

CONESTOGA

Energy Conservation & Demand Management Plan 2024 - 2029

Facilities Management 2024



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1. Introduction

Established in 1967, Conestoga now serves students through campuses and training centres across Southwestern Ontario including Kitchener, Waterloo, Cambridge, Guelph, Stratford, Ingersoll, and Brantford.

As the region's only provider of polytechnic education, Conestoga plays an integral role in the success of our community and our comprehensive range of programming meets the needs of a variety of learners, providing multiple entry points and established pathways to ensure that individuals across our community can access the education they need for their chosen careers.

Conestoga has prioritized environmental sustainability in our campus operations and programming and made significant strides



Reduce greenhouse gas emissions 40% by 2030 from 2010 levels

toward the decarbonization of our facilities since our last Energy Conservation & Demand Management Plan was issued in 2019. Energy Conservation and Demand Management (ECDM) refers to Conestoga College's ongoing commitment to energy management and the improvement of College-wide energy efficiency. ECDM measures and works to reduce Scope 1 and Scope 2 greenhouse gas emissions through facility upgrades, energy efficiency improvements, and renewable energy projects.

This report heavily intertwines with the College's carbon reduction plan and confirms our short- and long-term commitments to:



Achieve net-zero emissions by 2050

Conestoga College will continue to create a culture of sustainability with a focus on energy conservation and demand management and will update the ECDM Plan on a five-year renewal timeframe.



2. Goals & Objectives



Goals of Conestoga's Energy Conservation and Demand Management Efforts:

- Support a 40% GHG reduction by 2030; and
 - Net Zero GHG emissions by 2050.

Objectives of the 2024 to 2029 Plan:

- Find opportunities to reduce greenhouse gas (GHG) emissions.
- Measure energy performance over time.
- Develop formal energy conservation and demand management processes and policies.
- Better manage energy use and costs.
- Identify energy-saving and cost-saving opportunities.





Energy Conservation and Demand Management is a key priority across all our sites, with specific focus on our 7 main campuses:

- Doon Campus, Kitchener.
- Brantford Campus.
- Cambridge Fountain St. South Campus.
- Cambridge- Skilled Trades Campus (newly opened).
- Guelph Campus.
- Ingersoll Skills Training Centre.
- Waterloo Campus.



3. Energy Consumption & Achievements to Date

3.1 Energy Consumption to Date

Over the last 5 years, our ECDM efforts have allowed us to conserve and strategically manage energy consumption across our campuses while our square footage significantly increased, allowing us to maintain a stable rate of energy use intensity.



Figure 1: Site-wide energy consumption trends, 2019 to 2023.

While the COVID-19 pandemic impacted our energy usage starting in 2020 as a result of remote class delivery and work from home procedures, it allowed us to adopt lasting energy conservation procedures even after the full return to regular operations starting in Fall 2023. Efforts such as the work location initiative, hybrid in-person/virtual classroom deliveries, and widespread adoption of virtual meetings to reduce travel and on-campus requirements all contributed to energy conservation.

The following table summarizes our institutional utility consumption from 2019 to 2023. Consumption for each respective utility has been adjusted to fit a regular calendar year (365 days).



| Annual Energy Consumption | | | | | |
|---------------------------|------------|------------|------------|------------|------------|
| | 2019 | 2020 | 2021 | 2022 | 2023 |
| Electricity (kWh) | 15,373,229 | 11,942,783 | 11,483,353 | 15,804,261 | 18,100,766 |
| Natural Gas (m3) | 1,517,723 | 1,435,629 | 1,424,017 | 1,157,785 | 1,216,841 |

Table 1: Institutional utility consumption from 2019 to 2023.

As it relates to greenhouse gas emissions, the following graph shows our total (absolute) annual GHG emissions from 2019 to 2023. Over this time, our square footage grew over 359,000 ft².



Figure 2: Site-wide scope 1 and 2 greenhouse gas emissions, 2019 to 2023. Emissions factors from <u>Government of Canada National Inventory Report.</u>

For a detailed breakdown by site, view our annual energy consumption and GHG emissions report prescribed under O. Reg 25/23.

3.2 Achievements to Date

Key achievements from our 2019 ECDM plan include the following projects and their associated annual energy savings. Cumulatively, these projects have resulted in approximately \$479,000.00 in cost savings per year.



Other key achievements impacting greenhouse gas emissions from 2019 to 2023 include:

Work Location Initiative

Our Work Location Initiative was fully implemented in 2022 as we resumed regular operations following the COVID-19 pandemic. This working model supports student and staff success through the integration of physical and virtual spaces and work-from-home options to heighten engagement and strengthen wellbeing and work/life balance.

Electric Vehicle (EV) Charging Network

The College has established a goal to equip 1.5% of parking spaces with EV chargers by 2030, to support the needs of students and staff. This goal is supported by an EV Charging Network Plan which prioritizes campuses that are currently underserved. By the end of 2023, our EV charging network consist of 11 charging stations across 5 sites.

Electric Fleet Vehicles

As of early 2024, the College's fleet includes 4 fully electric cargo vans and a fully electric John Deere Gator utility vehicle. The College will prioritize the purchase of electric and hybrid fleet vehicles in all newly added vehicles going forward.

Sustainable Transportation

We continue to expand access to sustainable transportation options for students and staff, including increasing secure bike and scooter storage facilities, inter-campus shuttle services (hosted by Conestoga Students Inc.), discounted public transit passes, and providing access to micromobility and sustainable transportation programs such as TravelWise. We will also continue to expand walking paths on campuses and connections to community trails.

Waste Reduction and Diversion

We have set a goal to achieve an 80% waste diversion rate by 2030, which includes a strong focus on waste reduction. Each year we continue to expand our organics and recycling programs including common area waste, specialty waste from academic programs and departmental functions, as well as construction and renovation waste.

Several initiatives have supported waste diversion to date, including:

- Transition to a centralized waste management system.
- Standardization of colour-coded bins and signage.
- Increasing organics collection in common areas and employee office spaces and working in partnership with our Residence teams to provide organics collection in student housing.
- Reusable takeout container program at our Waterloo campus restaurant, Bloom, launched as a collaboration between the Centre for Supply Chain Innovation and the Conestoga Food Research & Innovation Lab.

 Furniture Reallocation Program which donates obsolete office furniture to community partners and excess being offered to employees. From March 2022 to December 2023, over 900 pieces of furniture were donated to 4 local non-profit organizations, over 800 pieces were re-homed to employees, and 400 pieces were resold.

Naturalization of Green Spaces

In 2023, two pollinator gardens were completed which are home to several varieties of drought-tolerant plants that are native to this area, making them resilient in the face of our local climate and requiring minimal watering to thrive. These plants attract and support pollinator species by providing food and shelter year-round. The walkways are constructed using 100% permeable pavement, allowing 100% of rainwater to filters back into the garden and into the water table.

4. Current & Proposed Energy Conservation and Demand Management Measure

4.1 Institution-Wide Measures

The following actions have been initiated in 2024, impacting college-wide operations and shaping the culture of carbon reduction and energy management. The impact of these actions will be seen across all Conestoga facilities, and championed by senior leadership:

1. Dedicated Energy Team

In 2024, Conestoga's first dedicated EnergyTeam will be formed. The team will focus on cross-departmental collaboration to implement energy efficiency initiatives and promote strategic energy management. The focus will be on continuous improvement, education, and awareness.

2. Energy Management Policy

Conestoga is in the process of formalizing an institution-wide Energy Management Policy to show our commitment to this work. The policy will outline energy management principles and objectives, including our carbon reduction targets, improving visibility across the institution and support in aligning efforts to improve performance.

3. Green Building Standards

Led by the Facilities & Capital Development team, internal building and design standards will be formalized for use internally and to inform consultants of the requirements for new buildings and renovation projects. These performance-based standards will focus on strategic energy management and environmental sustainability as well as social and equity considerations.

4. Energy Scans

In 2024 we completed our first energy scan of Doon campus, to identify energy conservation and efficiency opportunities. This initial scan was used as a model which will be replicated across our other campuses to find additional opportunities for consideration as part of our energy management and carbon reduction efforts.

5. Participation in Strategic Energy Management Program

Conestoga is an active participant in the Strategic Energy Management program delivered by the Independent Electricity System Operator (IESO) and Save on Energy. As part of this program, we are solidifying our commitment to energy conservation and management and developing a toolkit of resources to continuously improve our energy performance.

4.2 Site-Specific Measures

The following conservation strategies have been identified at each respective site, to be completed by 2030 to achieve our goal of a 40% greenhouse gas emission reduction.

| Campus | ID | Project | Expected Completion | Anticipated GHG Reduction (tCO2e) |
|----------------|------|---|------------------------|---|
| | DM1 | Installation of Lighting Controls integrated with Occupancy Sensors and Daylight Harvesting | 2030 | 1 |
| | DM2 | BAS Re-commissioning and Controls Upgrade | 2030 | 156 |
| | DM3 | Convert HW Loop to Primary Variable | 2026 | 26 |
| Doon Campus | DM4 | Ground Source Heat Pump System Installation | 2026 | 256 |
| | DM5 | Electrification of Boiler Plant – Woodskills Building | 2026 | 57 |
| | DM6 | Electrification of Boiler Plant – Welcome Centre | 2026 | 42 |
| | DM7 | Electrification of Domestic Hot Water Boilers | 2030 | 27 |
| | DM8 | Enersion Tri-Generation | 2026 | 60 |
| | DM9 | Retrofit or Replace old Air Handling Units | 2030 | 13 |
| | DM10 | Installation of Air Curtains for the Building Entrance and Loading Docks | 2026 | 7 |
| | DM11 | Replace Kitchen Makeup Air Unit | 2026 | 19 |
| | DM12 | Install a 113 kW Solar PV Rooftop System | 2026 | 9 |
| | DM13 | BlackPAC with Al | 2030 | 96 |

| | DI1 | Commissioning Quality | | | |
|----------|-------|---------------------------------------|--|-----|--|
| | | Assessment Process | Replace calcite on Rec Centre Rooftop | | |
| | | Server Room Heat Recovery | | | |
| | | Bay Door Improvements | | | |
| | DI4 | Tin Boof Insulation | | | |
| | | Lipiyopt in Woodskills Building | | | |
| | | Davlight Harvorting Sonsor Additions | | | |
| | | Server Room Redesign | | | |
| | Dio | Boot-cause Analysis: Walk-in | - | | |
| | DI9 | Freezer Pipe Condensation | | | |
| | DI10 | Energy Becovery Ventilation study | | | |
| | DI11 | Building Envelope "Patching" | | | |
| | DI12 | Duct Cleaning | | | |
| | DI13 | Hot Water Pump VEDs - Powerhouse | | | |
| | DI14 | Cogged Belts on HVAC Motors | - | | |
| | DI15 | Cooling Equipment Consultation | | | |
| Doon | BIIO | Demand-Controlled Kitchen | Under investigation, completion before 2029 | | |
| Campus | DI16 | Ventilation | | | |
| - | | Solar Glazing – F-Wing Bridge, | | | |
| | DI17 | E-Wing Common Area | | | |
| | DI18 | Water-Efficient Fixtures | | | |
| | DI10 | Food Services Bay Door | | | |
| | D119 | Repair/Redesign | | | |
| | DI20 | Door Leak Sealing Program | | | |
| | DI21 | Compressed Air Leak Audit- Shops | | | |
| | DI22 | Idling Lights Audit | | | |
| | DI23 | Sensor Audit | | | |
| | DI24 | Air Curtain- F-wing Entrance | | | |
| | DI25 | Screen and Projector Idling Program | | | |
| | DI26 | Computer Monitor Behavioural | | | |
| | DIZO | Campaign | | | |
| | DI27 | Light Switch Positioning as a | | | |
| | | Construction Standard Detail | | | |
| | DI28 | Exterior Wall Mount LED | | | |
| | DIZO | Lighting Upgrades | | | |
| | | | 2020 | Λ | |
| | | | 2030 | 4 | |
| | WM2 | Controls Ungrade | 2026 | 35 | |
| Weterler | W/M3 | Building Envelope Improvements | 2026 | 12/ | |
| | W/M/ | Electrification of Boiler Plants | 2020 | 50 | |
| Campus | WM5 | Installation of Air Sourced Heat Pump | 2020 | 83 | |
| | ••••• | Electrification of Domestic Hot | 2000 | | |
| | WM6 | Water Boilers | 2030 | 28 | |

| Waterloo Campus | WM7 | Monitor and Control Plug Loads Across the Campus | 2030 | 10 |
|---------------------|------|--|---|-----|
| | WM9 | Solar Photovoltaic Rooftop System | 2026 | 67 |
| | WM10 | Air Source Heat Pump RoofTop Unit Upgrade | 2026 | 30 |
| | WM11 | Ground Source Heat Pump Installation | TBD | TBD |
| | WM12 | BlackPAC with Al | 2030 | 23 |
| | | | | |
| | CM1 | LED Lighting Upgrade | 2030 | 2 |
| Combridge | CM2 | Ground Mount Solar Photovoltaic System | 2030 | 182 |
| Campus | CM3 | BlackPAC with Al | 2030 | 25 |
| Campus | CI1 | Cambridge Fume Extractors | Under investigation, completion before 2029 | |
| | | | | |
| | GM1 | LED Lighting Upgrade | 2030 | 4 |
| Guelph Campus | GM2 | Electrification of Domestic Hot Water Boiler | 2030 | 7 |
| | GM3 | Air Sourced Heat Pump Roof Top Unit Upgrade | 2030 | 109 |
| | GM4 | Install a 913 kW Solar Photovoltaic Rooftop System | 2026 | 72 |
| | GM5 | Install a 292 kW Solar Photovoltaic Carport System | 2026 | 13 |
| | | | | |
| | IM1 | LED Lighting Upgrade | 2026 | 2 |
| Ingersoll Campus | IM2 | Air Sourced Heat Pump Roof Top Unit Upgrade | 2030 | 9 |
| | IM3 | Install a 70.5 kW Solar Photovoltaic Rooftop System | 2026 | 5 |
| | | | | |
| | MB1 | LED Lighting Upgrade | 2030 | -1 |
| Brantford Campus | BM2 | Electrification of Domestic Hot Water Boilers | 2026 | 6 |
| | BM3 | Air Sourced Heat Pump Rooftop Unit Upgrade | 2026 | 20 |

Table 2: Conservation strategies by campus, to achieve our goal of a 40% greenhouse gas emission reduction by 2030.

Upon successful completion of the measures listed above in Table 2, we will meet our goal to reduce GHG's 40% by 2030, based on 2010 levels, and set ourselves up for success in reaching net-zero emissions by 2050.

Figure 3: GHG emission trajectory based on achievement of the measures included in this report and forecasted grid level emissions.

5. Monitoring Progress

Progress on this ECDM Plan will be monitored on an annual basis, in line with O. Reg. 25/23 reporting requirements. It will be made publicly available on our website and made available to the public in printed form at our main Facilities & Capital Development Office upon request.

Additionally, project-specific monitoring will ensure progress is made in a timely manner. Conestoga's senior leadership and Board of Governors have approved the 40% GHG reduction target by 2030, and dedicated staff and financial resources to its implementation. Progress against our carbon reduction target will be reported in our annual Business Plan, and as part of regular Corporate Sustainability Plan updates.

Our Facilities & Capital Development team is dedicated to carbon reduction, energy management, and commits to continuous learning and improvement to meet and exceed our goals.

6. Closing Comments

Conestoga College is a primary source of education, and an integral part of our local communities. As such, we have a responsibility to manage our resources efficiently and effectively, by integrating environmental sustainability into all aspects of our facility operations.

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

7. Glossary of Terms

| Term | Abbreviation | Meaning |
|--|--------------|--|
| Energy Conservation & Demand Management | ECDM | An ongoing commitment to conserving and strategically managing energy consumption. It is used to reduce greenhouse gas emissions, reduce load on provincial electricity systems, and achieve cost-saving opportunities by eliminating energy waste. |
| Greenhouse Gas Emission | GHG | Gases that contribute to the greenhouse effect by absorbing infrared radiation, e.g., carbon dioxide and chlorofluorocarbons. |
| Energy Usage Intensity | EUI | The amount of energy relative to a buildings physical size typically measured in square feet. |
| Light Emitting Diode | LED | An ultra efficient lighting solution, which produces light up to 90% more efficiently than incandescent light bulbs. |
| Building Automation System | BAS | Technology using sensors and networked electronic devices to allow building operators to access, control, and monitor all connected building systems from a single interface. |
| Heating, Ventilation, & Air Conditioning | HVAC | Various systems used for moving air between indoor and outdoor areas, and with heating and cooling buildings. |

