

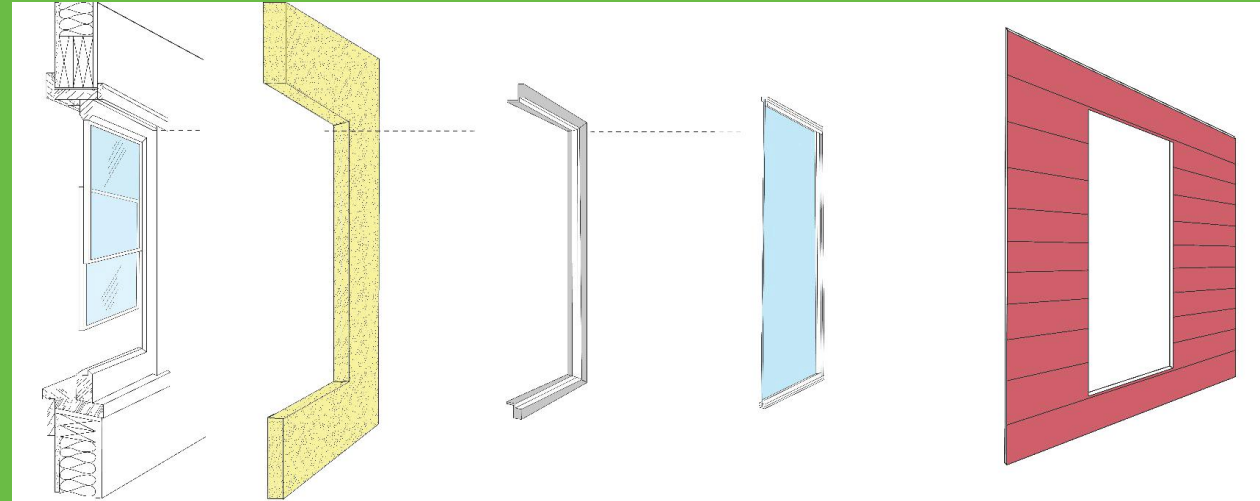
# Renew-Wall



First :  
Re-Side Tight  
air barrier +  
siding



Next :  
Re-Side Right  
air + thermal  
barrier +  
siding



**NOW: RENEW-WALL**  
**air + thermal barrier + hp storm + siding**

New Jersey Institute of Technology, BASF Corporation, Alpen High Performance Products, BRINC Building Products, Inc.

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DOE EE0009749

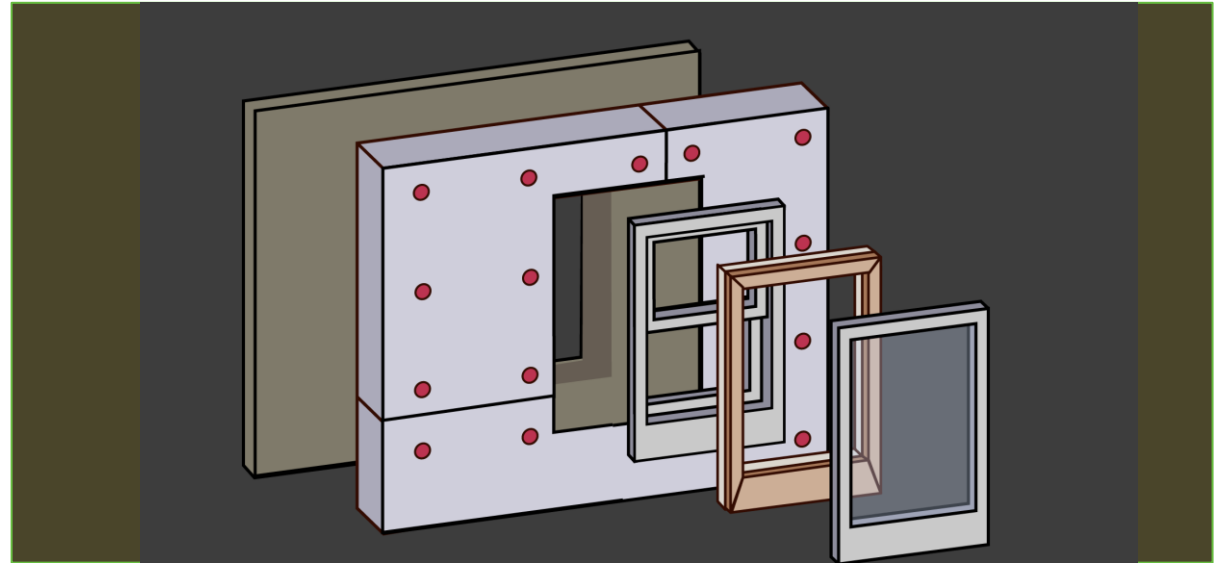
# Project Summary

## Objective and outcome

Renew-Wall will test and validate a cost-effective, market-ready, replicable and scalable high performance whole building envelope retrofit for single family homes across the US. Renew-Wall adds 2" of rigid insulation, a thermal buck and a high performance storm window to a standard re-siding job.

## Team and Partners

The Center for Building Knowledge at NJIT  
BASF Corporation  
Alpen High Performance Products  
BRINC Building Products, Inc.



## Stats

Performance Period: March '22 – December '25  
DOE budget: \$602k, Cost Share: \$124.5k

**Milestone 1: Renew-Wall Design ready for install**

**IN PROGRESS**

Milestone 2: Renew-Wall Installed on 5 houses

Milestone 3: Analysis, Training Material, Report

# Problem

**More than 1 million homes in the US are re-sided annually** and 3.7 million homes have windows and/or doors replaced.

**The majority of these jobs are not optimized for improved enclosure performance.**

As such, **opportunities for reduced infiltration, increased insulation and greater resilience are being routinely overlooked**, locking in inefficiencies that may not be remedied for decades.

Having **a cost-effective, market-ready, exterior system** that can be deployed by siding contractors during a retrofit job people would be doing anyway **could capture a large portion of this market and move them to greater efficiency.**



# Alignment and Impact

- **Preliminary modeling** of the *Renew-Wall* package on an existing single family home shows a **20% reduction** in the heating and cooling loads.
- **Comparable to Home Performance with Energy Star** – ***without the specific need for an energy focused contractor or homeowner.***
- With **the envelope focus**, Renew-wall homes are well **suited to** move toward **electrification.**



# Approach - air + thermal barrier

Re-siding jobs are typically done without any consideration for improved energy performance. Weather Resistive Barriers are not usually detailed as air barriers.

If rigid insulation is installed, it's typically a thin layer with negligible R-value and serves to provide a level substrate to the new siding.



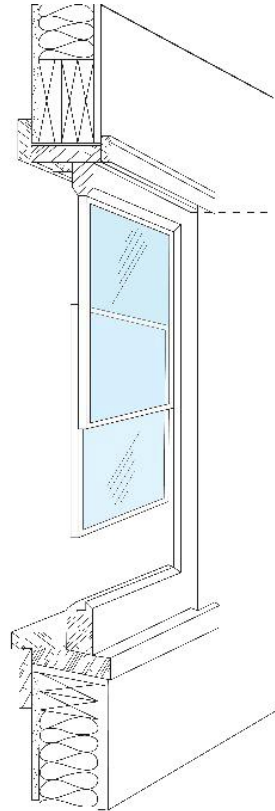
# Approach – site specific

Panelized solutions can be challenging for the varied existing housing stock found in much of the country.

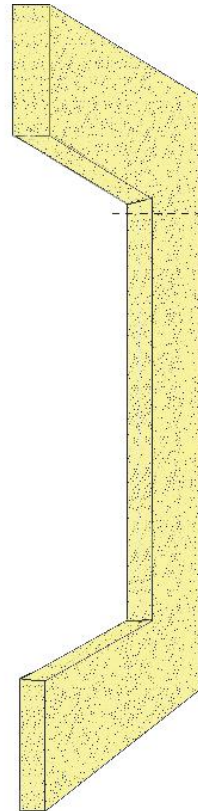


# Approach - components

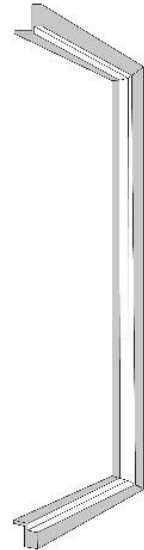
Renew-Wall addresses the whole exterior wall with 2" of rigid insulation with a WRB facing, a modified ThermalBuck and Alpen's Winsert interior storm window, redesigned for exterior installation.



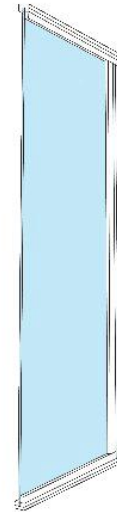
EXISTING  
WALL



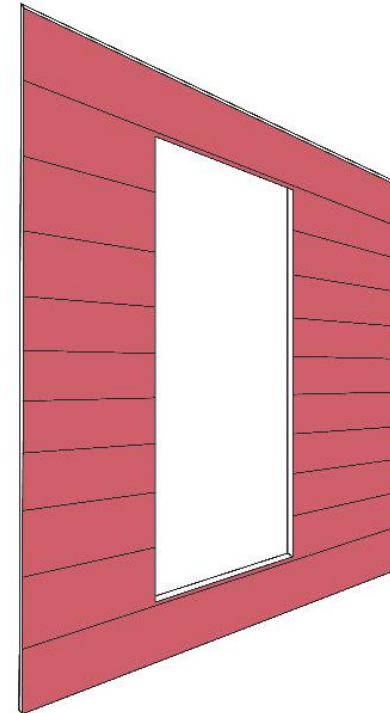
2" RIGID  
INSUL



MODIFIED  
THERMALBUCK



HP STORM



NEW SIDING

# Approach – Available workforce

There are **18,000 BPI** contractors in the US <sup>2</sup> and **128,012 Roofing & Siding Contractors** <sup>1</sup>

To scale up energy efficiency efforts, the greater retrofit workforce has to be involved.

BPI

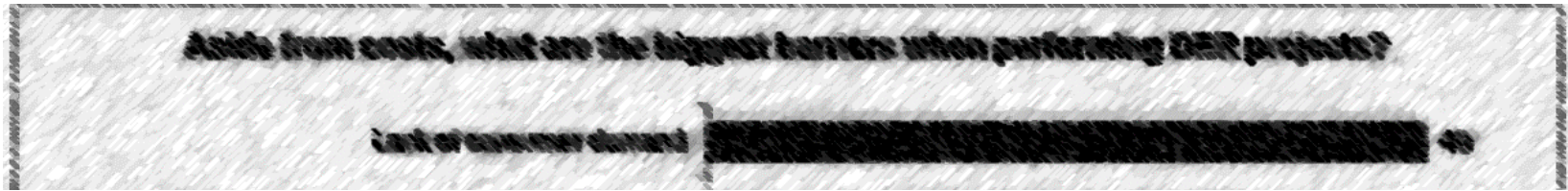


ROOFING & SIDING

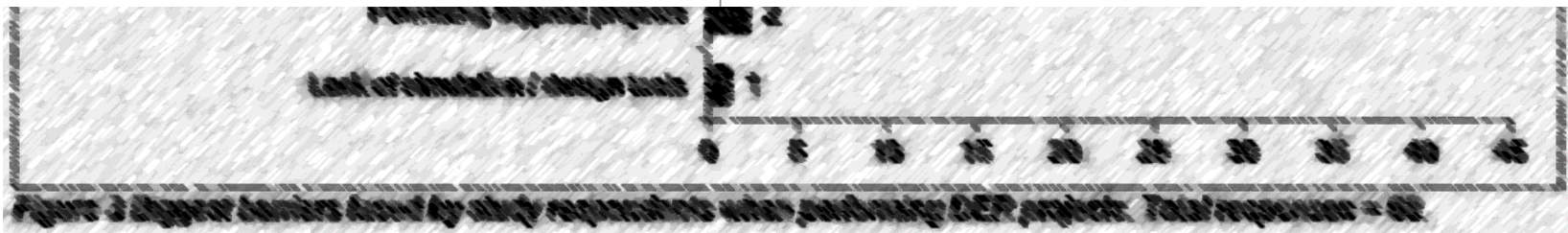




# Approach – Risks



Aside from costs, what are the biggest barriers when performing DER projects?



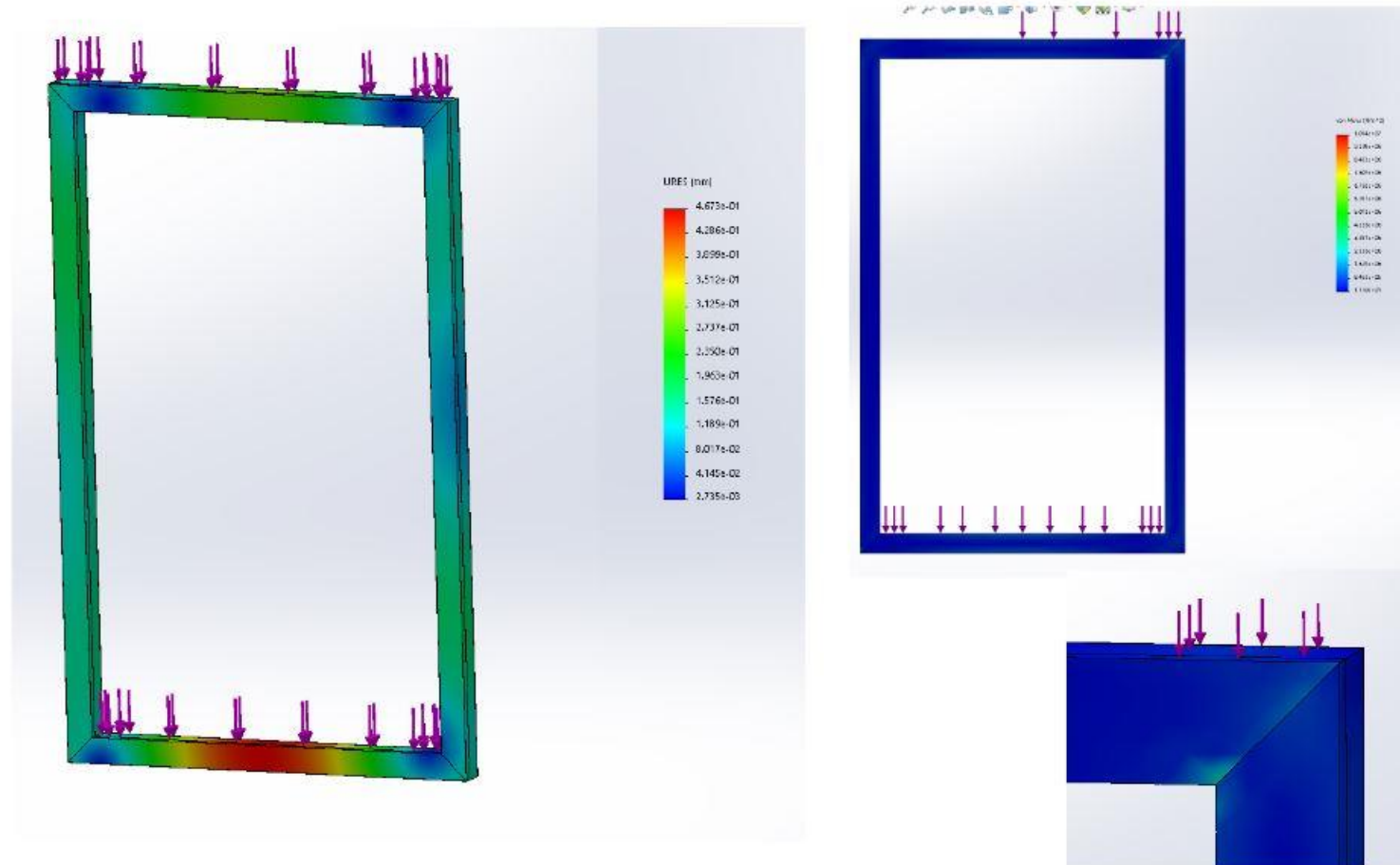
Chan et al. (2021)

# Progress and Future Work

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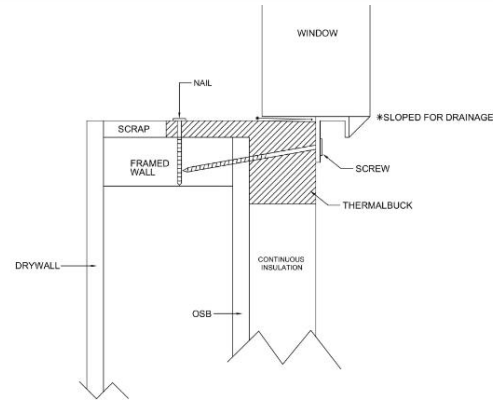
- **Milestone 1: Renew-Wall Design ready for install**
  - **IN PROGRESS**
- **Milestone 2: Renew-Wall Installed on 5 houses**
- **Milestone 3: Analysis, Training Material, Report**

# Progress and Future Work – ThermalBuck redesign



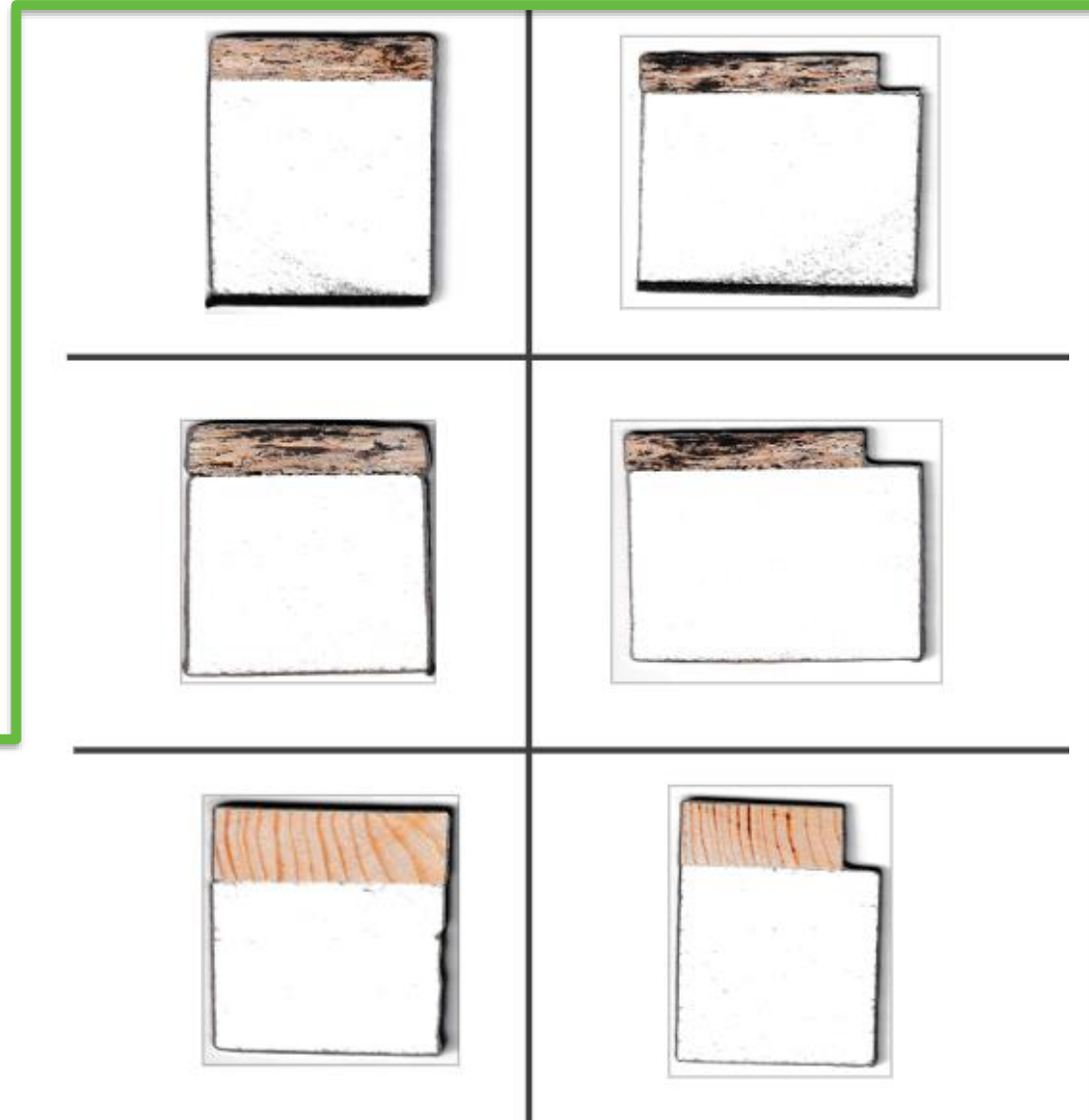
Modeling analysis of stress and strain parallel to benchtop testing and mockups

# Progress and Future Work – ThermalBuck redesign



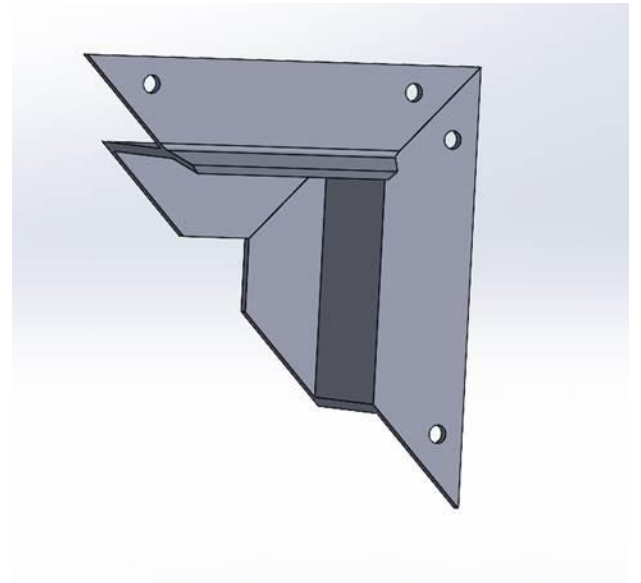
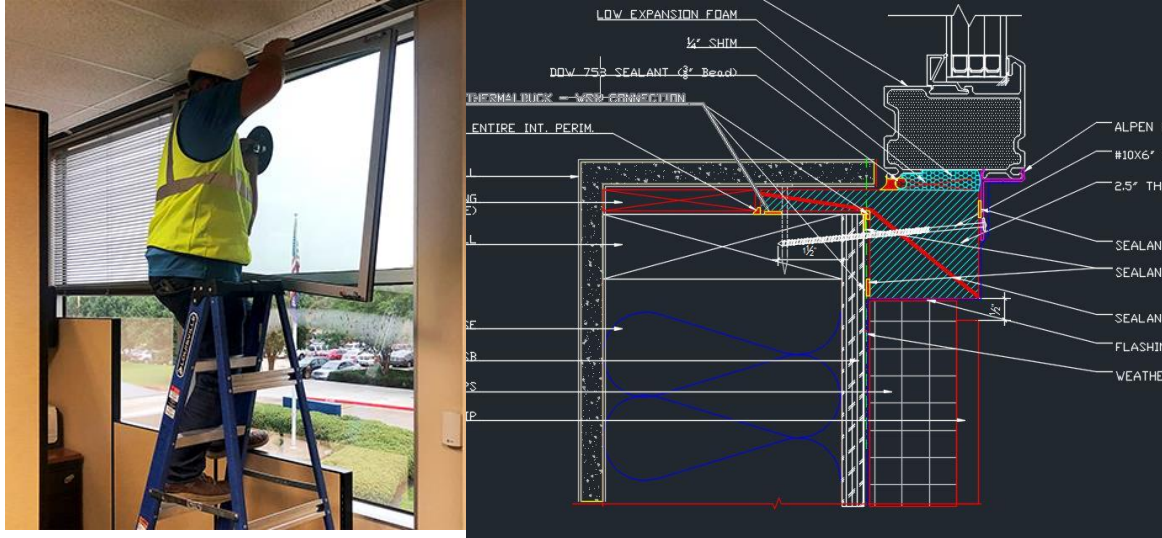
ThermalBuck is designed for new construction, set into a rough opening.

In a retrofit project, the buck needs to be installed on the face of the sheathing, yet still support our exterior storm window.

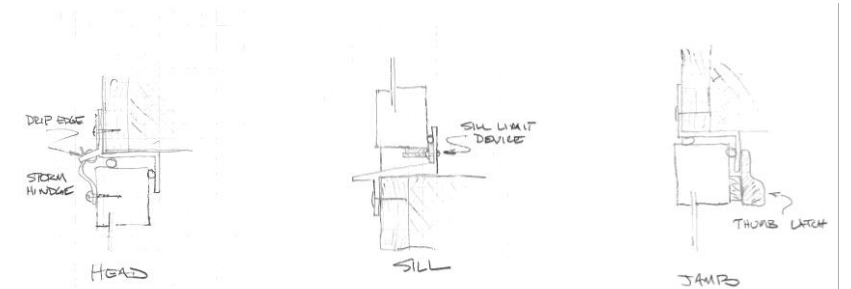


# Progress and Future Work – high performance storm window

Alpen's Winsert is designed for interior installation



For Renew-Wall, the high performance storm window will be installed over the re-designed thermal buck and allow for egress and ventilation.

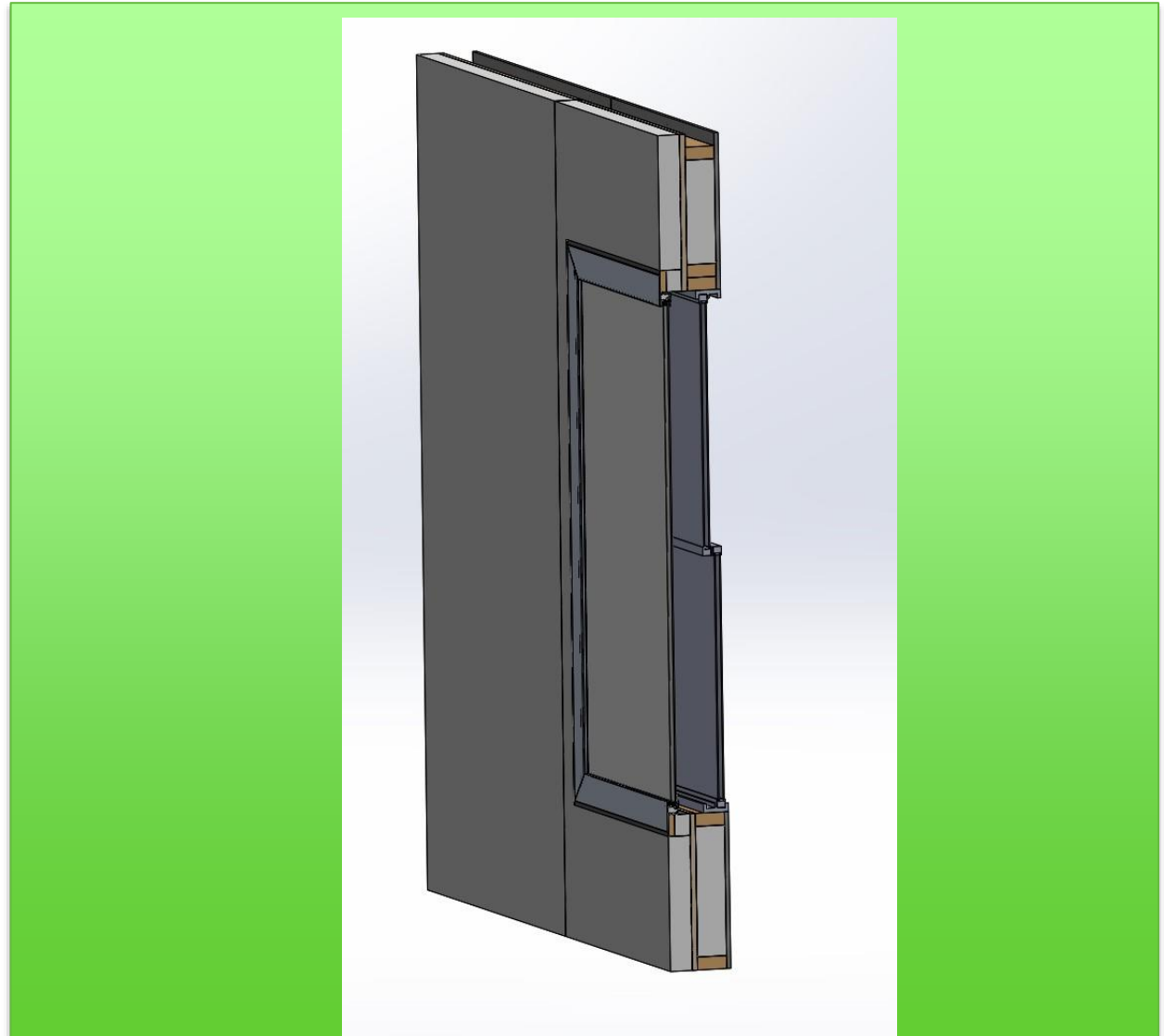


# Progress and Future Work

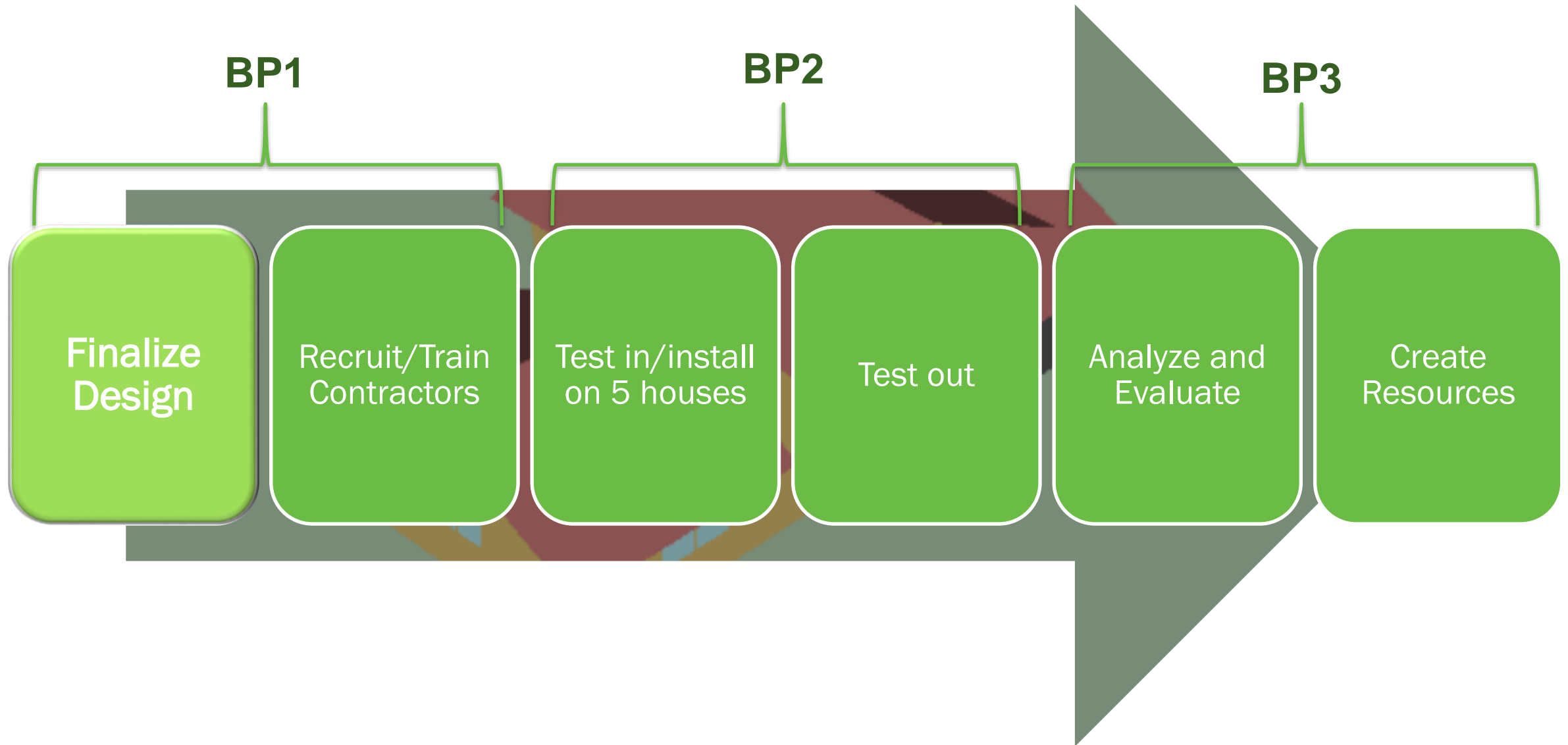
## Next steps:

**Assemble the components in a mocked up wall assembly to assess installation issues, functionality and trim out**

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# Progress and Future Work



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# Thank You

**New Jersey Institute of Technology, BASF Corporation, Alpen High Performance Products, BRINC Building Products,  
Inc.**

**Christine Liaukus, Architect, CPHC**

**Liaukus@njit.edu**

**DOE EE0009749**



- 1 Roofing and Siding Contractors in the US, IBIS World, FEB11,2023, <https://www.ibisworld.com/industry-statistics/number-of-businesses/roofing-siding-contractors-united-states/#:~:text=Questions%20Clients%20Ask%20About%20This%20Industry&text=There%20are%20128%2C012%20Roofing%20%26%20Siding,increase%20of%202.7%25%20from%202022.>
- 2 Jones, John, (May 17, 2019) US EPA Request for Comments: Draft revised Verification Oversight Organization (V00) Application chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.energystar.gov/sites/default/files/asset/document/BPI\_Responses%20to%20EPA%20V00-2.pdf
- 3 Chan, W., Less, B. , & Walker, I. (2021, January). *DOE Deep Energy Retrofit Cost Survey*. Lawrence Berkeley National Laboratory. <https://eta.lbl.gov/publications/doe-deep-energy-retrofit-cost-survey>

# Project Execution

	FY2022				FY2023				FY2024				FY2025				FY2026			
Planned budget	89346.66				178693.32				222657.32				235836.66							
Spent budget	39882.73				195761.32															
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1E	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<b>Past Work</b>																				
Q1 Milestone:																				
Q2 Milestone:																				
Q3 Milestone: Project Management and Planning, Market Assessment IRB Approval			■	◆																
Q4 Milestone: Market Assessment Report			■	◆																
Q1 Milestone: Design Modified ThermalBuck					■	◆														
<b>Current/Future Work</b>																				
Q2 Milestone: Design HP Storm; Identify Contractors					■	◆														
Q3 Milestone: Create Initial Mockup					■	◆														
Q4 Milestone																				
Q1 Milestone: Test, Analyze, Refine Mockup					■	◆														
Q2 Milestone: Complete Homeowner Survey Instrument									■	◆										
Q3 Milestone																				
Q4 Milestone																				
Q1 Milestone																				
Q2 Milestone: Select Houses, Test In												■	◆							
Q3 Milestone: Retrofit Houses, Test Out												■	◆							
Q4 Milestone: Analyze and Evaluate Renew-Wall															■	◆				
Q1 Milestone: Resource Development and Final Report																	■	◆		

# Team

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Luis Espada, Business Manager- Neopor North America BASF, technical support, material support

Brad Begin, CEO at Alpen High Performance Products, technical support, product support, product design

Pierre Graas, Product Manager, CPHC Alpen, product design, technical support

John Brooks, President-- BRINC Building Products, Inc., product design, technical support, product support

Mike Sheehan, Vice President, Acorn Home Improvement, technical support, field testing, consulting