

# How Does Energy Efficiency Relate to Housing Affordability for Americans

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March 28, 2024

# Presentation Overview

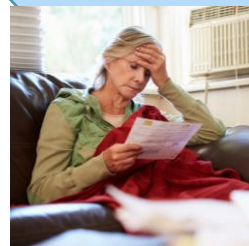
Introduction



Energy Efficiency



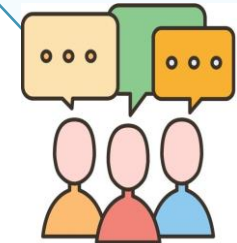
Energy Bill Assistance

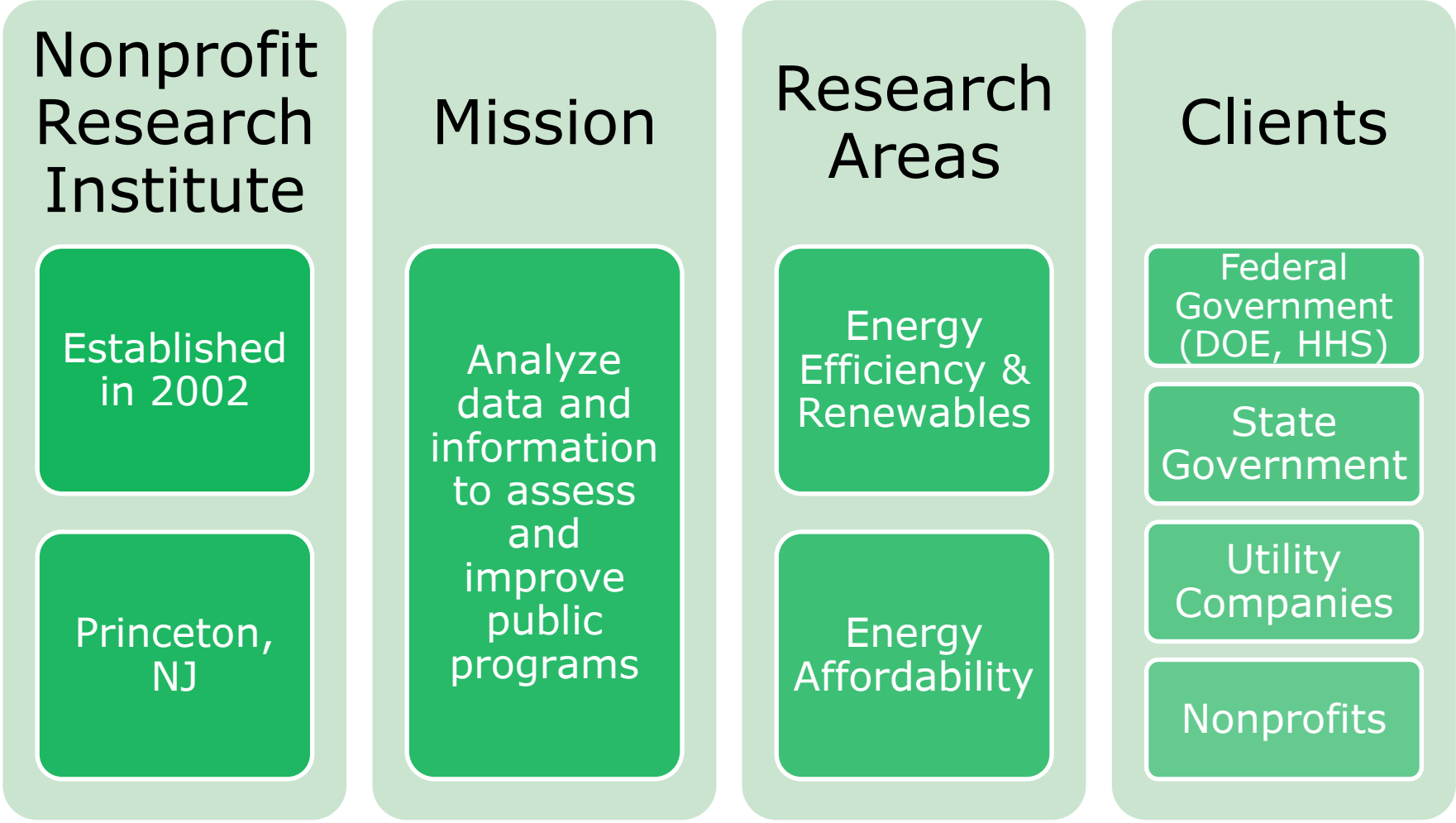


Recommendations



Discussion





## Nonprofit Research Institute

Established in 2002

Princeton, NJ

## Mission

Analyze data and information to assess and improve public programs

## Research Areas

Energy Efficiency & Renewables

Energy Affordability

## Clients

Federal Government (DOE, HHS)

State Government

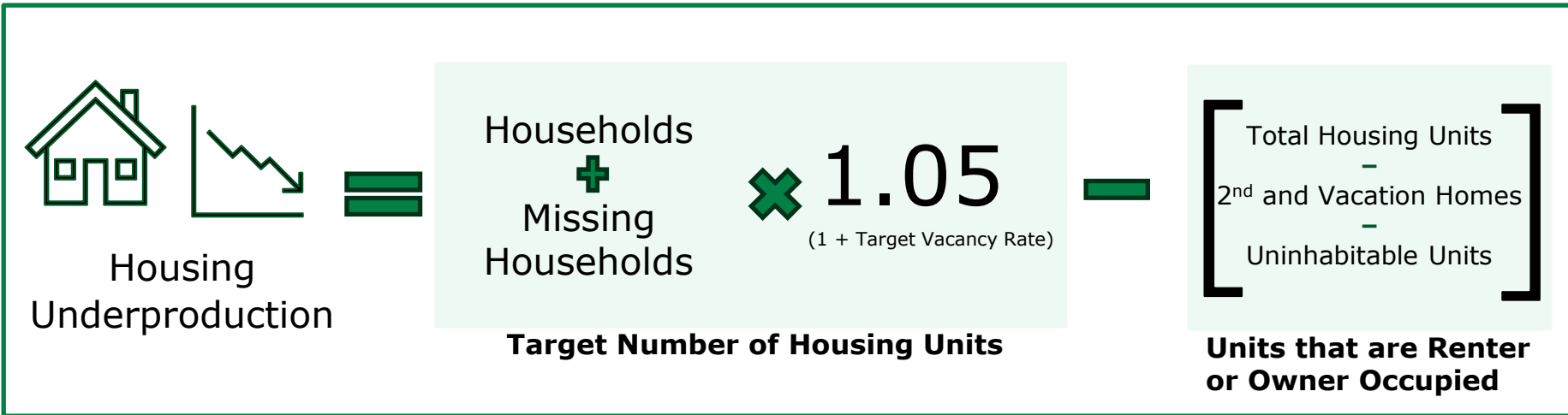
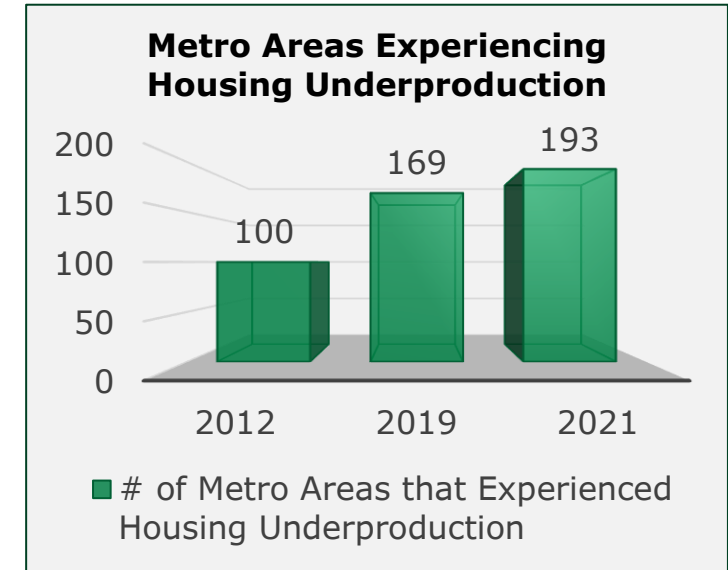
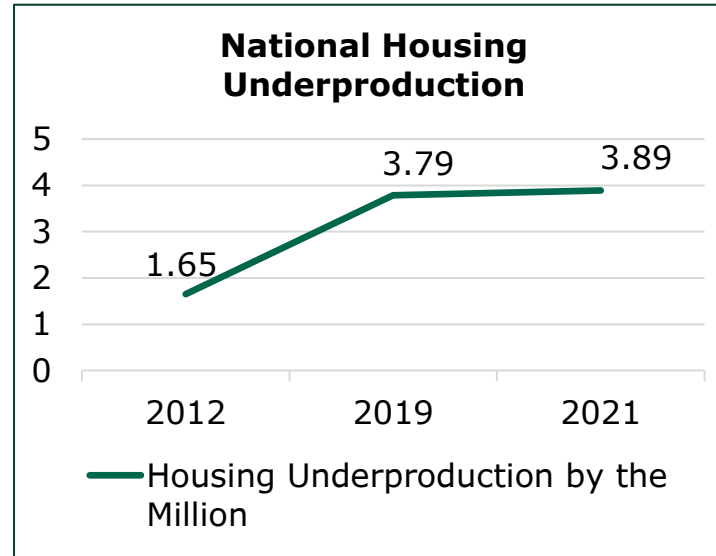
Utility Companies

Nonprofits

# Housing Affordability Challenges

Housing Underproduction, as defined by Up For Growth, occurs when communities fall short of meeting housing needs.

- High Housing Costs
- High Interest Rates
- Constrained Labor Supply
- Restrictive Zoning
- Inflation
- Uncertain Economy

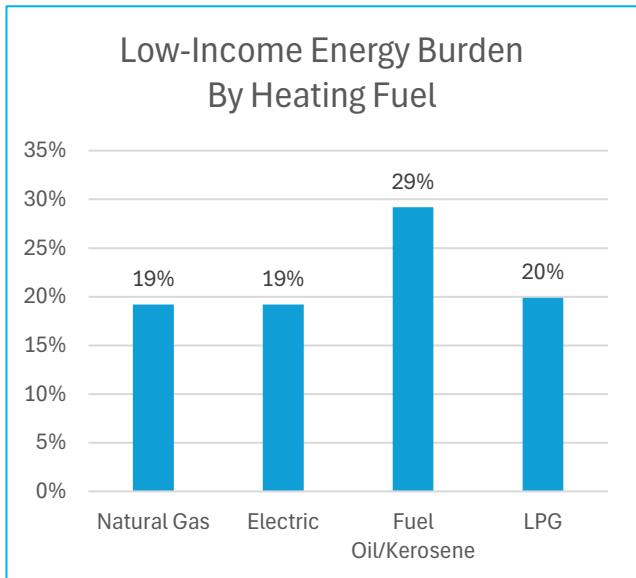
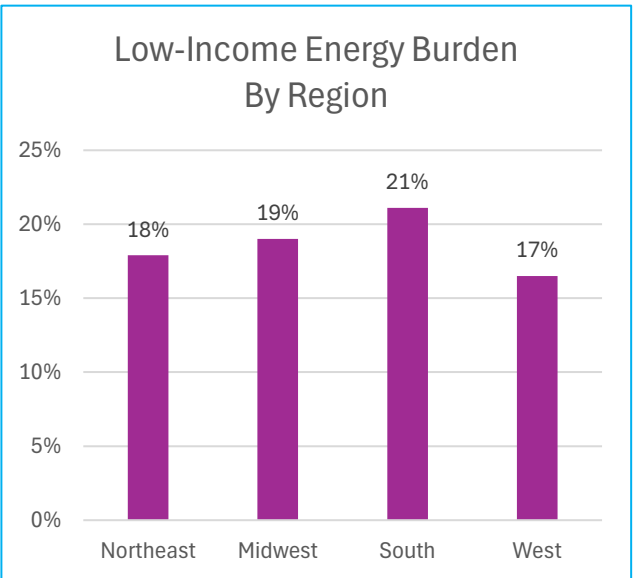
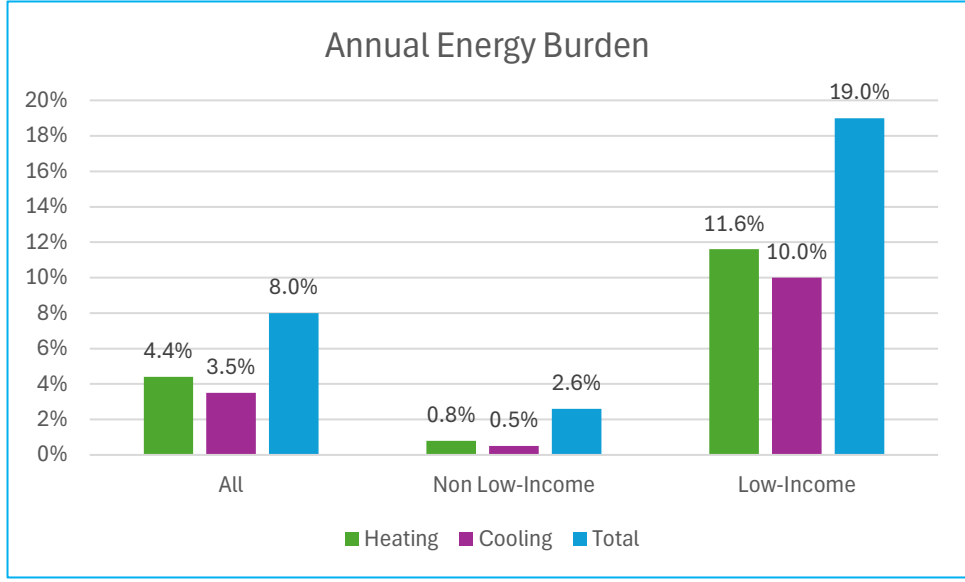
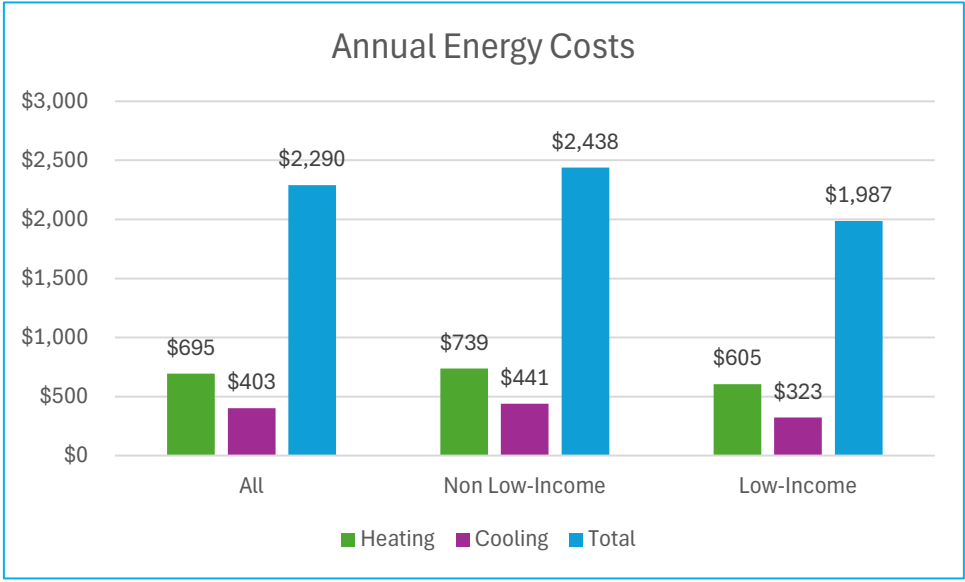


**“2023: The Year You Didn’t Buy a House”**  
 New York Times, January 4, 2024

- Redfin Study
- Less than 16% of homes for sale in 2023 affordable to local median earners.
- Defined as housing that costs no more than 30% of income.

<https://upforgrowth.org/apply-the-vision/2023-housing-underproduction/>  
<https://eyeonhousing.org/wp-content/uploads/2024/01/HMI-January2024-Special-Survey-Report.pdf>  
<https://www.nytimes.com/2024/01/04/realestate/affordable-housing.html>

# Energy Costs and Burden





# Energy Efficiency



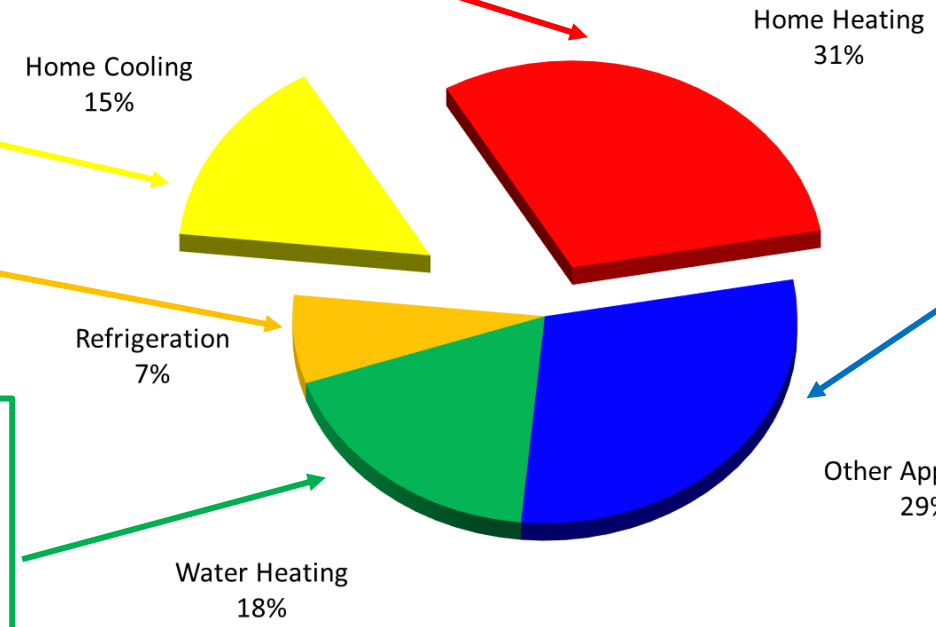
# Energy Efficiency Opportunities

Percent of U.S. Residential Energy Expenditures  
 Low Income Households, by End Use, FY 2022

- Air Sealing
- Insulation
- Duct Sealing & Insulation
- HVAC Repair & Replace
- Smart Thermostats

- Refrigerator Replacement
- Freezer Replacement
- Recycling

- Water Heater Replacement
- Water Heater Insulation
- Pipe Insulation
- Aerators
- Showerheads
- Showerstart Adapters
- Leak Repair
- Water Temperature Setback



- LEDs
- Power Strips

- Health & Safety**
- CO Detector
  - Smoke Detector
  - Extermination
  - Dryer Venting
  - Bathroom Venting
  - Whole House Ventilation
  - Mold & Moisture
  - Asbestos

Source: 2020 RECS

# Energy Efficiency Bill Reduction Evidence from APPRISE Evaluations

## Evaluation Population

- Low-Income Customers
- Utility Energy Efficiency Program Participants
- Northeastern U.S.

## Evaluation Methodology

- Pre/Post Energy Usage
- Billing Analysis
- Weather-Normalized
- Comparison Group in Some

## Results

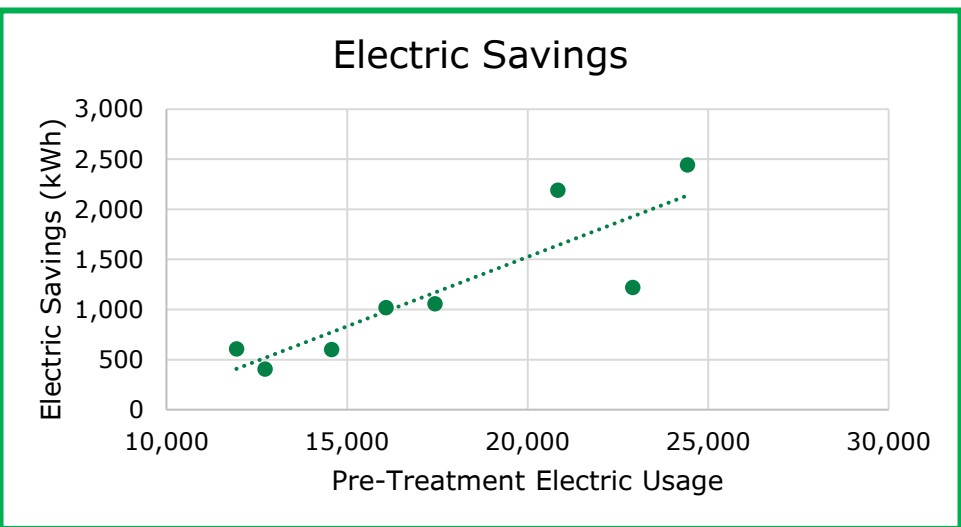
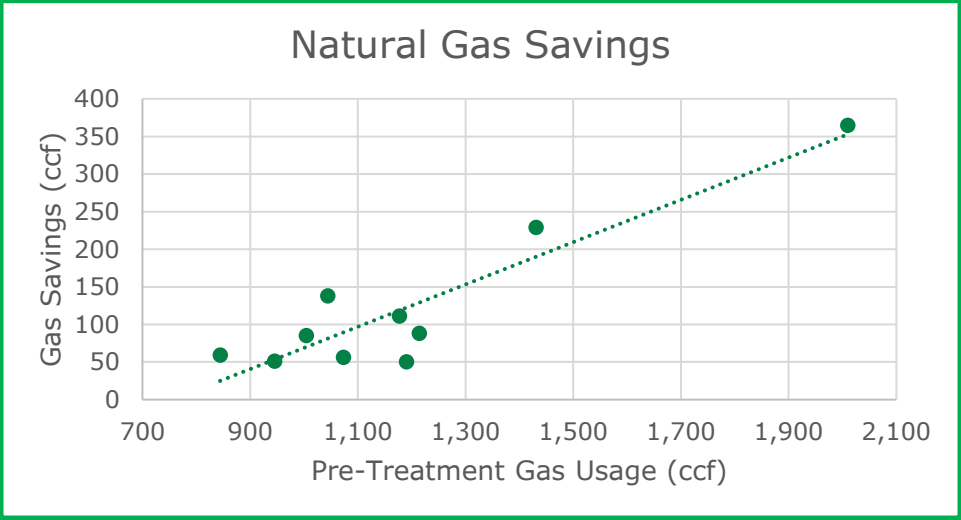
- Bill impact may not be enough to achieve affordability

Type	# Evals	Time Period	Mean Pre-Usage	Mean Savings	Savings	
					Mean %	% Range
Gas Heating	10	2017-2022 (No 2020 Included)	1,193 ccf	123 ccf	9.4%	3.9% - 18.2%
Electric Heating	8		17,614 kWh	1,194 kWh	6.3%	3.2% - 10.5%
Electric Baseload	10		11,829 kWh	714 kWh	6.0%	3.6% - 10.5%

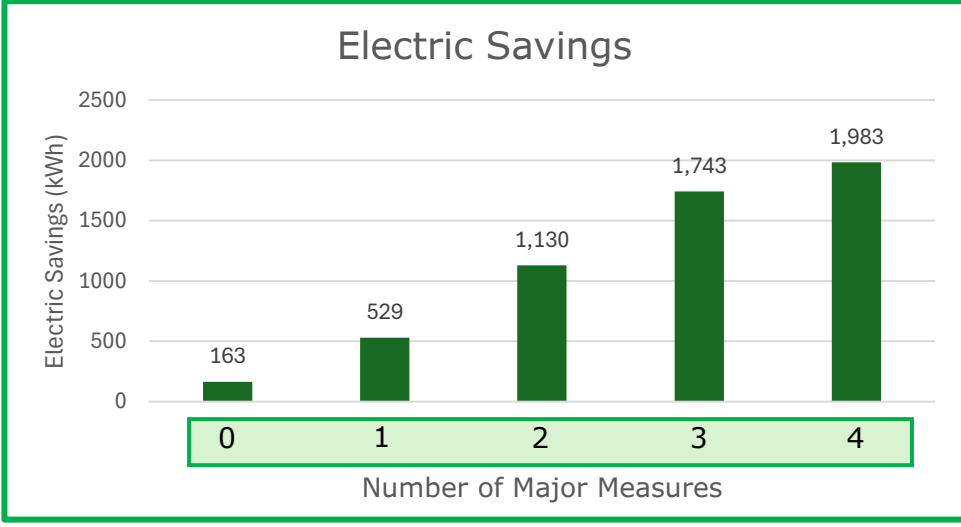
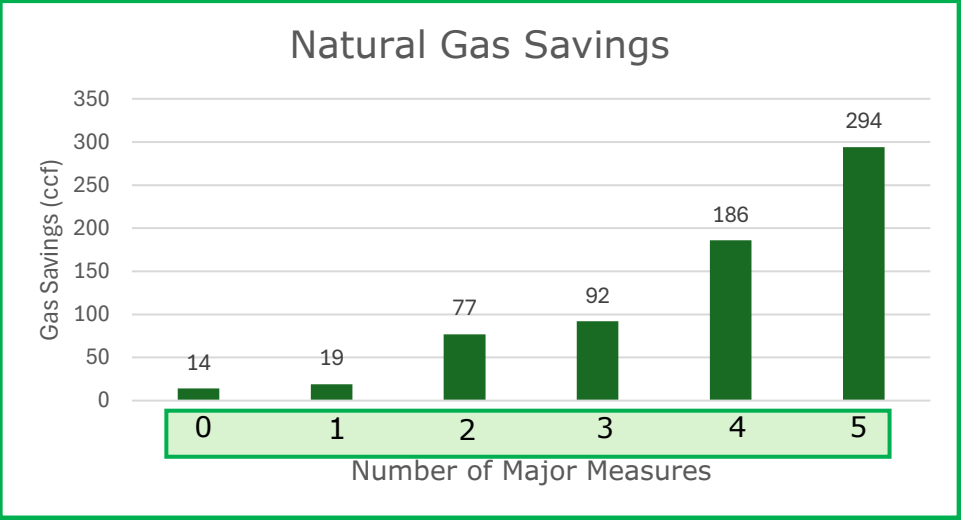


# Increasing Energy Efficiency Savings

## Higher Pre-Treatment Usage



## More Major Measures



## Major Measures

- Gas
- Air Sealing
  - Insulation
  - HVAC
  - Duct Sealing
  - Hot Water

- Electric
- Air Sealing
  - Insulation
  - Duct Sealing
  - Refrigerator Replacement

# Energy Efficiency Benefits

## Home Comfort

### Drafts



### Humidity



### Cold/Hot Rooms



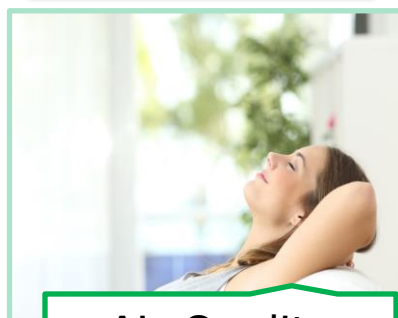
### Noise



## Health & Safety



Mold



Air Quality



Carbon Monoxide



Asbestos



Pests

# Feedback on Energy Efficiency From High Savers

## Usage & Bills



He estimates his usage decreased by 15-20%. He considers that a substantial decrease and his bills are much better than before.

**He has changed some of his behaviors. Now he understands how much air comes in through the door when it is open and when it is closed. This means that he makes an effort to close the door and not leave it open in the colder months.**

The program taught her how to work with the thermostat to conserve energy. Before, she did not know that she could program the thermostat instead of changing it as need be.

## Comfort



There are not as many drafts because of fixes to the doors and windows, the floors feel warmer, and the pipes were wrapped. These all resulted in vastly improved heating. Overall, her comfort level increased, especially in the wintertime.

**Her home is much warmer and more comfortable. There used to be a cold draft throughout the home, but there no longer is. She believes this is because they added insulation to her attic.**

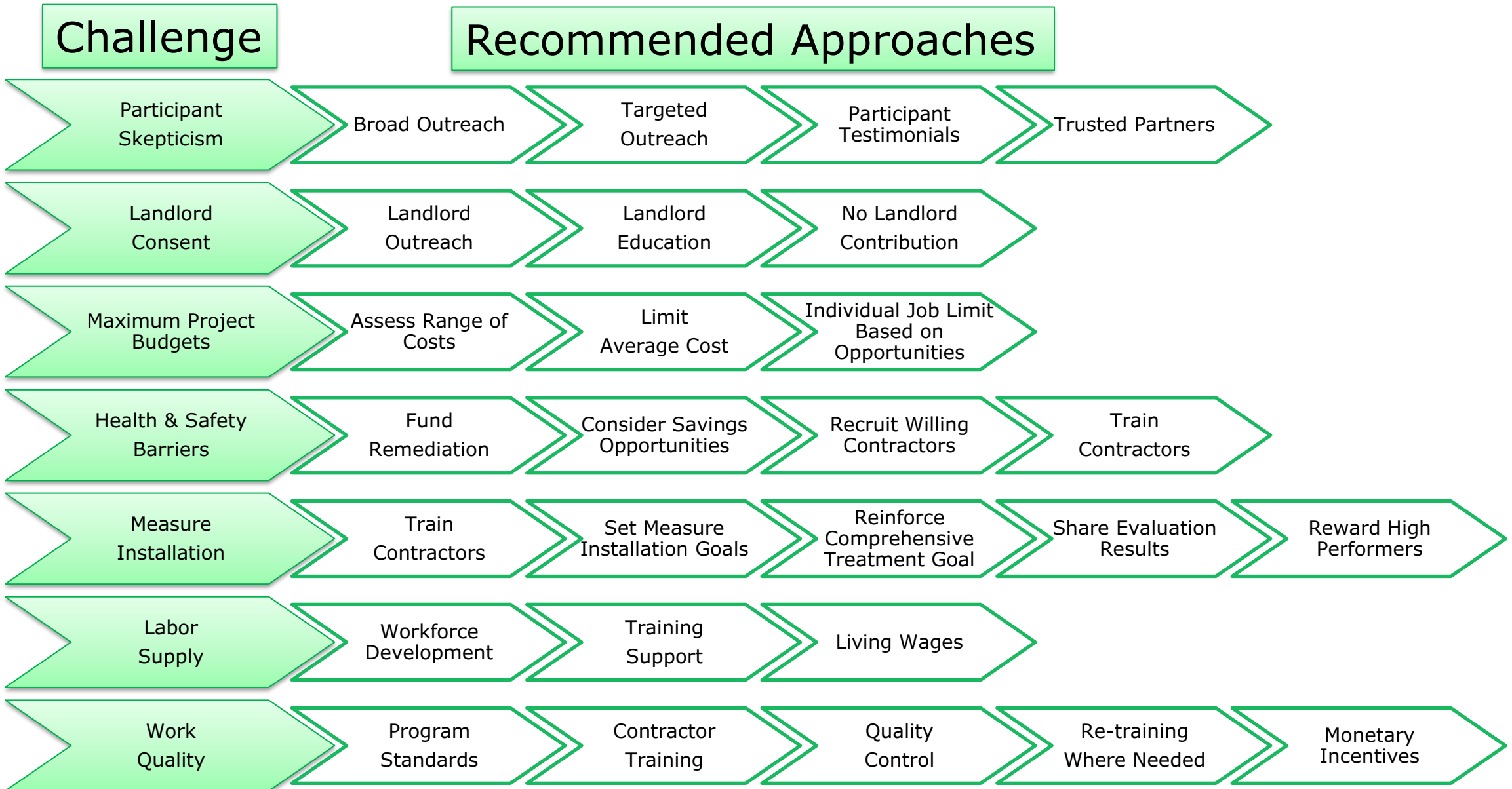
## Health



Her daughter used a machine for her asthma before the program services, and that machine used a considerable amount of energy. Since the program services improved the atmosphere of the home, her daughter used the machine much less.

**Her old refrigerator didn't work and didn't keep things cold. The new one is nice, works well, and keeps things cold. Overall, it seemed that the refrigerator had the biggest impact on her day-to-day life.**

# Energy Efficiency Challenges





# Energy Bill Assistance



# Energy Bill Assistance

## LIHEAP

- Federal Block Grant
- State & Tribal Grantees
- Heating Assistance
- Cooling Assistance
- Crisis Assistance
- Emergency Furnace Repair & Replacement

## Bill Payment Assistance

- State Programs
- Utility Programs
- Bill Subsidy
- Rate Discount
- Percentage of Income Payment

## Arrearage Forgiveness

- State Programs
- Utility Programs
- Arrearages Forgiven Over 1-3 Years

## Hardship Funds

- Nonprofits
- Utility Programs
- Grants to Customers Disconnected or in Danger of Disconnection



# Feedback on Energy Bill Assistance

Please continue this program - it is life changing to be able to afford my bill and keep my house at a comfortable temperature. The physical and mental stress it has relieved is beyond measure.

I want say thank you for the utility to keep us warm in winter and cold in summer and help us use our medication device we need and hope they are able help more people who are low income to stay safe.

It helps with bills and I can control it. I can save money and buy more groceries. Helps out so I can save money for health insurance for the kids.

I love the program, it is a life saver. I would have been homeless. I called the utility crying. I am so grateful.

# Recommendations

## Maximize Energy Savings

- Treat high users
- Remediate H&S issues
- Install major measures where cost-effective opportunities exist
- Provide training and quality control to ensure high quality work

## Assess Effectiveness

- Estimate savings using billing data
- Weather normalize energy usage
- Use comparison group if possible
- Re-assess frequently

## Other Assistance

- Energy bill payment assistance
- Refer from assistance programs to wx and from wx to assistance programs

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