Pane and Simple:
Breaking the 20-Year Window Performance Plateau with a Golden Carrot

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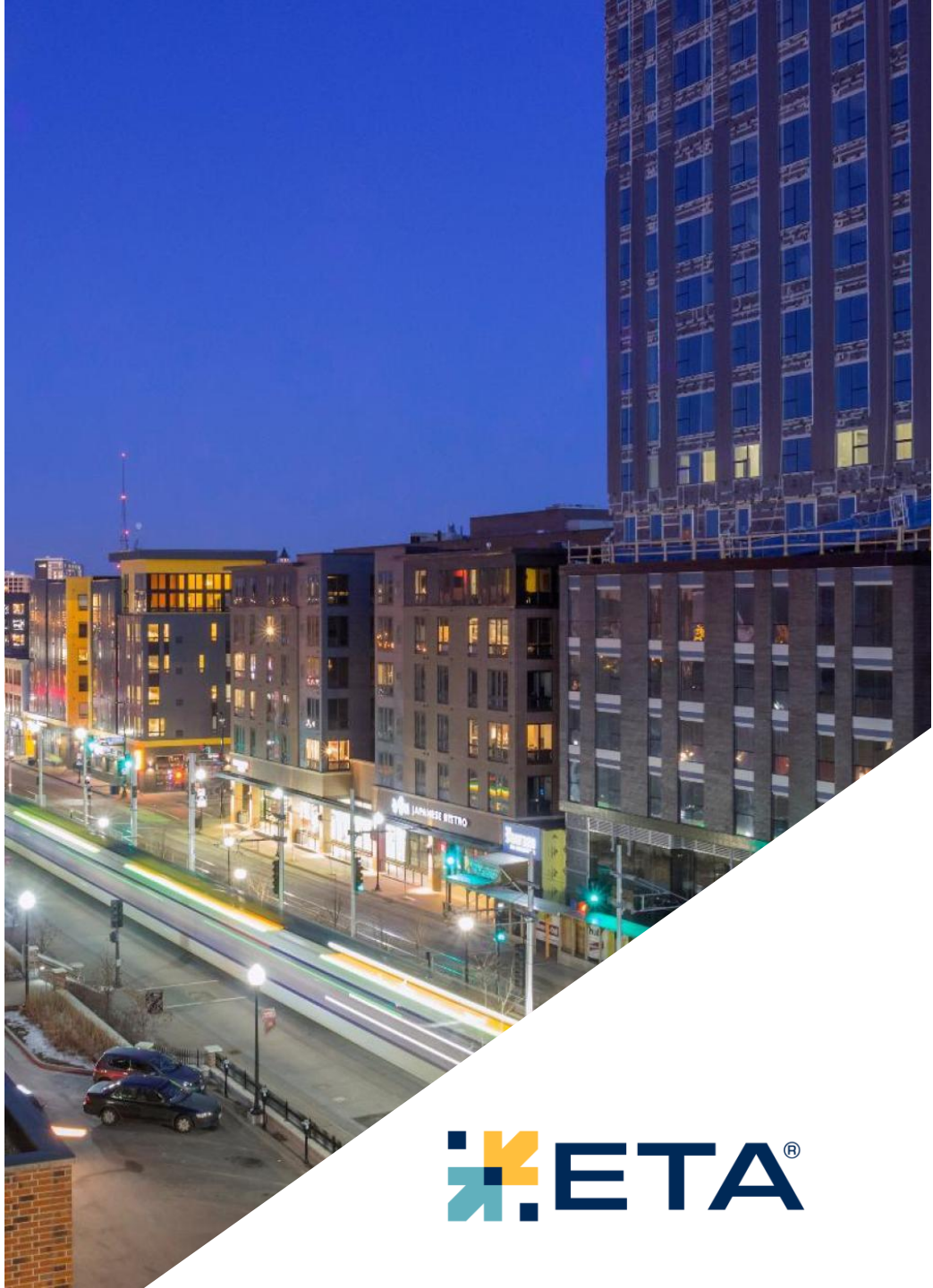
ETA®
EFFICIENT TECHNOLOGY ACCELERATOR

MN’s Efficient Technology Accelerator (ETA)

Minnesota’s Efficient Technology Accelerator (ETA) is a statewide market transformation program that accelerates deployment and reduces the cost of emerging and innovative efficient technologies, bringing lower energy bills and environmental benefits to all Minnesotans.

A partnership of:

- Participating investor-owned utilities and consumer-owned utilities (funders)
- Minnesota Department of Commerce, Division of Energy Resources (administrator)
- Center for Energy and Environment (implementer)



ETA Initiatives



Residential Air Source Heat Pumps*

ASHP air source heat pump collaborative



Luminaire-Level Lighting Controls

LLLC Luminaire-Level Lighting Controls



High-Performance Windows

Wise Window Hub



Next Gen Rooftop Units*

Next Gen Rooftop Units



Advancing Energy Codes

BuildUp MN

Electrification / efficient fuel switching technologies

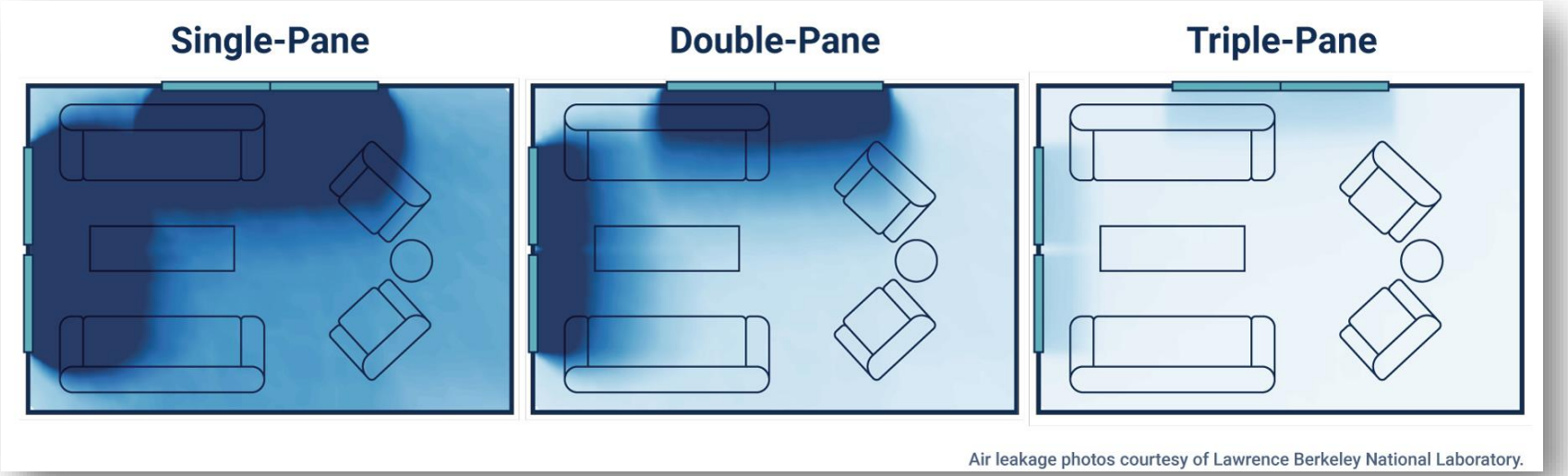
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Learning Objectives

- Why have windows **cost so much** and range so much in cost historically?
- Homeowners want good windows, but **rarely get offered** them: latent market demand
- New market research findings
- How a Golden Carrot fits in the market transformation toolbelt
  - Manufacturer Product Challenge: debundle high-performance window glazing from non-performance features to yield **cost-optimized entry-level products**

Why Windows Matter

- Business-as-usual windows are almost universally perceived as "good enough", but…
  - Windows contribute to about 40% of the energy loss in buildings
  - Improving windows can save homeowners $600/yr on utility bills:
    - $17.5 billion nationwide residential savings
    - $10.6 billion nationwide commercial savings



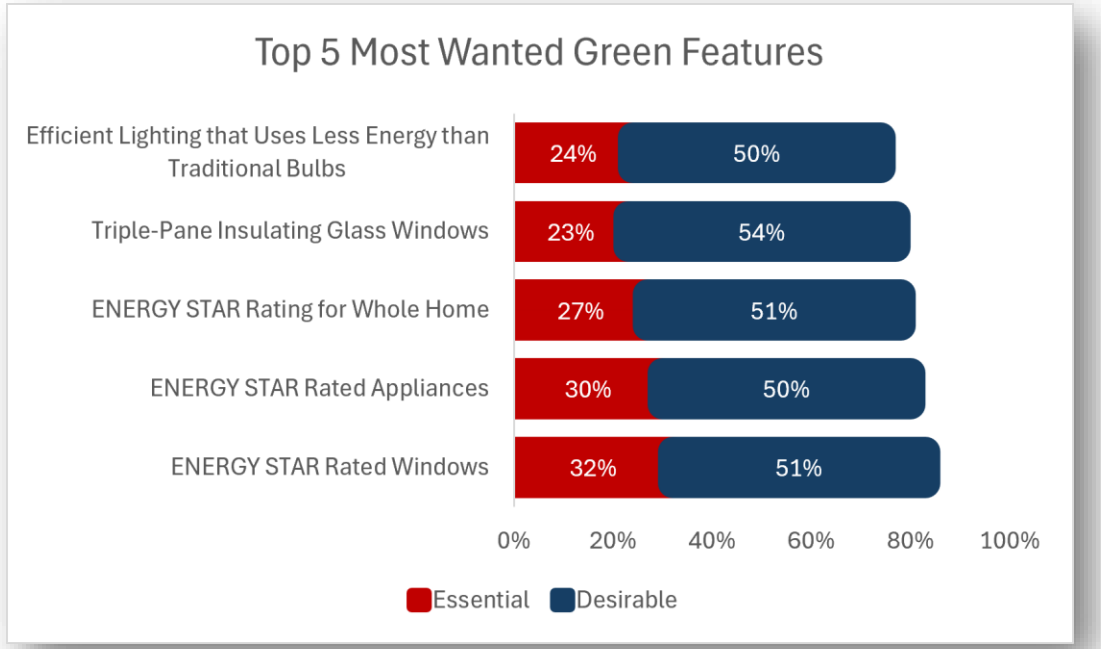
Air leakage photos courtesy of Lawrence Berkeley National Laboratory.

Why Do Better Windows Cost So Much?

- Feature bundling! Triple-pane windows have existed for decades, but have been **bundled into premium product lines and trim levels**
- There is a lack of *affordable, entry-level, cost-optimized* products: Incremental costs may range from $100 up to several thousand(!)
- If triple-glazing isn't bundled with other features, added cost per window was estimated to be $54 (ENERGY STAR 2022)

People Want to be Comfortable!

- 90% of surveyed MN contractors believe that business as usual double-panes are good enough, and HPW only offered to 24% of recent MN replacers,
  - but >60% of those offered triple-pane windows elected to buy them
  - Latent demand remains unmet, and people still want good windows!



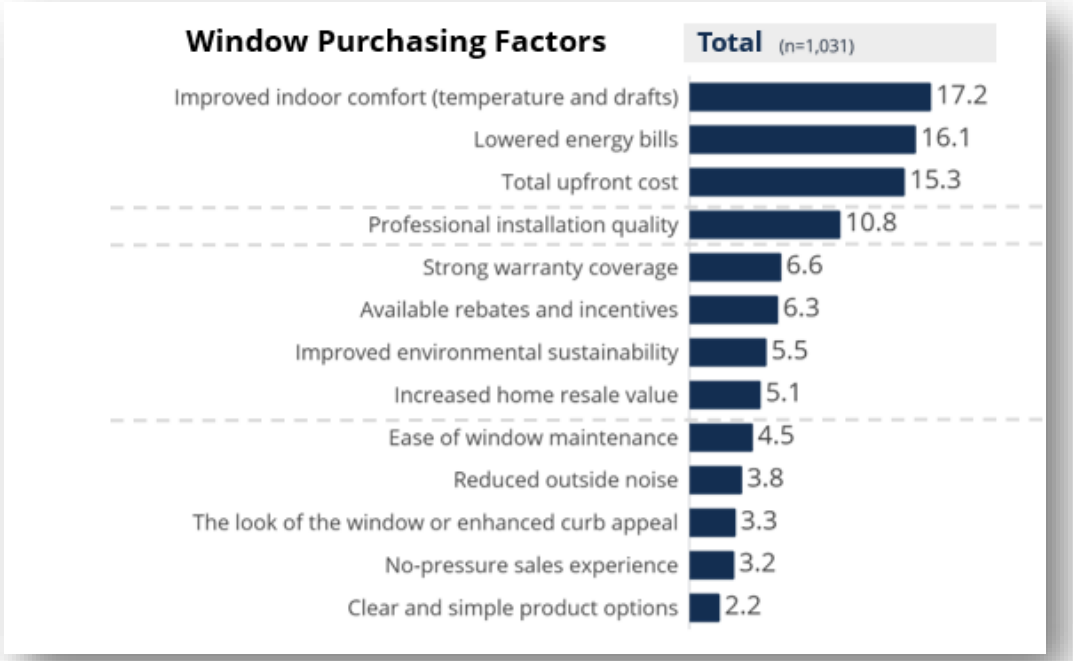
Homeowner Market Research Findings

- If incremental cost is reduced from $300 to $200, the percent of homeowners that would upgrade to triple-pane windows jumps from 25% up to 45% - nearly double!

- **27%** of surveyed window replacers purchased some triple-panes (all or a mix)
- **58%** would be willing to pay more for triple-pane windows
- **66%** would be more likely to purchase windows with a $100 utility rebate

Manufacturer Product Challenge: The Golden Carrot

- Purpose of incentive is to debundle performance features from non-performance features to produce *cost-optimized, entry-level products*
- $300,000 incentive pot split between three manufacturers, resulting in multiple times in-kind activation of winners
- Comfort and cost are 2-3x more important than any other purchasing factor… and the resulting products address these directly



Program Contributors

- Center for Energy and Environment (managing implementer, sponsor)
- Resource Innovations (implementer)
- Nicor Gas IL (sponsor)
- Xcel Colorado (sponsor)

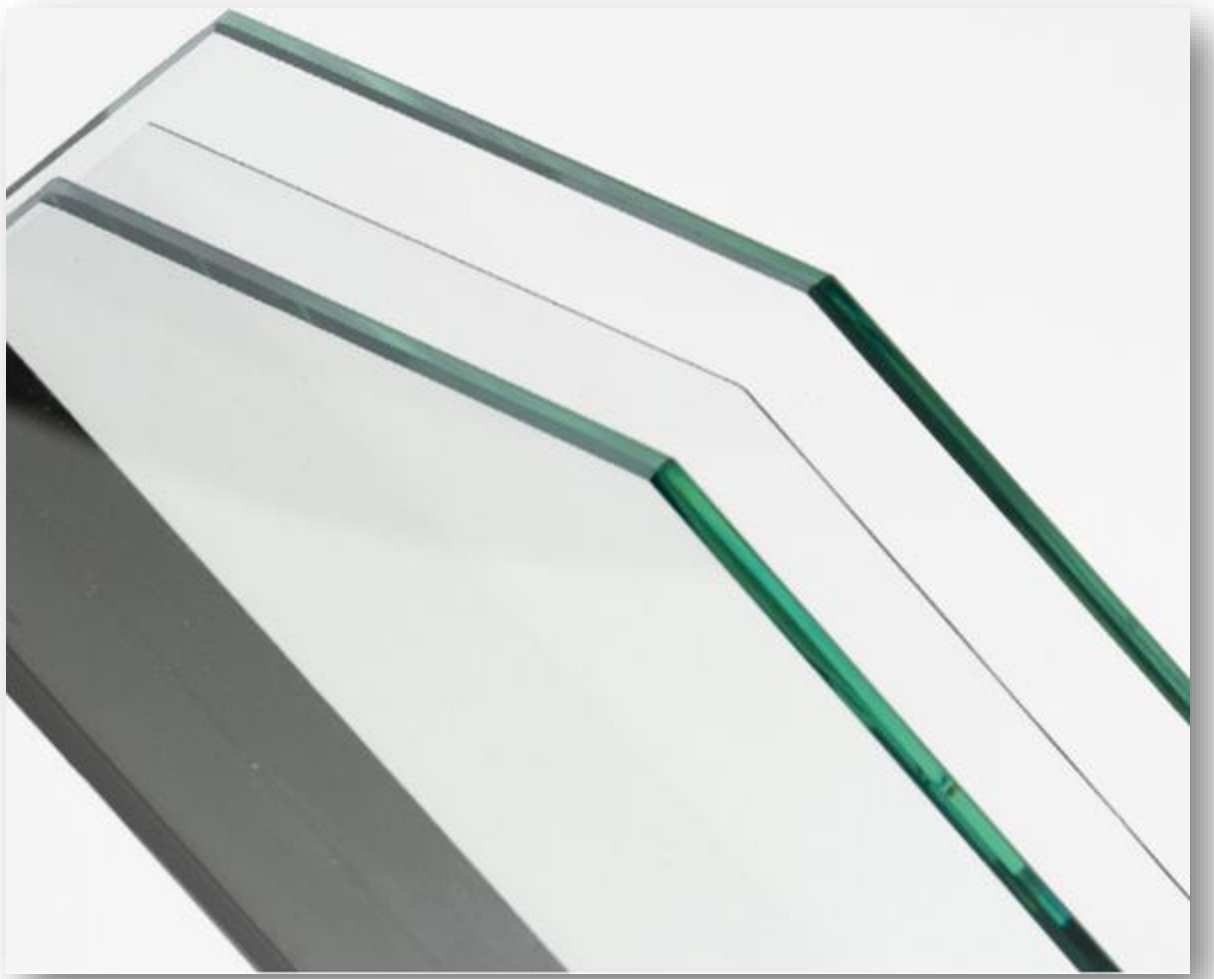
Manufacturer 1

- Adding triple-pane glazing to an existing and popular entry-level national product line with broad existing reach
- Historically, triple glazing was only available in premium product families
- Spending incentive on sales enablement, training, and marketing of the new entry-level offering



Manufacturer 2

- Optimizing an existing product family by limiting the number of features that the product comes with to reduce first costs
- Using fiber-reinforced composite frames, with **thin triple glazing** that uses a very thin middle lite of glass, their product reaches a U-Factor of about 0.16 (~R-6)
- Spending incentive on highly targeted activation of their distribution network, with key market partners in MN, IL, and CO



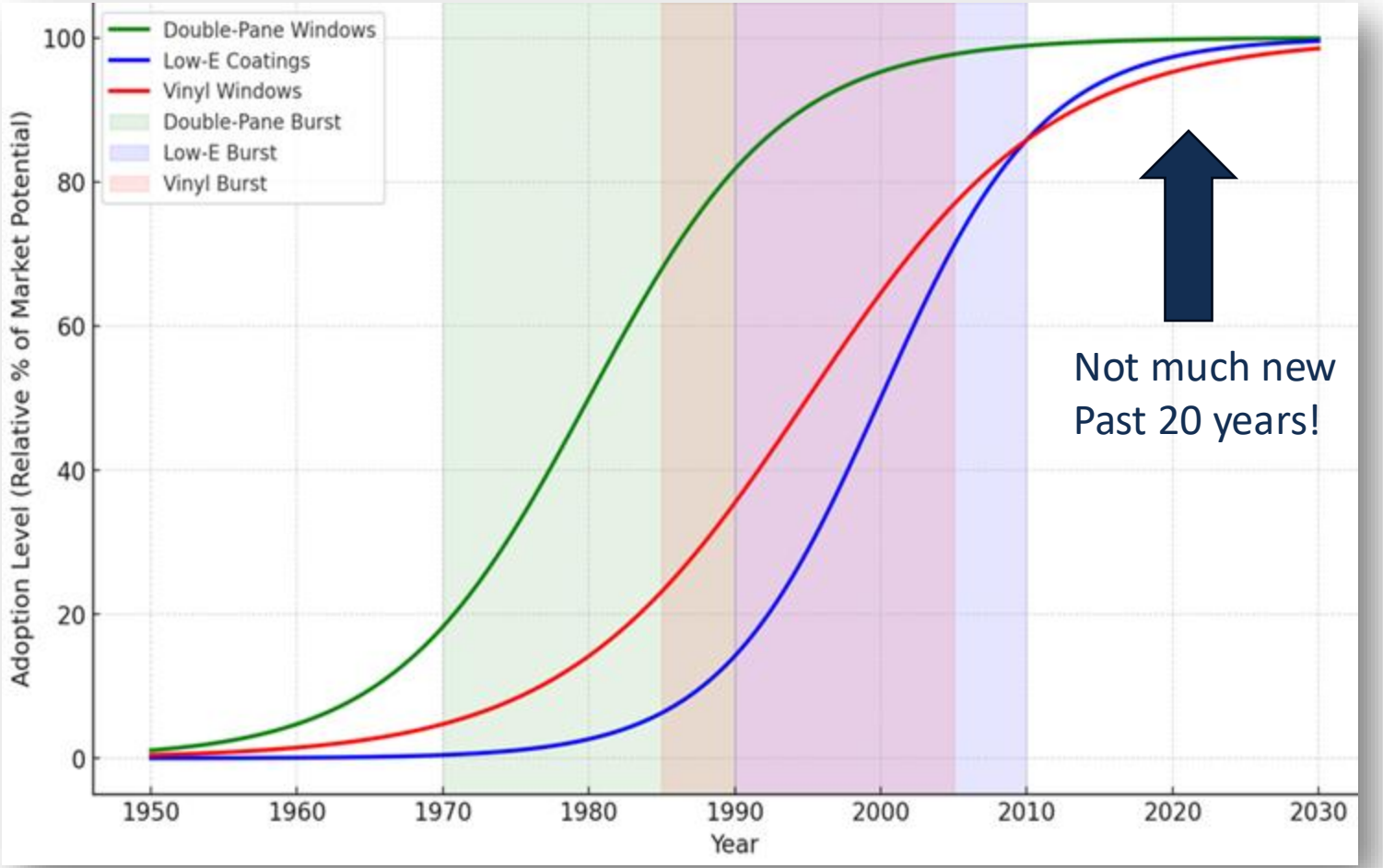
Manufacturer 3

- Using the funds for equipment upgrade, in-sourcing triple-pane production rather than externally sourced with a markup
- Through this equipment upgrade and related workforce upskilling, they will be able to offer a new tier of cost-per-performance they've never accessed before
- in-sourcing leads to a higher level of control over lead times, delivery times, and rework times, which are targeted value proposition metrics for this manufacturer.



The National Landscape is Shifting

- Programmatic support is growing nationwide (see www.PAWS.ENERGY for more)
- Manufacturer Product Challenge as a key pillar in MN and IL windows MT portfolio that is breaking the 20-year plateau!



What's Next?

Braiding market support strategies to maximize impact.

- Expanding incentive and programmatic support.
- Utilizing public-private partnership leverage gained from golden carrot.
- Demand signal aggregation – purchase commitments and expressions of interest to demonstrate market appetite to manufacturers.

<- Contractor Research

Homeowner Research ->

Thank You!

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Windows discussion session Tue @ 3!