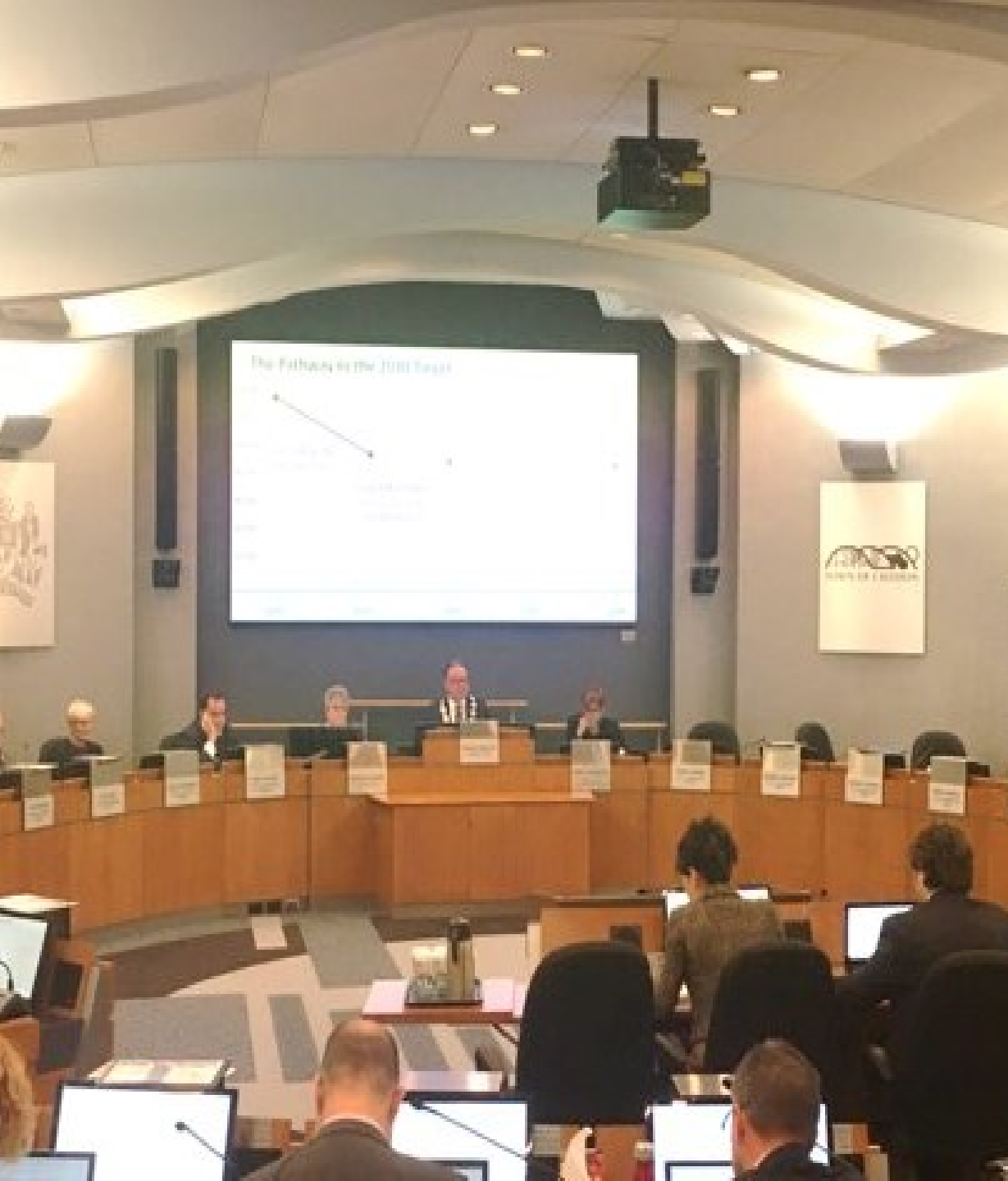# Energy Retrofits and Net Zero Emission Standards
Region of Peel

Hemant Grover,
Manager: Office of Climate Change and Energy Management
Region of Peel
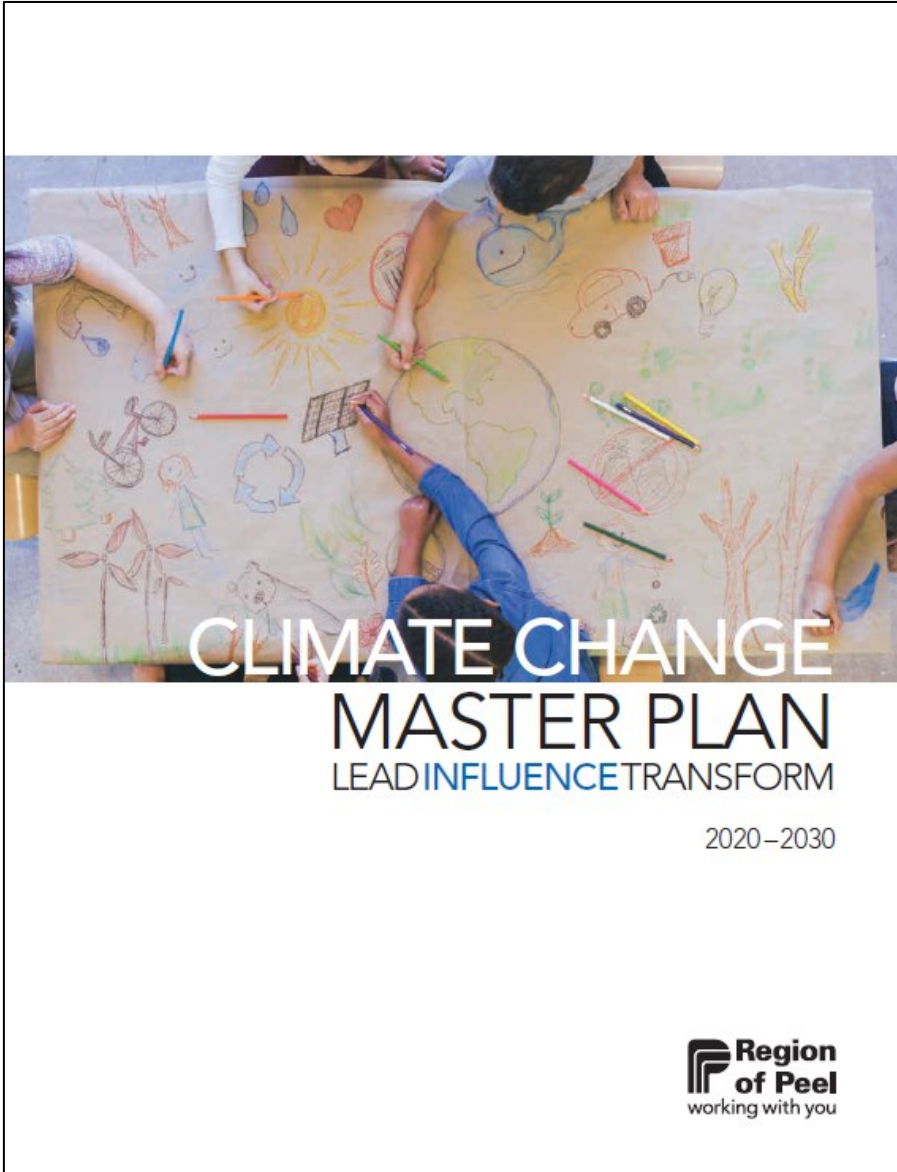
The Region of Peel

CLIMATE CHANGE
MASTER PLAN
LEAD INFLUENCE TRANSFORM

2020 – 2030

Climate Change Master Plan Overview

CLIMATE CHANGE
MASTER PLAN
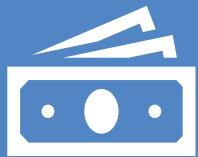LEAD INFLUENCE TRANSFORM
2020–2030

Region of Peel
working with you

Timeline 2020-2030

GHGs 45% below 2010 by 2030
More prepared for extreme weather

20 Actions and 66 Activities

$300-$400 million estimated incremental costs

$85 million estimated cumulative operational savings

Standards, Policies and Plans
for climate action

The Region of Peel's NZE Policy and Standard for New Construction

- **Policy:** Declares the NZE Commitment for all new builds

- **Standard**: NZE requirements
  - Design to the latest version of the CaGBC ZCB standard.
    - Zero on site combustion
    - Thermal Energy Demand Intensity target
    - Climate Resilience Risk Assessment
    - +

Policy

Region of Peel
NET ZERO EMISSIONS BUILDING STANDARD FOR NEW CONSTRUCTION

Standard

NZE New Construction Projects

Image depicting new proposed development at 4 and 10 Knightsbridge Road, Brampton.

- NZE 200 Unit Affordable housing: Geothermal
- NZE + NZEn Waste Yard
- NZE + NZEn Paramedic Station
- +

Aligning with long term capital and operations plans:

The Energy and Emissions Management Plan (EEMP)

Energy Emissions Management Plan: **Housing**

- Sets an interim GHG reduction target for affordable housing
- Aligns with capital planning till 2050
- Identifies projects and building level
  - Costing
  - GHG emission reduction potential
  - Suggests low carbon technologies
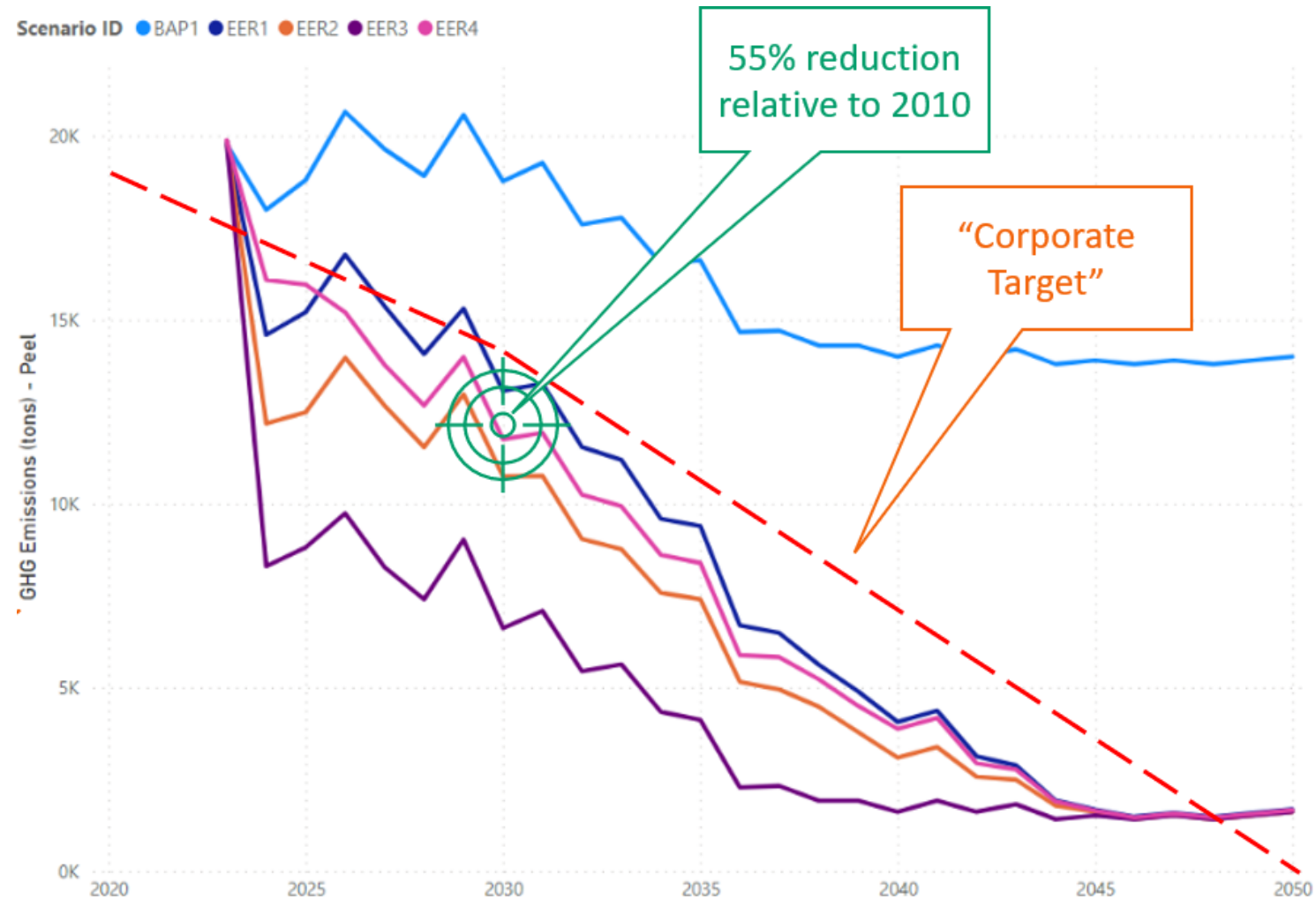
Sample building
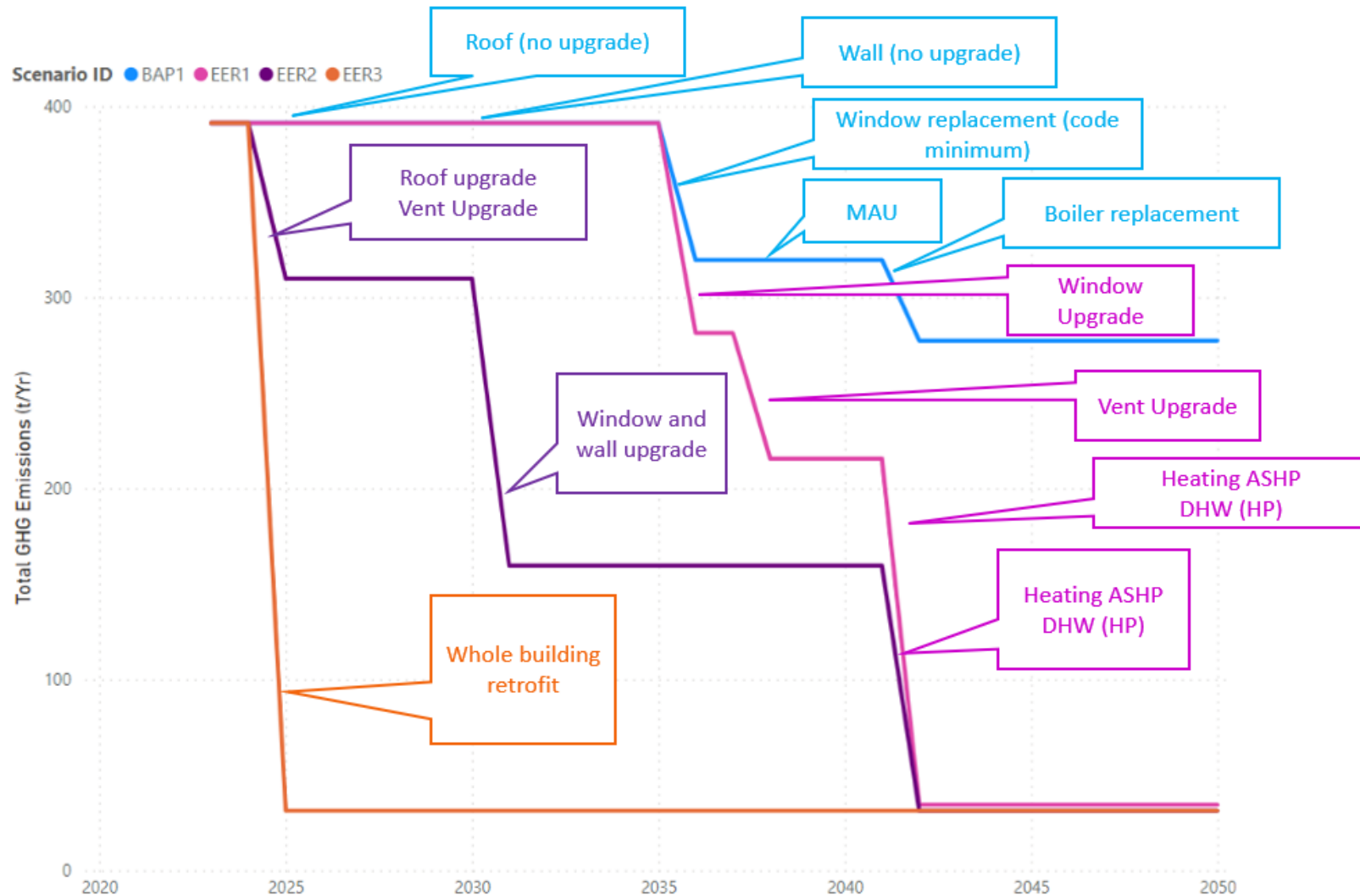
Tackling existing buildings

NZE building retrofit standard

NZE building retrofit considerations

Zero Carbon Goal

Most of the building systems retrofitted by 2030 will be in place in 2050

Archetype, Vintage, Condition

Decarbonization solutions will be developed for typical archetypes, take into account age and condition of the buildings to optimize cost effectiveness of decarbonization

Building or system level retrofit

Will have options for complete building as the most effective way of decarbonization or individual building system retrofit as required based on the site conditions

Thank you!

Hemant Grover
Manager, Office of Climate Change and Energy Management
Region of Peel
hemant.grover@peelregion.ca
Cell: 289-541-8200

DURHAM STANDARD

The Region of Durham's Standard for Facility Construction

November 2023

Where Are We:

Greater Toronto Area map showing regions including Peel, York, Halton, City of Toronto, and Durham with its municipalities.

- ✓ Pickering
- ✓ Ajax
- ✓ Whitby
- ✓ Oshawa
- ✓ Clarington
- ✓ Uxbridge
- ✓ Scugog
- ✓ Brock

Durham Region's building portfolio:

- ✓ Regional Administration Offices
- ✓ Police Station
- ✓ Paramedic Stations
- ✓ Traffic Depot
- ✓ Works Depot's
- ✓ Social Housing
- ✓ Health Offices

- ✓ Social Services
- ✓ Long Term Care
- ✓ Water Supply Plants
- ✓ Waste Pollution Control Plant
- ✓ Childcare
- ✓ Waste Management
- ✓ Durham Transit

What is the Durham Standard?

Region-specific minimum criterion for the design, construction, expansion and renovation of Regionally owned and operated facilities

Durham Standard

Region of Durham Design Standard for Regional Facility Construction, Expansion and Renovation

User Guide

Version 1

March, 2023
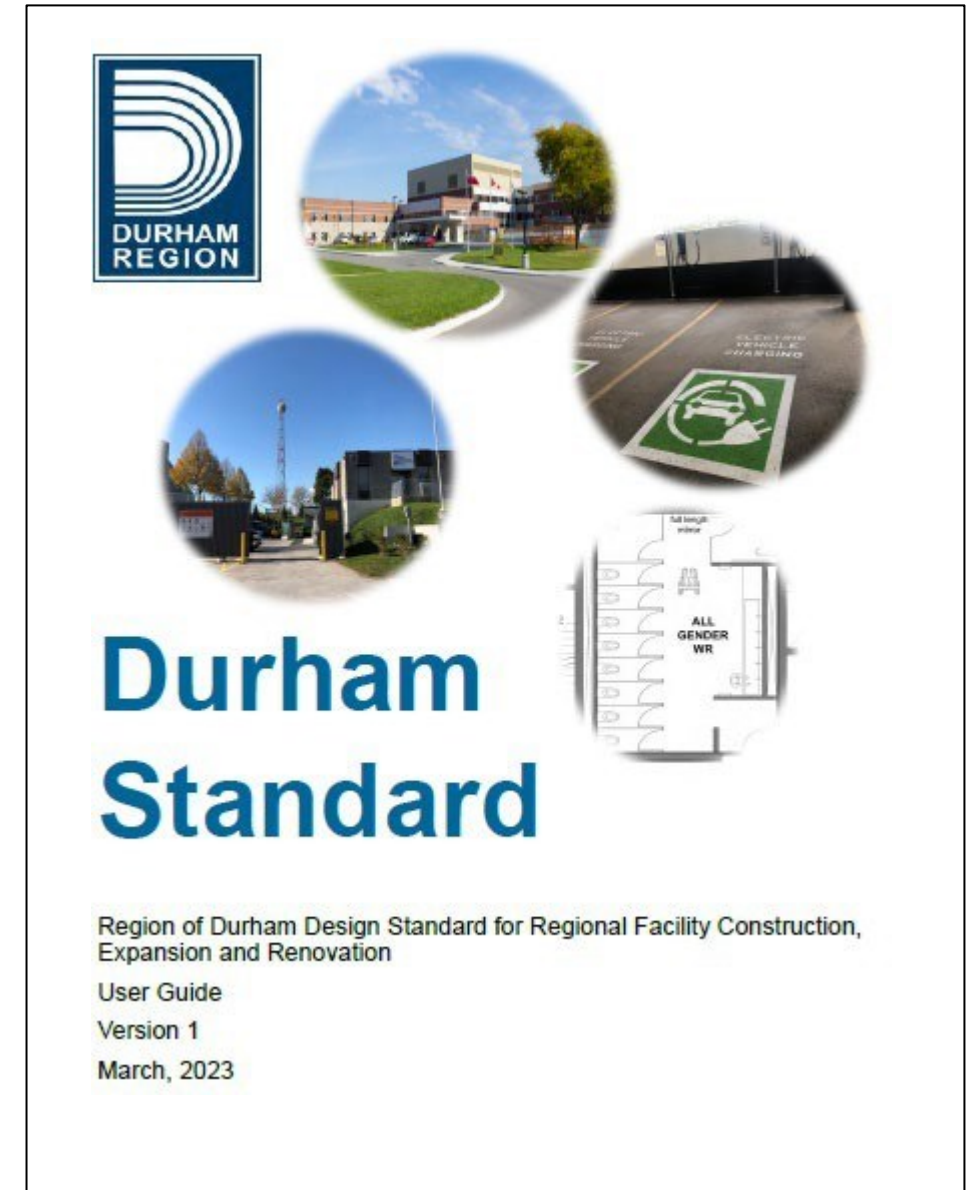
Purpose of the Durham Standard

A holistic design guideline

1. Commitment to Accessibility and Inclusivity
2. Leadership in Sustainability and Resilience
3. Space Optimization and Workplace Modernization

Alignment with the Region's Strategic Plan

- Multi Year Accessibility Plan
- Regional Council's Climate Emergency Declaration
- Corporate Climate Action Plan
- Asset Management Plan and Policy

Cross-Departmental Development Team

- Works Department:
  - ✓ Facilities Design, Construction and Asset Management
  - ✓ Facilities Maintenance and Operations
  - ✓ Technical Support

- Office of the Chief Administrative Officer:
  - ✓ Diversity, Equity and Inclusion Office
  - ✓ Strategic Initiatives—Sustainability Office

- Finance Department:
  - ✓ Corporate Asset Management
  - ✓ Purchasing
  - ✓ Risk Management

Standard Development Process

Phase 1 – Existing Standards & Processes

Phase 2 – Industry & Municipal Standards

Phase 3 – Durham Standard

Review current Regional practices and standards

Review relevant industry practices

Review Phase 1 & 2 findings and define set of drivers, priorities and targets

Define user group needs – owners, delivery managers, operators, consultants

List of Regional practices and standards

Summary of key findings

Summary of key findings

Recommendations to improve current standards and practices

Implementation Guidelines

Standard Method for Modelling

Future Updates

Measurement and Verification Guidelines

Design Checklists
- Accessibility and Inclusivity
- Space Optimization
- Sustainability and Resilience

Durham Standard Team

Accessibility and Inclusivity Requirements

Procurement Guidelines

Renewable Energy and Carbon Offsets Program

Lifecycle Impact Analysis

Training Program

BAS Requirements

Financial Assessment Guidelines

Carbon Pricing Escalation

durham.ca

Referenced External Standards

Local Municipalities	Industry Standards
Whitby Green Standard v1	LEED BD+C New Construction v4.1
Toronto Green Standard, City Agency v4	LEED O+M Existing Buildings v4
Mississauga Corporate Green Building Standard 2019	Canada Green Building Council Zero Carbon Building Standard v2
Oshawa Accessibility Design Standards v2	ASHRAE 140 – 2020: Standard Method of Test for Building Energy Simulation Computer Programs
	National Energy Code for Buildings 2020
	Ontario Building Code 2012
	Ontario Building Code Supplementary Standard 2016

Design Checklists

Design checklists are tailored to each project and contain the targets that the project's design must meet:

- Accessibility and Inclusivity Design Checklist

- Space Optimization Design Checklist

- Sustainability and Resilience Design Checklist

Accessibility and Inclusivity Design Checklist

5.4 – Acoustics:

Finishes do not unduly amplify occasional noise; include sound insulation; install permanent induction loop or other ALDs in noisy areas; design ceiling shapes to avoid echoes; minimize background noise in meeting rooms and assembly areas.

Master Accessibility and Inclusivity Design Checklist:

Section	Facility Design Feature	Purpose of Design Feature	Target (all indicated dimensions are in mm unless otherwise stated)
		2.0 Exterior and Interior Elements	
2.1	Ground and Floor Surfaces	The type of materials and finishes used in ground and floor surfaces is essential in determining accessibility for	Firm, stable, and slip-resistant; matte finish to minimize glare; well-drained; max 5 saw cut joints; Level changes (Up to 6 may be vertical, 6 - 13 to be bevelled (1:2 slope), over 13 to be ramp or curb ramp); grating max 13 openings with elongated openings perpendicular to the direction of travel.
2.2	Ramps	Where a change in level exists, an adequately designed ramp provides easy access for people using wheelchairs, scooters or other wheeled mobility devices, people with mobility issues and people with strollers and other	Min 1100 clear width; 1:15 (6.67%) max running-slope; 1:50 (2%) max cross-slope; max 50 edge protection; 40 – 60 wide color-contrast strip at slope transitions; wall or guards (min 1070 high) on both sides. **Landings:** Max 9 meters apart; min 2440 x 2440 at top and bottom; min 1670 x 1670 at directional change; 1670 long in straight ramps. **Handrails:** On both sides of ramps; 865 – 920 high; intermediate handrails for ramps wider than 2200; high tonal contrast; min 300 extension at top and bottom landings; return to guard/rail/wall.
2.3	Stairs	The requirements for stairs are important to improve safety and accessibility for all users.	Riser height 125 - 180; tread depth 280 - 355; closed risers; uniform riser height and tread depth; 610 deep tactile walking surface indicators (TWSI) at the top of the stairs starting one tread depth back and extending the full width of the stairs, wall, or guards (min 1070 high) on both sides. **Nosings:** max 25 projection; sloped >60 degrees to the horizontal; radius 8 - 13 at rounded or bevelled leading edge profile; horizontal strip markings (40 - 60 deep, full width of thread, high tonal contrast). **Handrails:** On both sides of ramps; 865 – 920 high; high tonal contrast; continues around landing less than 2100; intermediate handrails for stairs wider than 2200, with a handrail reachable within 825mm of all portions of access width, and at least one portion of the stairs with a clear width of 900; min 300 extension at top; diagonal extension of one thread depth plus min 300 parallel extension at bottom; return to guard/rail/wall.

Space Optimization Design Checklist

SOP4 - Office Density:

Meet the following minimum per person space requirements:

(1) Assigned workstations: 2.8 - 4.2 m^2

(2) Hoteling workstations (workbench): 1.9 - 2.8 m^2

(3) Hot-desking: 1.7 - 2.3 m^2

(4) Offices: 9.3 - 11.1 m^2

Master Space Optimization Design Checklist:

Section	Facility Design Feature	Purpose of Design Feature	Target
Space Optimization			
SOP1	Enhanced Collaboration and Communication	Promotes meaningful interactions between employees.	Provide collaborative spaces such as: (1) 3 m x 3 m huddle rooms (huddle rooms are configured the same as offices; seating for 3). (2) 1.5 m x 1.5 m focus rooms (3 different configurations) (3) Various open collaboration areas with different configurations (e.g. meeting, working, standing, lounge)
SOP2	Staff Safety and Security	Provides a safe everyday work environment.	Provide a centralized reception point by limiting public access to the staff side.
SOP3	Agile Workspace	Promotes a flexible work environment and improves collaboration.	Provide agile workspaces such as: (1) "Activity-Based Working" (ABW): Staff reserve specific rooms, areas, and/or workspaces throughout any given day. (2) Hoteling: Staff reserve their desired workspace for the day, or sometimes the week, prior to arriving and have that assigned location for the duration of their day. (3) Hot-Desking: Staff arrive at work and select their workspace from a specific number of unassigned spaces on a first-come, first-served basis.
SOP4	Office Density	Optimizes the number of occupants in the work environment.	Meet the following minimum per person space requirements: (1) Assigned workstations: 2.8 – 4.2 m^2 (2) Hoteling workstations (workbench): 1.9 – 2.8 m^2 (3) Hot-desking: 1.7 – 2.3 m^2 (4) Offices: 9.3 - 11.1 m^2
SOP5	Private Workspace	Enhances employee comfort and productivity in open workspace areas.	Provide private areas only accessible to employees when required, such as silent pods, enclosed meeting rooms, etc.

Sustainability and Resilience Design Checklist

WTR5 - Drought Tolerant Landscapes:

- Where potable water is used for irrigation, provide drought-tolerant plants for at least 50% of the landscaped site area (including at-grade landscapes, vegetated roofs and walls).

Master Sustainability and Resilience Design Checklist:

Section	Facility Design Feature	Purpose of Design Feature	Target
		On-Site Greenhouse Gas Reduction	
ONG1	Building Energy Use and Greenhouse Gas Emissions Limits	Promotes energy-efficient buildings with reduced operating costs and greenhouse gas (GHG) emissions.	Design for an annual greenhouse gas intensity (GHGI) of 0 kg/m^2 following the **Durham Standard - Standard Method for Modelling** and **Durham Standard - Carbon Pricing Escalation**. and Ensure no on-site combustion of fossil fuels (excluding backup generation). and achieve at least one of the following: (1) Total energy use intensity (TEUI) limit of 100 ekWh/m^2 & thermal energy use demand intensity (TEDI) of 30 ekWh/m^2 or (2) 50% energy use intensity (EUI) improvement over OBC SB-10 or (3) Passive House Certification or (4) Canada Green Building Council Zero Carbon Building Certification
ONG2	Energy Supply	Reduces GHG emissions associated with building operations by encouraging the use of less carbon-intensive fuel sources.	Assess the value of connecting to existing or planned low/no-carbon district energy systems, and design for connection where favourable.
ONG3	Peak Demand Management	Increases grid reliability and reduces GHG emissions associated with building operations.	Identify the cost-benefit of demand response and present to Durham Region for decision on implementation at the facility.

Outcomes:

The Durham Standard provides quantifiable and measurable outcomes, resulting in Regional facilities that:


- Are welcoming.
- Support a diverse community and work force.
- Minimize impacts to the environment and conserve energy.
- Have modern workspaces with flexibility to adapt to changing ways of working.

Ongoing Administration

The Durham Standard Team will:

- be responsible for the ongoing implementation of the Durham Standard.

- ensure the Durham Standard remains current and in alignment with the Strategic Plan, industry best practices, market solutions, and external standards including local municipal guidelines.
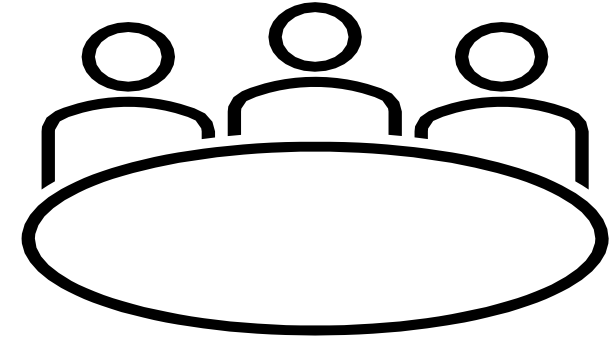
Works Department:
- Facilities Design, Construction and Asset Management
- Technical Support

Office of the Chief Administrative Officer:
- Diversity, Equity and Inclusion
- Strategic Initiatives—Sustainability Office

Finance Department:
- Corporate Asset Management
- Purchasing
- Risk Management

Durham Standard

Jacek Sochacki, Project Manager, Asset Management, Planning and Sustainability

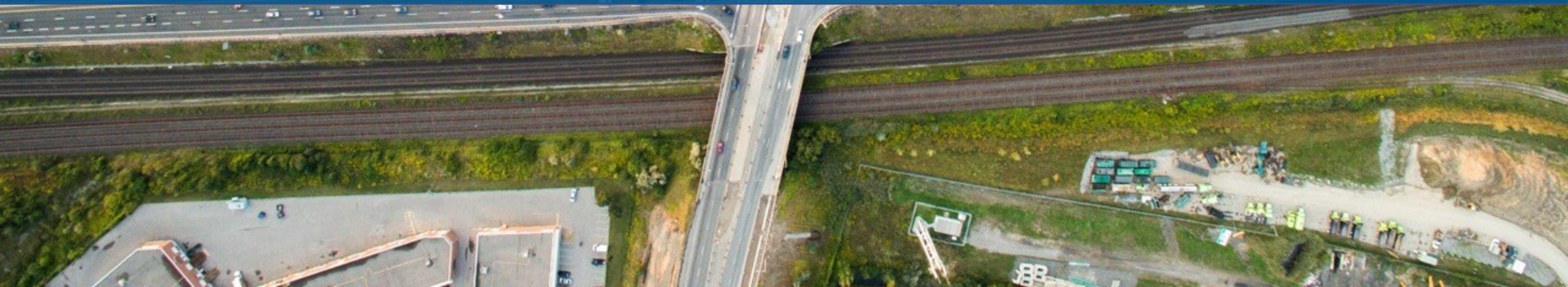Jacek.Sochacki@durham.ca

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Durham Greener Buildings Program

Nayel Halim, Policy Advisor - Sustainability, Durham Region

November 6th, 2023

Durham's commitment to climate action

- Regional Council declared a climate emergency in January 2020

- Durham Community Energy Plan – strategy to reduce GHG emissions & seize economic opportunities related to the clean energy transition.

- Presents low carbon pathway up to 2050.

Durham's Low Carbon Pathway – Key Strategies

Source: Durham Community Energy Plan (2018)
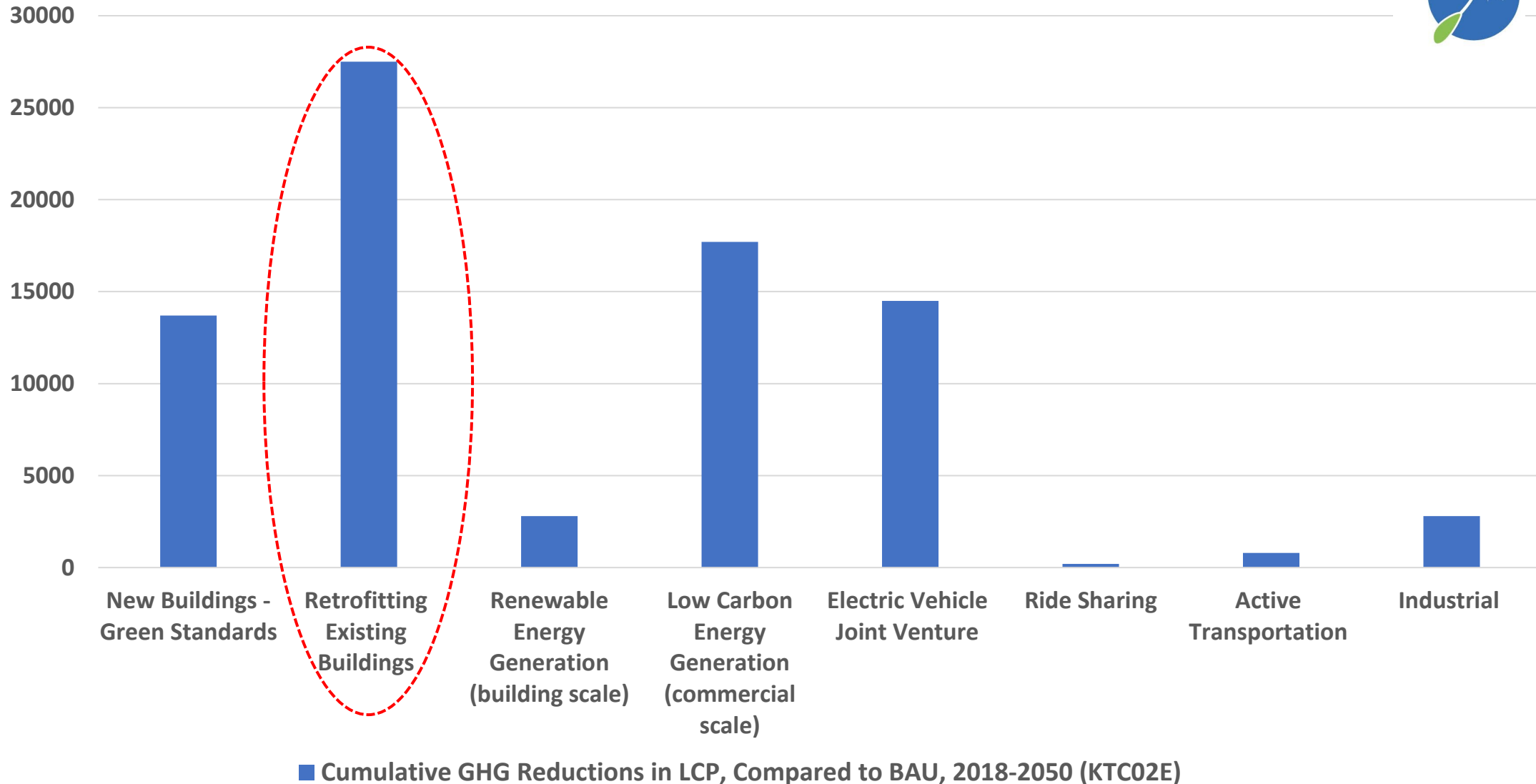
Key Drivers & Objectives

- Achieving emission reduction targets by 2050 requires retrofitting nearly all buildings & homes across the Region.

- Durham Greener Homes Program launched in April 2022 to enable homeowners to retrofit their homes via home energy coach service.

- Additionally, Regional Council approved two strategic priorities to address commercial and institutional buildings.

Regional Council approved Two Strategic Priorities – Environmental Sustainability

1. Launch a building labelling and disclosure (benchmarking) program to support voluntary energy use reporting, increase awareness and create demand for energy efficiency improvements in the commercial and institutional building sector.

2. Create a peer-to-peer business network modelled on the ClimateWise Business Network currently operating in York Region.
   o Partner with the Windfall Ecology Centre to implement these initiatives over the next three years.
   o Help prepare industry for looming benchmarking/ climate policies.

What is building energy benchmarking?

- Energy benchmarking is the process of **measuring and tracking a building's energy performance over time** and comparing the data with peers.

- Benchmarking programs often include disclosure, the process **of making benchmarking data available and/or visible to a range of stakeholders**, including local governments, peers, and the public.

Ontario Benchmarking Landscape

- Under the Reporting of Energy Consumption and Water Use regulation, large building owners in Ontario are required to report their building's energy and water use once a year (by July 1st of each year, for previous year of data) to the Ministry of Energy through the Energy and Water Reporting and Benchmarking (EWRB) program.

    o Currently applies to buildings **>100,000 sf**

    o From July 1, 2023, will apply to buildings **>50,000 sf**

TRACK TO SAVE

Ontario's Energy and Water Reporting and Benchmarking (EWRB)

Benchmarking Program Objectives and Targets

- **Increase compliance** with the Province of Ontario's EWRB program, especially as it expanded to cover buildings 50,000 to 100,000 square feet in size.

- **Encourage voluntary benchmarking** and reporting for buildings under 50,000 square feet.
  - Start with the **end in mind**: plan to disclose energy data on municipally-owned buildings first to demonstrate leadership.

- **Create demand for deep energy retrofits** to support implementation of Durham's Low Carbon Pathway

---

Target EWRB Compliance Rate: 60-70%

o In 2021, only **31%** of covered buildings in Durham reported to EWRB.

What is the program is aiming to do?

Owner	Buildings required to report to the EWRB as of July 1, 2023	Compliance Rate	Buildings not required to the EWRB	BPS Buildings	Buildings Reporting to Durham's Program
	50,000 SF +		20-50,000 SF	Public Sector	
Total / Max No. Buildings	663	-	692	683	2,038
2021 (Actual)	86	31% *Based on buildings 100,000 SF +*	-	-	N/A
Approach	Increase compliance especially as the requirements expands to building over 50,000 SF		Encourage voluntary benchmarking	Get BPS buildings to report to Durham's Program to demonstrate leadership	
Year 1 Targets	150 - 200	**20 - 30%**	0 - 50	300 – 400*	**450 – 650**
Year 2 Targets	350 - 400	**50 - 60%**	50 - 100	400 – 500*	**800 – 1,000**
Year 3 Targets	400 - 450	**60 - 70%**	100 - 150	500 – 600*	**1,000 – 1,200**

↑
Voluntary Participation

*Dependant on when the Broader Public Sector Buildings switches to using ESPM for reporting

What value does a benchmarking program offer?

- ❑ Provide technical support and recognition for benchmarking and reporting

- ❑ Build understanding of energy/emissions at the whole building level + opportunities for operational improvement

- ❑ Reduce operational cost and help businesses achieve corporate environmental goals

- ❑ Demonstrate leadership and differentiate from competitors

- ❑ Engage with peers to share experiences and lessons learned

- ❑ Attract and retain investors/prospective tenants who value transparency and responsible mgmt.

- ❑ **Prepare building owners to access significant federal and provincial incentives for deep retrofits**

How will the program work?

The current process for reporting to the EWRB program

Request an EWRB ID

→

Collect building information including:
Gross floor area
Energy and water usage
Building use information

→

Create account with ENERGY STAR Portfolio Manager and **upload building data**

→

Complete **Data Verification** if required*

→

Submit Data to the EWRB by responding to a Data Request from the Province

Proposed interaction with Durham's program

No Extra Work Required

Sign up for Durham's Benchmarking Program

→

Receive **additional support and incentives** for reporting to the EWRB

**Submit Data to Durham** by responding to a Data Request from Durham

*If the building is 100,000 square feet or larger, reported data must be verified by a certified professional the first year you report, then every five years.

Summary

Desired outcomes

- Equip local business and buildings to be ready for deep retrofit projects.

- Create scalable and transferable tools and processes.

- Build a cross disciplinary responsibility for taking action on climate change.

- Meet our metrics.
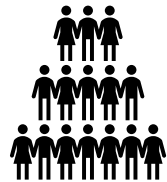
Challenges

- Complexity of the commercial real estate business

- Resistance to data sharing

- Engaging the businesses/tenants in the buildings to action.

- Urgency to participate is "minimal"

Thank You!

Nayel Halim, Policy Advisor - Sustainability, CAO – Strategic Initiatives

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