

U.S. DEPARTMENT OF  
**ENERGY**

*Office of*  
**ENERGY EFFICIENCY &  
RENEWABLE ENERGY**

# Efficiency Policy for Existing Buildings

**Billierae Engelman**  
US Department of Energy

2024 National Energy Codes  
Conference



# Discussion Session Audience Participation!





# EFFICIENCY POLICY FOR EXISTING BUILDINGS

Driving Market Transformation in Housing



PRESENTED BY

*Madeline Salzman*

HEAD OF STRATEGIC PARTNERSHIPS



## ABOUT EARTH ADVANTAGE®

Earth Advantage is a national nonprofit whose mission is to create an **informed and humane real estate market.**

We provide **knowledge to building professionals** and **information to consumers** through certification, research, education, and product development to move the building industry towards more sustainable practices.

– Our Work –

**GREEN  
HOUSING**

**REAL ESTATE  
SOLUTIONS**

**GREEN JOB  
SKILLS**

**CLIMATE  
JUSTICE**

# KEY TAKEAWAYS

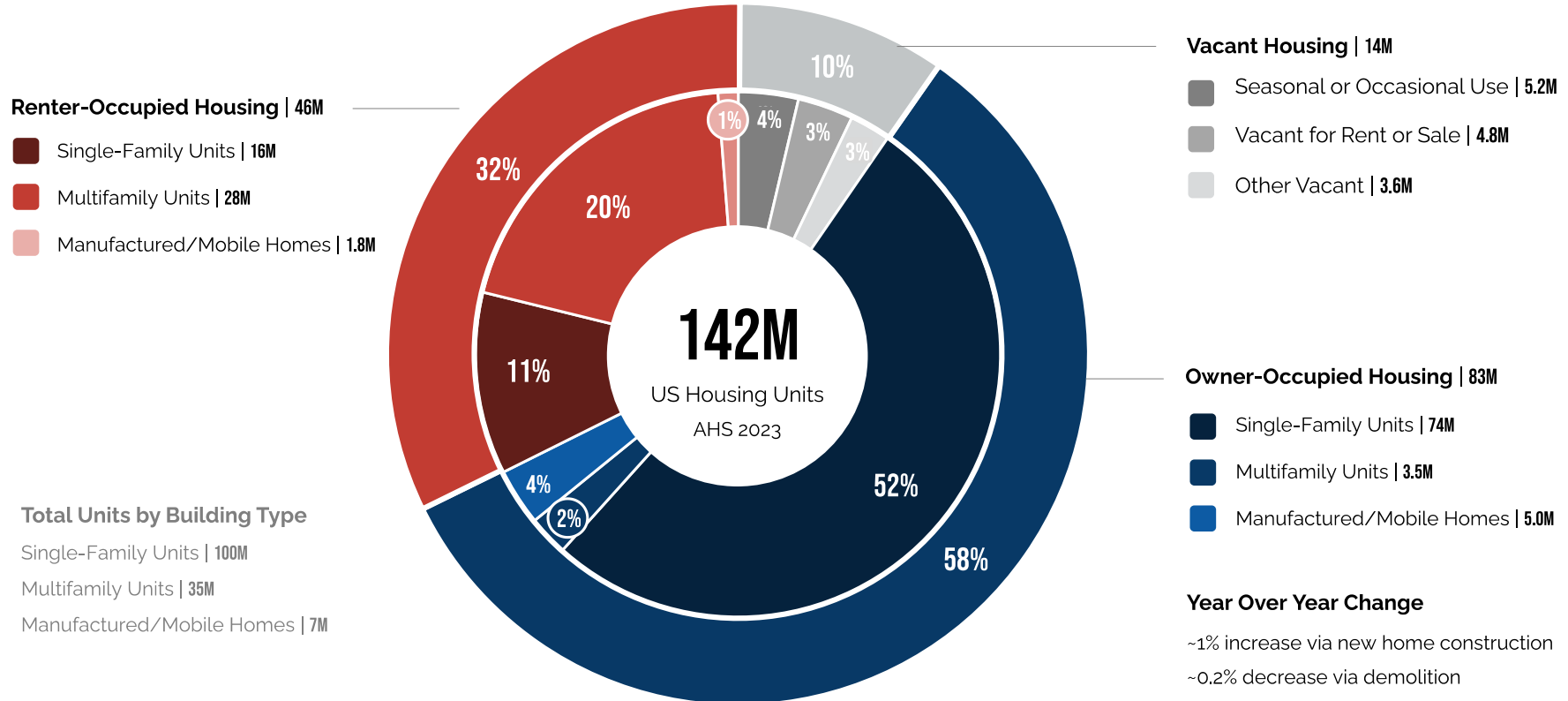
- ✓ Looking at the US housing market as a whole helps us identify truly meaningful strategies that address systemic market failures
- ✓ A dearth of data on existing home conditions impedes homeowner knowledge, energy system valuation, and low-risk financial products
- ✓ Efforts to lure funding and financing to existing home upgrades is necessary to address the climate crisis and housing inequalities
- ✓ There is no silver bullet, but disclosing information helps everyone make better decisions





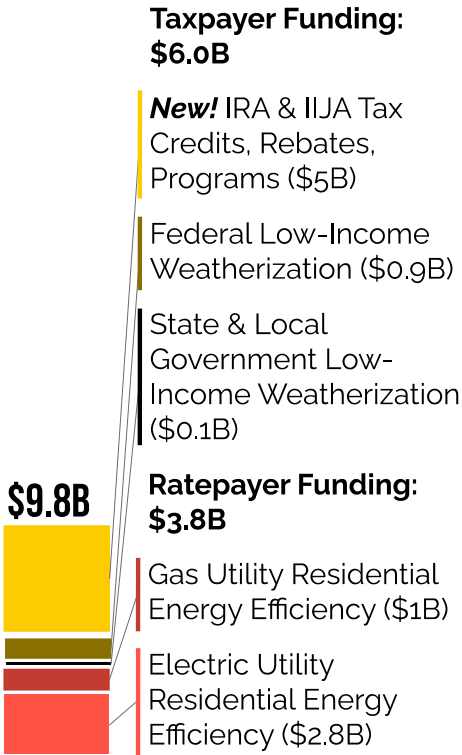
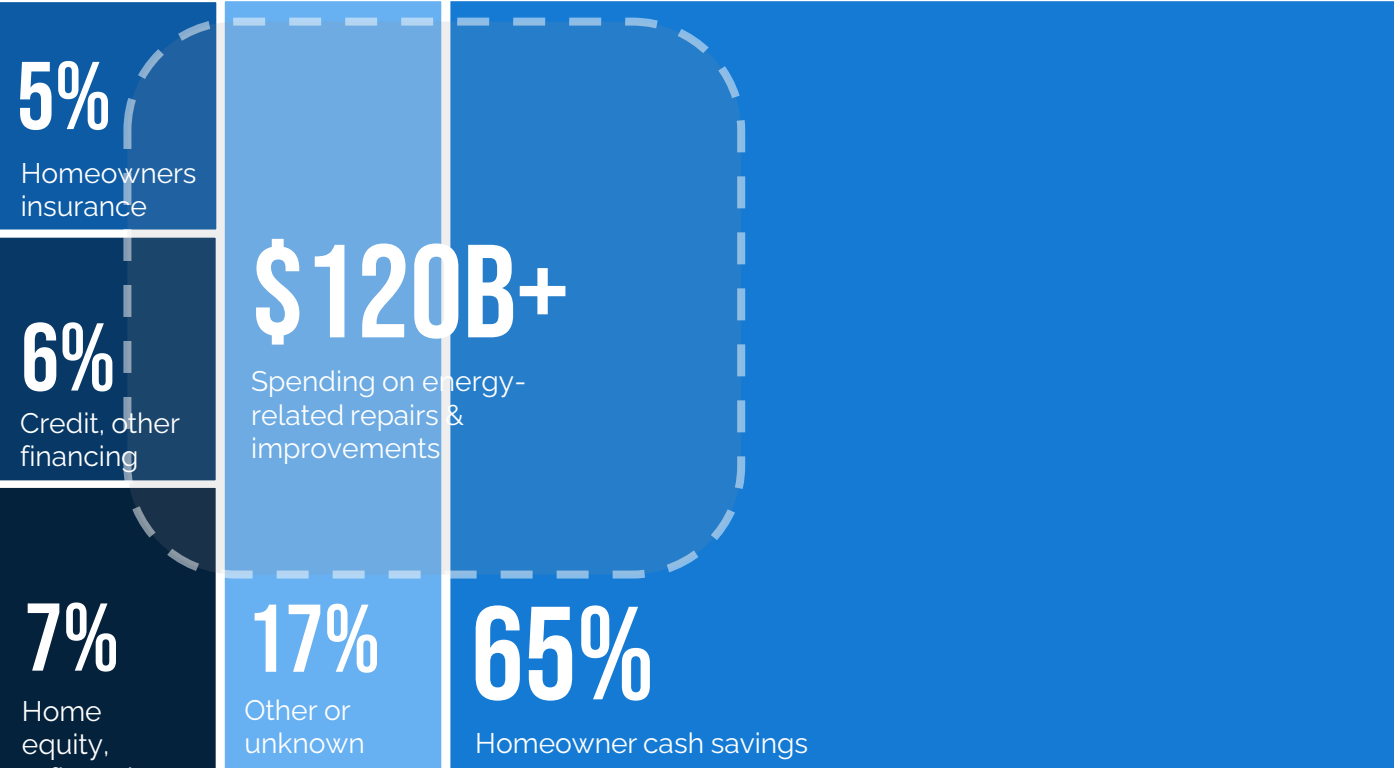
# CONTEXT OF US HOUSING

# THE US HAS ~130 MILLION OCCUPIED HOUSING UNITS



# SIZE OF THE US HOME IMPROVEMENT MARKET

## ~\$495B Market-Based Home Renovation & Repair Spending





# ESTIMATED COSTS OF DECARBONIZING US HOUSING

~\$5 TRILLION

Sources for Estimate: Walker et. al. 2023, Webster et. al. 2024

## Timeline for Reaching Full Housing Market Scale

Current rate of ratepayer & taxpayer funds only	400 years
+ Decarbonization-align current home energy spending	35 years
+ Grow market share of decarbonization-aligned home energy spending from 22% to 40%	20 years

## Mechanisms to Speed Up the Timeline

- Align public funds with decarbonization
- + **Standardize** access to decarbonization-aligned home energy upgrades
- + Make decarbonizing home energy upgrades **popular**



**TRANSFORMING THE MARKET**

6150

8257

# WHAT IS MARKET TRANSFORMATION?

## Home Energy Upgrades

*Activities and actions that result in a **product or service** growing as a percent of **total market share** within that product or service's **sector**.*

**~\$600 Billion (2023)**

**Home Repair &  
Renovation**

# WHAT CAUSES MARKET TRANSFORMATION?

**Activities and actions** that result in a **product or service** growing as a percent of **total market share** within that product of service's **sector**.

## 1. Limit Purchaser Choice in Market

- Building codes
- Appliance standards
- Building performance standards

## 2. Make Purchaser Choice More Obvious

- Create recognition of value
- Reduce costs
- Reduce time, confusion



# HOW ARE HOME UPGRADES PURCHASED?

## DECISION-MAKERS

Homeowner Occupants

Property Owners

## FUNDERS

Homeowner Occupants

Property  
Owners

Ratepayer  
Funds

Taxpayer  
Funds

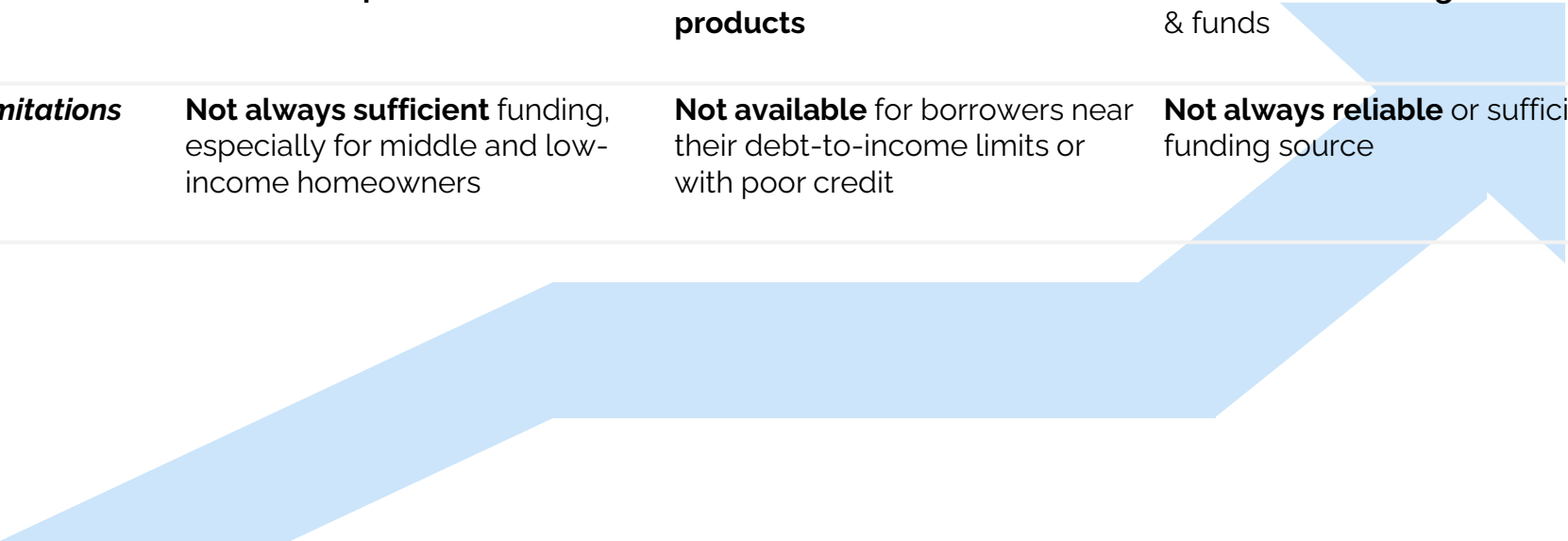
## FINANCIERS

Home Mortgage Lenders

Personal Property  
Lenders

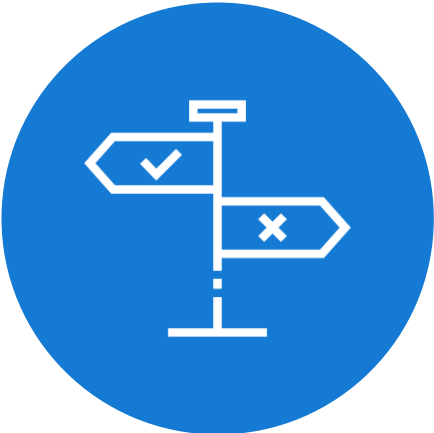
# MOTIVATING GROWTH IN MARKET SHARE

	Homeowners	Lenders	Regulators
<b>Must believe</b>	<b>Value</b> of home energy upgrade outweighs costs	Projects translate into real home <b>value</b> with relatively low risk	<b>Value</b> of projects outweighs costs
<b>Must have</b>	Access to <b>capital</b>	Must have useable <b>loan products</b>	An available <b>funding</b> mechanism & funds
<b>Limitations</b>	<b>Not always sufficient</b> funding, especially for middle and low-income homeowners	<b>Not available</b> for borrowers near their debt-to-income limits or with poor credit	<b>Not always reliable</b> or sufficient funding source

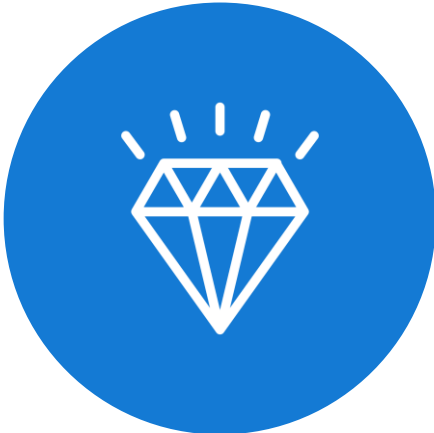


# STRATEGIES FOR GROWING MARKET SHARE

**Systematize data access about home energy features**



**Use data to value upgrades and de-risk private capital**



**Direct public funds toward households that need it most**







# VALUE UPGRADES AND DE-RISK CAPITAL



## Literature Review of Disclosure Policies

- |  |  |
|--|--|
| <b>Impact on Buyers, Renters</b>           | ✓ Homebuyers and renters are more likely to <b>prefer</b> home listings with higher Home Energy Scores   |
| <b>Impact on Home Sales</b>                | ✓ Higher scoring and/or green certified homes experience a <b>2-5% sales premium</b>   |
| <b>Impact on Lending</b>                   | ✓ When available, mortgage lenders collect home energy information to better understand loan risk and identify <b>green mortgage-backed securities</b> |
| <b>Impact on Home Investment Decisions</b> | ✓ Homeowners who receive recommended upgrades from an energy assessment are <b>more likely to pursue upgrades</b> than those who did not.              |

“We present evidence highlighting the **market failure**—incomplete information by both buyers and sellers—that **prevents widespread voluntary disclosure** of energy efficiency in housing transactions.”

- Myers, Puller, & West 2022

Sources: Energy Trust of Oregon 2024; Fannie Mae 2024; Myers, Puller, & West 2022; Pigman, Deason, Wallace, Issler 2022; Sussman, Bastian, Cooper, Tong, Sherpa, Pourfalamatoun 2022; Sussman, Kormos, Park, Cooper 2020.

# DIRECT PUBLIC FUNDS TO HOUSEHOLDS IN NEED



Public funding is **rare and precious** when it comes to funding housing decarbonization.

	Homeowner Savings	Underwritten Financing	Public Funds
<b>Disclosure Policy Impact</b>	Push spending alignment with investments that improve disclosed information	Push financing alignment with investments that improve disclosed information	Demonstrate need for public funds to subsidize improvements for low income, low credit households
<b>Limitations</b>	Only accessible to higher income homeowners	Only accessible to borrowers with good credit	Not enough funding to cover the need
<b>Best-Use Funding</b>	Higher income households invest in home energy upgrades aligned with comfort, health, and other desirable outcomes	High- and middle-income borrowers invest in home energy upgrades aligned with comfort, health, and other desirable outcomes	Lower-income residents benefit from home energy upgrades aligned with comfort, health, and other desirable outcomes

# COLLABORATE ON THE “RULES OF THE ROAD”

Leverage **national standards and programs** to limit market confusion

- ✓ Common infrastructure like labels, energy data, and market signals help homeowners, residents, funders, and financiers **understand and use this information**
- ✓ Home Energy Score can provide metrics showing a home's energy features and **actions that will improve** these features
- ✓ Linking home energy data systems to real estate can catalyze home energy **valuation, financing, and funding**



# KEY TAKEAWAYS

- ✓ Looking at the US housing market as a whole helps us identify truly meaningful strategies that address systemic market failures
- ✓ A dearth of data on existing home conditions impedes homeowner knowledge, energy system valuation, and low-risk financial products
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- ✓ There is no silver bullet, but disclosing information helps everyone make better decisions





**THANK YOU!**

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# **Commercial Sector Market Transformation Discussion**

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Reduce U.S. building emissions 65% by 2035 and 90% by 2050 vs. 2005 while enabling net-zero emissions economy wide and centering equity and benefits to communities

## CROSS-CUTTING GOALS



**Equity** – Advance energy justice and benefits to disadvantaged communities

**Affordability** – Reduce energy burden and technology costs so all can benefit

**Resilience** – Increase the ability of communities to withstand and recover from stresses

## STRATEGIC OBJECTIVES



### Increase building energy efficiency

Reduce on-site energy use intensity in buildings 35% by 2035 and 50% by 2050 vs. 2005



### Accelerate on-site emissions reductions

Reduce on-site GHG emissions in buildings 25% by 2035 and 75% by 2050 vs. 2005



### Transform the grid edge

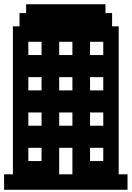
Reduce electrical infrastructure costs by tripling demand flexibility potential by 2050 vs. 2020



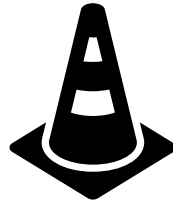
### Minimize embodied life cycle emissions

Reduce embodied emissions from building materials and construction 90% by 2050 vs. 2005

# Commercial Sector



**6 million commercial buildings in US**



**Aging buildings  
Carbon/energy intensive**




**60b sqft new construction now-2050**



**25x speed to reach 2050 goals**



The background features a large white triangle pointing downwards, set against a blue background. A diagonal line with segments in light green, dark blue, and bright blue runs from the top right towards the bottom right. A large green triangle is positioned at the bottom right, partially overlapping the white triangle.

**What has been done for  
commercial buildings?**

# Commercial – Entry Interventions

- Audits
- Retuning
- Retrocommissioning
- Data access
- Benchmarking
- Disclosure & transparency

# Commercial – Major Interventions

- Retrofit requirements
- Energy Codes
- Time of sale/listing actions
- Major renovation energy codes
- Building Performance Standards

# Commercial – Motivations

- Incentive/rebate programs
- Favorable financing
- Tax abatements
- Workforce programming
- Competitions/Challenges
- Voluntary recognition

# Foundations for Success

What makes energy efficiency policies for existing buildings actionable?



iStock™  
Credit: Blue





# Foundations for Success

- Good data, data access
- Workforce – motivations for new entrants, diversified skills, good jobs
- Push & Pull - Balance of support and requirements
- Access to capital
- Public agency administration capabilities
- Equity considerations, flexibility for unique circumstances



# Questions for Discussion

- What are we missing to transform existing buildings?
- How can we make policies & programs more actionable?
- How can the existing homes market benefit from building energy code system progress? Vice versa?
- Are there building energy codes activities that may not be transferrable to existing buildings? Housing?
- How can policymakers focus on pulling in new funding resources, particularly for households & providers that have not yet benefited from high quality buildings?

# Thank you!

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