U.S. DEPARTMENT OF
ENERGY

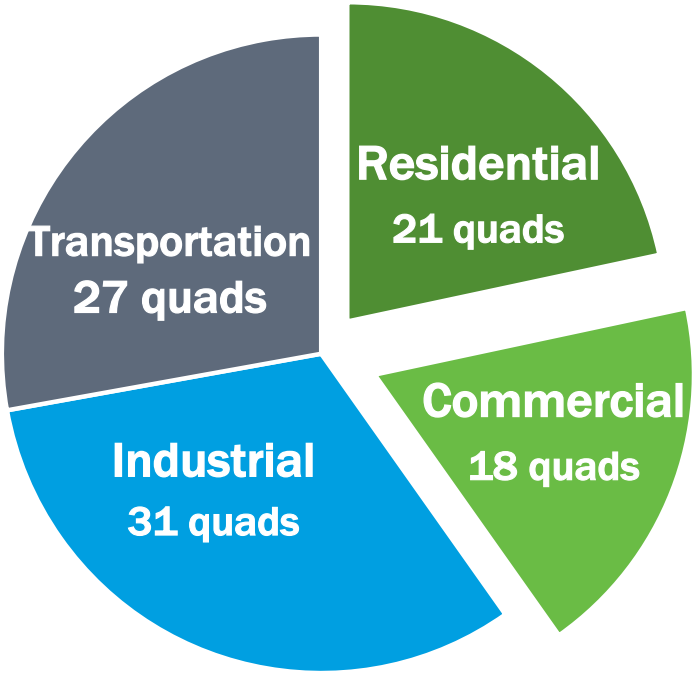
Office of
ENERGY EFFICIENCY &
RENEWABLE ENERGY

DOE Building Technologies Office Overview

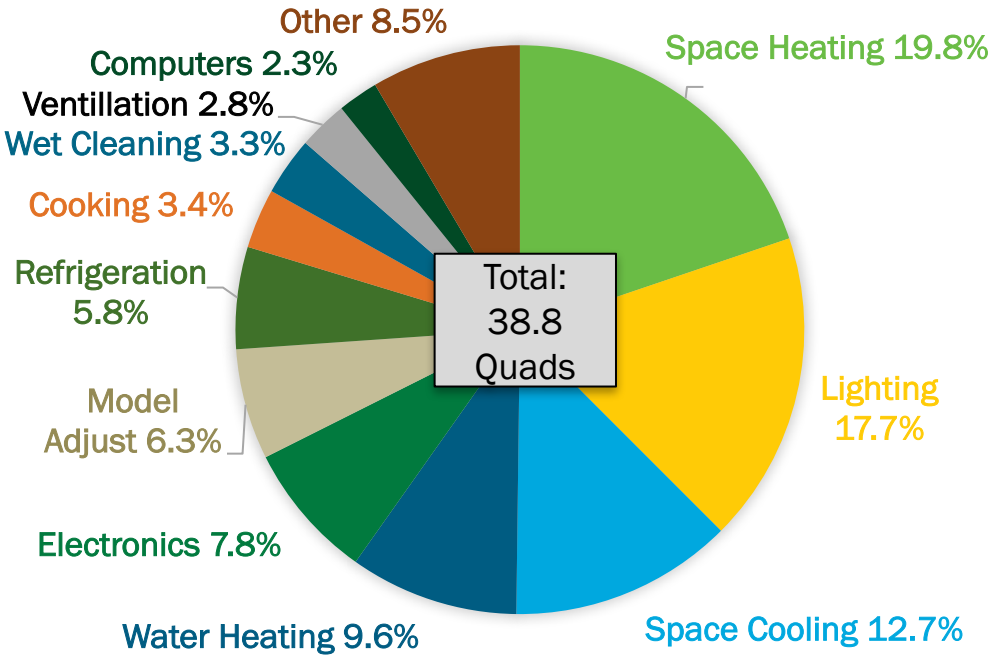
July 25, 2017

U.S. Energy and Electricity Consumption by Sector

Energy Use



Building Energy Use



Buildings Energy Use: 40% of U.S. total

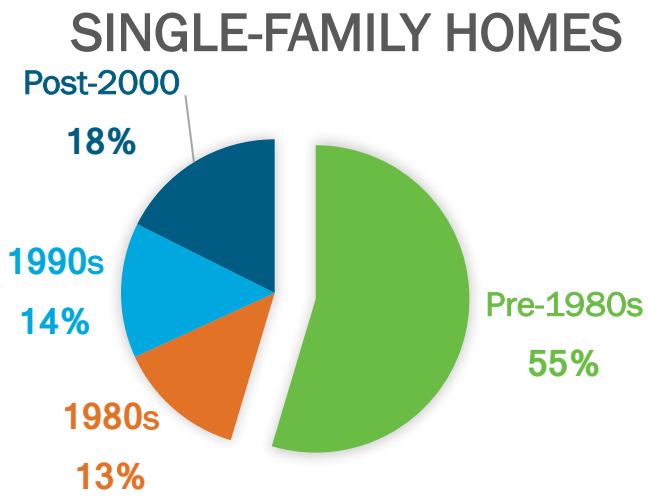
Buildings Electricity Use: 75% of U.S. total

U.S. Building Energy Bill: $380 billion per year

Chart sources: US EIA RECS 2015, CBECS 2012

Building Decisions Impact Energy Use for Generations

Only a small percentage of U.S. homes and businesses were built in the 21st century:



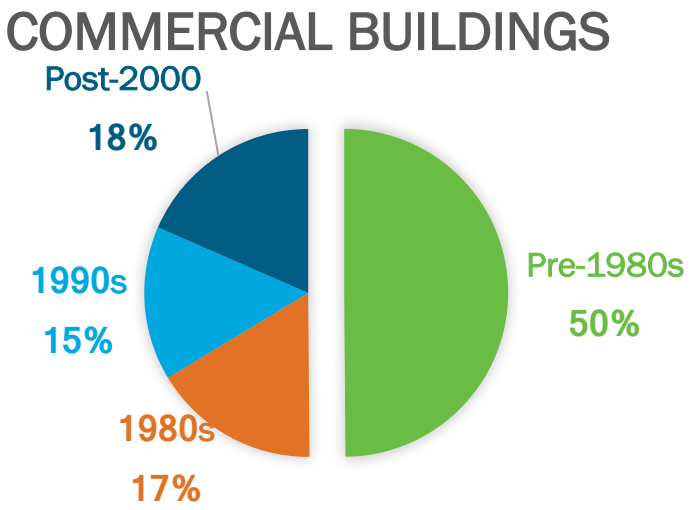
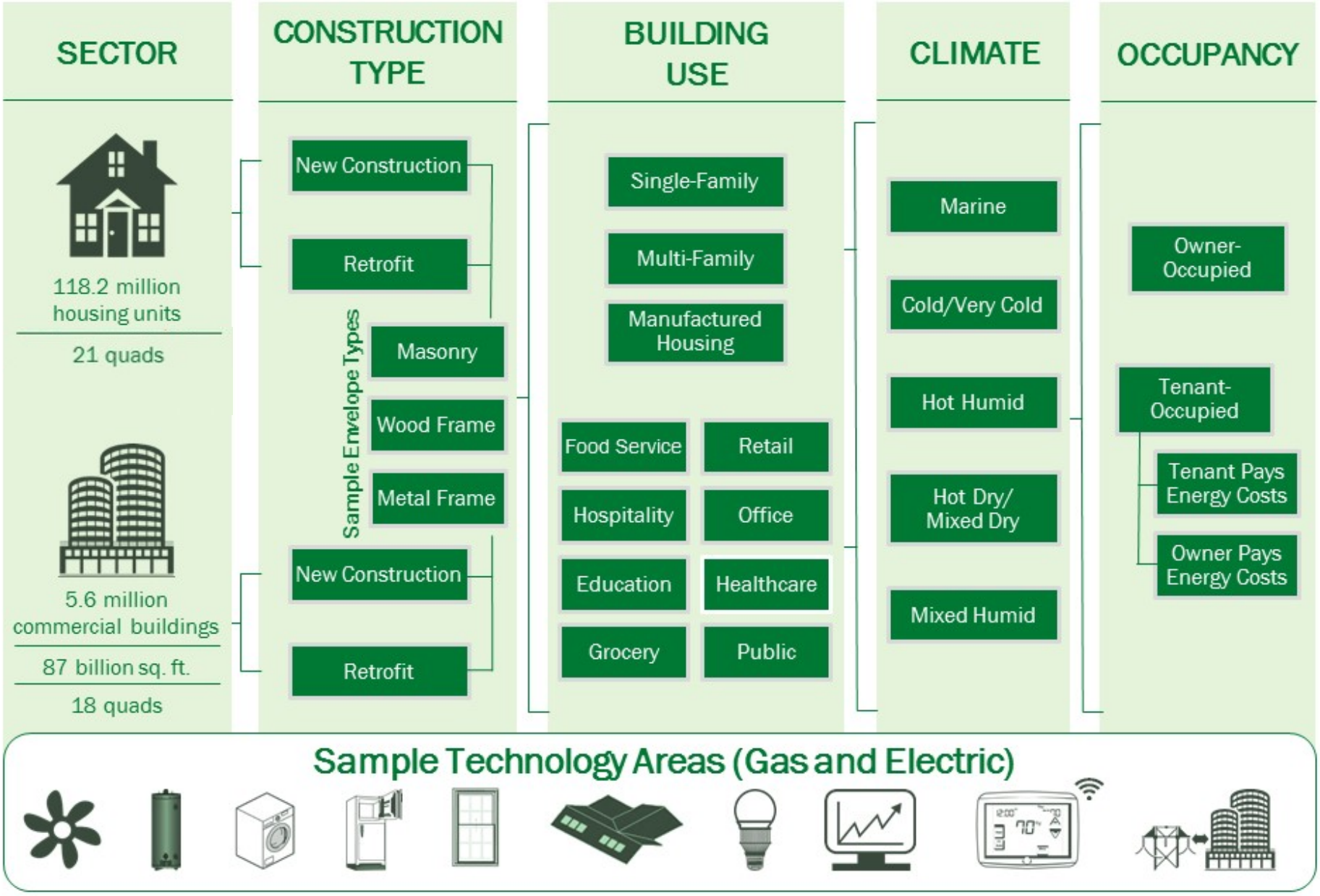


Chart sources: US EIA RECS 2015, CBECS 2012

The Complexity of Energy Use in the Buildings Market



Market Barriers for Building Energy Efficiency

Diversity of Businesses serving the buildings sector, making scale difficult

Lack of Reliable Information on the energy use and efficiency of specific end uses

Performance Uncertainties and the perceived risk of making significant investments in energy efficiency

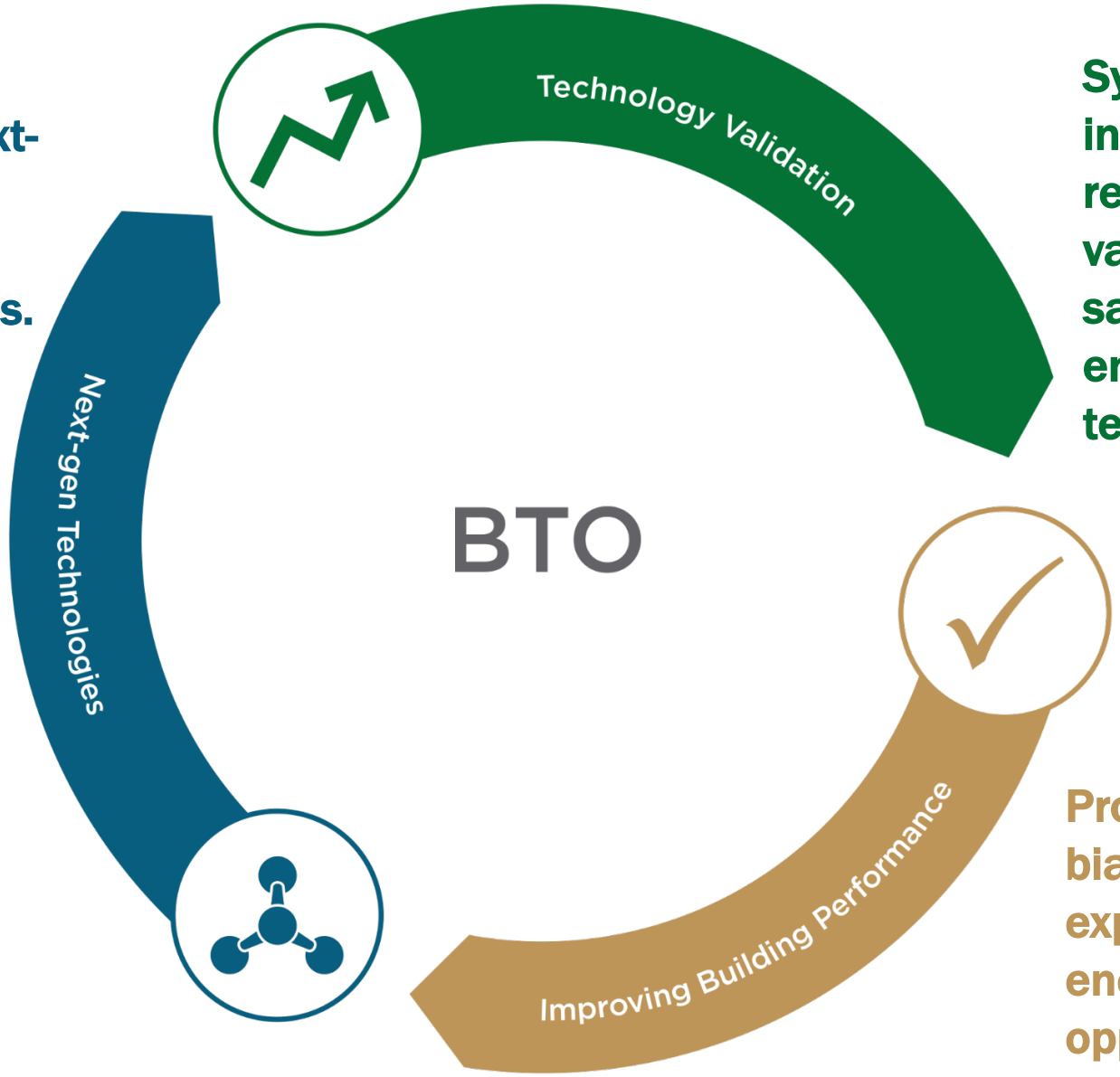
Lack of Mechanisms for establishing the market value of more energy-efficient properties

Split Incentives between owners and occupants of rental properties in both the residential and commercial sectors.

Photo Credit: Clean Energy Resource Team; dalioPhoto, Flickr Creative Commons

Making an Impact: BTO Strategy

Early stage R&D for next-generation building technologies.



Systems integration research to validate energy savings of emerging technologies.

Provide non-biased technical expertise on energy savings opportunities.

Emerging Technologies Program

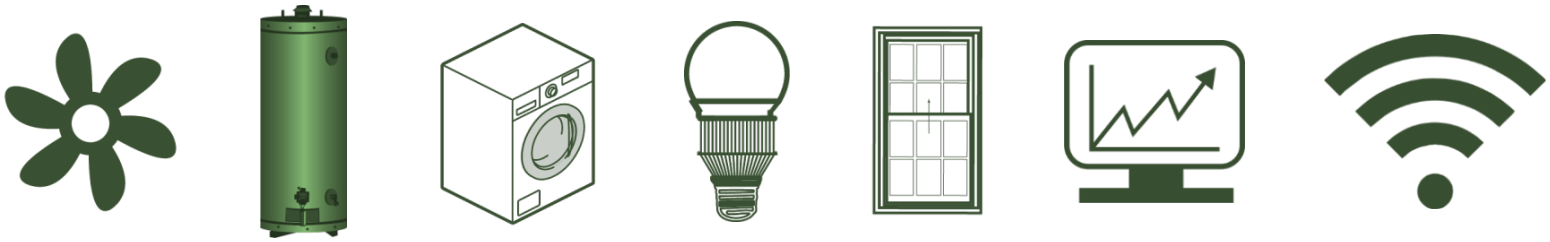
Goal

Develop cost-effective technologies capable of reducing a building's energy use per square foot by 45% by 2030, relative to 2010.

Strategy

- Use Scout to analyze building energy efficiency technology potential impacts
- Fund R&D through competitive solicitations and National Lab technical capabilities

Technology Areas



Commercial Buildings Integration Program

Goal

By 2025, market leaders will achieve in their buildings an improvement in energy consumption per square foot of at least 35% relative to typical commercial buildings in 2010.

Strategy

- Conduct whole-building and systems integration R&D
- Validate energy performance of targeted, high-impact technologies (HITs)
- Develop modeling and analysis tools that provide opportunities for identifying pathways for energy performance
- Support research needed for zero energy buildings

Residential Buildings Integration Program

Goal

By 2025, reduce the energy used for space conditioning and water heating in single-family homes by 40% from 2010 levels.

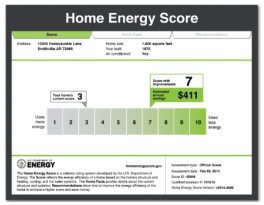
Strategy

- Conduct systems integration R&D
- Validate energy performance of targeted, home-improvement technologies
- Research, validate, and facilitate learning and leadership opportunities that result in new strategies and practices in residential energy efficiency
- Support research needed for zero energy buildings

Building AMERICA U.S. Department of Energy

HOME PERFORMANCE WITH ENERGY STAR

ZERO ENERGY READY HOME U.S. DEPARTMENT OF ENERGY

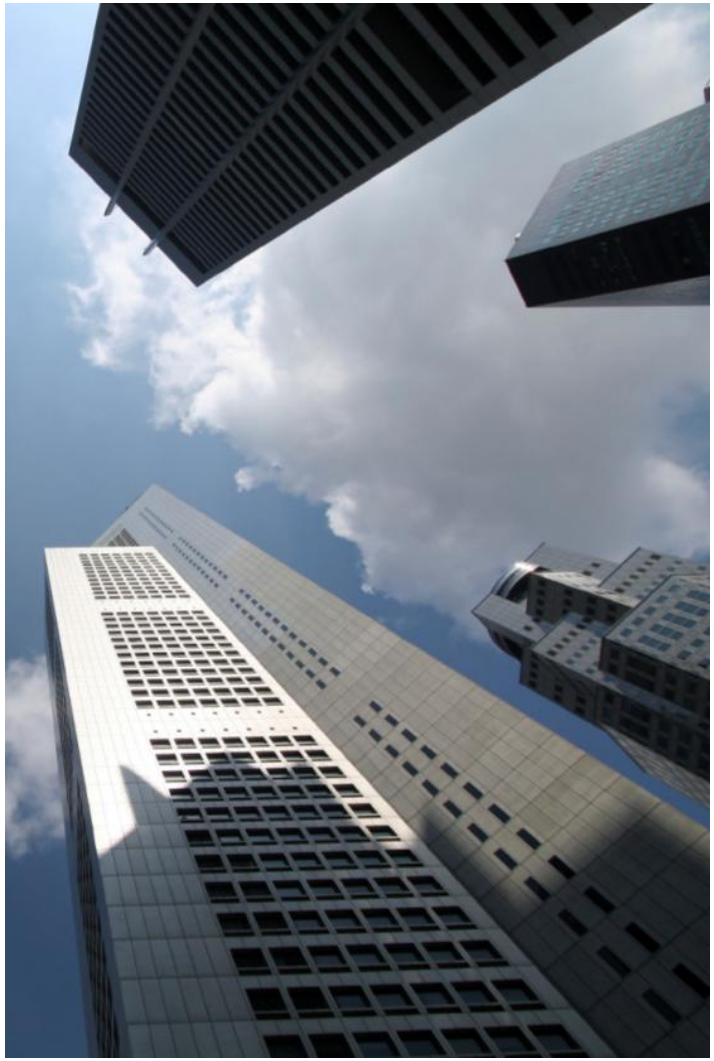


Better Buildings U.S. DEPARTMENT OF ENERGY

Building Energy Codes Program

The Building Energy Codes Program has no regulatory authority; it does not create, require adoption of, or enforce energy codes at any level. Statute directs DOE to participate in all phases of codes:

- **Development.** Participates in industry-run processes to develop national model codes.
- **Adoption.** Provides technical and economic analyses to state and local governments to allow them to make better-informed decisions on whether to adopt the most current national model codes. Tracks adoptions nationally.
- **Compliance.** Provides software tools for building officials and design and construction professionals to make compliance easier. Provides education/training/outreach at state/local level. Conducts field research to identify cost savings opportunities for consumers from increased compliance.



Appliance and Equipment Standards

Main Program Areas:

Test Procedure Development

- Covered products
- FTC EnergyGuide Label
- ENERGY STAR Products

Proposed and Final Rules

- Traditional rulemaking
- Consensus Agreements
- Negotiated Rulemakings
- Voluntary Agreements

Testing and Compliance

- DOE covered products
- ENERGY STAR products

- Federal energy efficiency standards reduce regulatory burden on appliance and equipment manufacturers by pre-empting a potential patchwork of state standards with a single federal standard, enhancing industry competitiveness, profitability.
- Transparency and stakeholder participation essential to rulemaking processes. The Appliance Standards and Rulemaking Federal Advisory Committee (ASRAC) was established to facilitate deeper stakeholder engagement through negotiated rulemakings.

Standards implemented since 1987 saved American consumers **$64 billion** on their utility bills in 2015 alone.

How does BTO work with NASEO

- NASEO can provide research insights to BTO
- NASEO is addressing how the various energy labels can work within the housing market
- BTO funded NASEO to develop emergency disaster response guidelines
- NASEO is an affiliate partner with DOE's SEED Collaborative
- NASEO is an affiliate partner on the Better Communities Alliance
- NASEO serves as a sounding board for BTO on research and applicable deployment programs