

Missouri Weatherization Assistance Program



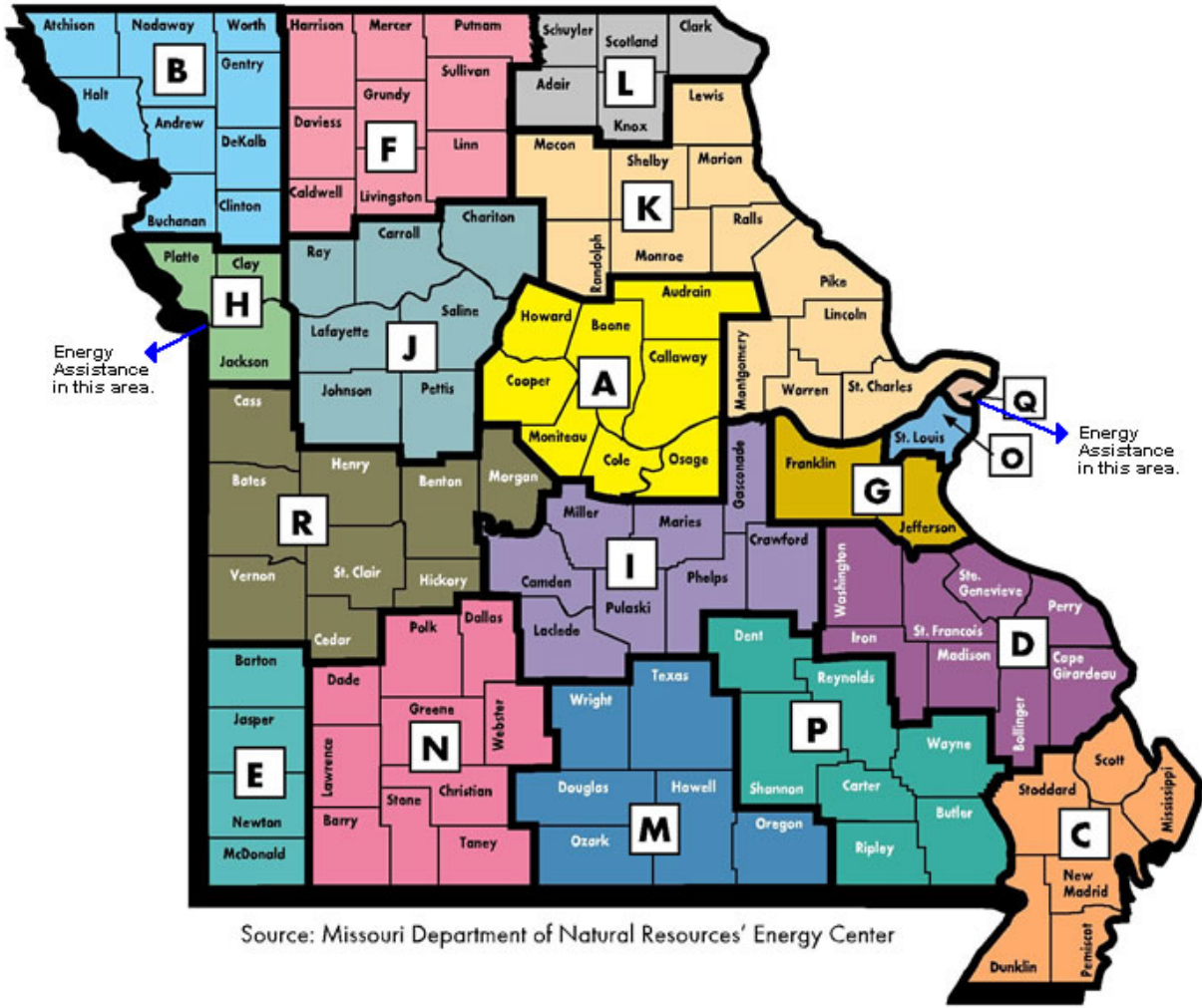
Missouri Weatherization Program Mission

- Reduce the energy burden on Low-income residents by installing cost effective energy efficiency measures, while ensuring their health and safety

Benefits to Missourians

- ❑ Reduces energy usage
- ❑ Makes housing more affordable
- ❑ Increases efficiency of existing housing
- ❑ Alleviates substandard living conditions and reduces risk of homelessness
- ❑ Provides a safer, healthier living environment

Where is Weatherization ?



What types of homes can be Weatherized?

- Services delivered to single-family, multi-family, and mobile homes



Program Funding

U.S. Department of Energy (DOE)

- Administered by Missouri Department of Natural Resources Division of Energy

Other Sources of Weatherization Program Funding

- Utility companies
- State and Federal housing program partnerships
- Leverage additional private resources
- A portion of the estimated costs required by landlord
- Missouri may transfer up to 15% of LIHEAP funds directly to the Weatherization Program
- 0% of LIHEAP funds are currently transferred to the Weatherization Program

Why Weatherization?

- Heavy energy burden on low-income
 - Typically spend 14.4% of annual income on energy, compared with 3.3% for other households
- Weatherization lowers the incidence of arrearages and disconnects
- Low-income families choose between heat and other necessities
- 445,888 low-income households in Missouri

Source: http://www.waptac.org/data/files/transcripts/transcripts_216.pdf

Source: US Census Data

Weatherization Benefits

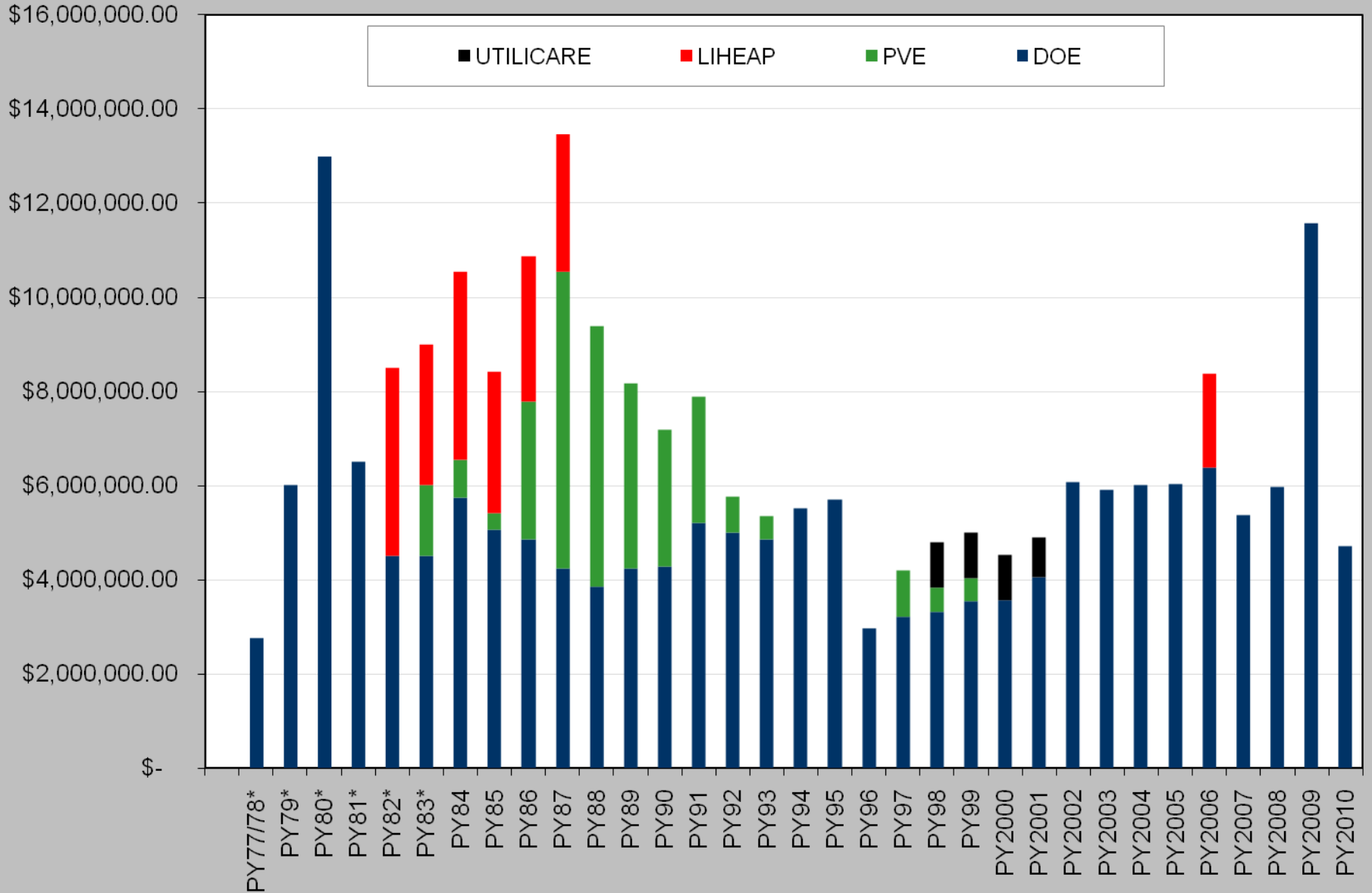
- ❑ Increases home energy efficiency
- ❑ Safe and healthy living environment
- ❑ Permanent energy solution
- ❑ Reduces arrearages, lessens destructive cycle of shut-offs and re-connections
- ❑ Economic development

Weatherization Benefits

- Average annual energy savings = \$437
- Returns \$2.51 to the household and society for every \$1 invested
- Decreases national energy consumption by the equivalent of \$24.1 million
- Reduces demand on the electric grid
- Reduces need to build more power plants

www.waptac.org

Missouri Weatherization Funding History (Excluding ARRA Funding)

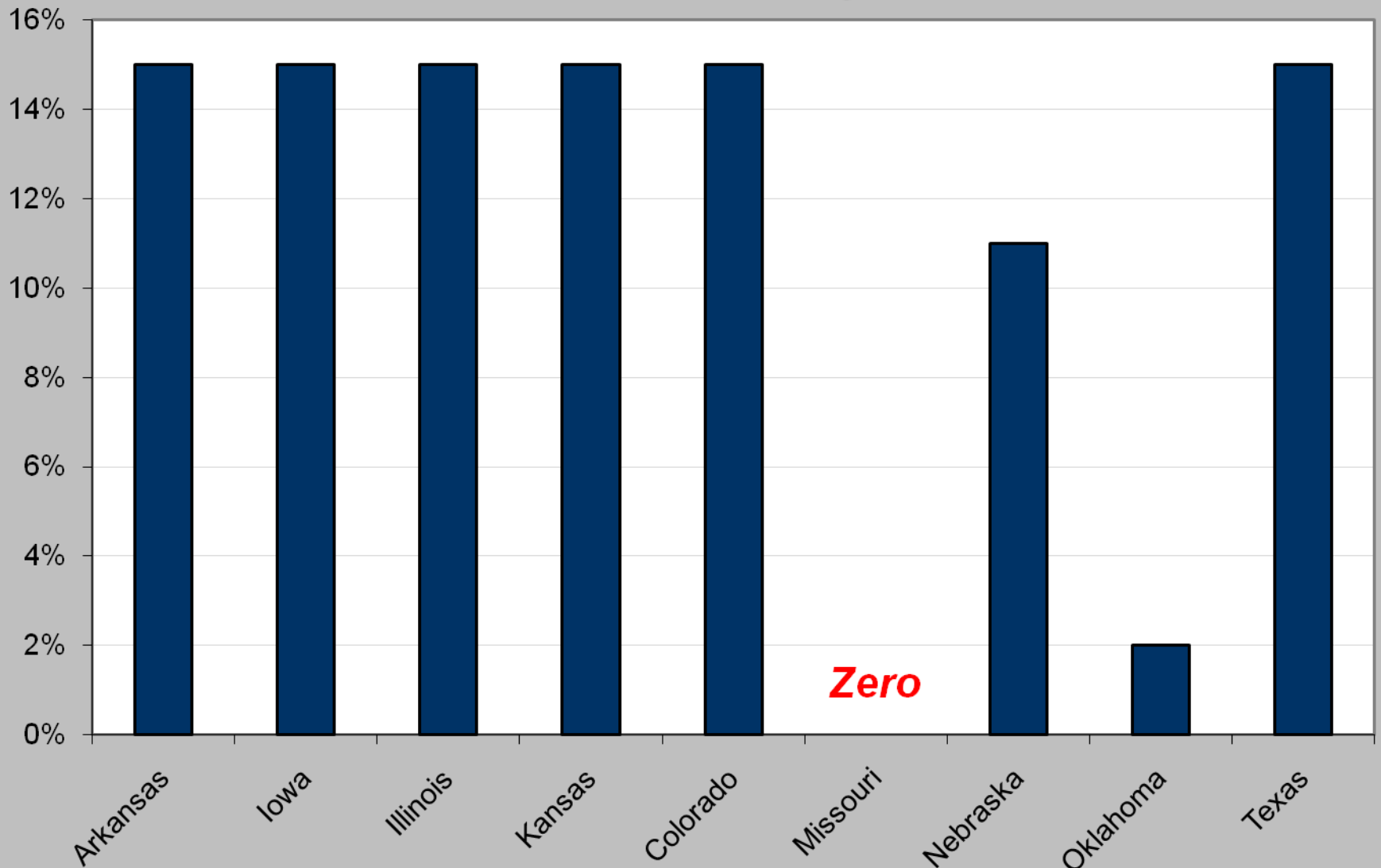


Percent of LIHEAP Funding Designated for Weatherization Services

(Source: LIHEAP Clearinghouse)

State	FY	Percent of LIHEAP Funds for Weatherization
Arkansas	2011	15%
Iowa	2011	15%
Illinois	2011	15%
Kansas	2011	15%
Colorado	2011	15%
Missouri	2011	0%
Nebraska	2011	11%
Oklahoma	2011	2%
Texas	2011	15%

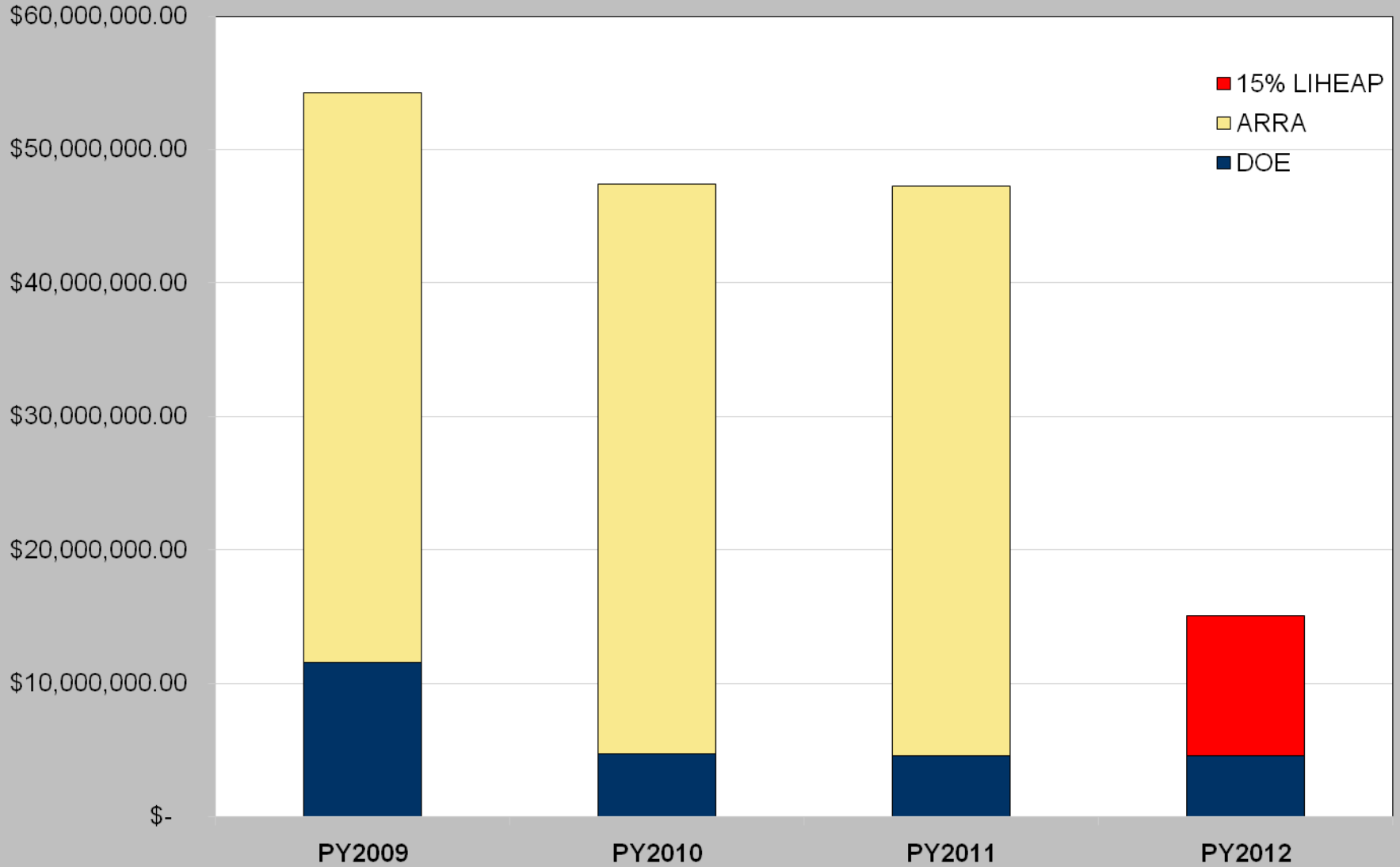
Percent of LIHEAP Funding Designated for Weatherization By State



LIHEAP Funding FY 2011

- \$45 million in FY 2012
- 15% to Weatherization equates to:
 - \$6.75 million for Weatherization
 - 1,300 homes weatherized
 - Potentially 100 direct jobs maintained
 - Additional job creation for contractors and local suppliers

Missouri Weatherization ARRA Funding and Proposed 15% of LIHEAP



Weatherization Process

- Application Submitted
- Energy audit conducted
- Health and Safety concerns addressed
- Client energy education
- Work order completed
- Energy efficiency measures installed
- Post-work inspection completed

Weatherization Income Guidelines

<u>Household Size</u>	<u>Maximum Income</u>
1	\$21,780
2	\$29,420
3	\$37,060
4	\$44,700
5	\$52,340

Eligibility Determination

- Priority groups
 - Elderly, disabled, family with children, household with high energy burden
- Renters
 - Landlord must approve
 - A portion of the estimated costs are required from landlord (not required if income eligible)

Energy Audit

- Energy auditors inspect the home and determine energy efficiency, and health and safety measures

- Building Performance Institute (BPI)
 - Certification maintained to safely perform weatherization
 - Combustion analysis
 - Nationally recognized

- Diagnostic tools
 - Improve identifying energy problems and health and safety concerns.
 - Carbon Monoxide
 - Gas leaks
 - Moisture
 - Leakage and heat loss

Energy Audit Software

- National Energy Audit (NEAT) and Mobile Home Energy Audit (MHEA)
 - Determines the most cost effective energy measures for each individual home
 - Savings to investment ratio (SIR) \$1 or greater
 - Developed and maintained by Oak Ridge National Laboratory

Diagnostic Tools

- Blower door
 - De-pressurizes home
 - Identifies and measures air leakage rate of home



Diagnostic Tools

- DG-700
 - Indicates level of air leakage
 - Used to locate leaks



Diagnostic Tools

- Pressure Pan
 - Leaky ducts can increase utility costs by 10-30%

 - While the blower door runs, pressure pan is placed over air registers to determine duct leakage



Diagnostic Tools

- Duct Blaster
 - Measures duct leakage
 - Results help locate large leaks
 - Leaks to the outside



Diagnostic Tools

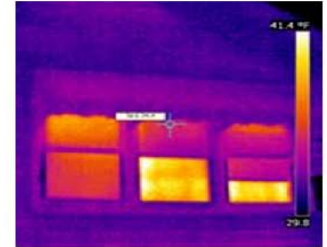
□ Infrared Camera

- Identifies heat loss
- Guides air sealing and insulation
- Helps to educate clients
- Quality control for insulation and other measures

Images Taken from Digital Camera



Images Taken from Thermal Image Camera



Diagnostic Tools

- Combustion Analyzer
 - Efficiency and safety
 - Composition of flue gases
 - Indicates inefficient combustion, hazardous by-products (e.g., carbon monoxide)



Diagnostic Tools

- Gas Leak Detector
 - ▣ Identifies combustible gas leaks
 - ▣ Important health and safety test
 - ▣ Saves lives, fuel, and money
 - ▣ Effective tool for client education



Dangers of Back Drafting

- ❑ Draws flue-gases and toxins into home
- ❑ Makes occupants sick
- ❑ Can be fatal



Identifying Back Drafting

- Identify conditions causing combustion appliances to exhaust flue gases back into a home

- Worst Case Testing Conducted
 - Creating greatest depressurization to combustion appliances
 - Exhaust fans, dryer, furnace fan, etc.
 - Opening or closing house room doors (depending on pressure impact to combustion appliance zone)

Energy Efficiency Measures

- Blower Door Guided Air-Sealing
 - Locates air leaks
 - Indicates when “optimal” air-sealing is achieved
 - Visual inspections may miss “hidden” air leaks and bypasses through floors, sealed fireplaces, cabinets
 - Auditors are trained to air seal without harming indoor air quality
 - Minimum ventilation requirements

Energy Efficiency Measures

- Insulation
 - Attic, floors, and walls



Energy Efficiency Measures:

○ Insulation

- Blown insulation most effective
- Reduces air infiltration
- Increases thermal resistance



Energy Efficiency Measure: Duct Sealing and Insulation

- Duct Sealing and Insulation
 - Duct system may need sealing and/or balancing
 - Apply approved tape and mastic
 - Ducts in unconditioned spaces are insulated



Energy Efficiency Measures

- Heating System
 - May need tune-up or basic repairs
 - Can replace dangerous or inoperable furnaces
 - Can replace furnaces for efficiency
 - Unvented space heaters must only be used as a secondary heat source in site built homes

Energy Efficiency Measures

- Base Load Reduction
 - Electricity consumption can be reduced through lighting, refrigerator, water saving measures, and water heater measures
 - Equipment may need tuning

Energy Efficiency Measures

- Base Load Reduction
 - Wrap water heater tank and pipes
 - Install programmable thermostat



Health and Safety

- Pre and post inspection of home
- Conduct weatherization in a lead-safe manner
- Check for carbon monoxide, gas leaks, moisture/mold, electrical hazards
- Ensure safety of clients

Health and Safety Measures

- Combustion Appliances
 - Technicians test all gas furnaces, water heaters, cook stoves and dryers
 - All safety problems are addressed

Before



After



Client Education

- Client education is a critical component, and is conducted before and after measures are installed
 - Ensure savings
 - Prevent health hazards
 - Prolong life of measures, appliances, and client

Post-Work Inspection

- Blower door test ensures quality air sealing
- Combustion Appliance Zone (CAZ) testing
 - Indicates adequate combustion air and proper combustion appliance drafting
- Insulation and other measures checked for quality and completion

Success Stories

- Before weatherization, Mrs. S.T.'s heating system was vented improperly and unsafe.
- Local Sub-contractor did repairs.
- Carbon Monoxide (CO) & smoke alarms were installed.
- Insulation measures were installed.
- Combustible appliances were rechecked & determined safe, completed Weatherization measures.
- Air Infiltration Rate (before) 16,100 CFM (after) 3,781 CFM. Reduction of 12,319 CFM.



Success Stories

- During Ms. D.C.'s client interview we discovered that her home had a 50+ year old furnace. During the audit we found a crack in the heat exchanger, exposed wiring & high CO levels.
- Weatherization replaced furnace, installed chimney liner & attic insulation.
- She stated high utility (gas & electric) bills; down by about half (1/2) since work was completed.
- Home stays cooler in summer with less A/C costs.



Success Stories

- At Ms. D.W.'s interview her statement was "My home is in horrible shape." "I have to put comforters over the doors so we will not freeze in the winter."
- Weatherization work completed by local St. Louis County CAA. Work included attic & floor insulation, air sealing measures and CO & smoke alarms installed.
- She stated she is now able to participate in budget billing for her home heating fuel.
- Her electric was about \$500 a month during summer and is now averaging \$280 a month since Weatherization services were provided.

Weatherization Works!

- ✓ **For Families**
- ✓ **For Communities**
- ✓ **For Missourians**