Energy Efficiency and Decarbonization Plan

OCAD UNIVERSITY

2025-2030

ENERGY EFFICIENCY AND DECARBONIZATION PLAN

OCAD U Energy Efficiency and Decarbonization Plan 2025-2030

Executive Summary

OCAD U Facilities & Studio Services and Campus Planning & Projects departments are actively working to lower energy use and carbon emissions on campus. Two projects that are currently underway are an all-campus lighting upgrade that converts incandescent, fluorescent, or other existing types of lighting to LED; and one to replace end-of-life natural gas heating equipment with efficient hybrid-electrical equipment. This will position us for a full shift to a carbon-neutral campus in the coming decade.

As part of the latter project, we are working with consultants to improve our building performance through HVAC scheduling, air balancing, installation of demand-control systems, and more. Our goal is to reduce energy consumption through these means by a minimum of 20 per cent.

Eliminating and/or offsetting on-site burning of fossil fuels is at the core of decarbonization. It requires the replacement of older inefficient gas-burning equipment with non- or reduced-carbon producing alternatives. This is often referred to as fuel-switching. At OCAD U this means replacing heating, ventilating and cooling (HVAC) equipment with alternatives such as heat pumps or electrically heated water systems. This is not an insignificant task; at 100 McCaul alone there are 45 rooftop units, two large boilers, and two gas hot water tanks that will need to be replaced.

Timing is very important to getting the full value out of fuel-switching. It is important to replace existing equipment when it has reached end of useful life and would otherwise need to be replaced as part of regular capital renewal.

For OCAD U, the timing is good. Most of the existing equipment at 100 McCaul was installed in 2004, during the construction of the Sharp Centre and renovation of the main building. It is now time to replace it, as it is approaching the end of its anticipated useful life. Upgrading to heat pumps, electric boilers and improving controls will add an estimated $1.1M to the cost of full replacement, but is calculated to provide equal payback over the following ten years, through energy efficiency.

Phasing of Decarbonization - Campus 'Clusters'

Given the complex ownership and building types that make up the OCAD U campus, this plan divides the building complement into four 'clusters':

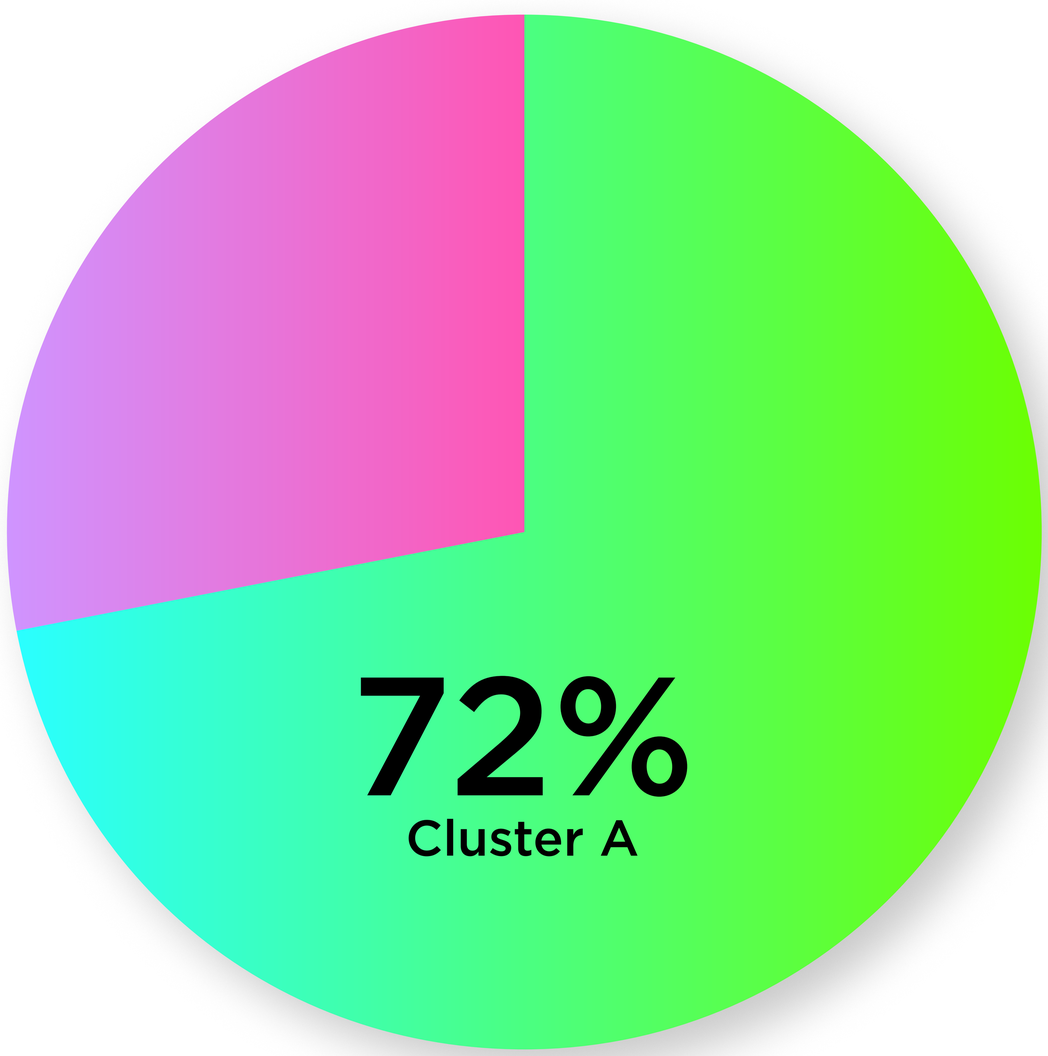
- **Cluster A**: 100, 115 and 74-76 McCaul (Aboveground building). OCAD U has full control of heating and cooling infrastructure at 100 and 115 McCaul.
- **Cluster B**: 113, 49 and 51 McCaul, 210 Simcoe. Heating and cooling is supplied by Village By The Grange, 210 Simcoe Condominium.
- **Cluster C**: 199, 205, and 230 Richmond St. W. Heating and cooling supplied by Hullmark and Studio PM.
- **Cluster D**: 130 Queen's Quay E. Heating and cooling supplied by 130 QQE.

The bulk of capital investment will take place in Cluster A, where we are in full ownership and control of the HVAC equipment. For Clusters B through D, we will be engaging with property and operating partners to implement efficiencies and further progress toward net zero.

OCAD U uses the most energy on campus in Cluster A, which accounts for 79% or our direct-billed electricity, and 72% of gas. Fuel-switching in Cluster A will lead to an estimated elimination of 65% of our carbon production, according to our engineering consultants.

Campus Gas Consumption by Cluster

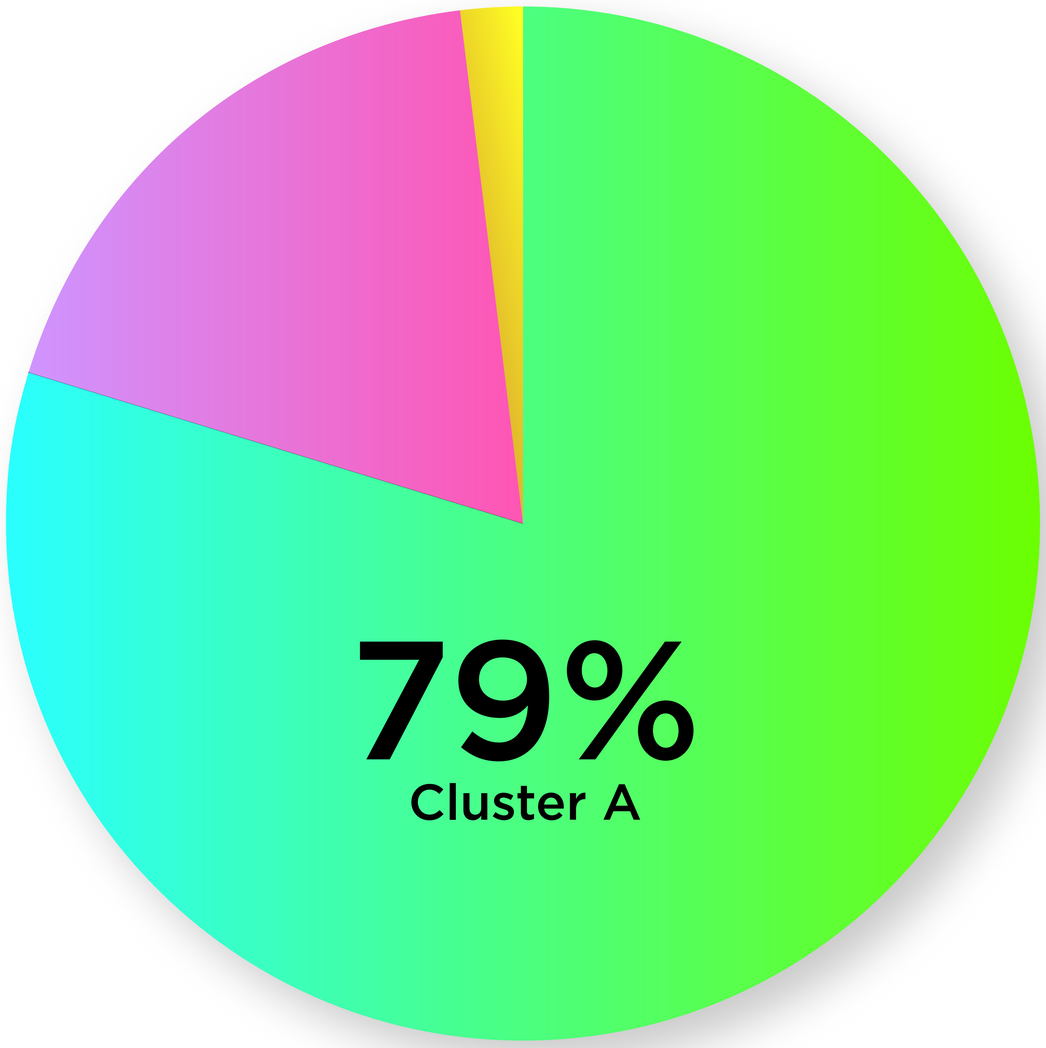
- Cluster A – 72%
- Cluster C – 28%



** Note that clusters B and D are not represented, as OCAD U does not control gas consumption in these buildings.*

Campus Electrical Consumption by Cluster

- Cluster A – 79%
- Cluster B – .18%
- Cluster C – 18%
- Cluster D – 1.8%



Fuel-switching in Cluster A will lead to an estimated elimination of 65% of our carbon production

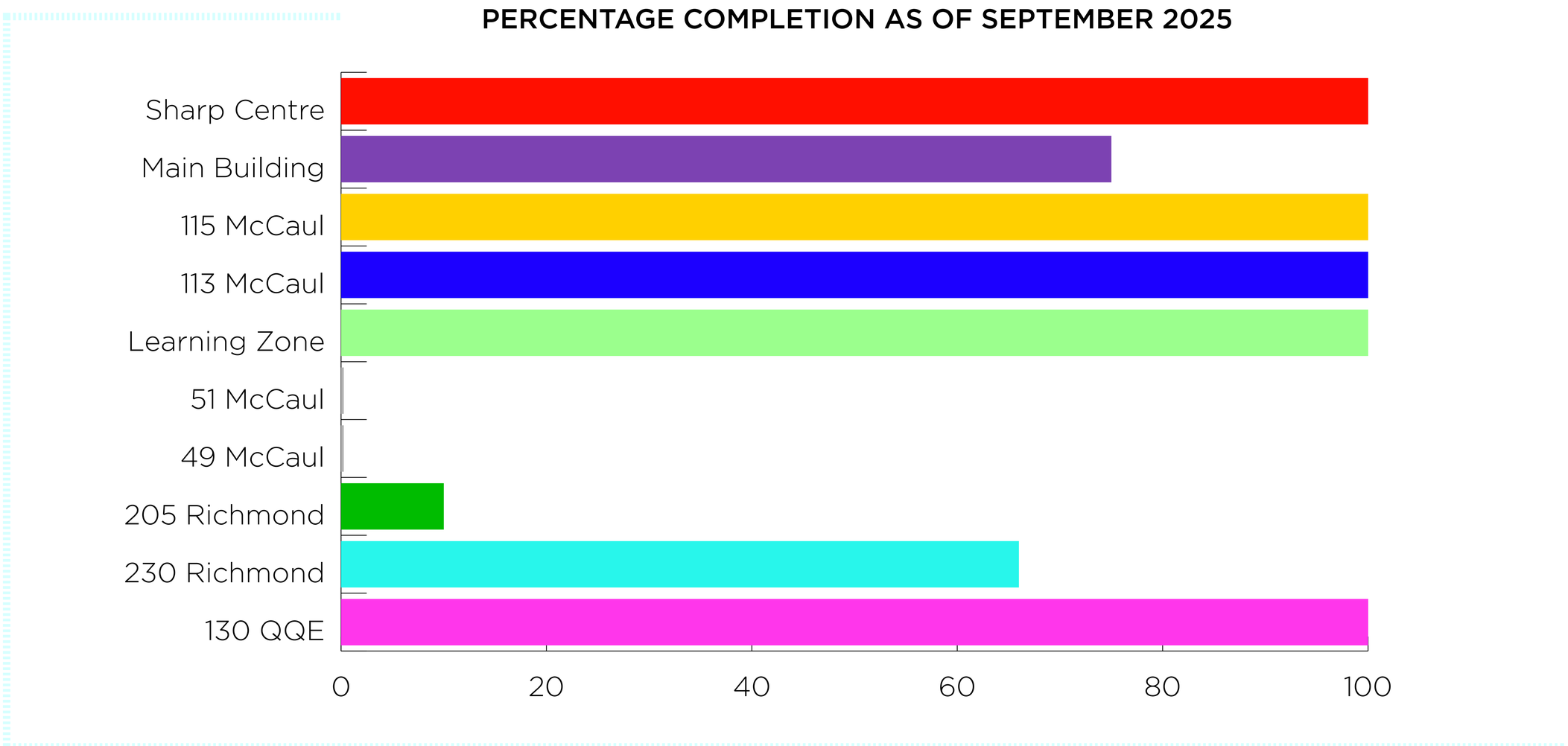
Where We Are Now

Important energy efficiency actions have been carried out in Cluster A over the last few years, to improve overall energy performance. They include the replacement of aging inefficient windows on the south face of 100 McCaul (2022); upgrading of exterior ductwork insulation at 100 McCaul (2024); extensive replacement of fluorescent lighting with more efficient LED lighting (2019, ongoing); upgrading of Sharp Centre domestic water booster pumps with more efficient variable-speed pumps (2023); and the implementation of strategic summer room scheduling by clustering programmed classrooms together and saving on cooling unused parts of the building (2024, ongoing). We will continue to look for efficiencies while we engage in our fuel-switching program.

Energy Efficiency – Lighting Conversion to LED

Conversion to LED lighting is unquestionably an energy-saving measure and advantageous for maintenance reasons. LED lighting typically requires about a quarter of the energy of fluorescent, does not need regular bulb changes, and provides a brighter, more even light. OCAD U has been installing LED lighting fixtures in all newly constructed and renovated spaces, as well as retrofitting older fixtures with new ballasts and LED bulbs.

This conversion process is ongoing, with an anticipated completion date of April 2027.



Energy Efficiency – Building Envelopes

The building envelopes in Cluster A are generally in good condition. 115 McCaul was recently completely renovated and outfitted with new external insulation and cladding, as well as new windows.

Energy modeling of 100 McCaul conducted by Entuitive Consulting Engineers in 2022 concluded that although some of the windows and skylights are nearing end of life and could be more efficient, a net energy efficiency gain of only 3% higher could be expected if they were replaced. The existing building is quite efficient due to its efficient wall-to-window ratio, thick walls, and the fact that most windows already have been converted to double-glazed. A large window replacement project was undertaken during the pandemic closure to replace all of the windows on the south end of the main building. Old and inefficient single-glazed windows were replaced with double-glazed windows with thermally-isolated frames

The Next 5 Years

Building science, electrical, and mechanical engineering consultants have analysed the makeup of our HVAC systems and existing building conditions and come up with a detailed phasing plan for equipment replacement. This plan considers the age of the existing units, the areas they serve within the buildings, and the processes involved with the replacement. Given the tight footprint of the buildings and the logistical challenges of removing and replacing equipment, it will be important to be efficient in our actions.

An annual budget of $1 million has been allocated to the equipment replacement project for planning purposes. It will take approximately 8 years to replace the existing equipment given this budget.

2025	Cluster A	Replace domestic hot water tanks, Main building Level 6 Sharp Centre Make-Up Air Units	**$1,000,000**
2026	Cluster A	Major electrical upgrades to support replacement of Rooftop Units	**$1,000,000**
2027	Cluster A	Replace selected Sharp Centre Rooftop Units	**$1,000,000**
2028	Cluster A	Replace selected Sharp Centre Rooftop Units	**$1,000,000**
2029	Cluster A	Replace selected lower rooftop HVAC Units	**$1,000,000**
2030	Cluster A	Replace selected lower rooftop HVAC Units	**$1,000,000**

Longer-Term Development

Longer term, OCAD U will continue to work with consultants to develop on-site energy generation. This would be either solar or wind, or a combination of the two. The roof of the Sharp Centre offers good sun and wind exposure, but at this point the cost of hardware and installation do not make either of these an attractive financial investment. We will re-evaluate these costs annually as well as pursue any special funding that may allow us to speed up implementation of these resources.

It is important to OCAD U's mission that the energy operations of the campus be 'future proofed' as much as possible, and expanding sources of electrical energy will assist in that goal.

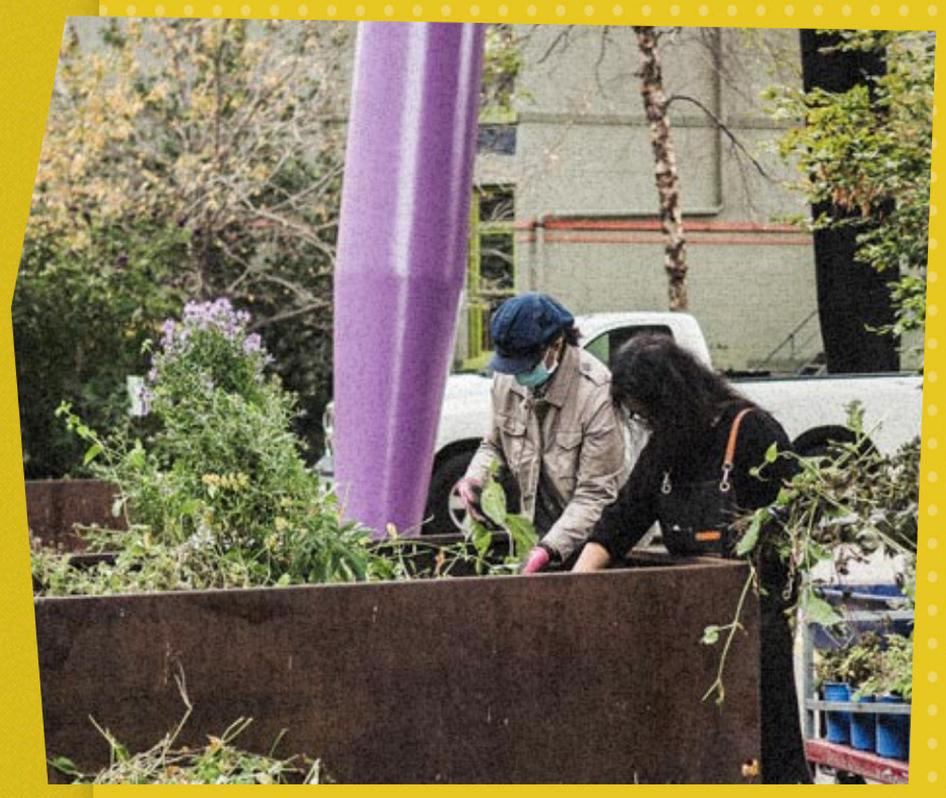
Alignment with Academic and Strategic Plan

Sustainability takes a prominent role in OCAD U's current Academic and Strategic Plan. From wide inclusion in curriculum, to emphasis on sustainability through research, to convening global conversations in climate action, OCAD U strives to embed and enact a deep and regenerative connection with our environment.

Decarbonization is a key performance indicator in our sustainability path. In Priority 2, Objective E of the plan, we commit to improving our '*carbon emissions and energy and water consumption in campus planning, buildings, and operations, moving towards net zero by 2030'.* This is an ambitious target, but one we take on with a deep commitment and optimism.

INTRODUCTION

Through cultural and material production, OCAD University will lead the transition to an environmentally sustainable future.

We will work towards carbon neutrality in our buildings and operations. We will also embed environmental sustainability in learning outcomes across our curriculum, producing the world's leading artists and designers in a post-extractive future.

We will build regenerative relationships between people and land, guided by Indigenous Knowledge Leaders, Indigenous Knowledges and practices, and decolonial ways of being.