



PILOTING ZERO IN CANADA

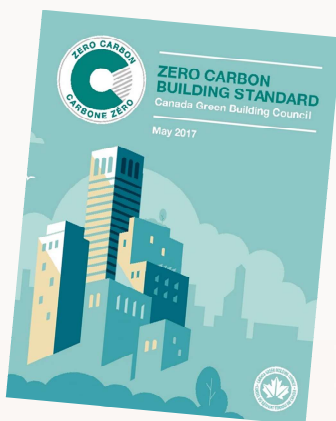
LESSONS LEARNED AND PROGRAM CHANGES

Fin MacDonald
October 11, 2019

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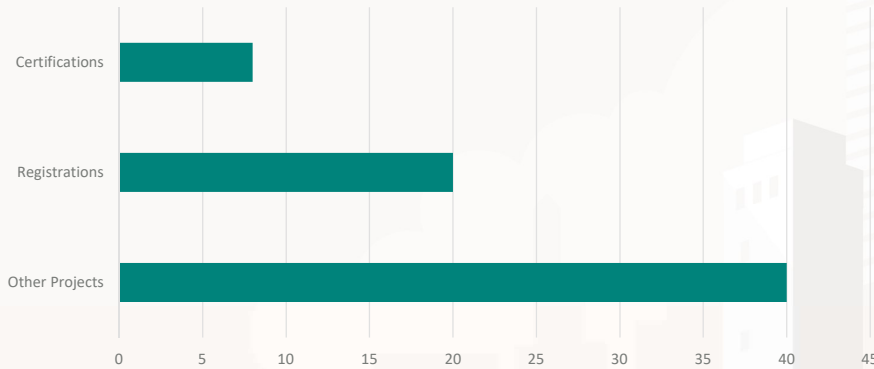
ZERO CARBON BUILDING STANDARD



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PROGRAM UPTAKE



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INCREMENTAL LIFE-CYCLE RETURNS ACROSS CANADA

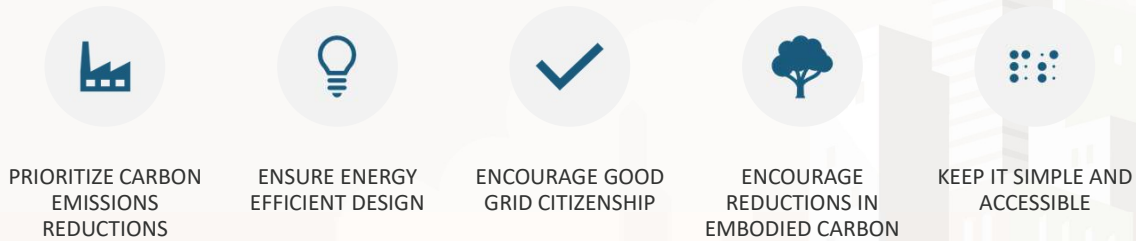
NATIONAL RESULTS

Incremental Life-cycle Return
\$27/m² | \$34/tCO₂e **1%**

Incremental Capital Costs
\$253/m² **8%**

City	Incremental Life-cycle Return (%)	Incremental Capital Costs (\$/m ²)	Incremental Life-cycle Return (\$/m ²)	Incremental Life-cycle Return (\$/tCO ₂ e)
Vancouver	-1%	\$55/m ²	-\$137/tCO ₂ e	
Calgary	1%	\$32/m ²	\$18/tCO ₂ e	
Toronto	1%	\$58/m ²	\$110/tCO ₂ e	
Ottawa	1%	\$51/m ²	\$79/tCO ₂ e	
Montreal	0%	-\$4/m ²	-\$6/tCO ₂ e	
Halifax	4%	\$187/m ²	\$122/tCO ₂ e	

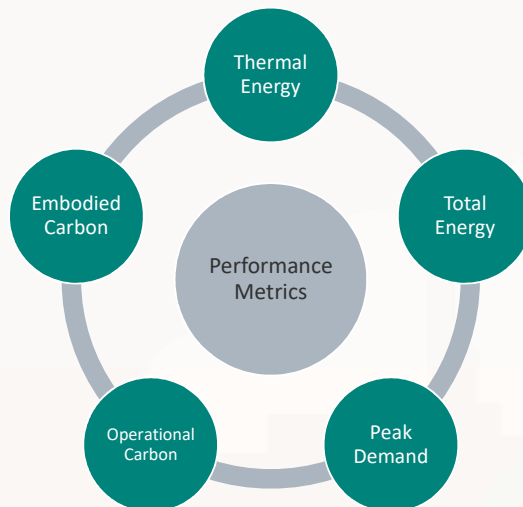
GUIDING PRINCIPLES



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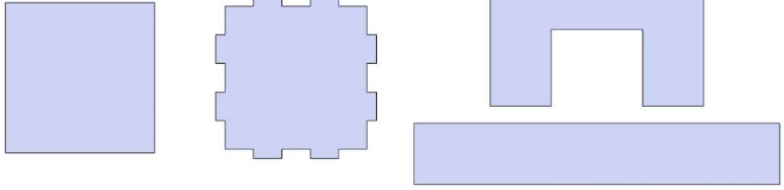
PERFORMANCE METRICS



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THERMAL ENERGY (CLIMATE ZONE 4)



	Square	Articulated	Narrow
VFAR	0.49	0.59	0.7
TEDI (kWh/m ²)	15.1	20.3	26.1
TEDI (kBtu/ft ²)	4.8	6.4	8.3

Source: Guide to Low Thermal Energy Demand for Large Buildings
BC Housing / Morrison Hershfield, April 2018



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PILOT FOCUS – THERMAL ENERGY



MacKimmie Project Redevelopment
Owner: University of Calgary
Designer: DIALOG

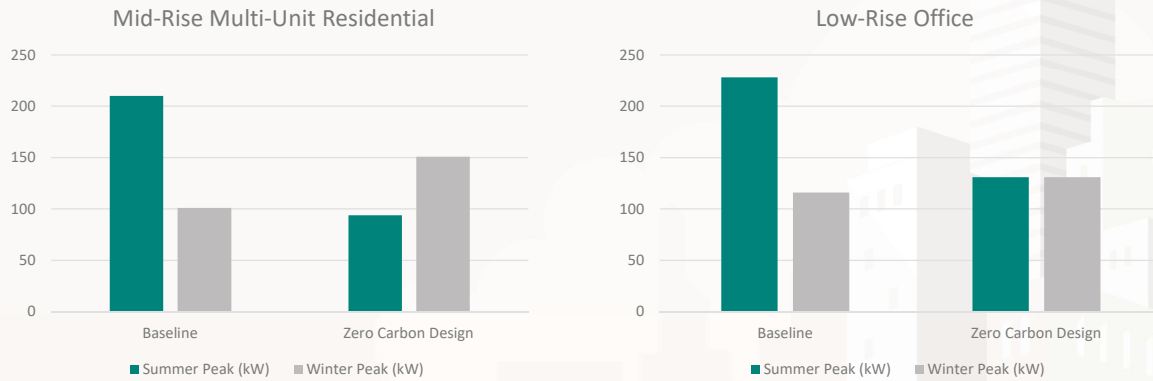


evoluv1
Owner: The Cora Group
Designer: Stantec



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GEO-EXCHANGE AND THE PEAK RE-BALANCING ACT



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Source: Making the Case for Building to Zero Carbon, CaGBC / WSP 2019



PILOT FOCUS – ARTHUR MEIGHAN BUILDING



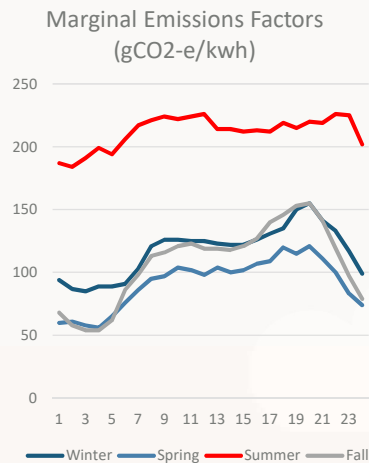
Arthur Meighan Building
 Owner: Government of Canada
 Designer: DIALOG

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Photo Credit: On-Site Magazine



TIME OF DAY EMISSIONS - ONTARIO



- Peaking power is supplied by a mix of fossil fuels and hydropower
- Significant variability by time of day in Fall, Winter, and Spring

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Source: A Clearer View on Ontario's Emissions – The Atmospheric Fund



EMBODIED CARBON



REPORTING

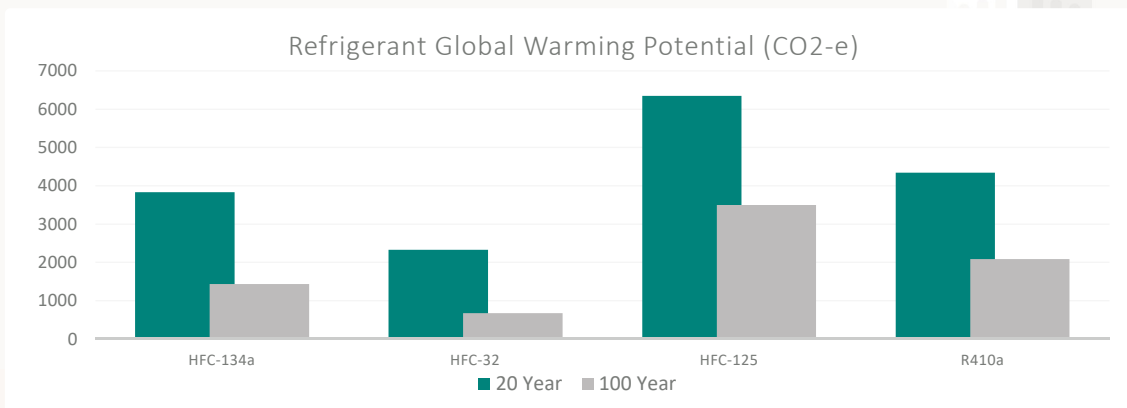


REDUCTIONS

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KEEPING AN EYE ON REFRIGERANTS



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Source: IPCC 4th Assessment Report

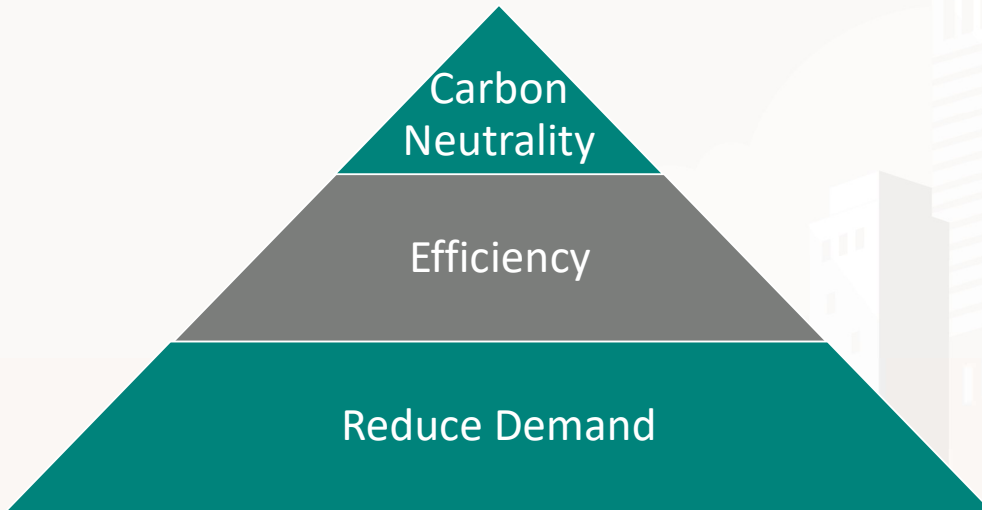
SUMMARY OF KEY REQUIREMENTS

	Version 1	Version 2
Efficiency	TEDI Target	TEDI Target + one of: <ul style="list-style-type: none"> - Overall Energy Use Target - Lower TEDI target - Non-contractual GHGI target
Carbon	Operational Carbon. Report Embodied Carbon	Operational & Embodied Carbon. Start LCA by schematic design.
Time Dependent Valuation	Not included	Optional use
Refrigerants	Excluded	Included
Renewable Energy	5% Minimum	5% Minimum (unchanged)

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TRANSFORMATION GOALS



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