

2017 Carbon Neutral Action Report

LANGARA COLLEGE

May 2018

Langara.

THE COLLEGE OF HIGHER LEARNING.

2017 Carbon Neutral Action Report

Introduction

At Langara College, we are deeply committed to being part of a sustainable society. We understand that the world's resources are finite and need to be used conservatively and wisely. We know that our choices, both big and small, impact our world and future generations. As an educational institution, we have a responsibility to lead initiatives that positively contribute to our community. Our goal is to foster and provide leadership to create more environmentally sound, socially just, and economically vibrant communities.

Our mission is to provide accessible, high-quality undergraduate, career, and continuing educational programs and services that meet the needs of our diverse learners and the communities we serve. This is guided by Langara's Strategic Plan, which complements the Academic Plan. While all outcomes in the plan are important, the thematic priority to support our mission for academic excellence is a focus on organizational and financial sustainability.

- Langara 2020 Strategic Plan: www.langara.ca/strategic-plan
- Langara Academic Plan 2014-2019: <https://langara.ca/about-langara/academics/academic-plan/index.html>

Langara College has been working at reducing greenhouse gases (GHG) and increasing sustainability for many years and has been actively monitoring and managing energy and GHGs of its facilities for over 15 years. Since 2010, along with all BC public sector organizations (PSOs), as mandated under the Greenhouse Gas Reduction Targets Act, Langara has been reporting their annual GHG emissions and investing in offsets to achieve net-zero emissions.

As part of the College's commitment to reducing GHG emissions, an Environmental Responsibility Policy was established in June 2001. The purpose of the board governance policy is to provide direction to the College regarding the creation of learning and working environments characterized by social responsibility, the Board is committed to:

- protecting and enhancing the environment for future generations, and
- using and managing its own physical environment more sustainably.

The College is proud of its commitment and successes related to our GHG reduction effort. We will continue to increase environmental, financial, and social sustainability at Langara, in our city, and in our world.

Declaration Statement

This Carbon Neutral Action Report for the period January 1, 2017 to December 31, 2017 summarizes our emissions profile, the total offsets to reach net-zero emissions, the actions we have taken in 2017 to reduce our greenhouse gas emissions and our plans to continue reducing emissions in 2017 and beyond.

By June 30, 2018 Langara's latest Carbon Neutral Action Report will be posted to our website at <http://www.langara.ca/about-langara/sustainability/initiatives/carbon-neutral.html>.

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Emissions and Offset Summary Table

Langara College GHG Emissions ¹ and Offsets for 2016 (tCO ₂ e ²)	
GHG's created in Calendar Year 2017	
Total Emissions (tCO ₂ e)	1,587
Total Offsets (tCO ₂ e)	1587
Adjustments to GHG's Reported in Prior Years	
Total Emissions (tCO ₂ e)	0
Total Offsets (tCO ₂ e)	0
Total Emissions for Offset for the 2017 Reporting Year	
Total Offsets (tCO ₂ e)	1,587

Retirement of Offsets

In accordance with the requirements of the Greenhouse Gas Reduction Targets Act and Carbon Neutral Government Regulation, Langara College (the Organization) is responsible for arranging for the retirement of the offsets obligation reported above for the 2017 calendar year, together with any adjustments reported for past calendar years. The Organization hereby agrees that, in exchange for the Ministry of Environment ensuring that these offsets are retired on the Organization's behalf, the Organization will pay the associated invoice to be issued by the Ministry in an amount equal to \$25 per tonne of offsets retired on its behalf plus GST.

Executive Sign-off



Dr. Lane Trotter
President & CEO

June 1/18
Date

¹ Emissions are calculated as per Ministry of Environment, 2014 B.C. Best Practices Methodology for Quantifying Greenhouse Gas Emissions (Victoria, BC: November 2014).

² Tonnes of Carbon Dioxide Equivalent as a standard measurement for GHGs by multiplying each gas' emissions by its global warming potential (GWP).

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Overview

The total emission offsets applied to become carbon neutral in 2017 was 1,587 tCO₂e. As indicated in the chart below, 92% (84% + 8%) of Langara’s tracked emissions are from building energy use.

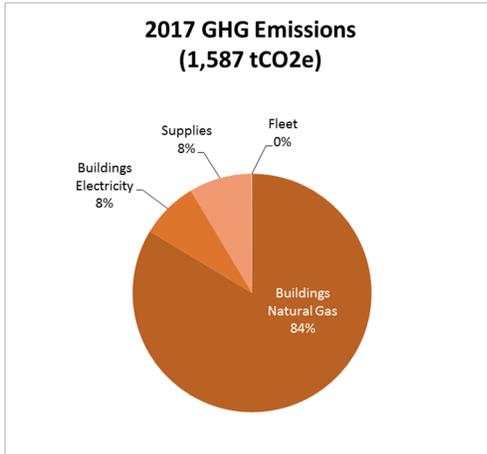


Figure 1: 2017 Emissions Breakdown

Langara College’s GHG emissions for the mandatory reporting categories are summarized in the table below. Comparisons to 2016 calendar year and 2007 (the Ministry base-year for GHG target reduction) are included. The Buildings and Paper emissions are also charted on the next page.

	2017 GHG Emissions (tCO ₂ e)	2017 Results Compared to 2016	2017 Results Compared to 2007 Baseline
Buildings – Natural Gas	1,327	8% Increase	28% Decrease
Buildings – Electricity	124	17% Increase	28% Decrease
Supplies – Paper	134	22% Decrease	Not Available
Fleet	0.01		
Total	1,587	6% Increase	31% Decrease

Table 1: Emissions Breakdown for 2017 Compared to Previous Year (2016) and Baseline (2007)

As required by the *Greenhouse Gas Reduction Targets Act* and *Carbon Neutral Government Regulation*, the results shown above are based on absolute emissions and have not been corrected for the impact of weather conditions.

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Figure 2 below shows the trend in GHG emissions for our Buildings compared to the base period year of 2007 and the previous five reporting years. As you can see in the bar graph and summarized in the previous Table 1, the emissions from buildings (natural gas and electricity combined) have increased from 2016 to 2017. This is expected as our new Science & Technology Building opened in September 2016, increasing the campus area by 20%; 2017 is the first full year of occupied operation for this new building.

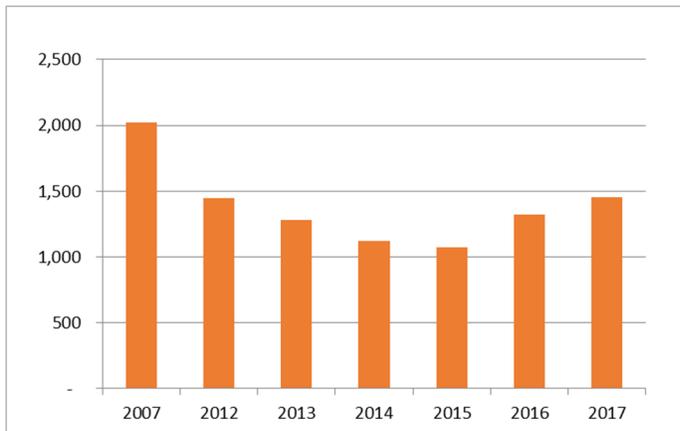


Figure 2: Building Emissions Trend (tCO2e)

Figure 3 below shows the trend in emissions for paper purchases on campus. As summarized in Table 1, paper consumption from 2016 to 2017 has decreased by 22%. Langara is happy to note that we have completed the installation of our new fleet of multi-function devices and printers across campus. With the addition of these new units we now have an accurate tool to track the consumption of paper and related resources. This information gathered will help us make better decisions and develop targeted reduction campaigns in an effort to reduce emissions and utilize our resources efficiently.

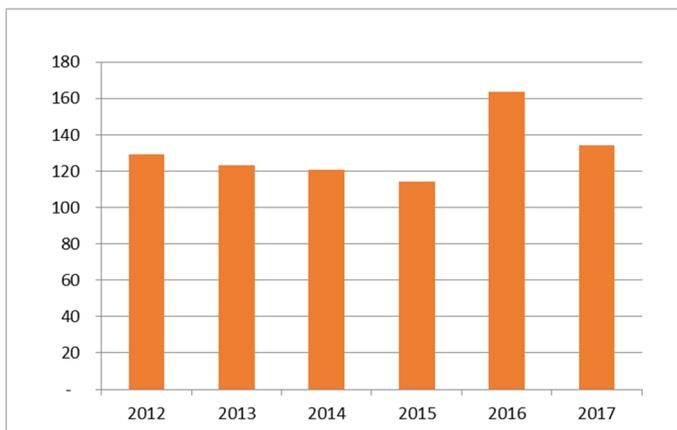


Figure 3: Paper Supplies Emissions Trend (tCO2e)

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Emission Reduction Activities 2017

As shown in the 2017 Emissions Breakdown pie chart (Figure1), 92% of the emissions from Langara's operations are related to building energy usage. Emissions reduction activities for 2017 related to buildings are summarized below in four key areas: Green Buildings, Green Renewal, Operations & Maintenance, and Engagement & Awareness.

Green Buildings

Langara College's newest addition, the Science and Technology Building, officially received LEED® gold status on October 4, 2017. LEED®, or Leadership in Energy and Environmental Design, is a global rating system recognizing sustainable and energy efficient practices. The Science and Technology Building received 67 LEED® points to achieve gold status.

Available at <https://langara.ca/news-and-events/langara-news/2017/171013-science-and-technology-building-earns-leed-gold.html>



Photo: Andrew Latreille

We continue to promote our green building audio tour to highlight green features of the new Science & Technology Building. http://www.buildingaudio.com/buildings/langara_science_and_technology_building

Green Building Highlighted Features:

- Proximity to major transportation hubs
- Protected a landscaped area from future development equal to the building footprint (2087 m²)
- Modeled to save the equivalent of an Olympic swimming pool of water each year through washroom fixture efficiencies
- Innovative water-side heat recovery system that targets zero thermal energy waste and preheats domestic hot water
- Outdoor views in over 90% of the regularly occupied areas for greater indoor environment quality

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Green Renewal

Building “A” Fan System Renewal

In 2016 we received funding through the Federal Strategic Investment Fund (SIF) to upgrade our Building “A” Fan Systems. Built in 1970, Building “A” is our oldest building on campus with much of the equipment end of life including these fan systems. This building is also the most energy intensive, producing approximately 75% of the entire campus’s emissions.

The fan systems were rebuilt and converted to a Variable Air Volume (VAV) Reheat Systems, including improving air distribution in classrooms and updated integrated building controls. The result is a “like new” air distribution system for the building which will improve comfort and decrease operating costs related to energy usage, ongoing maintenance and repairs. The project is expected to decrease our emissions on campus by an additional 155 tCO₂e or 11% of our 2017 buildings emissions.

“The substantial investment from the Government of Canada and the Province of British Columbia have allowed us to accelerate our commitments to sustainability on campus. In fact, with the completion of this project, we have already met our 2020 target of reducing 2007 greenhouse gas emission levels by 33%.”

Lane Trotter, president and CEO, Langara College

<https://langara.ca/news-and-events/langara-news/2018/180510-SIF-fan-completion.html>

C South Building Fan System Renewal

Similarly, the fan system serving our older C South Building area was upgrade from inlet vane to variable speed drive, including updated and integrated digital controls. This was completed in parallel with the addition of our new Gathering Space.

Lighting Efficiency Projects

Lighting efficiency projects were implemented throughout campus, the following were the projects for 2017:

- Replaced old 150 watt, pulse start metal halide pole top fixtures with new LED fixtures in parking lots and walkways with an estimated annual savings of 21,600 (kWh). In general, all of our exterior lighting has been upgraded to LED over the past two years, replacing original parkade lighting. The retrofits will result in electrical energy savings and will reduce ongoing maintenance cost associated with end of life systems. The fixtures were specified to consider the new guideline from the International Dark-Sky Association (IDA) for reducing light pollution, trespass, and sky-glow.
- Installed LED fixtures when spaces were renovated, including a dance studio, our new Massage Therapy instruction space, new classrooms designed for vacated lab space (labs moved into our new Science & Technology Building in fall 2016).

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Kitchen Equipment Renewal

Langara conducted an audit of food service equipment in 2016. This audit identified the need to upgrade several large gas and electric appliances in Langara's main cafeteria in Building "A" to new energy efficient models. In total, eight new appliances were upgraded in 2017. The new equipment is expected to save 24% of the electricity and 10% of the gas consumption compared to the original equipment.

As part of our participation in the BC Hydro's Energy Wise program, we are working with kitchen staff to identify and implement energy saving strategies. Signage, including training and awareness was identified as an opportunity for further reductions. The "Turn off when not in use" campaign will be ongoing in 2018.

<https://langara.ca/about-langara/sustainability/initiatives/pdfs/energy-wise-campaign-story-langara-kitchen.pdf>



Conserving energy in the kitchen
Langara's cafeteria serves up energy awareness

"At Langara, we are always looking for ways to save energy and reduce our environmental footprint."
- Zeeshan Khan,
Manager, Building Operations

Understanding energy use

Langara conducted an audit of food service equipment in 2016. This audit identified the need to upgrade several large gas and electric appliances in Langara's main cafeteria in Building A to new energy efficient models. In total, the eight new appliances represent up to 24% in savings for the electric equipment and 10% on the gas equipment replaced.

As part of the implementation of the upgrades, the need for additional signage was identified in order for staff to safely operate the equipment. Also, staff were encouraged to think about different ways to improve energy conservation in the kitchen.

Other Initiatives:

- Two high-efficiency chillers were installed for our new secondary datacenter.
- Our old air compressor serving the workshop in A-building was replaced with a new, more energy efficient unit.

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Operations & Maintenance

- New thermal meters were installed across campus, including integrating existing and new energy meters into our building controls system that shows real-time energy data from energy meters. Our building controls system is now fully web hosted and plans for optimization of monitoring and alarm dashboards are underway.
- Additional Building Automation System operator training and coaching was carried out; this included developing checklists for scheduled checks of primary equipment, control panels, system settings, and parameters to proactively identify anomalies and excessive run times. This includes reviewing energy usage by meter and comparing to best performance models. The intent is to identify issues prior to failure in an effort to improved comfort, performance and minimize disruptive operational issues.

Engagement & Awareness

- Continued participation in BC Hydro's Energy Wise program. This included continued awareness energy usage in the labs - Promoted "Shut the Sash" campaign and other similar campaigns.

Saving energy in the labs

Langara's new state-of-the-art labs promote energy conservation



"We want students to understand how they can make a difference in the labs and beyond."

- Zoeshan Khan,
Manager, Building Operations

Shut the sash

Langara's new Science and Technology Building houses state-of-the-art biology, chemistry, physics, astronomy, nursing, and computing science labs. The building also has a lecture hall, multi-purpose classrooms, and collaborative study spaces.

Alongside the launch of the new lab facilities, meetings were held with teachers to design special signage for the new variable air volume (VAV) fume hoods. Delays in building commissioning presented some setbacks in the initial timeline for the campaign but eventually all of the fume hoods were installed.



"Shut the Sash" campaign

<https://langara.ca/about-langara/sustainability/pdf/fume-hoods-handout-final.pdf>

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Other Sustainability Activities in 2017

Waste Management

- In July, Facilities purchased and installed 30 additional four-stream recycling stations in the Library and A Building hallways to complete the campus wide transition to new bins with consistent signage.
- Additional water refill stations were installed in an effort to reduce waste from disposable bottles.

Transportation

- Langara participated in the May and October Bike to Work Week workplace challenges and hosted celebration stations for cyclists on Ontario Street



- The BC Commuter Challenge made a comeback at Langara in 2017 with the help of new employee volunteers leading the organizing efforts.
- The college conducted a very successful Transportation Survey in October which polled both students and employees on transportation behaviors and satisfaction. With over 3000 responses, Institutional Research have been able to compile useful statistics that will inform our transportation strategies going forward. The survey will run every other year in the fall.

Academic Plan Action Group 5 (APAG5)

- The renovation of our college mailroom included a dedicated space for a new Reusable Office Supplies Exchange, which will help reduce the waste and costs associated with moves and transitions.
- Facilities introduced a Zero Waste Event Checklist to encourage our internal events to adopt more sustainable practices. This year's APAG Mini-Conference became the inaugural participant and achieved Zero Waste Event Gold Status.
- APAG5 continues to investigate the college's ability to host a Thingery, which would provide a permanent space for community members to share and exchange small tools and equipment
- Sustainability Signage will be installed at key points to highlight our Apiary, Geo-exchange Fields and Community Garden
- Sharing table event promoted the reuse of household items

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Langara Student Sustainability Engagement

- In the collaboration with Facilities, International Education and The Hub, Langara College's summer 2017 Sustainability Ambassadors hosted engagement booths for students during orientation week to share information on Langara College's sustainability program. The purpose of the Langara thinks green program (LTG) is to connect with new students to highlight our green culture at Langara College.



Photos of Langara Thinks Green Summer 2017

- Partnering with the HUB, the Facilities Department brought on another co-op student for two semesters as our part-time Sustainability Coordinator responsible for student outreach and educational engagement



Other Sustainability Related Events included:

- Small appliances recycling event with ElectroRecycle (Nov 9, 2017)
- Goods Swap in September 2017: In the summer of 2016, a group of students in ECON 1119 organized the first Goods Swap at Langara College. A Goods Swap is intended to establish a community of sharing and reusing while reducing waste. This an opportunity for you to declutter your home and to share your unwanted goods with our students and co-workers while supporting Vancouver's Greenest City 2020 initiative.

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Plans to Further Reduce Greenhouse Gas Emissions and Improve Sustainability

Our plans to continue reducing greenhouse gas emissions in 2018 and beyond include the following initiatives:

Green Buildings

- Installation of a 5.4kWp solar photovoltaic (PV) system on the roof of the Science and Technology building for educational purposes. This is a student led initiative funded by student fundraising projects and supported by the Langara Foundation and Facilities.
- Utilize meter data to understand building loads in more detail for future campus planning and expansion.

Green Renewal

- Continue to install more efficient and affordable lighting solutions with improved LED technologies to save on energy, update aged equipment and decrease ongoing maintenance costs.
- Continue to upgrade energy intensive gas and electric appliances in to new energy efficient models.
- Continue replacing old unitary HVAC equipment with more energy-efficient equipment.
- Updated building controls to replace end of life equipment and improve performance.

Operations & Maintenance

- Continue to monitoring and reporting on energy usage and larger systems performance, looking for low cost opportunities (ie schedule changes/alignment with occupancy, general systems review and commissioning, etc.)
- Conduct water audit to identify opportunities to reduce water consumption.
- Continue timely repairs of equipment to minimize impact on energy consumption.
- Continue to conduct preventative maintenance and upgrades to HVAC system and associated appliances.
- Continue to complete lighting upgrades on a failure-based requirement and during planned renovations where feasible.

Engagement & Awareness

- Continue to raise awareness around plug loads, inventory space heaters, and utilizing the most efficient option where required.
- Continue with the Kitchen's "Turn off when not in use" campaign and other similar campaigns.
- Promote green building audio tour to highlight green features of the new Science & Technology Building
- Consider continuing the use of a Langara co-op student every year to help with student engagement related to energy and waste management on campus.

Waste Management

- Conduct a waste audit in 2018.

Transportation

- Participate in Bike to Work Week and BC Commuter Challenger events
- Investigate Car share opportunities.
- Planning for additional electric car charging stations.

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Academic Plan Action Group 5 (APAG5)

- Increased communications related to sustainability on campus, including signage.
- Installation of a “Thingery” on campus – which is a Community Owner Lending Library which could include tools, kids’ toys, recreation equipment, etc.

Part 1: CNAR Survey

1. General Information

Name: Patricia Baker

Contact Email: patriciabaker@langara.ca

Organization Name: Langara

Sector: Post Secondary

2. Stationary Sources (eg. Buildings, Power Generators): Fuel Combustion, Electricity use, Fugitive Emissions.

During 2017, did your organization take any of the following actions to support emissions reductions from buildings? (please select all that apply)

Performed energy retrofits of the organization's building(s); Built, or are building new LEED Gold or other "Green" buildings

2. Stationary Sources - Other? Please specify: Officially received our LEED Gold certification for our New Science and Technology Building which opened in Sept 2016.

If you selected "*Performed energy retrofits of the organization's building(s)*":

How many buildings were retrofitted?: 2

If you selected "*Built, or are building new LEED Gold or other "Green" buildings*":

How many new "Green" buildings?: 1

Did your Organization perform any retrofits during 2017? Please describe briefly:

Building 'A' Fan System Renewal The fan systems were rebuilt and converted to a Variable Air Volume (VAV) Reheat Systems, including improving air distribution in classrooms and updated integrated building controls.

Building C South fan system was upgrade from inlet vane to variable speed drive, including updated and integrated digital controls.

Lighting Efficiency Projects
Kitchen Equipment Renewal

Two high-efficiency chillers for new data center
Old air compressor replaced

2a. Stationary Sources (eg. Buildings, Power Generators): Fuel Combustion, Electricity use, Fugitive Emissions.

Please briefly describe your organization's plans to continue reducing emissions from its stationary sources:

a) Over the next 1-5 years

continue to upgrade end of life equipment with more energy efficient technology.

- Continue to install more efficient and affordable lighting solutions with improved LED technologies to save on energy.
- Continue to upgrade energy intensive gas and electric appliances in to new energy efficient models.

consider renewable energy sources. (solar, wind?)

expand new central heating plant to rest of campus

reduce heat island effect with white roof technology

b) Over the following 6-10 years

continue building systems optimization, including proactive response through fault detection opportunities.

renewables - continue to add to campus,

continue to implement most efficient technologies when replacing end of life equipment.

continued awareness and engagement campaigns.

3. Mobile Sources (Vehicles, Off-road/portable Equipment): Fuel Combustion:

During 2017, did your organization take any of the following actions to support emission reductions from its mobile sources? (please select all that apply)

None of the above

3) Mobile Sources - Other? Please specify: not applicable to our organization as we have only one vehicle for our theatre arts program. Business case does not support replacing vehicle.

If you selected "*Replaced existing vehicles with more fuel efficient vehicles (gas/diesel)*":

How many vehicles?:

If you selected "*Replaced existing vehicles with hybrid or electric vehicles*":

How many vehicles?:

3a. Mobile Sources (Vehicles, Off-road/portable Equipment): Fuel Combustion:

Please briefly describe your organization's plans to continue reducing emissions from its mobile sources:

a) Over the next 1-5 years

not applicable

Note: we are actively promoting alternative transportation.

b) Over the following 6-10 years

not applicable

4. Supplies (Paper): Indicate which actions your PSO took in 2017:

During 2017, did your organization take any of the following actions to support emissions reductions from paper supplies? (please select all the apply)

Had an awareness campaign focused on reducing office paper use; Had a policy requiring the purchase of recycled content paper

If you selected "*Had a policy requiring the purchase of recycled content paper*":

State the required recycled content here (30%, 50%, 100%): 30

If you selected "*Had a policy requiring the purchase of alternate source paper (bamboo, hemp, wheat, etc)*", which type of alternate source paper did you use?

Please briefly describe your organization's plans to continue reducing emissions associated with its office paper use in future years.

Monitor the use of paper products through the installation of our new Multi-Function Devices installed last year.

5. Other Sustainability Actions

a) Business Travel

During 2017, did your organization take any of the following actions to support emissions reductions from business travel? (please select all that apply)

Encouraged alternative travel for business (e.g. bicycles, public transit, walking)

b) Education/Awareness

During 2017, did your organization have any of the following programs or initiatives to support sustainability education and awareness? (please select all that apply)

A Green, Sustainability or Climate Action Team; Support for professional development on sustainability (e.g. workshops, conferences, training)

c) Other Sustainability Actions

During 2017, did your organization have any of the following programs or initiatives to support sustainability? (please select all that apply)

A water conservation strategy which may include a plan or policy for replacing water fixtures with efficient models; An operations policy or program to facilitate the reduction and diversion of building occupant waste (e.g., composting, collection of plastics, batteries) from landfills or incineration facilities; Green procurement standards for goods (e.g., office furniture, etc.)