

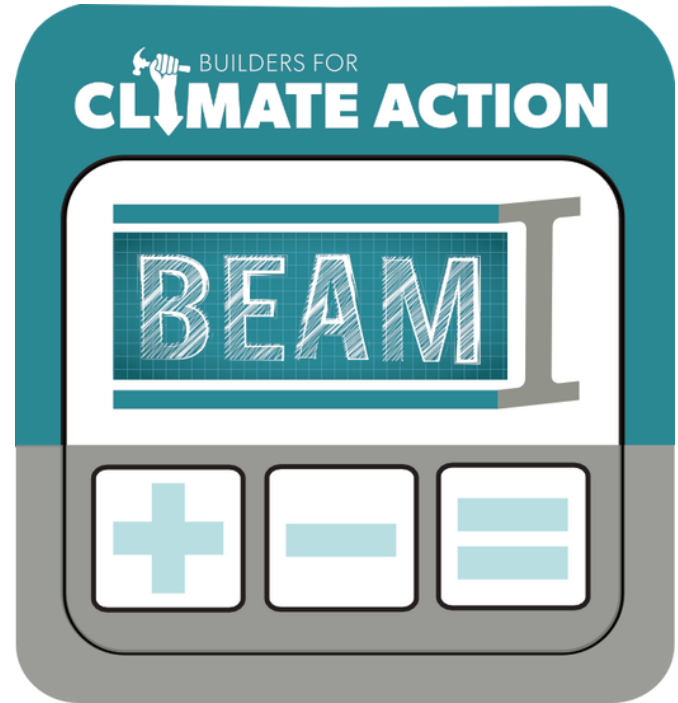
**BUILDING EMISSIONS**  
**ACCOUNTING** FOR MATERIALS

# Evolving Standards, Research, and BEAM Tool Solutions for Residential Construction

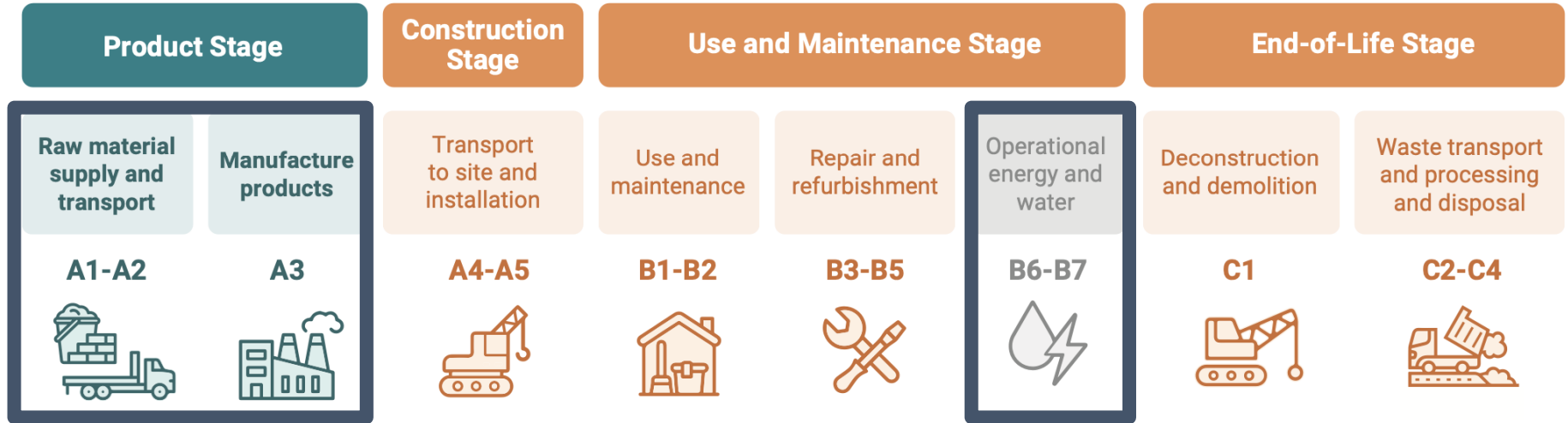
Jacob Deva Racusin  
Builders for Climate Action  
Spring Training 2026

# Tools for Analysis

- **Material comparisons**
- **Assembly comparisons**
- **Design development**
- **Whole building models and comps**
- **Novel materials with EPDs or LCA**

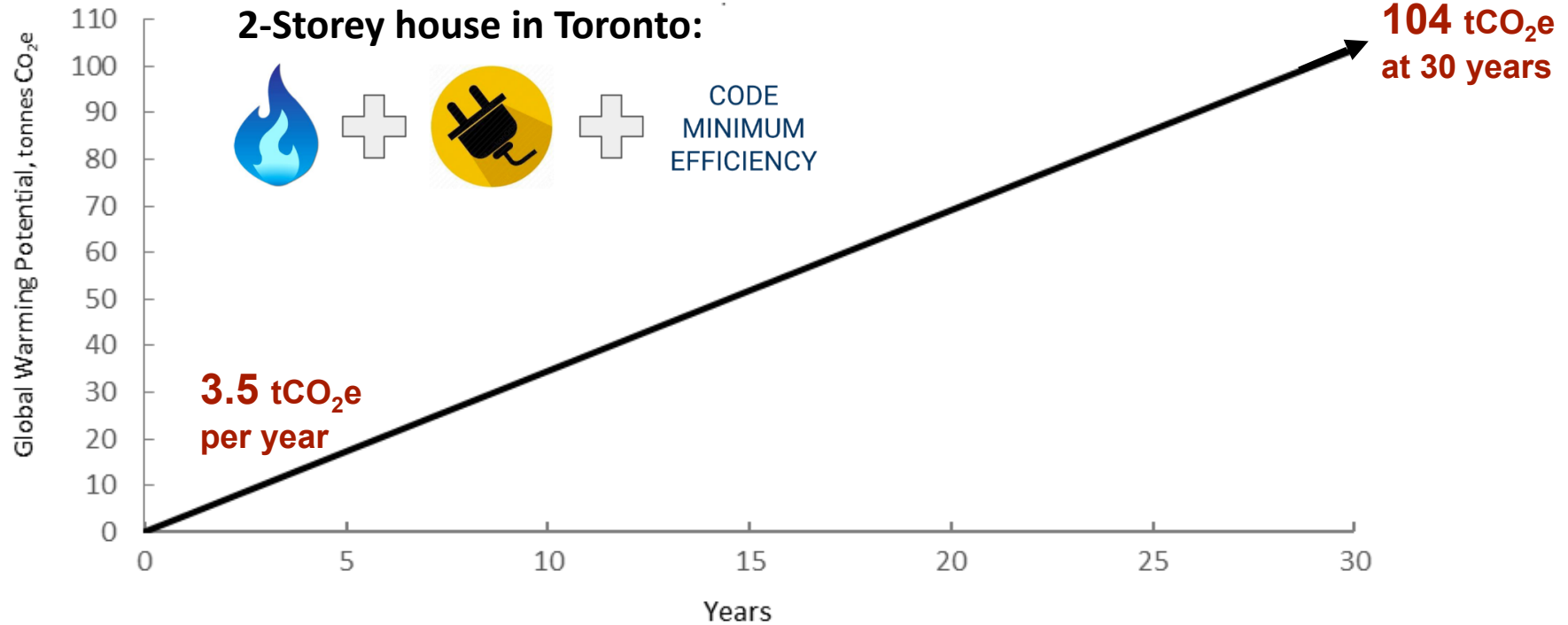


# GHG Emissions over the life cycle

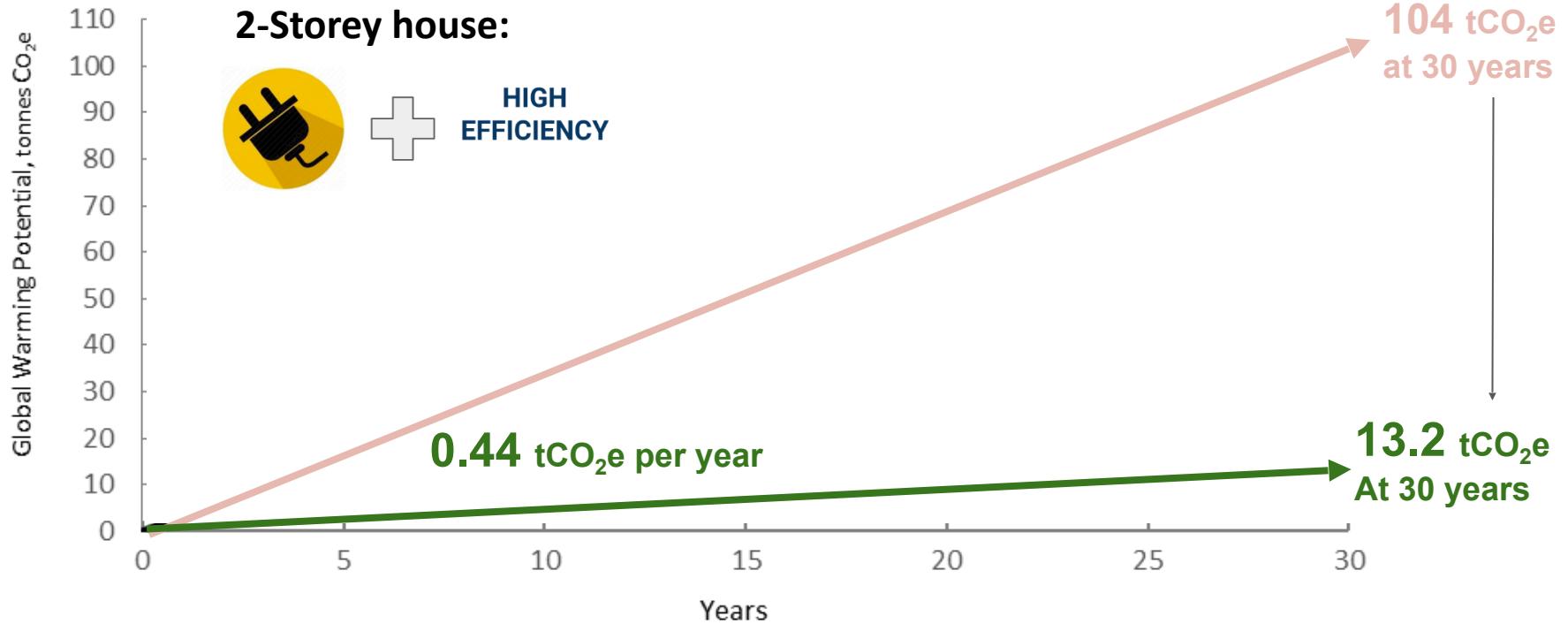


Embodied Carbon is the emissions used to extract and manufacture building product materials (Stages A1-A3).

# Operational Carbon Emissions - *Business as usual*



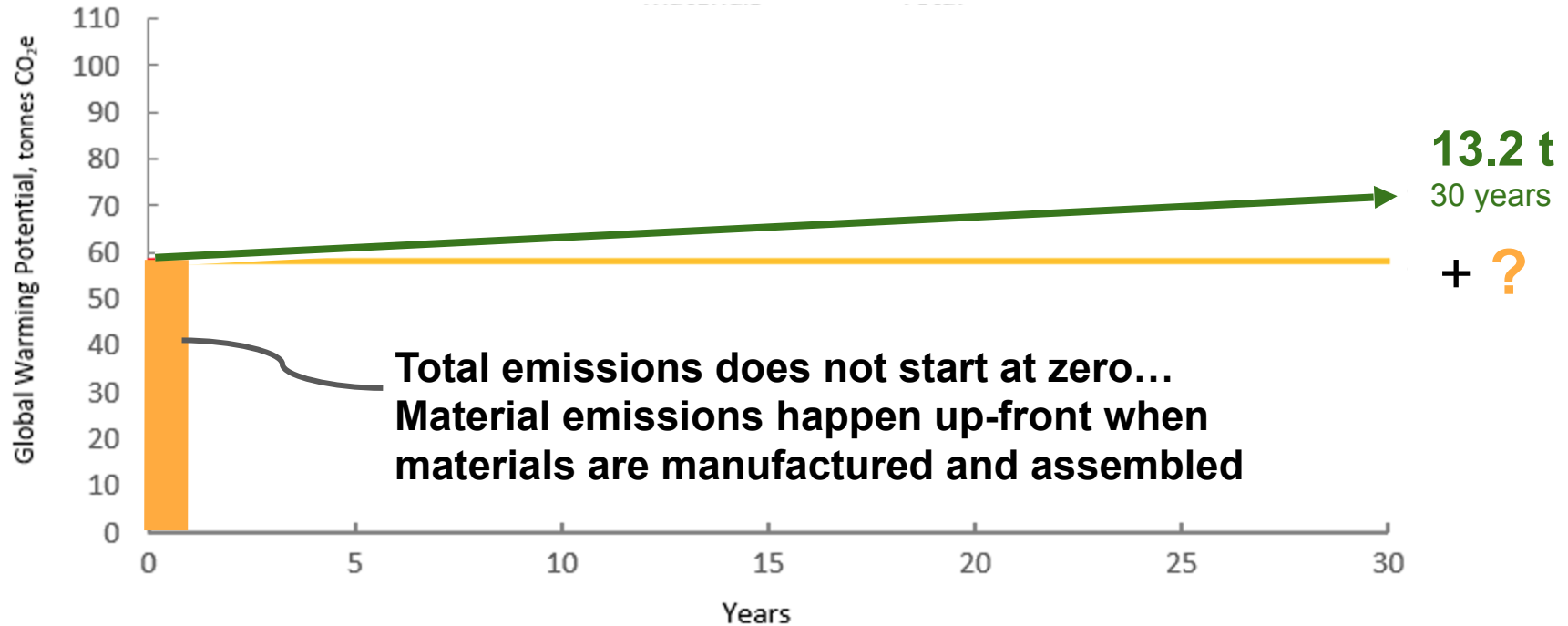
# Operational Carbon Emissions - *High Efficiency*



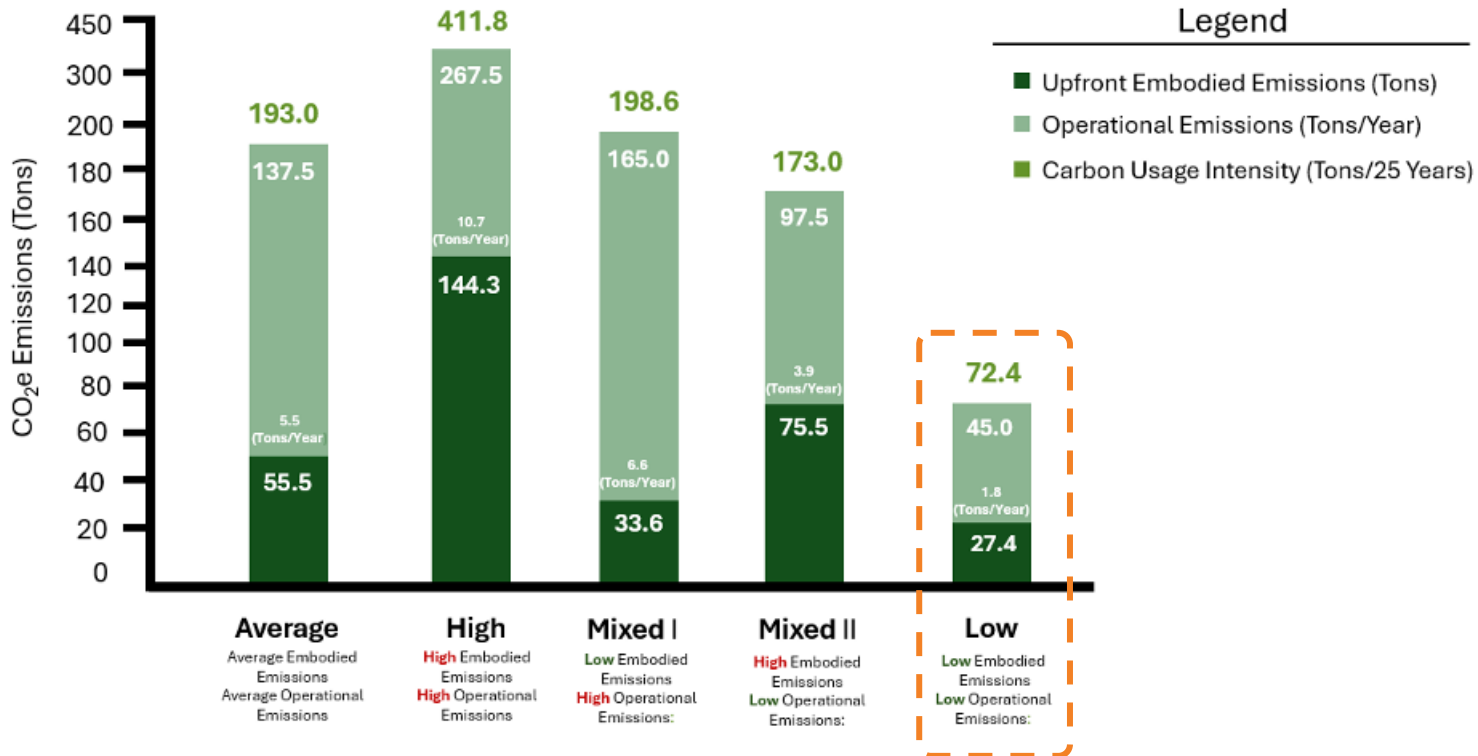
Measuring and reducing OC is well understood...

# But before operating emissions happen...

...there are upfront emissions that need to be counted



# BOTH material and fuel choices matter!



# BEAM Results Insights

## MATERIAL CARBON EMISSIONS BY SECTION

Footings & Slabs	11,229 kg CO <sub>2</sub> e	
Foundation Walls	0 kg CO <sub>2</sub> e	
Structural Elements	0 kg CO <sub>2</sub> e	
Exterior Walls	2,619 kg CO <sub>2</sub> e	
Party Walls	0 kg CO <sub>2</sub> e	
Cladding	9,453 kg CO <sub>2</sub> e	
Windows	2,847 kg CO <sub>2</sub> e	
Interior Walls	1,536 kg CO <sub>2</sub> e	
Floors	2,269 kg CO <sub>2</sub> e	
Ceilings	341 kg CO <sub>2</sub> e	
Roof	2,450 kg CO <sub>2</sub> e	
Garage	0 kg CO <sub>2</sub> e	
<b>NET TOTAL</b>	<b>32,743 kg CO<sub>2</sub>e</b>	0 MCE (kg CO <sub>2</sub> e) 15,000

Identify “hot spot” assemblies

# BEAM Results Insights

## BEAM RESULTS

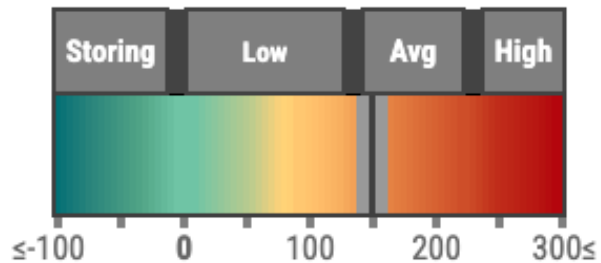


### PROJECT EMISSIONS (MCE)

NET EMISSIONS kg CO <sub>2</sub> e	GROSS EMISSIONS kg CO <sub>2</sub> e	STORAGE SHORT CYCLE kg CO <sub>2</sub>	STORAGE LONG CYCLE kg CO <sub>2</sub>
<b>32,743</b>	32,743	0	0

### PROJECT EMISSIONS INTENSITY (MCI)

	Metric kg CO <sub>2</sub> e/m <sup>2</sup>	Imperial lb CO <sub>2</sub> e/ft <sup>2</sup>
<b>MCI Conditioned Floor Area</b>	<b>148</b>	<b>30</b>
MCI Total Floor Area	148	30
MCI Per Bedroom	10,914	24,062



Identify emission intensity

# BEAM Results Insights

## HIGHEST EMITTING MATERIALS

SECTION	kg CO <sub>2</sub> e	MATERIAL
Footings & Slabs	4,065	Concrete - 0-2500 psi, 20-29% Fly Ash / NRMCA
Windows	2,847	Window - double-glazed / Vinyl frame / BfCA Stu
Footings & Slabs	1,767	Concrete - 2501-3000 psi, >50% SCM mix / NRM
Exterior Walls	655	Plywood / 5/8" / AWC & CWC [Industry Avg   US i
Interior Walls	619	Drywall 1/2" [BEAM Avg   US & CA]
Floors	556	Wood I joist / TJI 230/360 / 11-7/8" Depth / AWC
Roof	509	Asphalt Shingles / Asphalt Roofing Manufacture
Roof	482	Wood roof truss / Gable Roof, Double Howe, 2x6
Footings & Slabs	467	Ceramic tile / Tile Council of North America/ 18.
Floors	442	Ceramic tile / Tile Council of North America/ 18.

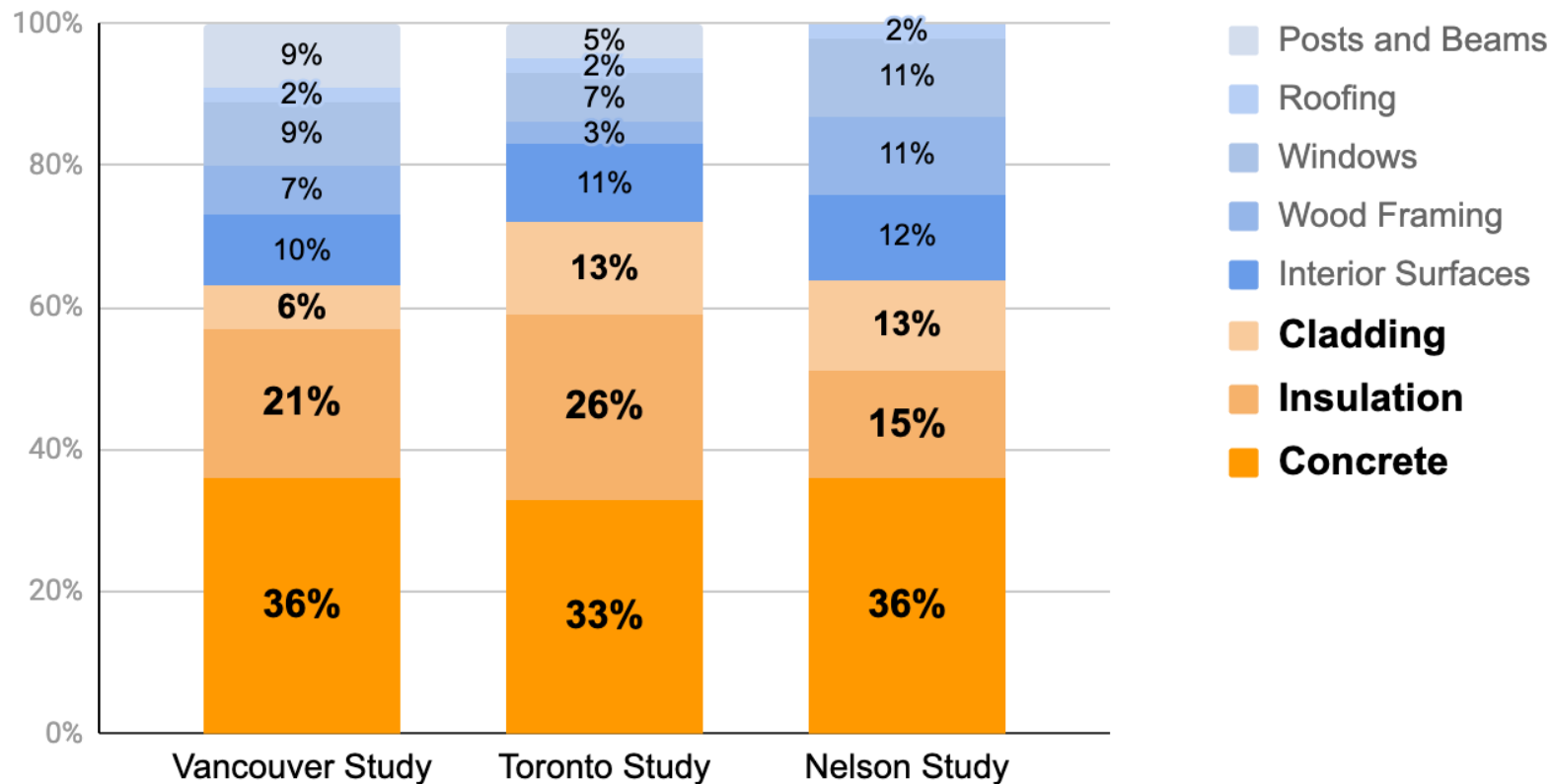
Identify “hot spot” materials

## HIGHEST CARBON-STORING MATERIALS

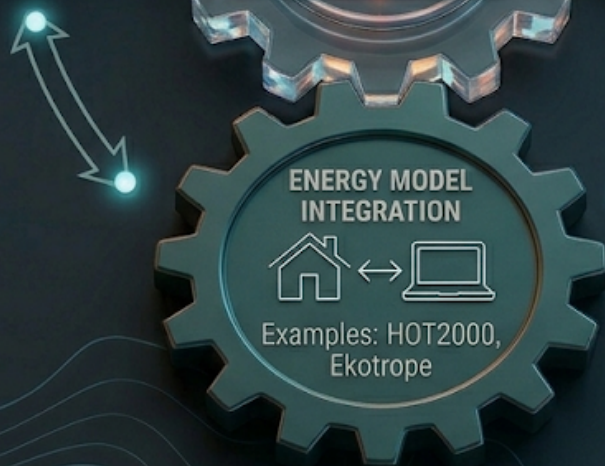
SECTION	kg CO <sub>2</sub> e	MATERIAL
Exterior Walls	-1,310	Cellulose / dense pack / CIMA / R 3.7-inch / [Ind
Cladding	-1,246	Wood / SPF / 3/4" boards / AWC & CWC [Industr
Interior Walls	-1,210	Wood / SPF / 3/4" boards / AWC & CWC [Industr

Identify storage materials

# BEAM Results Insights - Low hanging fruit

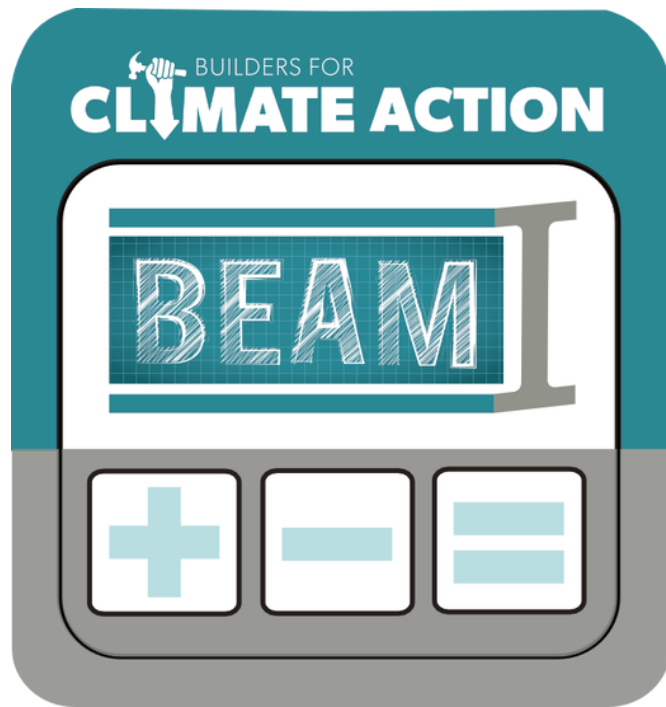


*Embodied Carbon Emissions from New Homes by Material Category, BfCA studies.*



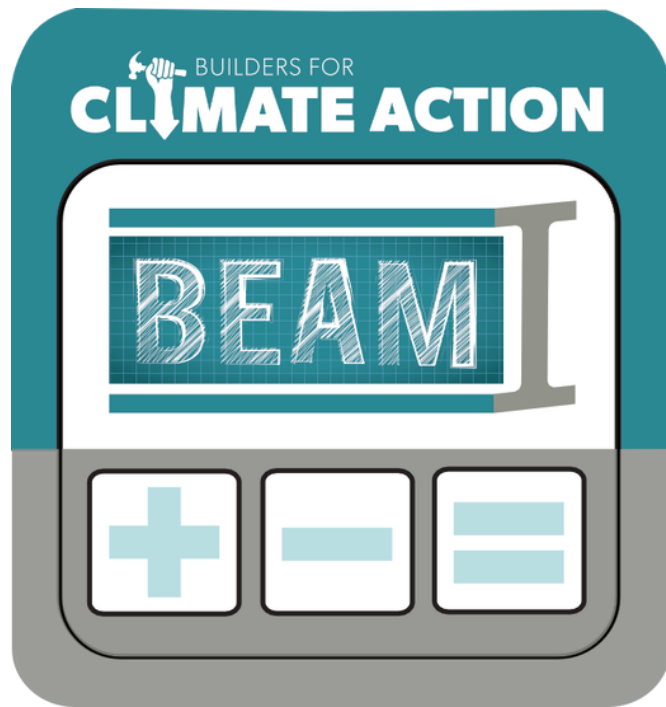
# Coming Soon: BEAM 2.0!

- **Web+ application**
- Interfaces for EAs and others
- Expanded data and sourcing
- Energy data / HOT2000
- New: paint, MEP, stairs, more!
- Compliance: 1550, VBBL, NMBC



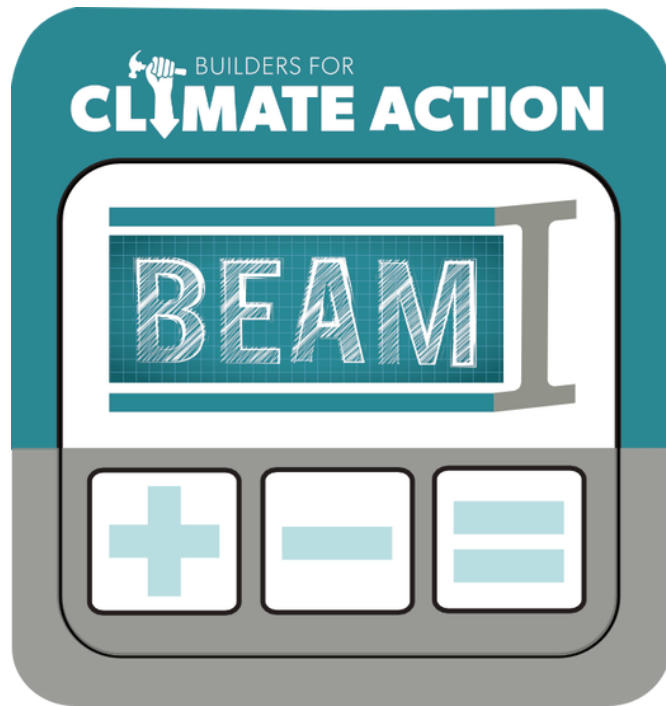
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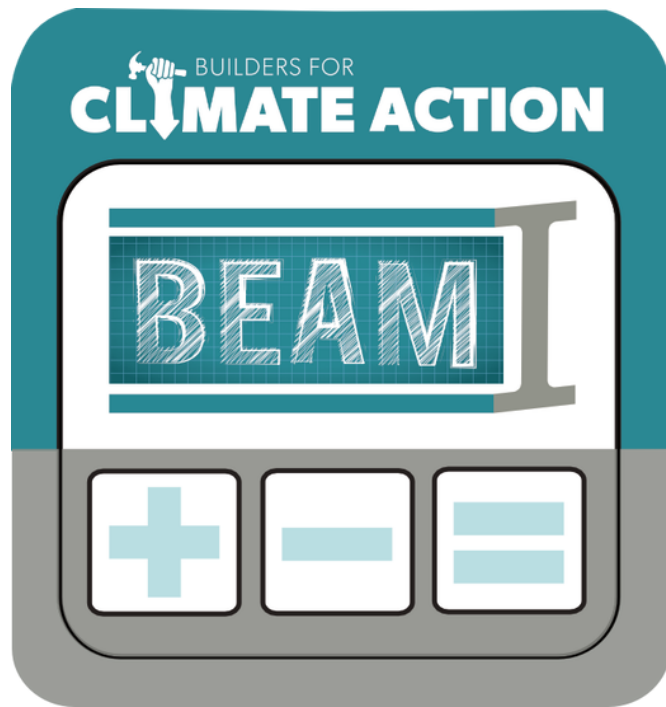
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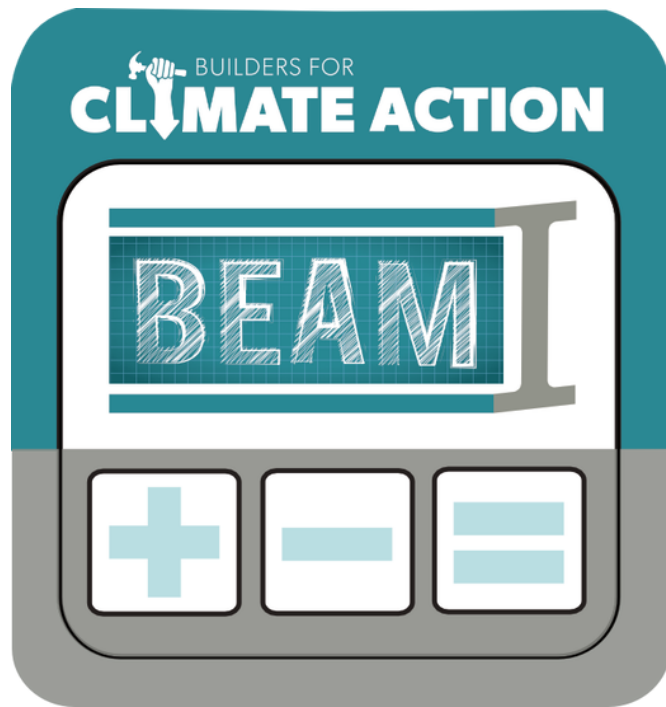
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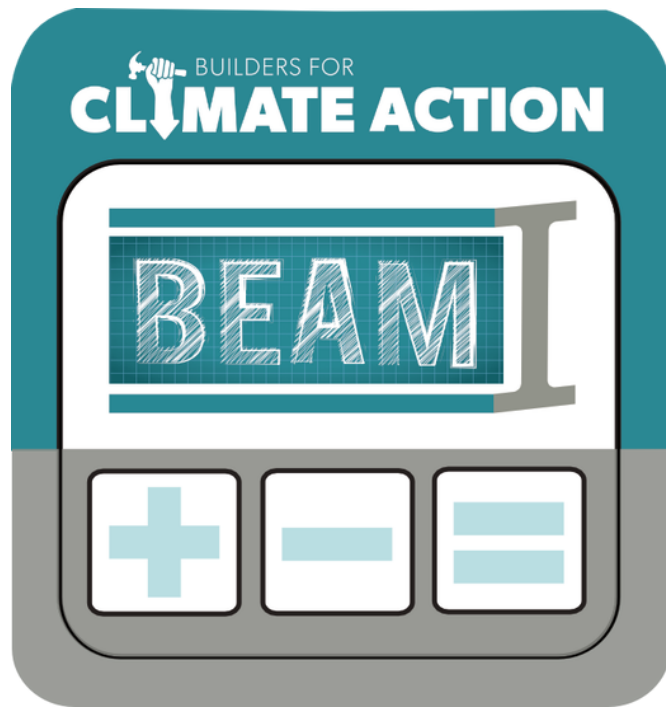
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- **Compliance: 1550, VBBL, NMBC**



# Thank you!

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Innovation Advisor*

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