pool covers save chemical water treatment too)
- Purchase and operate Energy Management Systems (EMS) that allow for a high level of control and optimization
- Fully insulate heating distribution system
- Deploy solar PV on appropriate campus rooftops
- Explore the use of alternative fuel sources to fuel the campus heating plant
- Explore the potential to establish an off-site wind farm
- Explore the future use of geothermal to provide heating and cooling in new buildings
- Create a 'natural gas only' fuel burning policy in the central heating plant to avoid use of oil and diesel
- Install scrubbers in the central heating plant stack to reduce emissions
- Replace older AC units, chillers and cooling tower with maximum efficiency models with efficiency curves that best matches the load profile
- Replace old boilers with new high efficiency boilers that are not oversized
- Retrofit boilers with variable flame burners
- Consider multiple high efficiency modular boilers to improve efficiency by better matching hot water heating loads
- Consider replacing boilers with cogeneration units (which produce both electricity and heat)
- Retrofit boilers with flue gas/stack heat recovery
- Building envelope improvement that include, weather/infiltration sealing, increased insulation, high performance window replacement, low emissivity reflective window film (to reduce unwanted solar gain in the summer and increase the R-value of windows in the winter)

Funding

- Create a Queen's University Sustainability Fund
- Establish a student and staff fee to support sustainability
- Charge Advancement to fundraise for the general sustainability fund and also for particular projects as they arise (an option to donate to sustainability could be added to other online quick choices)
- Utility budget revolving loan set to provide capital on 7 year payback projects
- Seek community joint project partnerships to off load some capital expenditure
- Impose a Carbon tax on projects over $1million (% of project is leveraged for sustainability initiatives)
- Impose a carbon tax on energy intensive buildings (fees would flow into the sustainability fund and the tax would encourage better onsite conservation by users and departments)
- Impose a carbon emissions travel limit on departments and any annual overage would require a fee to paid into the sustainability fund

Climate Action Plan

- Natural gas only policy
- Occupancy sensor technology
- Computer shutdown software
- Alternative lawns
- CO_2 monitoring
- Fuel efficiency policy for campus fleet
- Vending Misers
- Tree planting fund
- Energy Star equipment policy
- Fan scheduling policies
- Prohibit the use of space heaters
- Incentive for departments to save energy
- Incentive to save energy for area managers/project managers
- AC policy
- Heating policy
- Summer building shutdowns
- Steam to hot water
- Geothermal lake (CHP)
- Steam line insulation (main campus)
- West Campus geo-thermal heating plant
- West Campus natural gas boiler
- Bio-fuelled heating plant (CHP)
- Bio-fuelled heating plant (West Campus)
- Fume Hoods (VAV)
- Heat recovery systems
- Solar PV (roof mounted)
- Off-site wind farm
- Solar thermal
- Green roof's
- Retrofit VFD's on fans and pumps (energy audits)
- Fuel cells - combined heat and power
- Building standards (50% energy reduction)