

Nate Finch



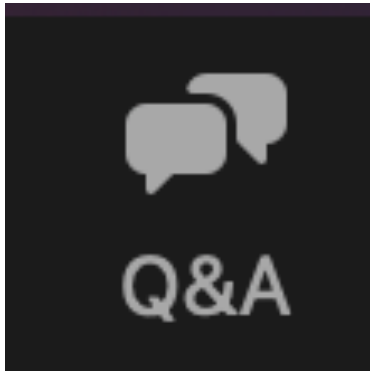
Building Science and Weatherization

WE ARE MASS SAVE®:



We look forward to hearing from you

Please put all your questions into the questions section with this icon.



A vertical rectangular area on the left side of the slide, filled with a green-tinted photograph of a dense forest of tall trees, viewed from a low angle looking up.

Agenda

BUILDING SCIENCE 101

WEATHERIZATION FUNDAMENTALS

WHY WEATHERIZE?

HOW TO SELL WEATHERIZATION

PROGRAM PATHWAYS

STATEWIDE WEATHERIZATION INITIATIVE

Building Science 101

Control Heat

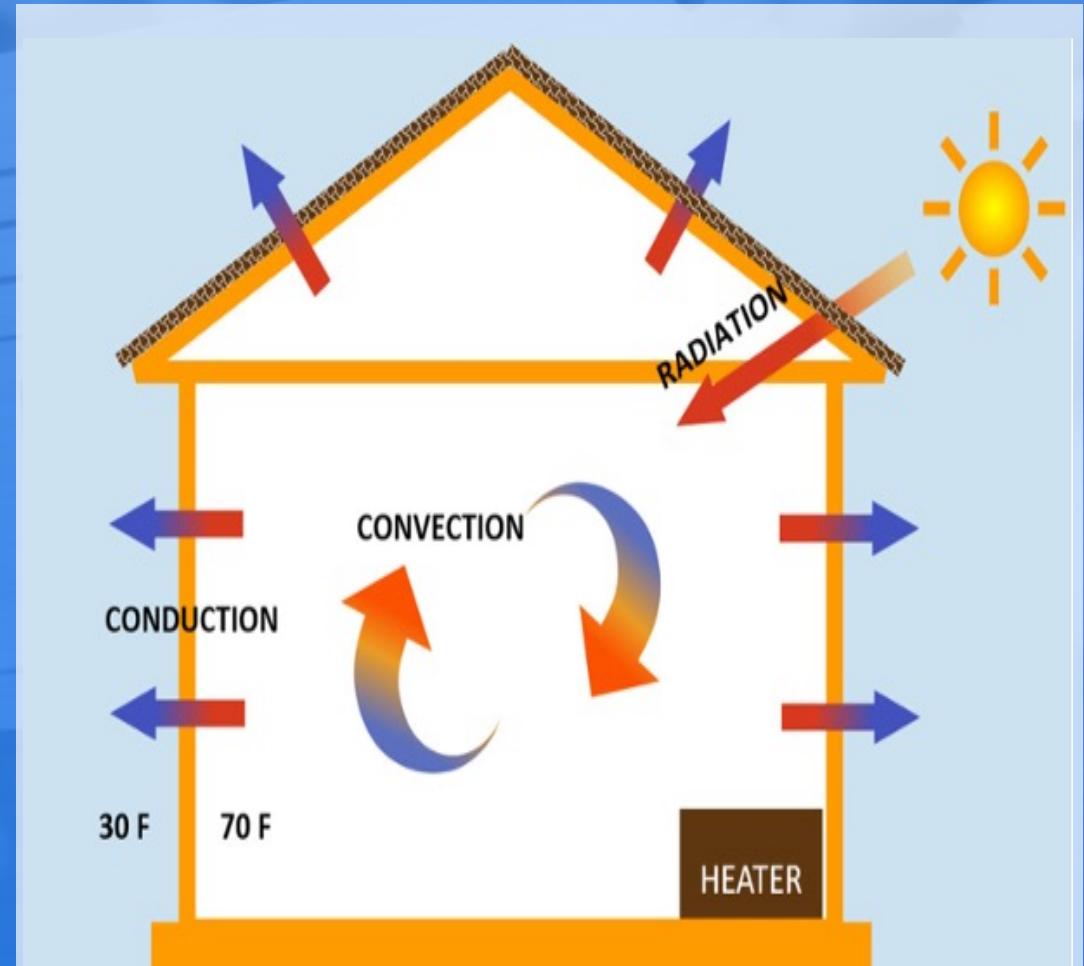
R-Value: A measure of thermal resistance, which is used to calculate the ability of a material to slow down heat transfer (Conduction)

- A higher number is better

U-Factor: The rate of thermal transmittance through an assembly.

- A lower is better

Thermal Boundary: A thermal boundary is defining what space is being conditioned vs. unconditioned. All buildings *should* have a thermal boundary.



Control Airflow

Infiltration:

Movement of air into a building

Exfiltration:

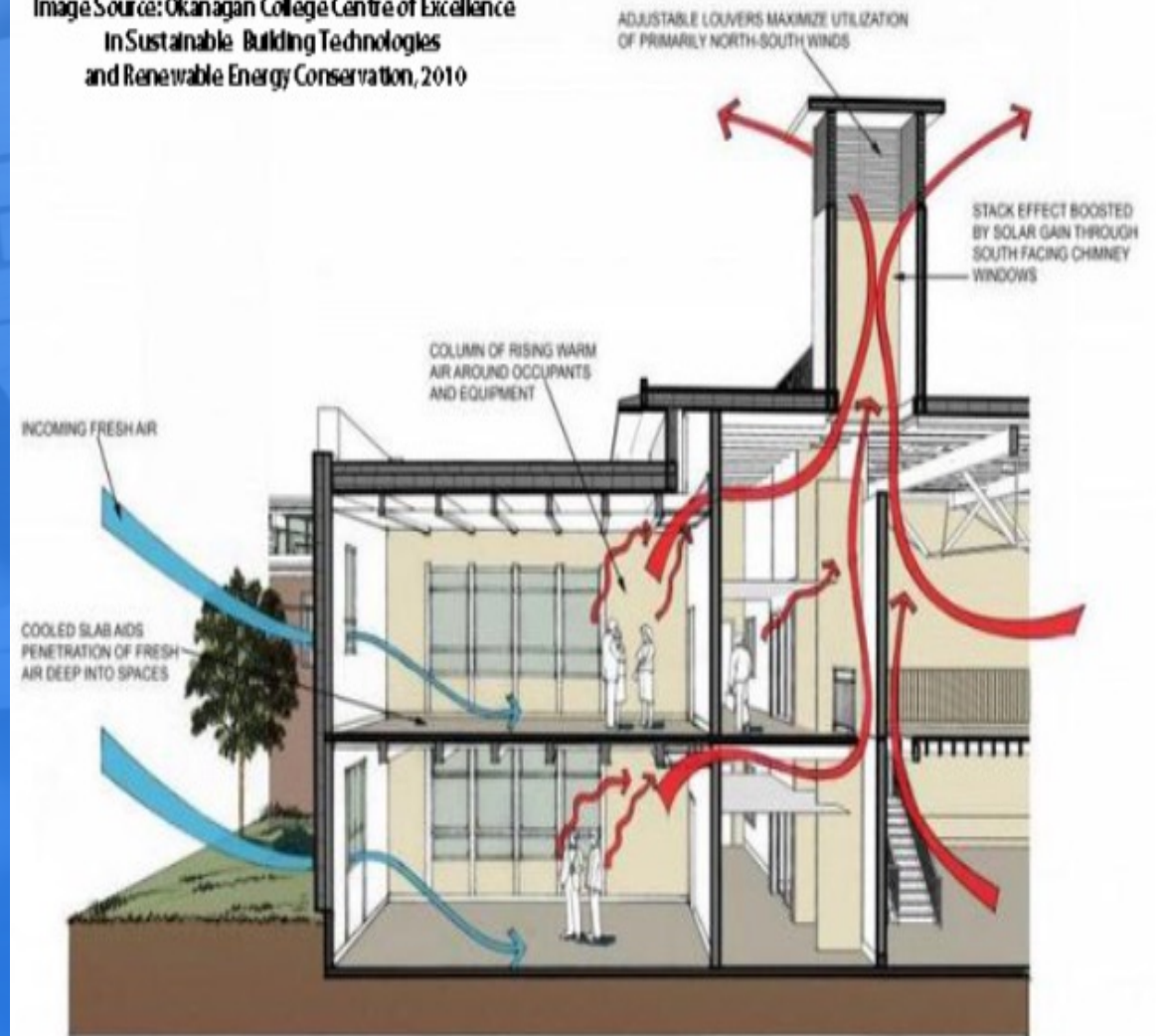
Leakage of conditioned air out of a building

(The difference is determined by pressure or temperature differences)

Stack Effect:

Drives airflow through buildings

Image Source: Okanagan College Centre of Excellence
In Sustainable Building Technologies
and Renewable Energy Conservation, 2010



An analogy on air sealing and insulation



Insulation is a sweater for your building



Air Sealing is like a wind breaker for your building



Both equal comfort and savings

Weatherization Fundamentals

Different Material Types

Foams

Open Cell – water-based blowing agent

- Less dense (spongy) with “open cells”
- Allows moisture to migrate through but not air
- Great for air sealing

Closed Cell – can utilize different blowing agents

- Takes about 3x as many chemicals to make closed-cell vs. open-cell
- More plastic in the mixture
- Is an air, vapor, and thermal barrier in one product

Open Cell: 2024 Ecofoam of Florida

Closed Cell: Permission from Mark Tajima B. Alpha Construction



Non-foam Insulation Types



Rockwool

Great for higher moisture or heat applications
Can be blown or batt or rigid board

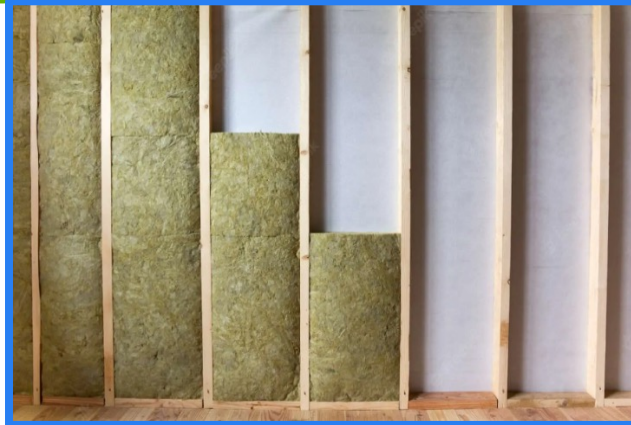


Wood Fiber

Environmentally friendly re-used waste product from the lumber industry
Can be blown, batt, or rigid board

Fiberglass

Common in new construction.
Can be blown or batt



Cellulose

Recycled material with low carbon impact
Can be blown or sprayed



Air Sealing

Primarily done with caulking or foams.

Reduces infiltration or exfiltration aka “drafts”



Why Weatherize?



Cost Savings



Increased Comfort



Environmental Responsibility



Financial Incentives



Resilience for your Building



Carbon Free Preparation



Increase Asset Value and Marketability

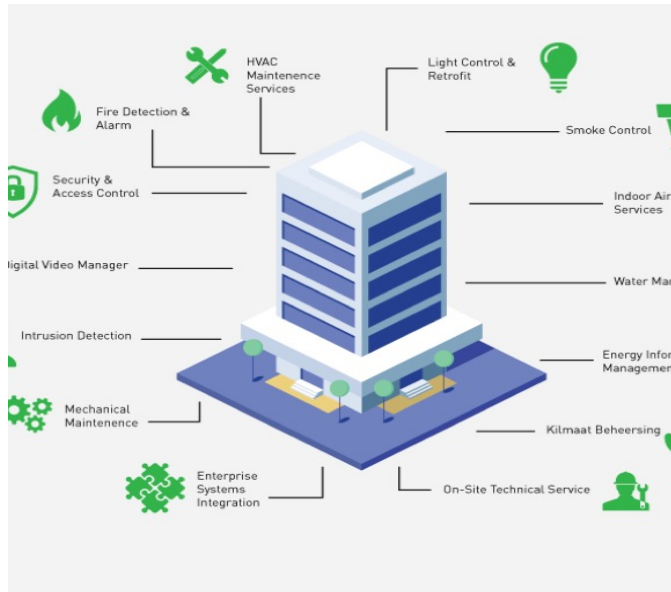


Benchmarking Status



Measure Life

Selling Weatherization



BMS and DCV

- Control indoor air quality with air sealing as well as demand control ventilation



Mechanical Insulation

- Control thermal energy with mechanical insulation as well



Electrification

- Save money by weatherizing your building before heat pump design

Selling Weatherization Continued



**Electrification and
Resiliency**



IAQ

Selling weatherization continued:

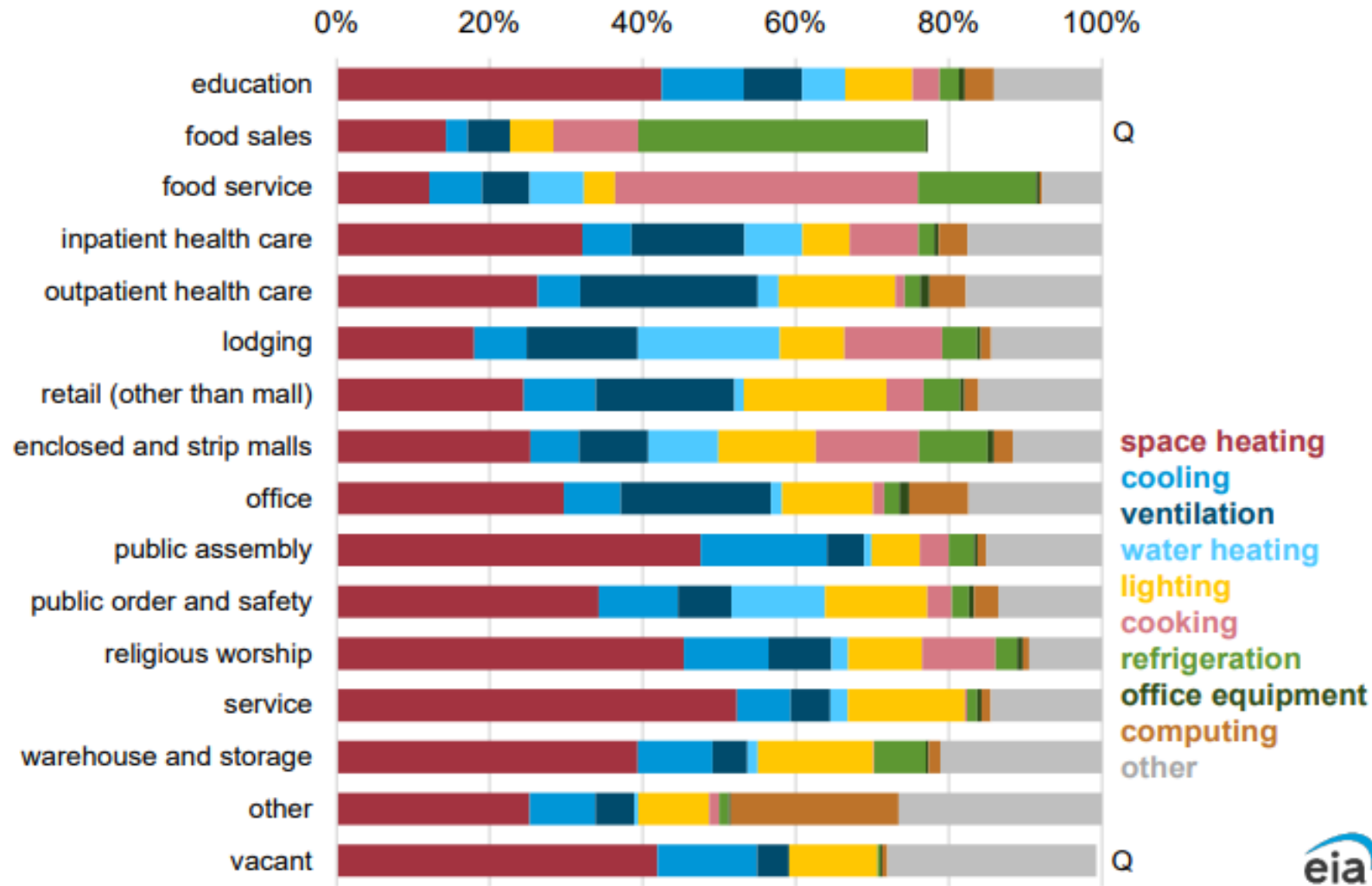


Know your customer

What Motivates Them?

- Cost
- Comfort
- Decarbonization goals

Major fuels consumption by principal building activity and end use, 2018 percentage

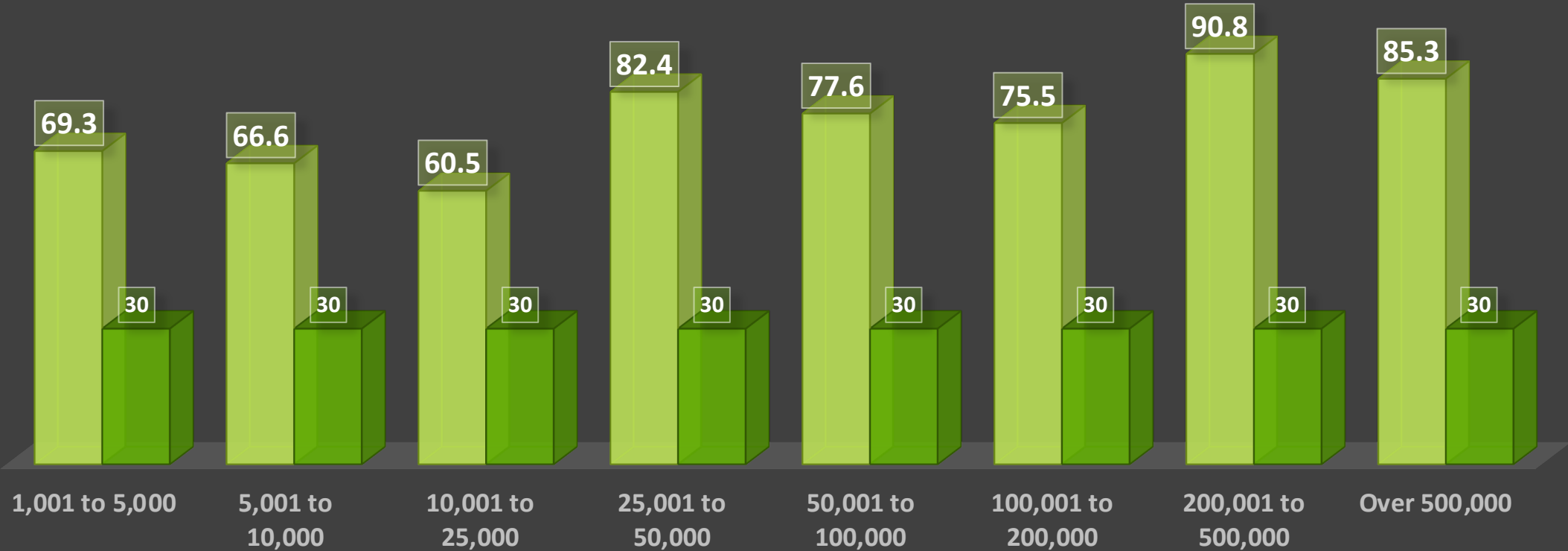


Data source: U.S. Energy Information Administration, *Commercial Buildings Energy Consumption Survey*
 Q = Data withheld because the relative standard error was greater than 50% or the reporting sample had fewer than 20 buildings. Water heating, computing, and other end uses were withheld for food sales buildings. Water heating and cooking were withheld for vacant buildings.

REAL EUI VS NET ZERO NC EUI BY BUILDING SQFT

■ Energy intensity for
sum of major fuels
(thousand Btu/square foot)

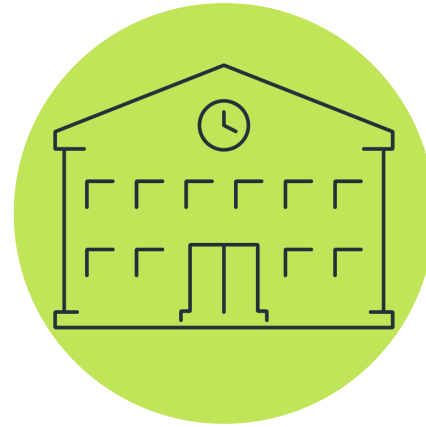
■ Net Zero Level EUI Targets



Program Pathways are based on building size



Prescriptive
0 - 8,000 sq/ft



Custom Express
8,001 – 100,000 sq/ft



Custom
100,000 sq/ft +
&
All ventilation load-
driven buildings

Mass Save Weatherization Evolution



Weatherization Pre-2022

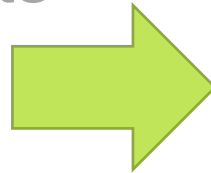
- Custom energy savings review for all projects
- Multiple site visits
- Weeks-long process
- Unpredictable incentives

Mass Save Weatherization Evolution



Weatherization Pre-2022

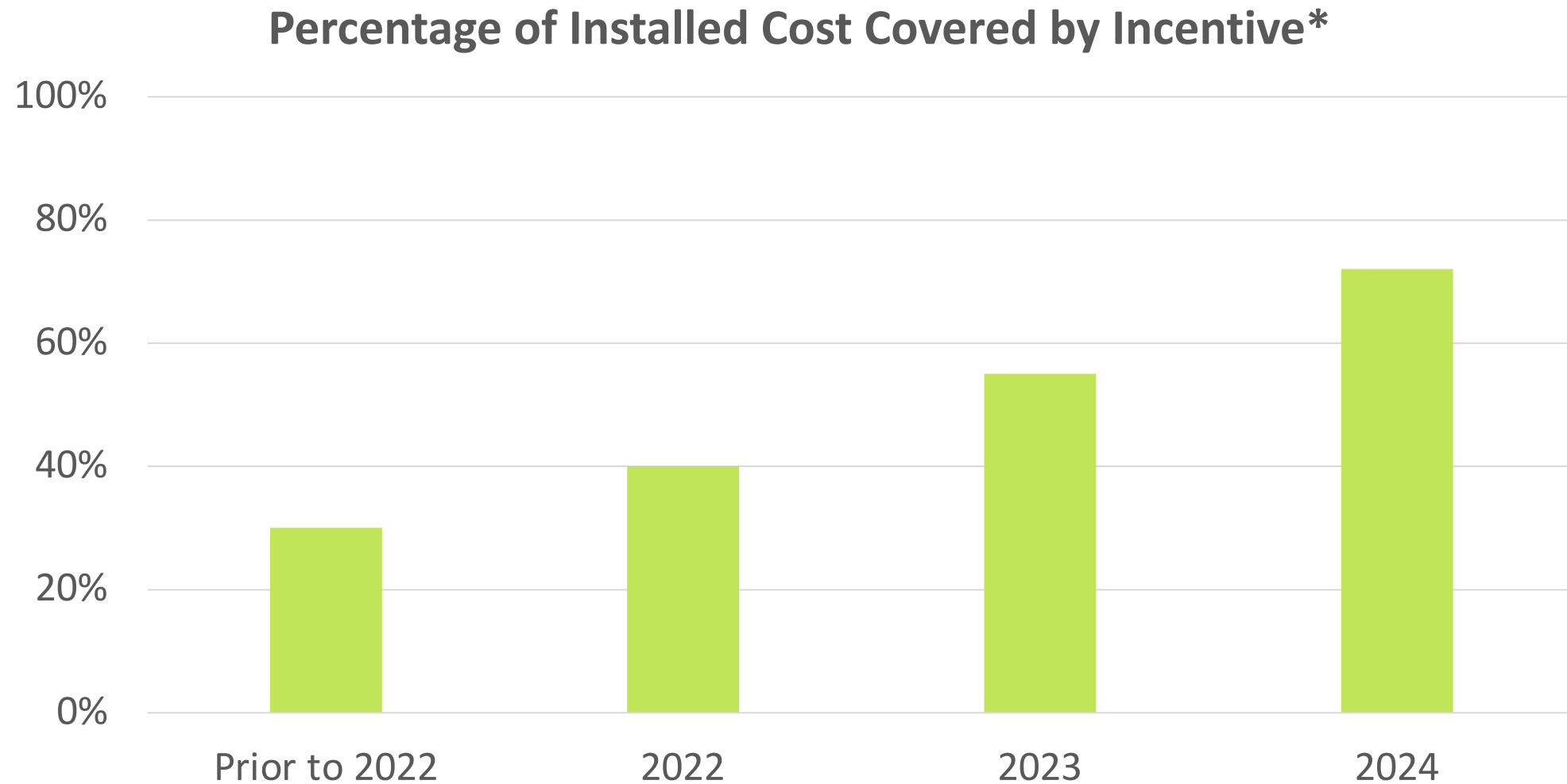
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Weatherization Now ('22 onward)

- New prescriptive weatherization rebate process for small buildings
- Savings calculator tools to help for larger buildings
- Days-long process, or instant
- Fixed incentives for prescriptive projects
- Significantly higher incentives overall

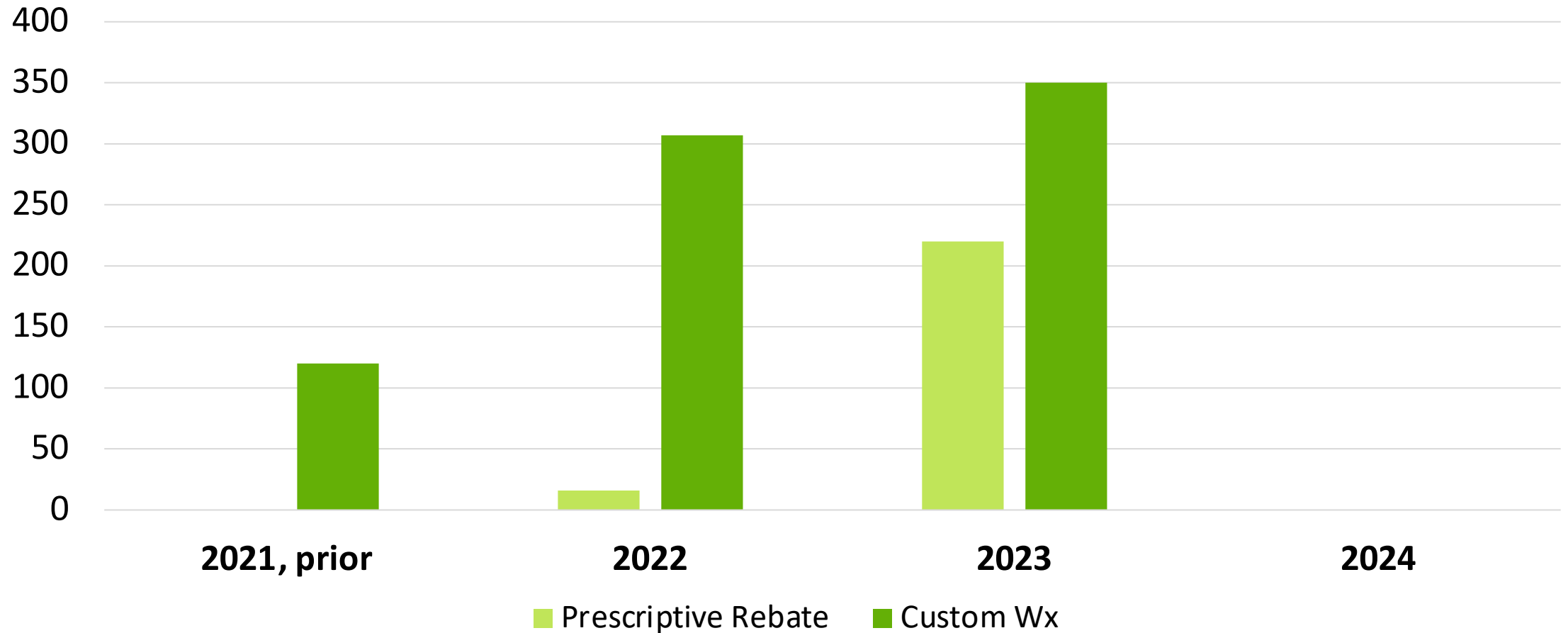
The Sponsors of Mass Save have meaningfully increased Weatherization incentives in recent years



*Actual costs and incentives vary, approximate values only

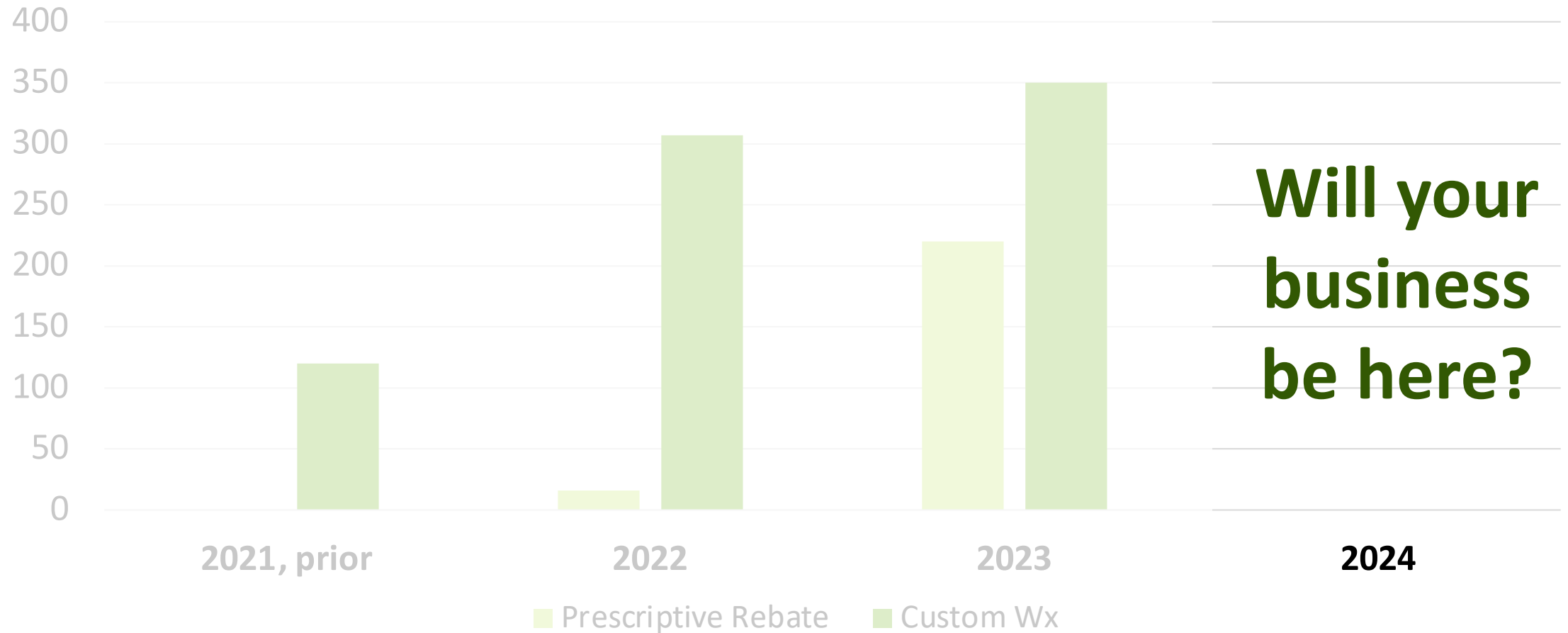
Contractors and customers have responded to the new Weatherization Pathways

Mass Save Incentivized Weatherization Projects by Year



Contractors and customers have responded to the new Weatherization Pathways

Mass Save Incentivized Weatherization Projects by Year



Looking ahead: Mass Save Weatherization in 2024



- Overall higher incentives
- New prescriptive incentives for weatherstripping and basement insulation
- Single vendor calculator tool, guiding through the process
- Weatherization Initiative
- Trainings for contractors and weatherization vendors

2024 Mass Save Weatherization Initiative



For buildings between 20,000 and 100,000 sq/ft

Submit a proposal, incentive amount request, and required custom express documents

Projects get scored on various metrics

Cost effectiveness, incentive amount requested, scope, creativity

5 Project Categories with 2 winners in each

Sloped Roof or Stick Framed, Masonry or Metal, Electrification, Landlord / Tenant, Other

Incentive awards provided in April 2024

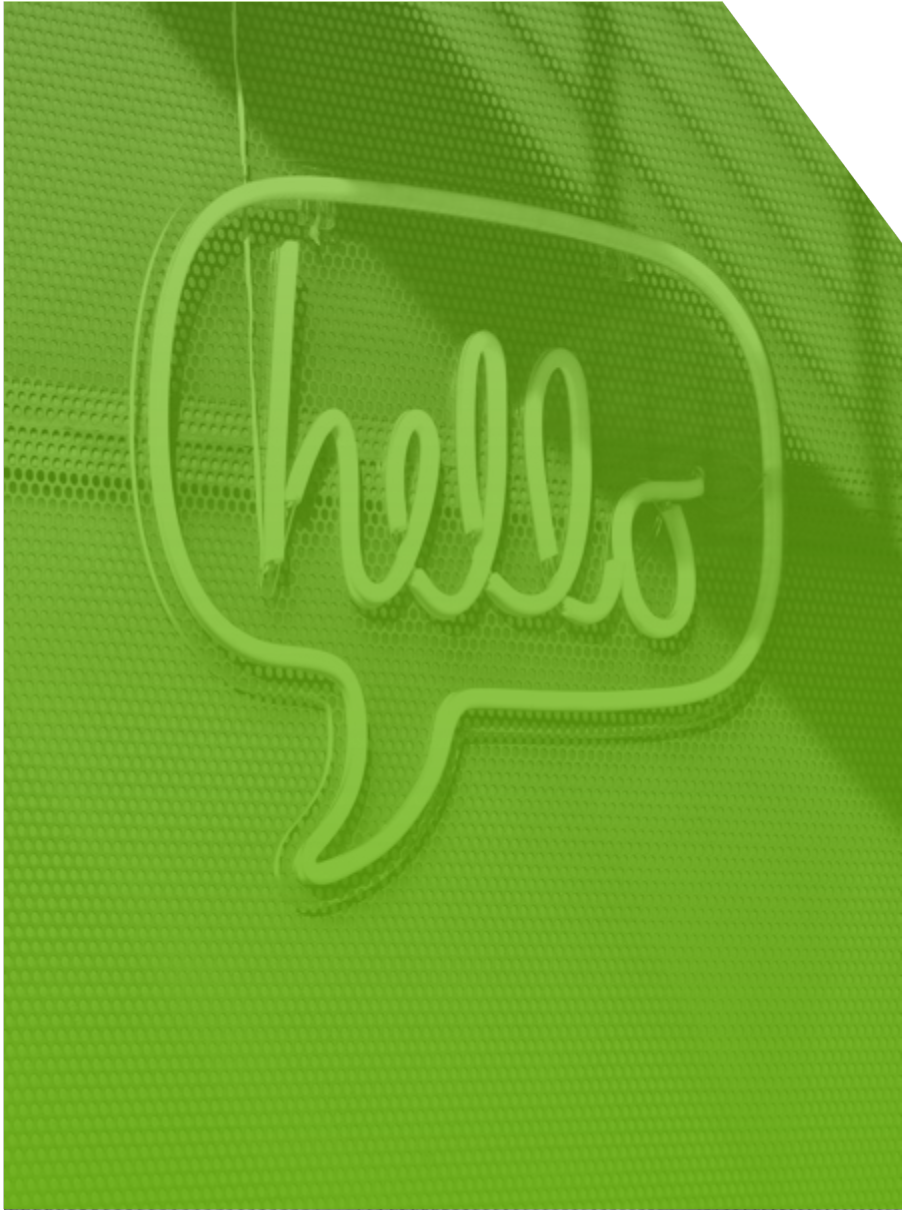
Second round to commence in April 2024

Get awarded incentives for cost effective projects

All incentive contributions require pre-approval by the Mass Save Sponsors. Some incentive contributions may be approved on a contingent basis, pending budget availability of the Sponsor.

Reach out to Weatherization-MA@DNV.com for further questions.

Small Business Program Sponsor Contacts



Berkshire Gas

Andrew Christofor
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Cape Light Compact

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Eversource

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EVERSOURCE



nationalgrid

