

Driving Innovation, Speeding Adoption, Scaling Savings

An Overview of the Building Technologies Office



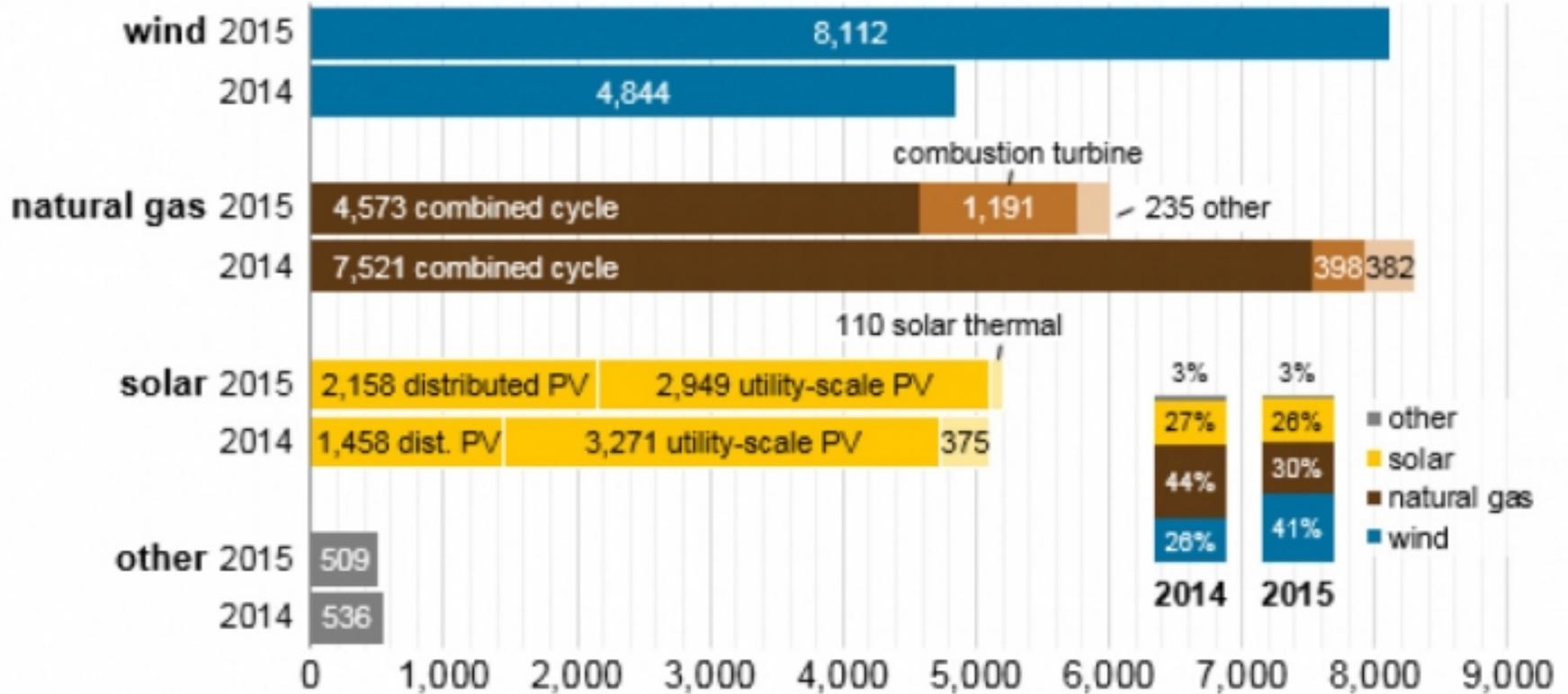
U.S. DEPARTMENT OF
ENERGY

Energy Efficiency &
Renewable Energy

Roland Risser
2016 Building Technologies Office Peer Review
April 4, 2016

U.S. is in midst of rapid shift toward clean energy

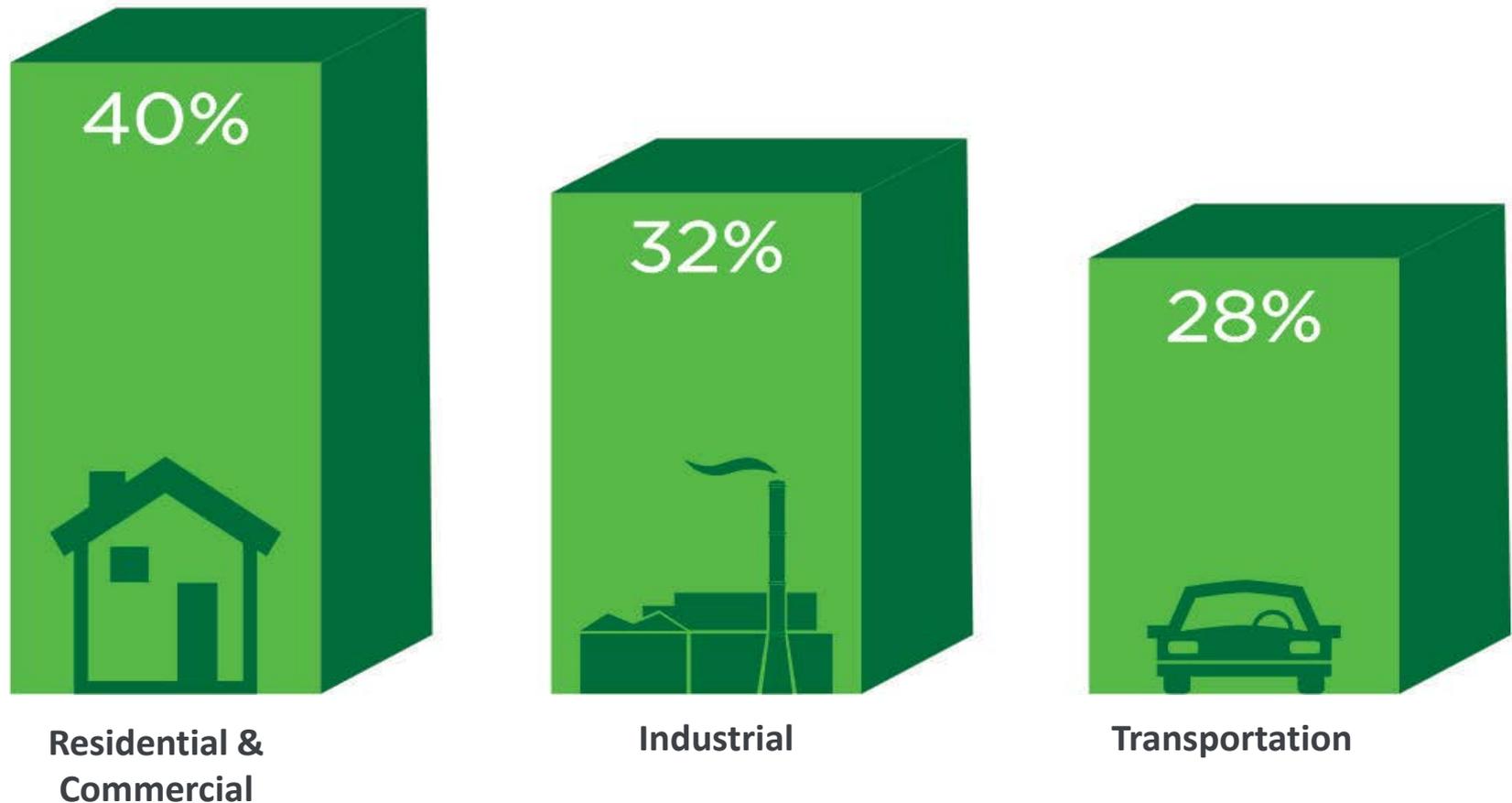
U.S. electric generation capacity additions, 2015 vs. 2014
megawatts (MW_{AC})



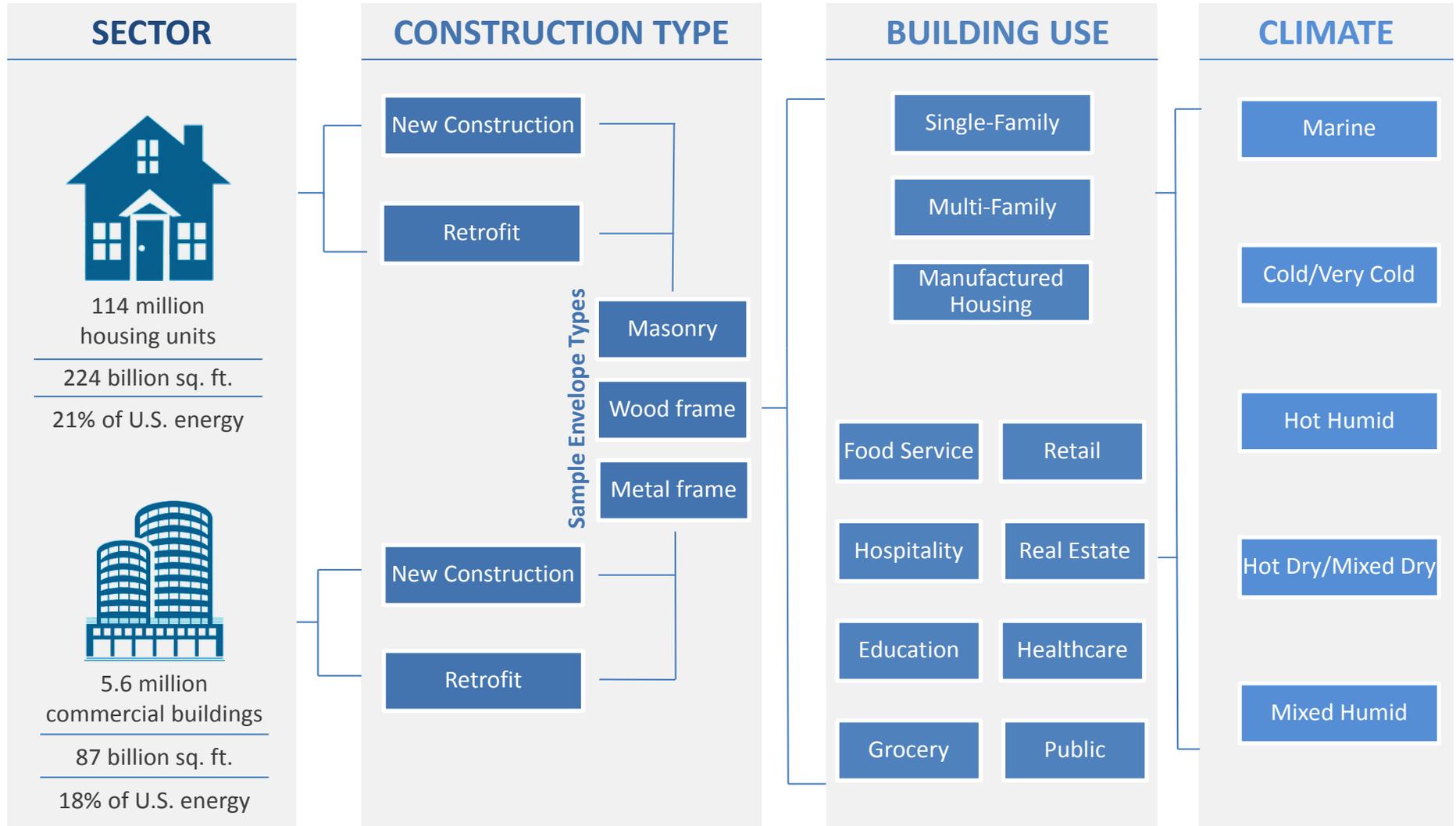
Source: U.S. Energy Information Administration, *Preliminary Monthly Electric Generator Inventory*

Efficiency is key to meeting U.S. climate, energy goals

Our Homes and Buildings Use More Energy than Any Other Sector



The Complexity of Energy Use in the Buildings Market

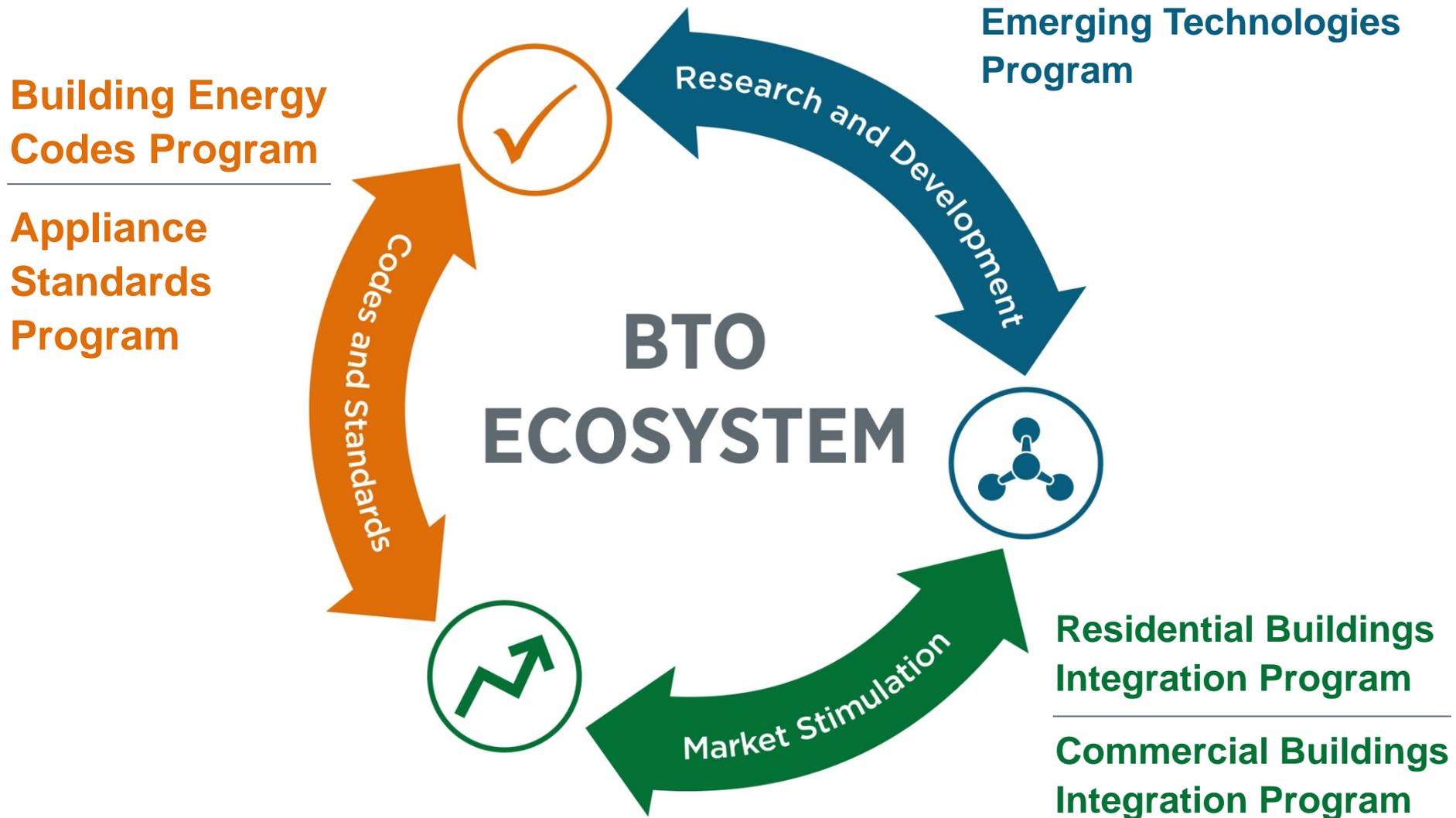


Sample Technology Areas (Gas and Electric)



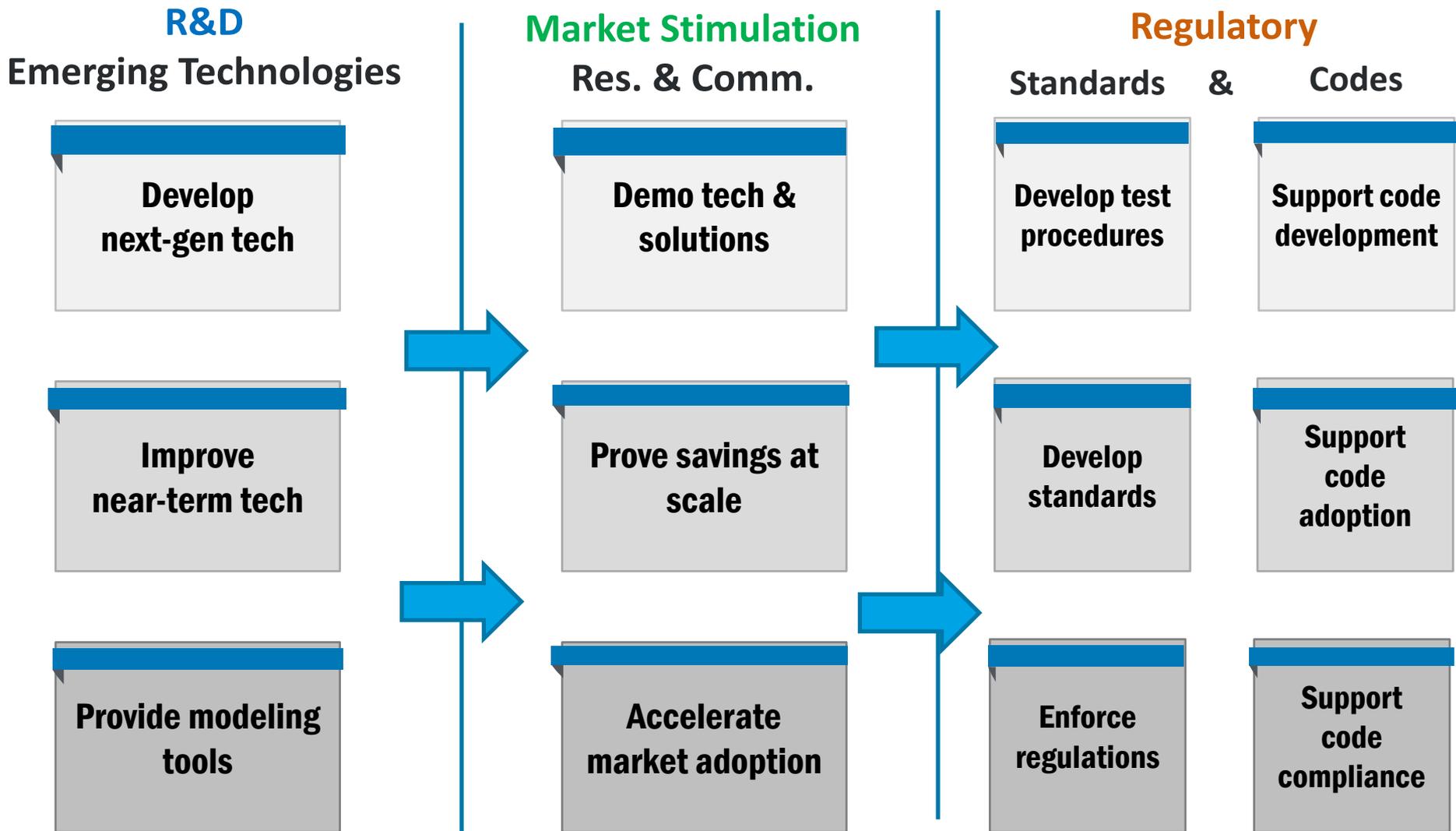
BTO's 5 Programs

Tech-to-Market → Speed Adoption → Scale Savings



BTO's Program Strategies

Integrate R&D, Market Stimulation, and Regulatory Activities



BTO Releases 2016-2020 Multi-Year Program Plan



BTO Goal:

- **2030 goal:** Reduce average energy use per square foot of U.S. buildings by **30%** below 2010 levels
- **Long-term goal:** reduce average EUI of U.S. buildings by **50%**



National Goals:

- By 2030, double energy productivity relative to 2010
- Reduce greenhouse gas emissions 26%–28% below 2005 levels by 2025

DOE Quadrennial Technology Review Assesses Opportunity Space



QUADRENNIAL TECHNOLOGY REVIEW

AN ASSESSMENT OF ENERGY
TECHNOLOGIES AND RESEARCH
OPPORTUNITIES



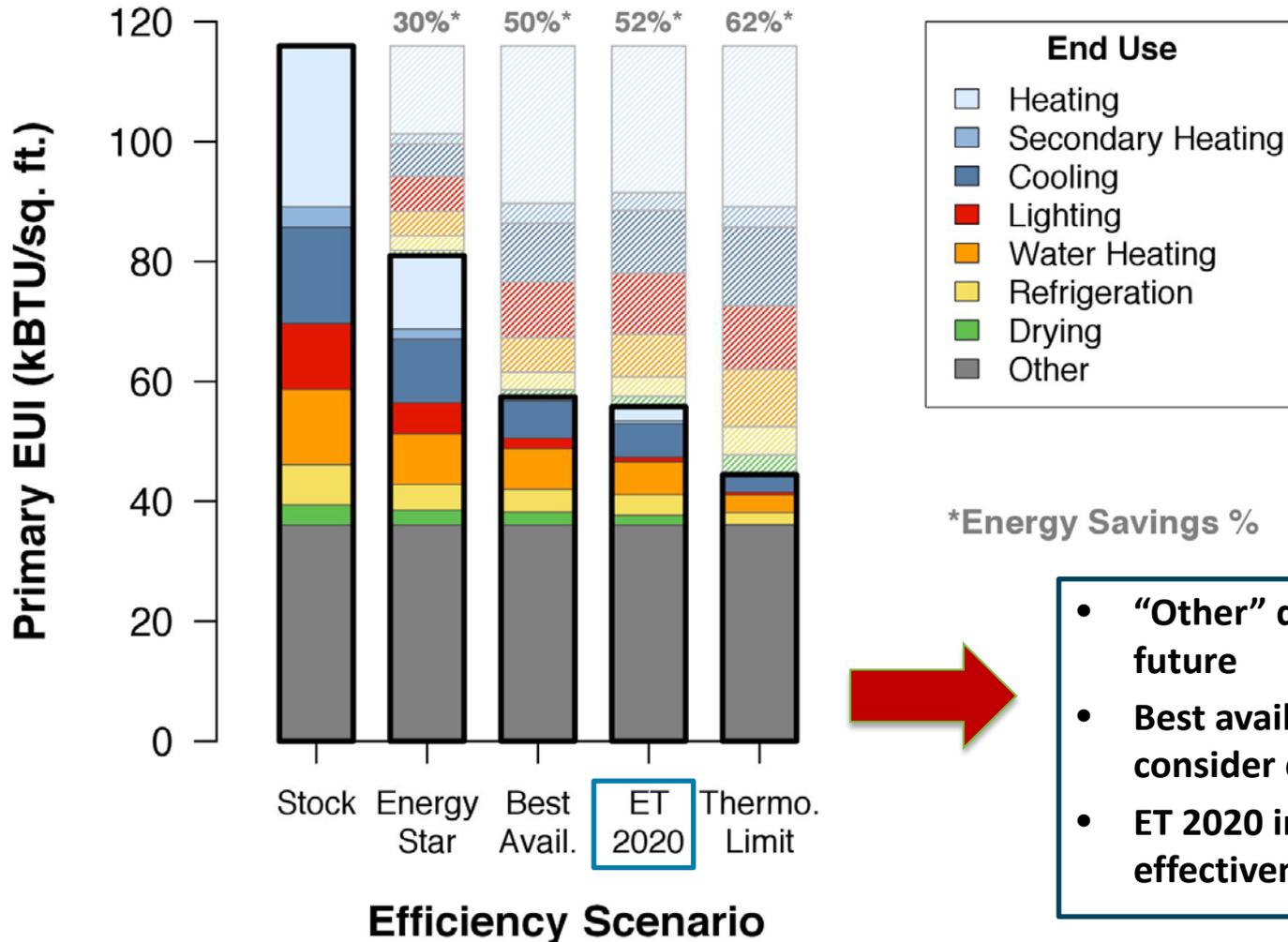
September 2015

Key research opportunities:

- Heat pumps with low to zero-GWP refrigerants
- Thin insulating materials
- Windows and building surfaces with tunable optical properties
- High efficiency lighting devices
- Building design and operation software
- Sensors and controls
- Interoperable communication systems
- Decision science
- Miscellaneous electric loads

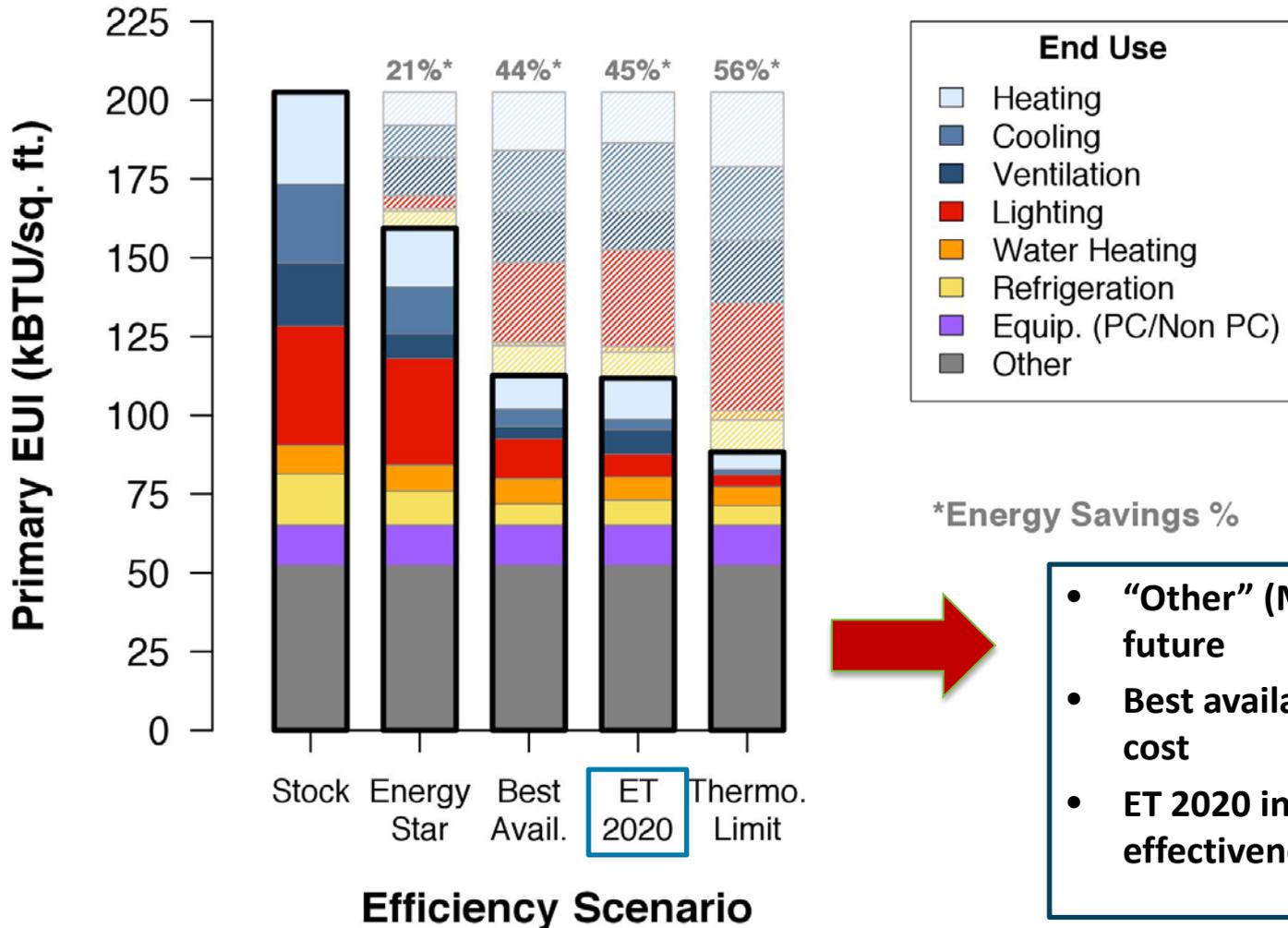
Opportunity for Residential Energy Savings

Residential Energy (Single Family, All Regions)



Opportunity for Commercial Energy Savings

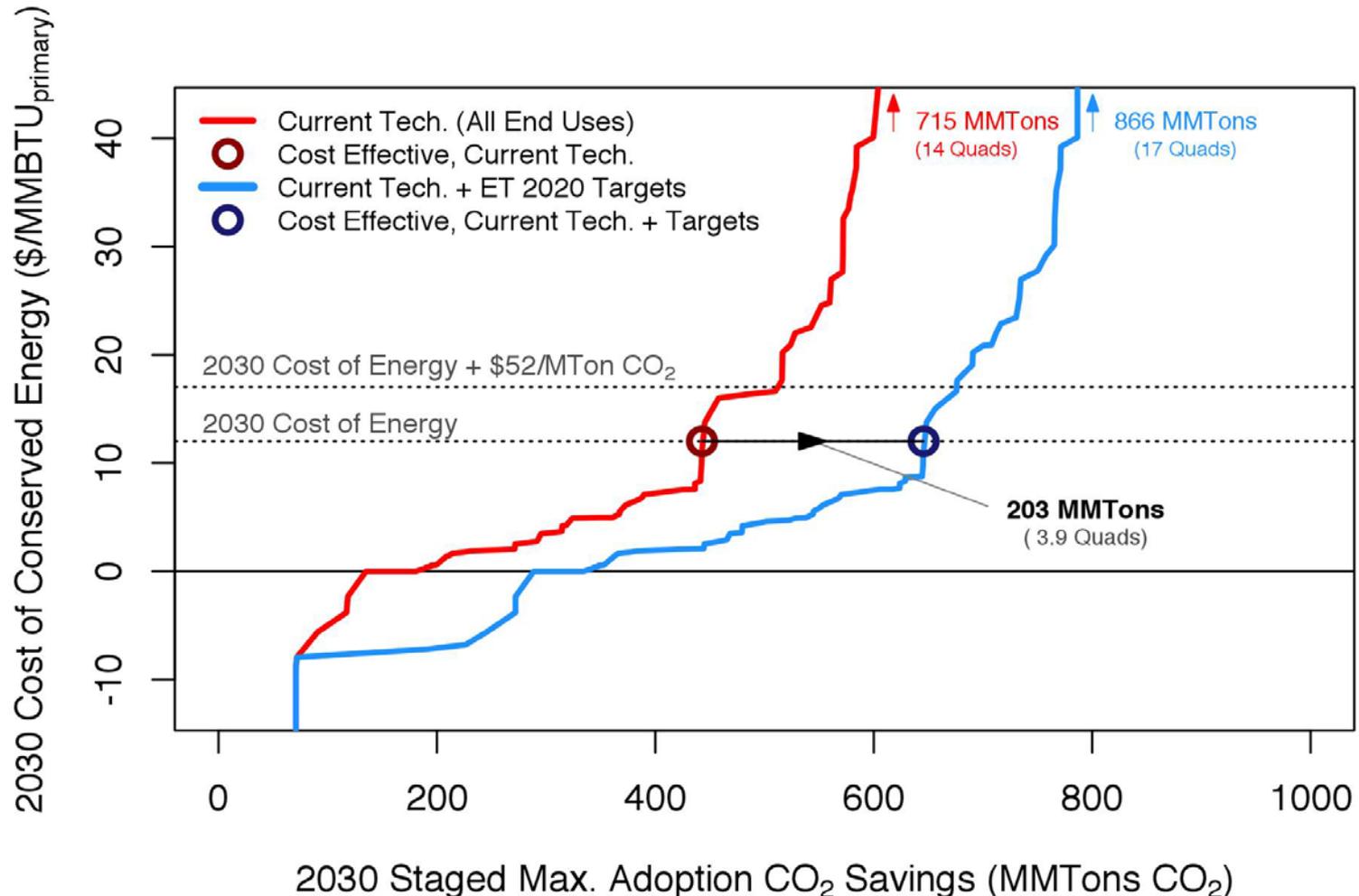
Commercial Energy (Composite, All Regions)



Climate and Efficiency are Inherently Linked

2030 Cost Effective Avoided CO₂ Emissions (All Building Sectors):

203 Million Metric Tons



2015 Successes Span Technologies, Sectors

3D-Printed Heat Exchanger



Rooftop Unit Adoption



Manufactured Homes



Low-E Storm Windows



Electrochemical Water Heater



Low-GWP Refrigerant



Advanced Air Sealant



Low-GWP Refrigerator



Lighting Breakthroughs



Market Partners Key to Accelerating National Adoption



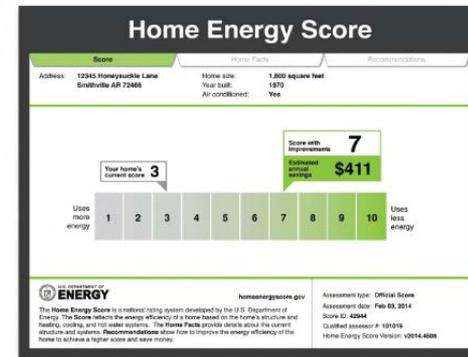
2016 ALLIANCE PROGRESS UPDATE

[DOWNLOAD FULL REPORT](#)

PARTNERS AT-A-GLANCE

200+ ORGANIZATIONS	11+ Billion SQUARE FEET REPRESENTED	13% OF U.S. COMMERCIAL BUILDINGS	19 NEW PARTNERS AND AFFILIATES	40+ NEW RESOURCES DEVELOPED
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INNOVATIVE SOLUTIONS THROUGH TEAMWORK



U.S. DEPARTMENT OF ENERGY PARTMENT OF ENERGY Energy Efficiency & Renewable Energy

Building Energy Codes Lock in Energy Savings

Codes since 2010:

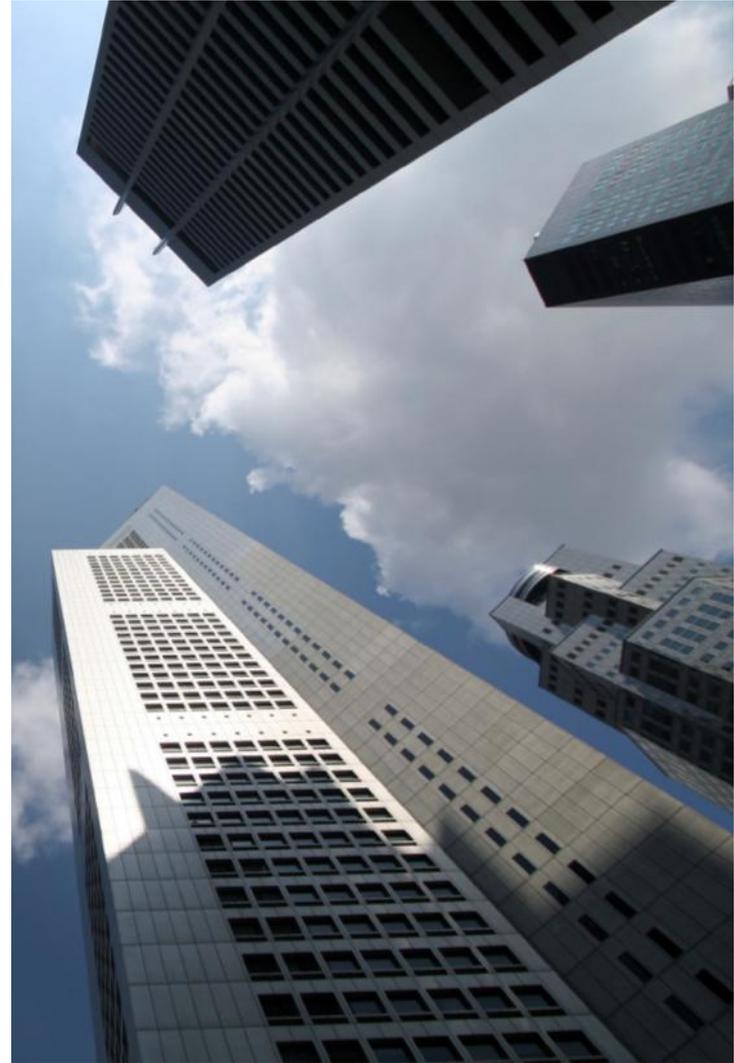
- **30%** improvement in model energy codes for residential and commercial buildings (2 - three year cycles).
- **42 states** have updated energy codes

Projected Cumulative Savings (2010-2030):

- **14 quads** of energy savings
- **\$125 billion** of energy bill savings
- **1 billion metric tons** of reduced CO₂

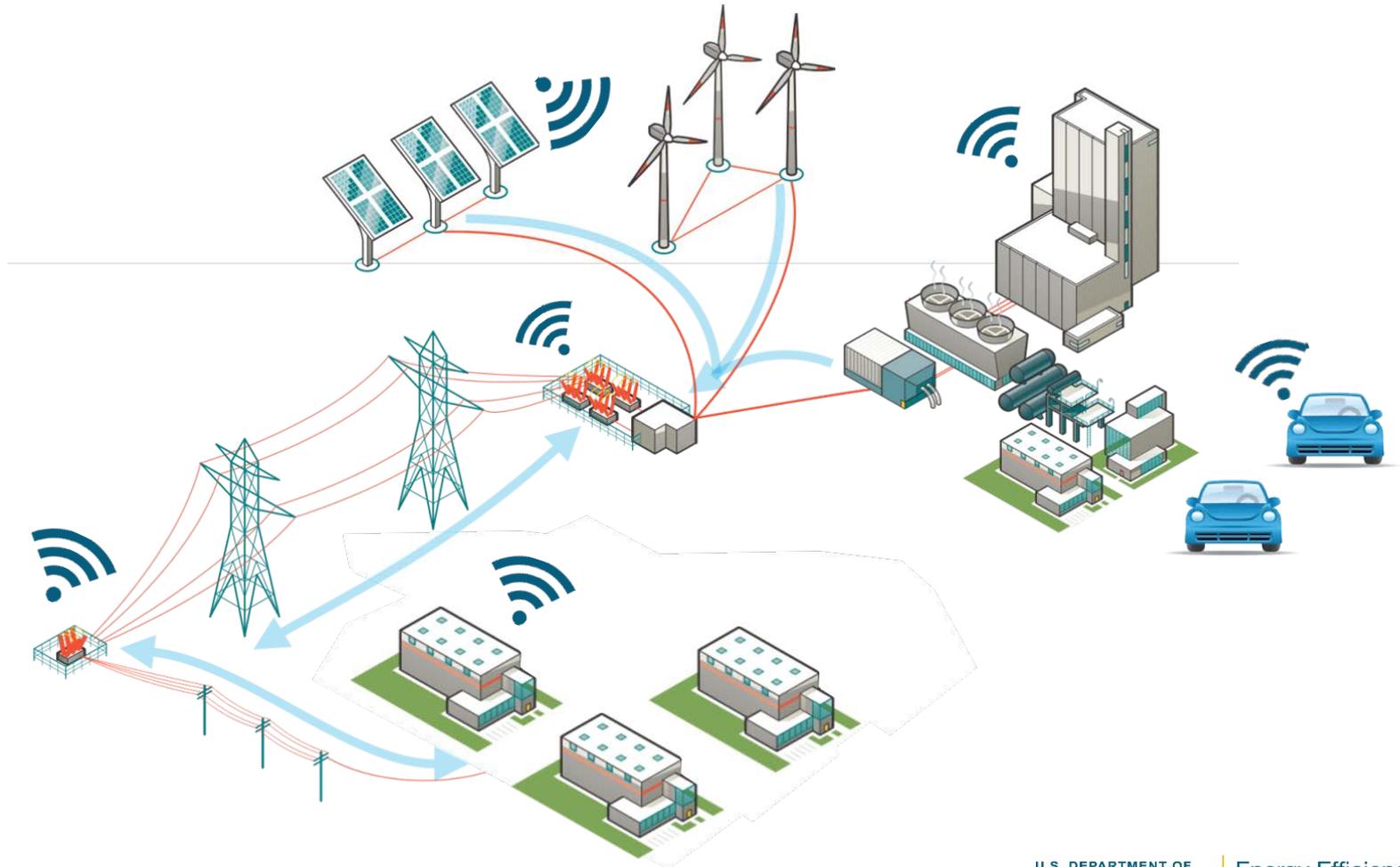
NEW: Compliance Field Studies FOAs

- **Residential** (ongoing) and **commercial** (new)
- Provide data on code compliance benefits to **spur increased private sector investment in EE**



Buildings to Grid is Key to EE & Renewable Deployment

Seamlessly integrating emerging technologies into the grid in a safe, reliable, and cost-effective manner is critical to enable EE/RE deployment at scale.

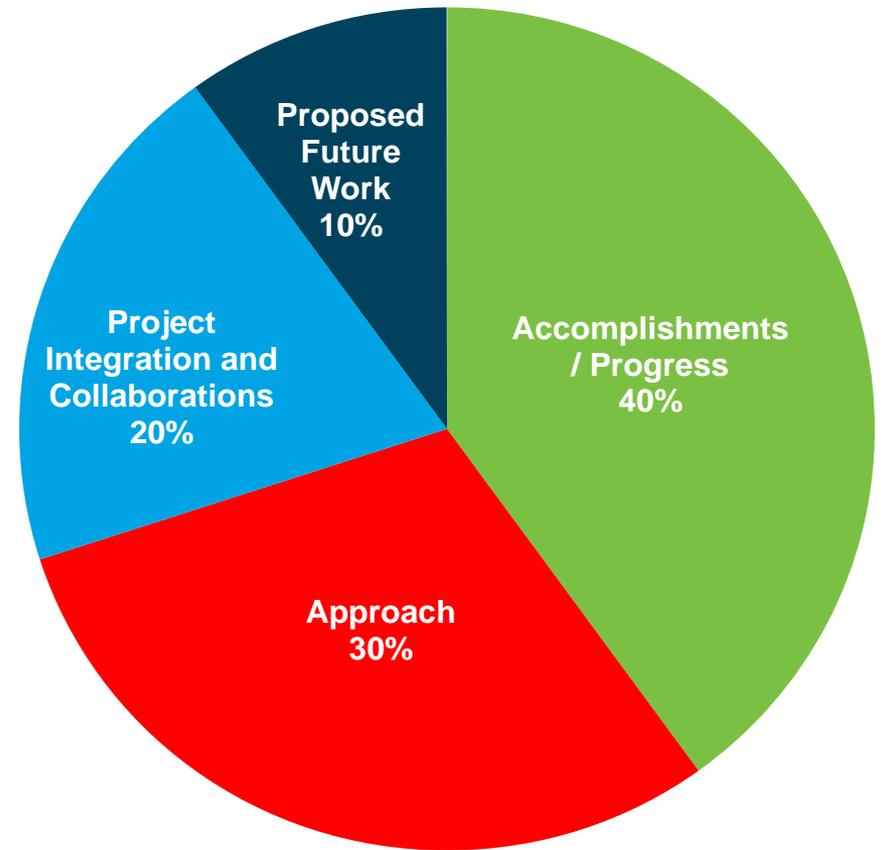


FY 2016 Peer Review Objectives and Evaluation Criteria

Objectives

1. Communicate BTO program activities and their connections, highlighting: what we do; transparency; progress being made with taxpayer dollars
2. Objectively evaluate BTO projects
3. Provide a forum that promotes the creation of more collaboration and partnerships
4. Demonstrate DOE's role in energy efficiency

Evaluation Criteria Weighting



Peer Review Agenda Day 1

Room	Time	Project	Presenter or Organization
Monday, April 4, 2016			
	8:15-9:15	REGISTRATION/ CONTINENTAL BREAKFAST	
Salon 1-4	9:15-9:35	Welcome	Kathleen Hogan (DOE)
	9:35-10:05	Building Technologies Office Overview	Roland Risser (DOE)
	10:05-10:35	Goals Framework	Jack Mayernik (NREL)
	10:35-10:50	Grid	Joseph Hagerman (DOE)
	10:50-11:05	BREAK	
	11:05-11:35	Tech-to-Market (T2M)	Karma Sawyer (DOE)
	11:35-12:05	Plenary Questions and Answers	All Attendees
	12:05-12:35	BREAK	
	Salon 5	8:45-9:10	Reviewer Orientation (PEER REVIEWERS ONLY)
12:10-12:35		2nd Reviewer Orientation (PEER REVIEWERS ONLY)	Oak Ridge Associated Universities
12:35-1:35		LUNCH	
1:35-2:35		Emerging Technologies Program Facilitated Discussion	Pat Phelan (DOE)
2:35-3:05		Appliance and Equipment Standards Program Facilitated Discussion	John Cymbalsky (DOE)
3:05-3:35		Building Energy Codes Program Facilitated Discussion	David Cohan (DOE)
3:35-3:50		BREAK	
3:50-5:35		Technologies of the Future Panel	
Salon 6-8	1:35-2:35	Residential Buildings Integration Program Discussion	David Lee (DOE)
	2:35-3:35	Commercial Buildings Integration Program Discussion	Jason Hartke (DOE)
	3:35-3:50	BREAK	
	3:50-4:05	Market Engagement Overview	Cody Taylor (DOE)
	4:05-4:35	RILA - Financial Management for Retail Energy Efficiency	Adam Siegel (RILA)
	4:35-5:35	Seventhwave/NREL - Accelerate Performance	Adam McMillen (Seventhwave) Paul Torcellini (NREL)
Tickets Reception	5:35-7:05	POSTER SESSION/ NETWORKING EVENT	

THANK YOU

Visit the BTO website at
buildings.energy.gov