

# Thin Triple Windows (TTW) – Market Transformation Program Update

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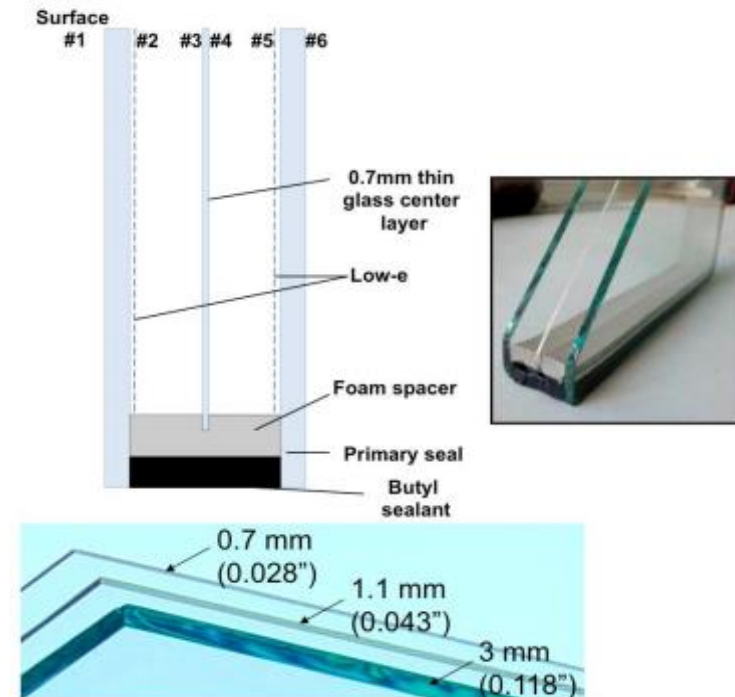
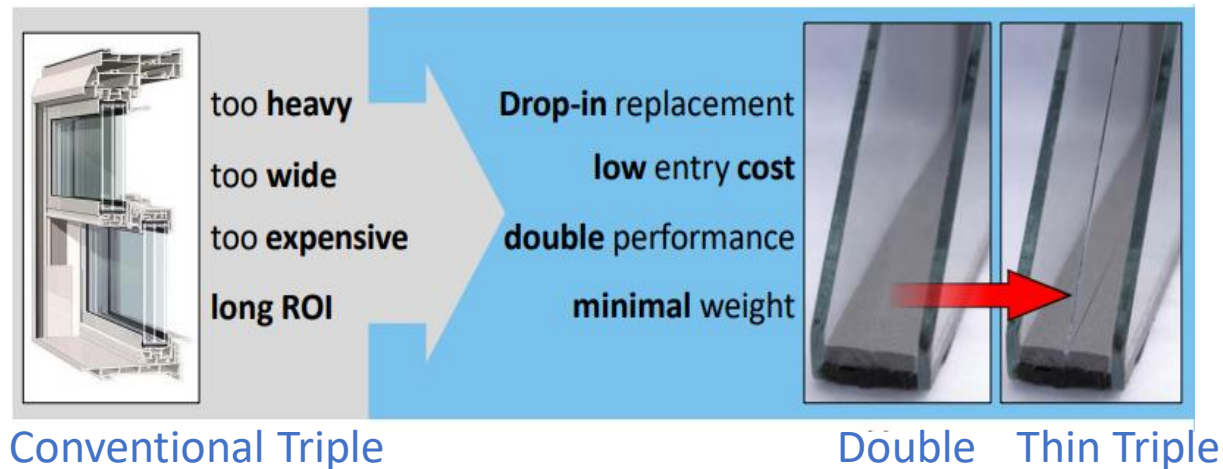
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# Thin Triple Window Design



- TTW is a new version of triple pane windows that provide roughly the same insulation value ( $\sim R-5$ ) of conventional triple pane windows without the added frame thickness and weight
- TTW use the same glazing unit dimensions as a double-pane windows
  - 40% more energy efficient to typical double pane ( $\sim R-3$ ) windows without any change to how the window is framed, or internal trim details.



# Why focus on Thin Triple Windows now?

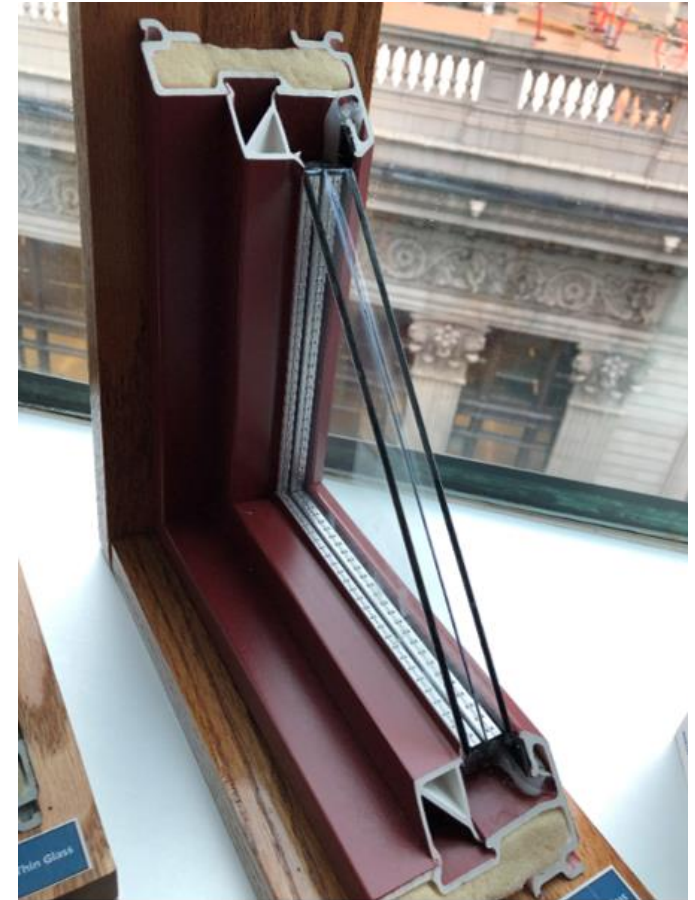


- In most homes, windows are the weakest part of the building envelope, resulting in increased energy costs, GHG emissions and poor overall building performance
  - Windows account for 10% of the building envelope, yet account for 30 – 40% of heat loss in Winter and add to cooling peaks and discomfort in Summer
- The typical R-3 (U-factor – 0.33) code compliant or ENERGY STAR window commonly used in the Midwest is double-glazed and has not changed significantly for the past two decades
- Conventional triple-pane windows are available but have a low rate of adoption due to the increased size, weight, and expense of the product and installation

# Manufacturers



Products are currently available from the manufacturers listed below



# Current Partnerships and Engagements



Nicor Gas has partnered with **NEEA** (Northwest Energy Efficiency Alliance), **LBNL** (Lawrence Berkeley National Lab) and **Steve Selkowitz** (subject matter expert) to develop this national initiative while providing support for IL specific components (e.g., IL TRM Workpaper)

Nicor Gas has coordinated with **IL utilities (ComEd/Ameren/PG/NSG)** and evaluation teams from **Guidehouse** to review/evaluate MT components, including the logic model, TRM workpaper, and NC pilot strategy to present co-funding and partnership opportunities in support of this initiative

The NC pilot program aims to partner with **national homebuilders** and **window manufacturers** to promote TTW and support pathways to product adoption.

The **Partnership for Advanced Windows Solutions (PAWS)** – coordination with **NEEA** and the **DOE** on development and support launching the PAWS collaborative to promote improved window standards.

Nicor Gas Residential New Construction Builders Engagement

# IL TRM Market Transformation Framework Components



## Business Plan Components

- ✓ TRM Saving Work Paper
- ✓ Target Market
- Logic Model
  - Intervention Strategies
- Market Characterization Research
- Natural Market Baseline
- Market Progress Indicators
- Data Collection & Management Plan
- Budget
- Savings & Attribution

# Thin Triple Window – Logic Model



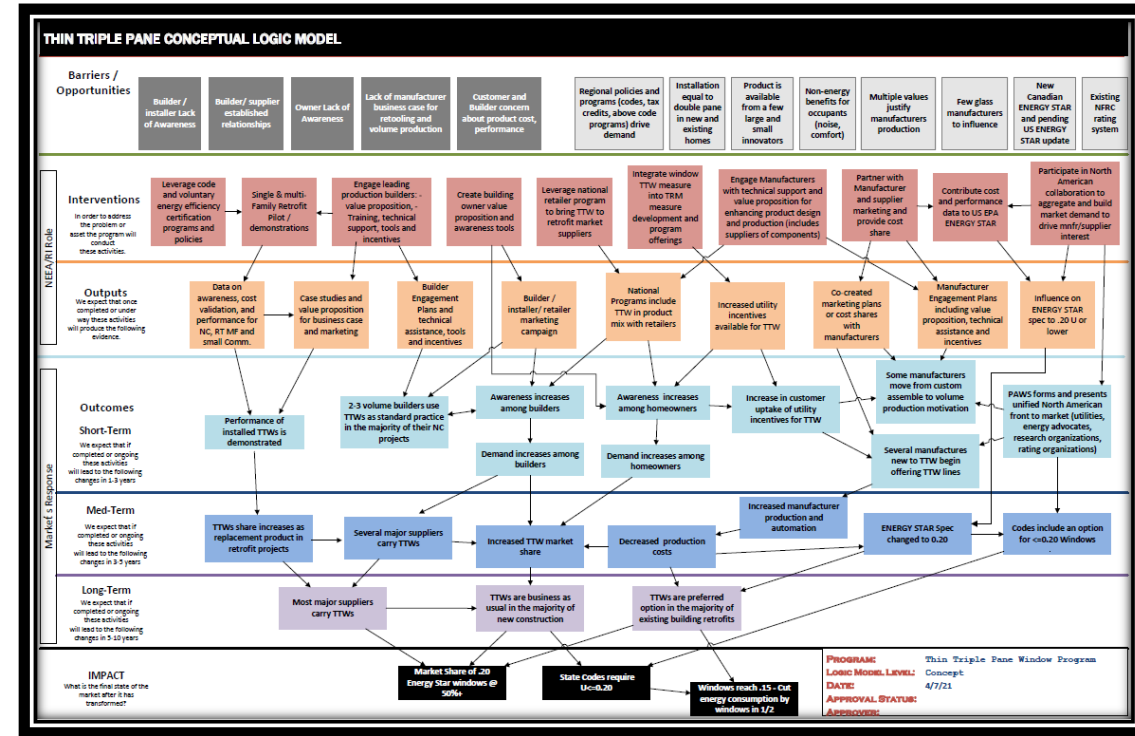
The logic model was developed through a collaborative process with NEEA, Guidehouse and other IL utilities

Nicor Gas' evaluator (Guidehouse) was a part of the early discussions and provided in-flight evaluation to refine the Logic Model through development

Target Markets: Residential New Construction and Retrofit

The end goal of this initiative is to have:

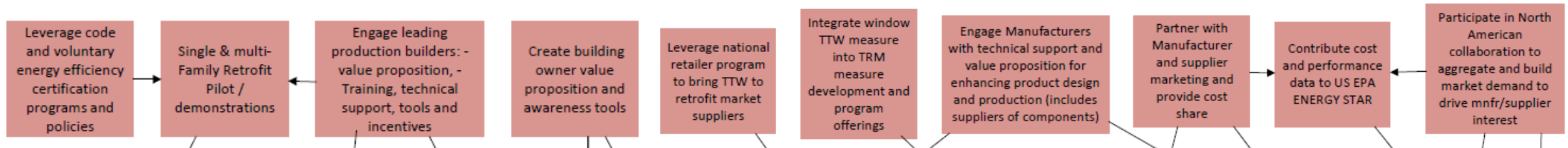
- IL state code require window standards **U-factor  $\leq 0.20$**
- Manufacturers innovating and developing even better windows down to **U-factor  $\leq 0.15$**
- **50% market adoption of windows with U-factor  $\leq 0.20$**



# Logic Model Intervention strategies



- Single and multi-family new construction pilots/demonstrations
  - Develop builder value proposition, technical support, training tools and incentives
- Single and multi-family retrofit pilots/demonstrations
- Influence ENERGY STAR spec to U-Factor  $\leq 0.20$
- Leverage national retailer program to bring TTW to retrofit market suppliers
- Integrate TTW measure into TRM to allow program integration
- Leverage voluntary EE certification programs
- Co-created marketing plans or cost shares with manufacturers
- Participate in North American collaboration – Partnership for Advanced Window Solutions (PAWS)







# Thin Triple Window Workpaper in the IL TRMv10

Savings developed based on window performance specifications – not specific to *Thin triple-* or *Conventional triple pane* window design.

## Partners:

- Lawrence Berkeley National Laboratory (LBNL) – Energy Modeling Analysis
- Guidehouse – Evaluation and Workpaper Development

## Illinois Baseline Conditions

- New Construction U-factor = 0.30 (Chicago - 2018 IECC Construction Standards)
- Retrofit or Early Replacement U-factor = 0.55

## Savings per square foot

- Heating Type = Gas Furnace/Air Conditioner (therm and kWh savings)

**Table 7: Heating savings per window area by climate zone and baseline window condition**

Climate Zone	New Construction or Time of Sale (therm/ft <sup>2</sup> )	Early Replacement (therm/ft <sup>2</sup> )
1 – Rockford	0.11	0.35
2 – Chicago	0.10	0.31
3 – Springfield	0.09	0.24
4 – Belleville	0.11	0.23
5 – Marion	0.09	0.19

**Table 4: Gas Furnace and Air Conditioner - savings per window area by climate zone and baseline window condition<sup>13</sup>**

Climate Zone	New Construction or Time of Sale (kWh/ft <sup>2</sup> )	Early Replacement (kWh/ft <sup>2</sup> )
1 – Rockford	0.55	1.28
2 – Chicago	0.55	1.24
3 – Springfield	0.62	1.47
4 – Belleville	0.56	1.44
5 – Marion	0.51	1.42

# Natural Market Baseline Development – Overview

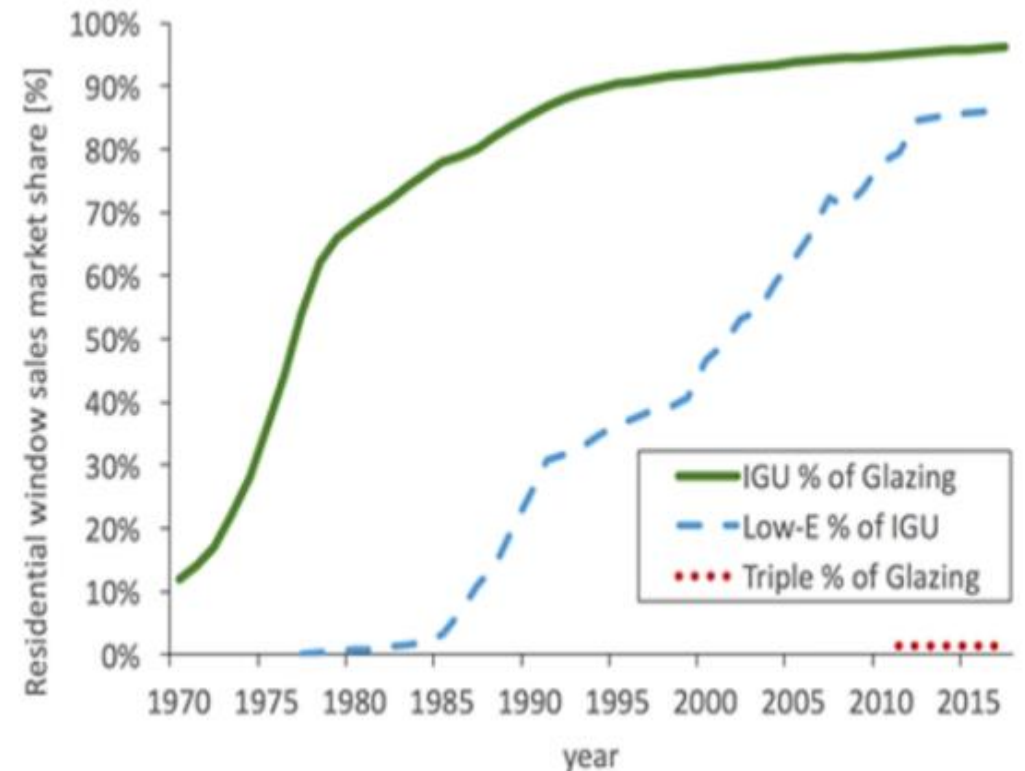


TRM: The basic task is to develop a baseline of how the energy efficient product, service or behavior would have grown in the market independent from utility activity.

MT Activity: Conducting a market characterization study of the Illinois residential windows market.

- **National Market Baseline for Triple Pane Windows**  
Prepared by Stephen Selkowitz For NEEA and Nicor Gas (Guidehouse is currently reviewing)
- The US residential building stock of 118.2M units, 73.9M are single-family detached/attached, 1.2M (**1.6%**) of those units have triple pane windows.
- “Absent aggressive new building energy codes, very high energy prices/carbon taxes or much lower ENERGY STAR voluntary U-factor targets, the lack of market demand pressure suggests that regular and thin triple pane window market share will rise only slowly from current low levels and is not likely to exceed 5% national market share by 2030”

Single to Double Insulated Glass Unit (IGU) Windows



# Next Steps



# Nicor Gas Initiative Timeline & Next Steps



Task/Activity	Timeline
Logic Model	March 2021
IL TRM Workpaper	May 2021
Natural Market Baseline (National)	June 2021
New Construction Builder Questionnaire/Survey	Q3 2021
Market Characterization Research	Q3 2021
Natural Market Baseline (IL specific)	Q4 2021
Business Plan	Q4 2021 - Q1 2022
New Construction Pilot Program	Q4 2021 – Q4 2022

Questions?

