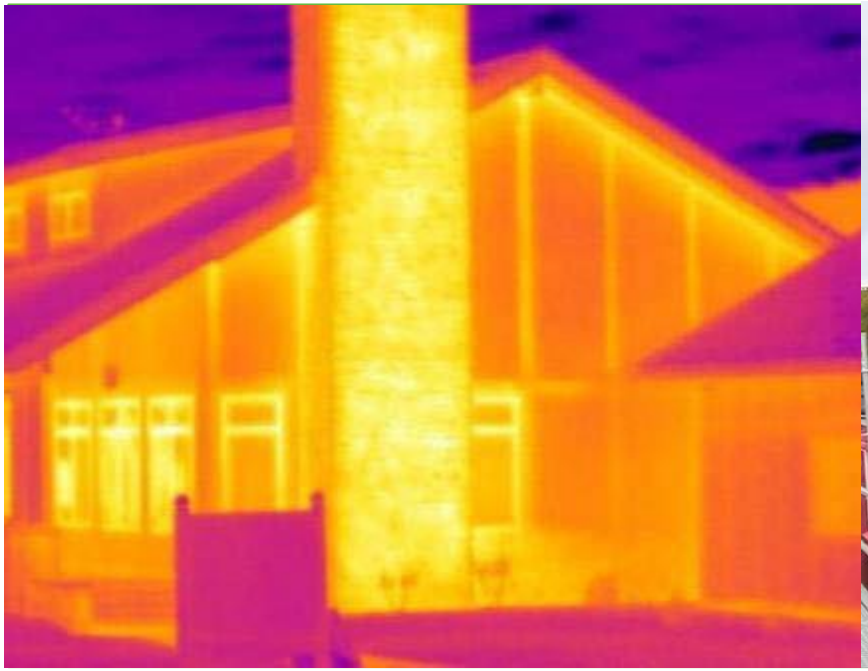
U.S. DEPARTMENT OF ENERGY

Office of ENERGY EFFICIENCY & RENEWABLE ENERGY

2019 BTO Peer Review – Envelope (Mon)



Sven Mumme, Technology Manager
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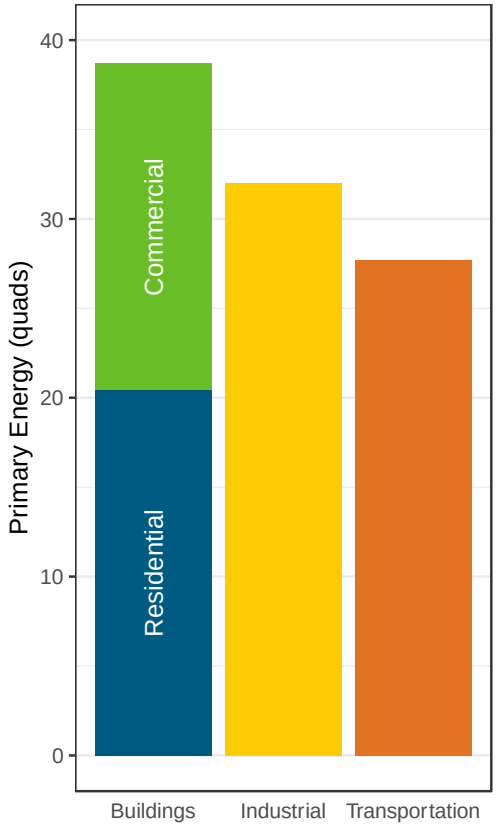
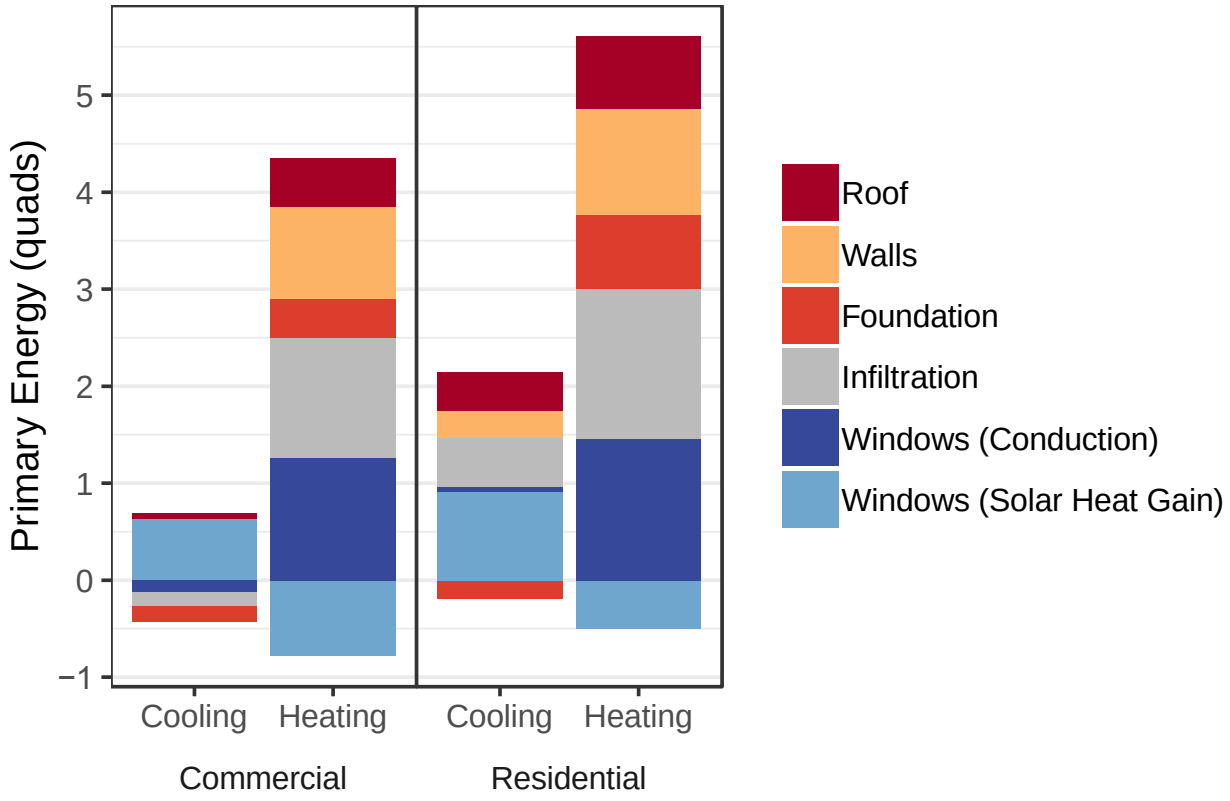
Impact of Building Envelope





Source: 2018 EIA Annual Energy Outlook, Scout

Opaque Building Envelope Sub-Program Goals

Develop next-generation building envelope technologies that reduce the energy required to heat and cool a building, contribute to improved occupant comfort, building flexibility, and resilience, and have competitive installed product costs to enable widespread market adoption.

Ultra-high R/in insulation materials and assemblies

Advanced retrofit technologies

Advanced Thermal Management

Tunable transport materials

Thermal storage materials

Tunable and dynamic

High performance

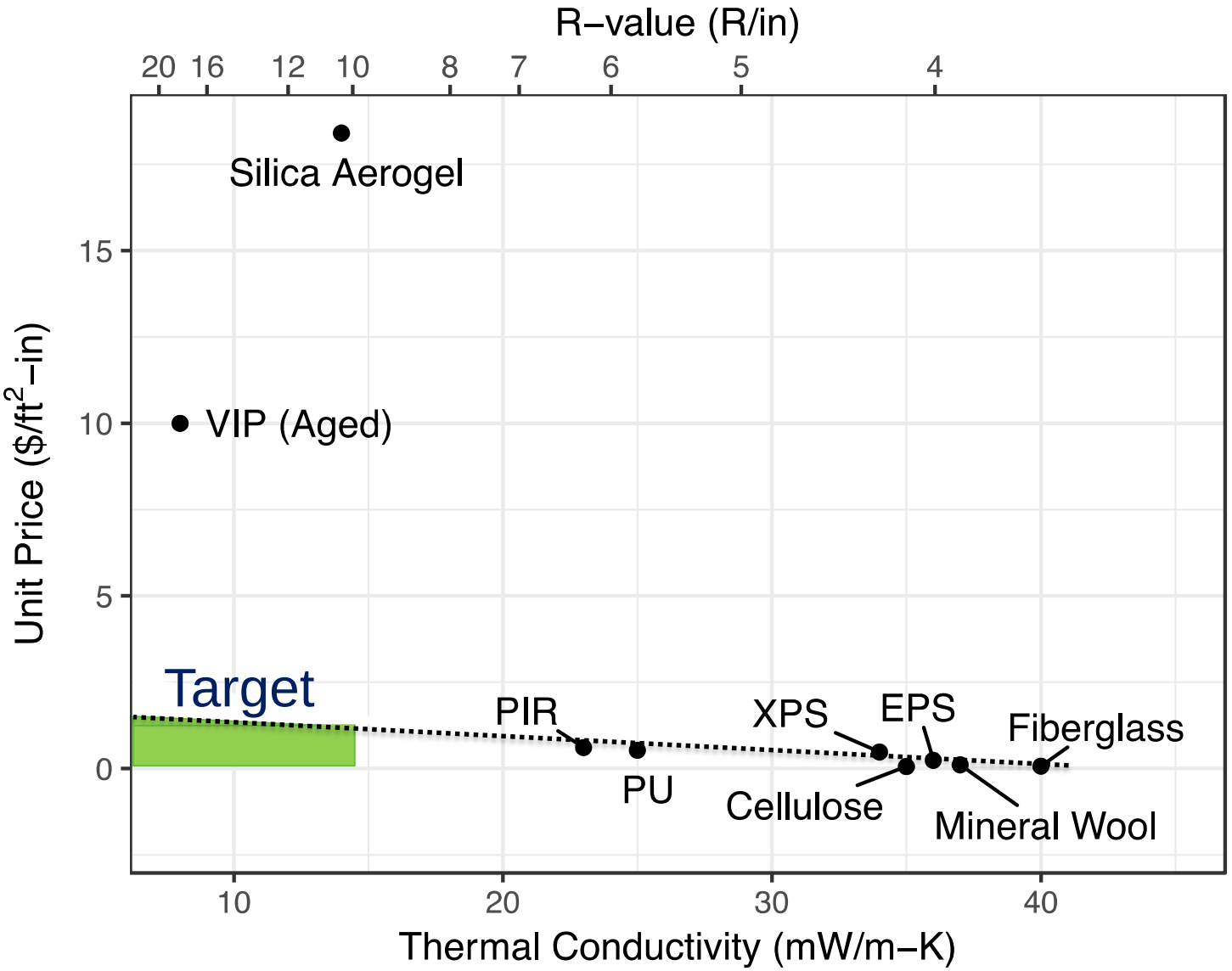
Low-cost, scalable

Reduced air leakage

Improved durability, moisture management

Improved constructability/reduced errors

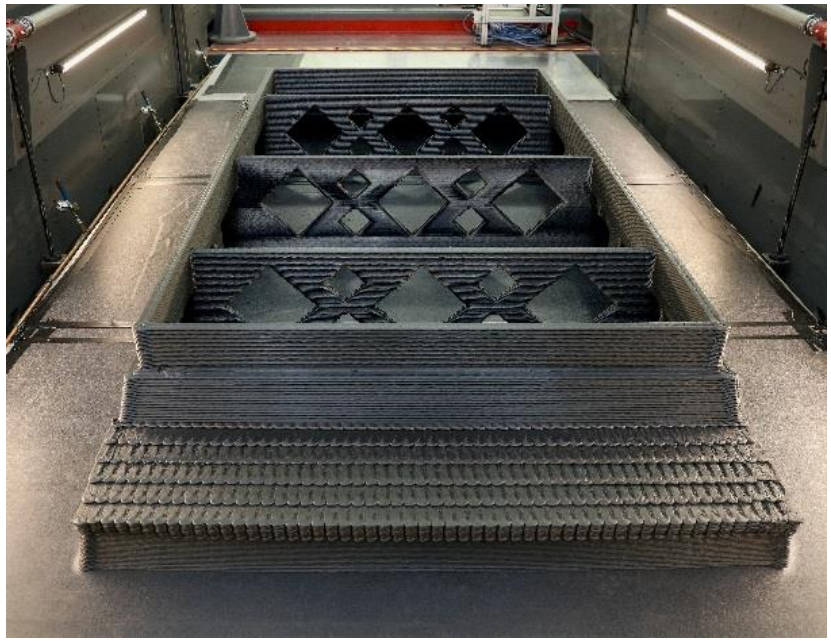
Thin, High-R/in Insulation Materials



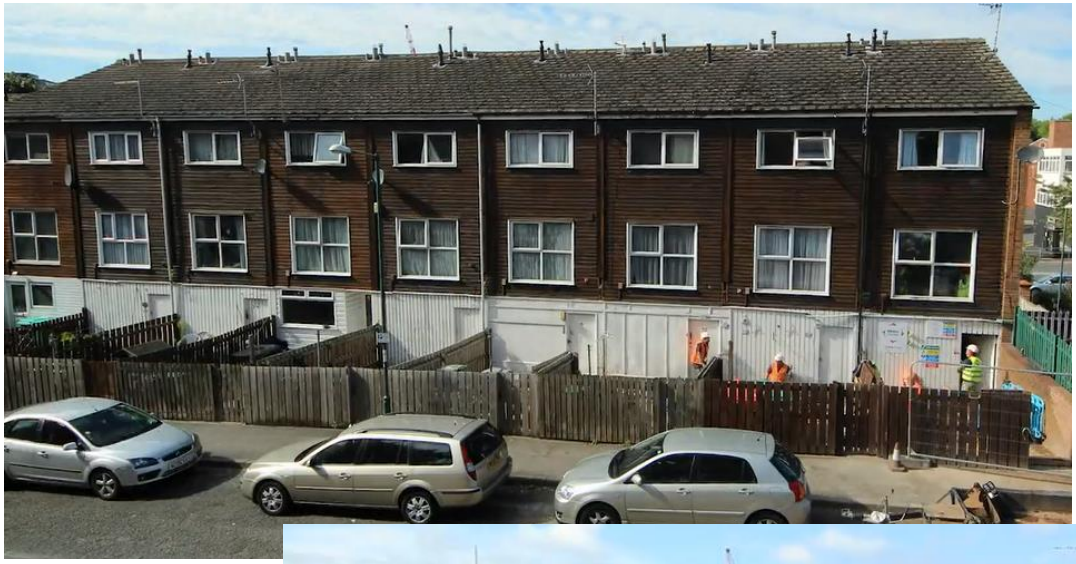
Advanced Building Construction (ABC) for energy efficiency

Next-gen technologies and practices that improve building energy performance without *increasing costs of building construction, including innovations in design, component fabrication, onsite assembly, and construction process integration*

- ✓ **New Construction & Retrofit applications**
- ✓ **Lean Construction & Remodeling processes:**
  - Shorter construction schedules
  - Less production uncertainty
  - Construction cost savings through component standardization & automation
  - Improved labor productivity
  - Fewer installation errors
- ✓ **Off-site production technologies**



Rethinking Building Retrofits

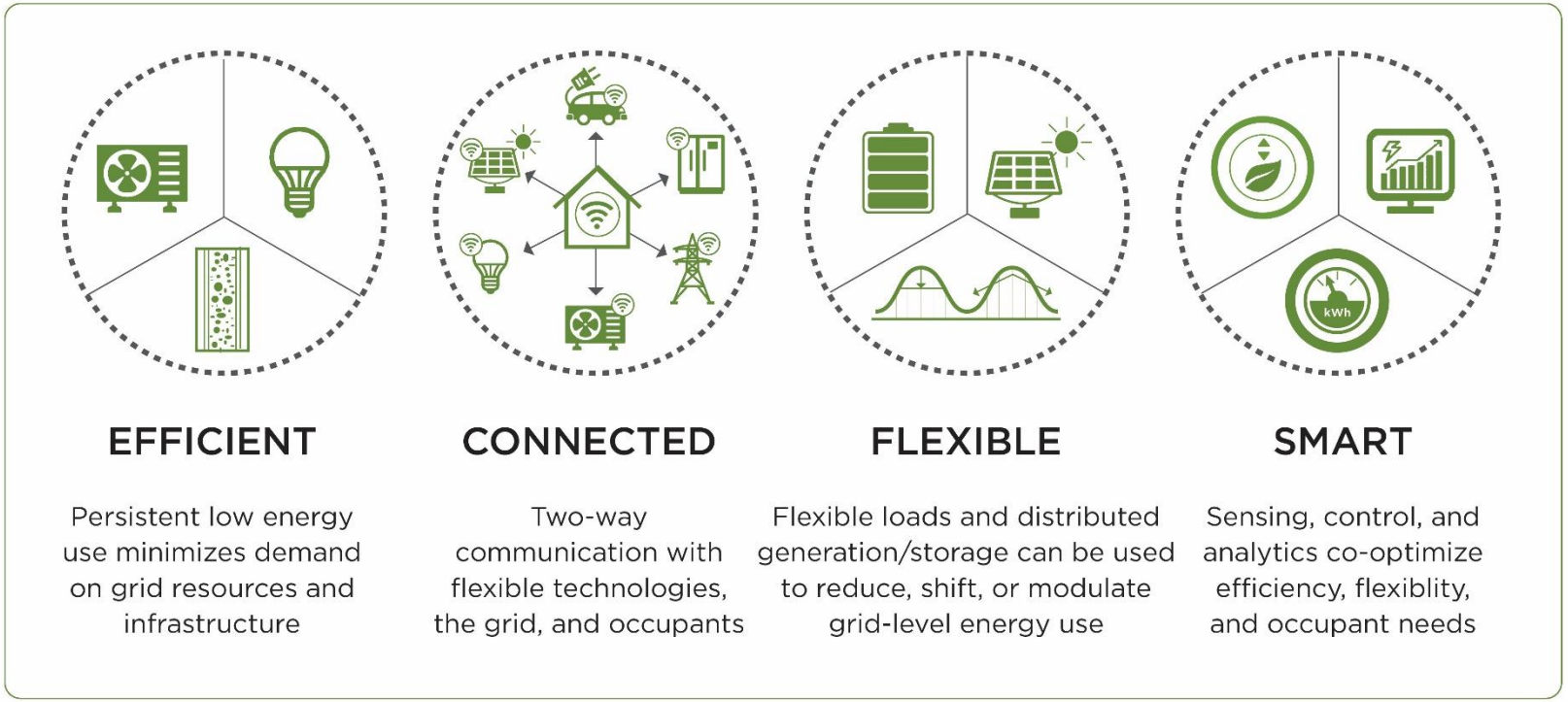


Rethinking Building Retrofits

Rethinking Building Retrofits

Grid-interactive Efficient Buildings (GEB)

A new, holistic approach that reaches beyond a building's walls and into the grid to maximize the energy efficiency and buildings and the grid simultaneously



www.energy.gov/eere/buildings/geb

GEB Technical Report Series Overview

The GEB Technical Report Series will help inform and guide BTO's R&D portfolio and serve as a foundational resource for the larger building research community.

Reports will be published in Summer 2019 in partnership with

Navigant, NREL, PNNL

GEB Technical Report Series:

- Overview
- Heating, Ventilation, & Air Conditioning (HVAC); Water Heating; and Appliances
- Lighting
- Building Envelope & Windows
- Sensors & Controls, Data Analytics, and Modeling

1 Establish Frameworks

- Defines grid-interactive efficient buildings and demand flexibility
- Establishes potential grid services and some basic requirements for buildings to provide flexibility

2 Assess Flexibility Potential

- Evaluate state-of-the-art and emerging building technologies based on ability to provide grid services
- Considers implementation attributes

3 Discuss Research Opportunities

- Identify major research challenges of technologies with significant potential for grid benefits and opportunities for additional technology-specific R&D.

Today's Agenda – Envelope Track (Monday)

11:30-12:00	Envelope Overview	Sven Mumme, DOE & Chioke Harris, NREL
12:00-12:30	Models for Low Thermal Conductivity Materials	Som Shrestha, ORNL
12:30-1:30	Lunch	
1:30-2:00	Metrology for Super-insulating Materials	Andre Desjarlais, ORNL
2:00-2:45	Closed-cell Vacuum Insulation	Diana Hun, ORNL
2:45-3:15	Lightweight and Thermally Insulating Nanowood (SBIR)	Amy Gong, InventWood
3:15-4:00	High R/in Core Materials for VIPs & Self-Healing Films	Kaushik Biswas, ORNL
4:00-4:15	Break	
4:15-4:45	Ultralow Thermal Conductivity Material	Jaswinder Sharma, ORNL
4:45-5:15	Robust Nanomaterial-based Insulation	Suman Kaur, LBNL
5:15-5:45	R-12/in PIR-based Super Insulation at ATM Pressure	Jan Kosny, Fraunhofer CSE
5:45-6:15	Multifunctional Composite Panels for Envelope Retrofits	Diana Hun, ORNL

Tomorrow's Agenda – Envelope Track (Tuesday)

11:15-11:30	Envelope Overview	Sven Mumme, DOE
11:30-12:00	Active Insulation Systems	Florian Antretter, ORNL
12:00-12:30	Low-cost Composite Phase Change Material	Kyle Gluesenkamp, ORNL
12:30-1:30	Lunch	
1:30-2:45	Envelope GEB Technical Report	Chioke Harris, NREL
2:45-3:15	Solid State Tunable Thermal Storage and Switches	Chris Dames, LBNL & Roderick Jackson, NREL
3:15-3:45	Anisotropic Thermal Management	Som Shrestha, ORNL
3:45-4:15	Break	
4:15-4:45	Dynamic Photonic Metamaterial	Ralph Muehleisen, ANL
4:45-5:15	Adaptive Weather Resistant Barrier (SBIR)	Joseph Trentacosta, EA Membranes
5:15-5:45	Stationary Concentrator Daylighting System	Chris Gladden, Glint Photonics

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Questions?