

A Misguided Frame: Examining Path Dependencies in Defining, Assessing, and Evaluating Energy Poverty in The United States

Dominic J. Bednar, EIT

: @GO__DJ

2018 HBCU Climate Change Conference

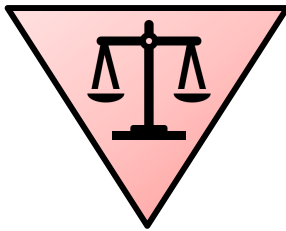


CENTER FOR SUSTAINABLE SYSTEMS
UNIVERSITY OF MICHIGAN

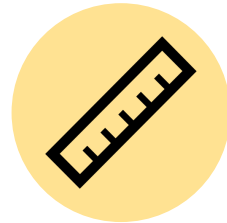




Outline



Definition



Performance
Measures



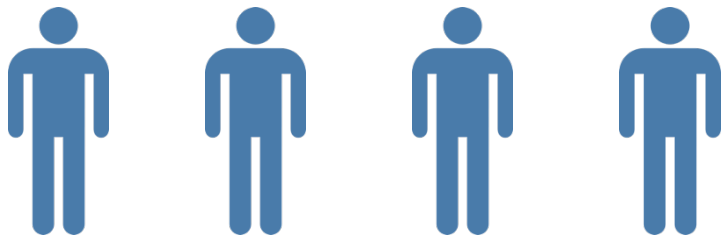
Evaluation

Problem

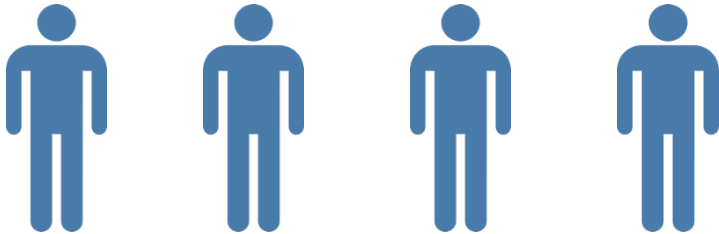
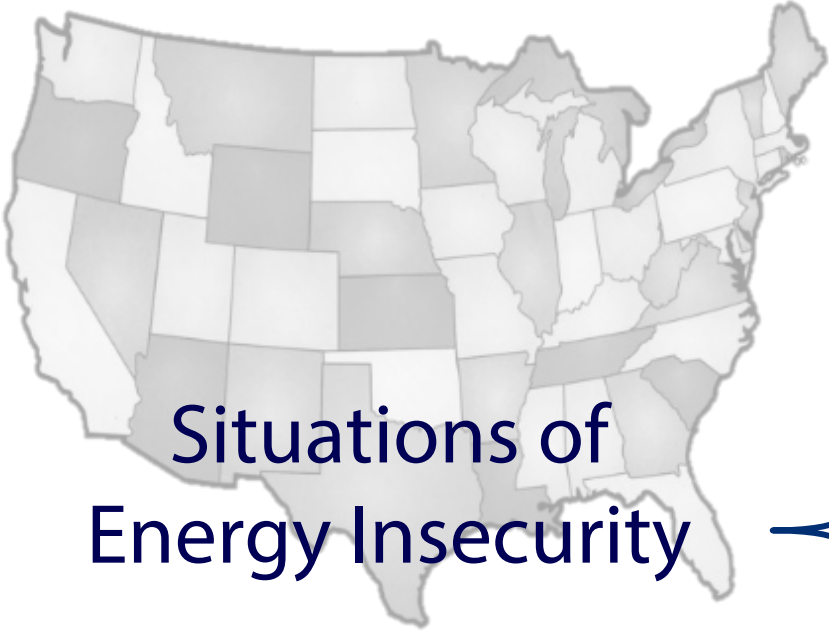


14 Million
Unpaid utility
Bills

2.2 Million
Experience
utility
Disconnects



Problem



25 Million
7 Million each month



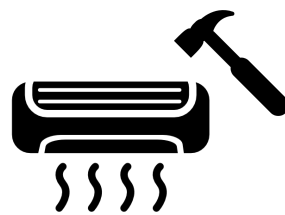
17 Million
2 Million each month



13 Million



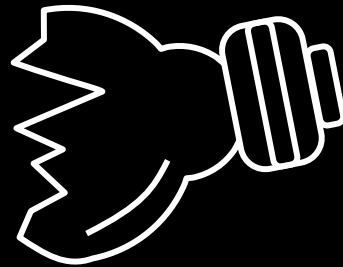
7/6 Million
(Heat/cool equipment)



(U.S. EIA, RECS, 2015)

Blacks are:

2X more likely to be behind on utility bills



3X more likely to experience a utility shut off



No Poor Mothers = No Poor Children

WE DEMAND non-polluting energy & technology so our planet survives

OVER 2 MILLION PEOPLE ARE LIVING IN FUEL POVERTY

45% OF IMMIGRANT/CHILDREN OF COLOUR LIVE IN POVERTY
Source: College for the Community College of the City of New York

MOTHERS DON'T EAT SO CHILDREN HAVE HEAT
Single Mothers' Self Defense

WOMEN FORCED TO

ANGRY
CLIMATE
climate.org
JOBS

REGI
RS

le
eaths
eople
et

IN

Low Income

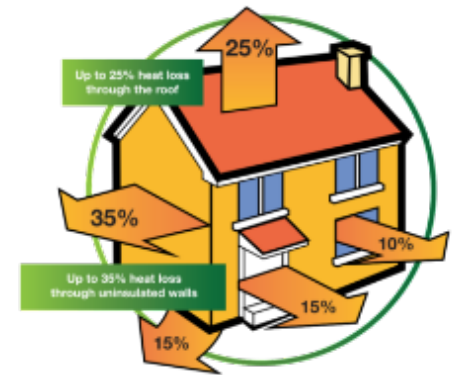


Energy
Disparity

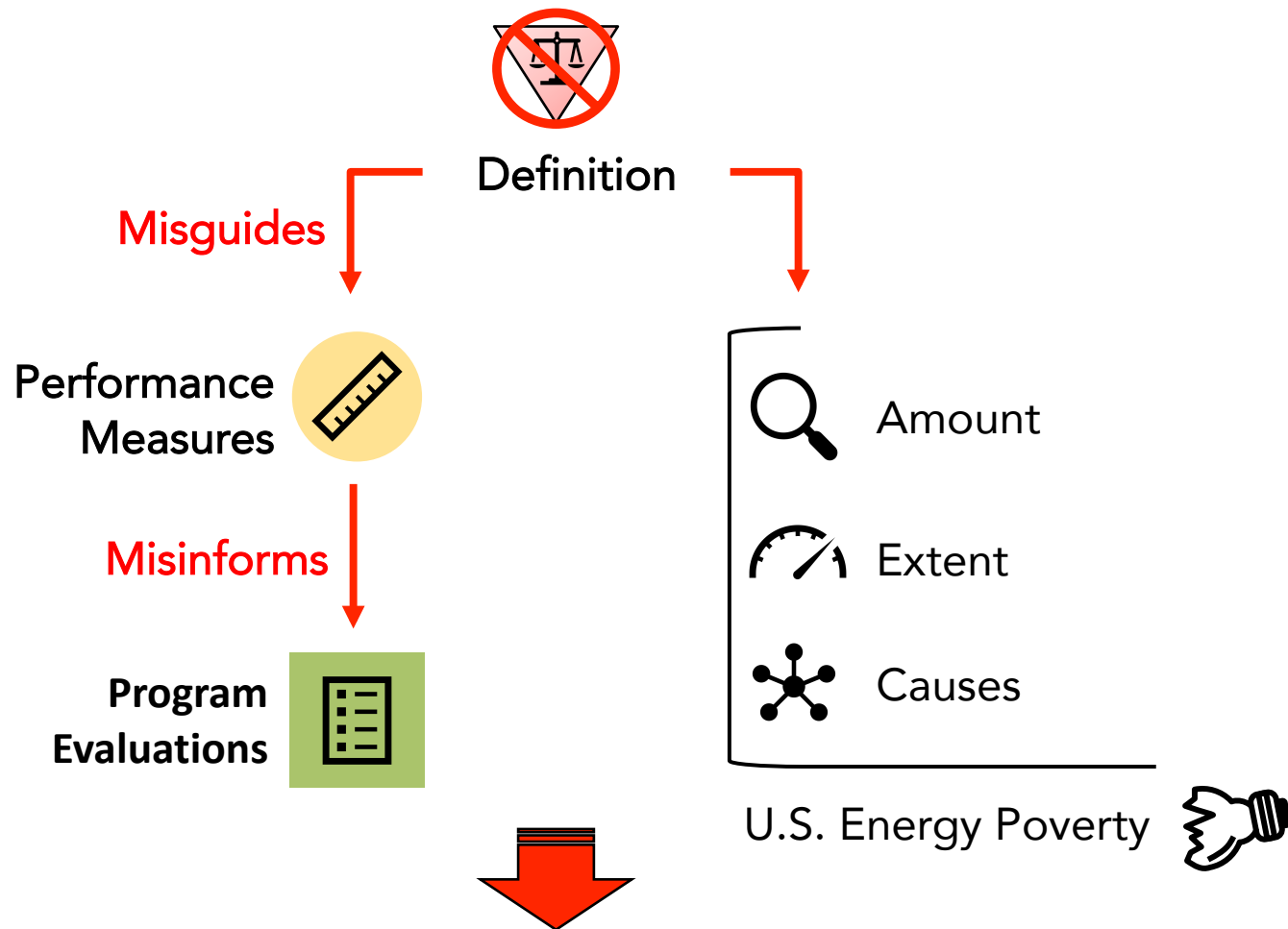
High Fuel Costs



Inefficient Homes



Argument



“doing the same thing over and over again, but expecting different results”

1973-1974 Oil Crisis





Motivation



Energy Consumption



Fuel Cost



U.S. Timeline

1973 – State of Maine Implements “Project Fuel” to weatherize homes

1975 – Energy Policy and Conservation Act

- Strategic Petroleum Reserves
- Emergency Conservation Program (ECP) – **Weatherization Focus**

1977 – Department of Energy (DOE) Created

1979 – DOE’s Weatherization Assistance Program (WAP) replaces ECP

1980 – Low-Income Home Energy Assistance Act (LIHEAP)

"to assist low income households, particularly those with the lowest income, that pay a high proportion of household income for home energy, primarily in meeting their immediate home energy needs."

U.K. Example

1997 – Warm Homes and Energy Conservation Act requires Secretary of state to publish and implement a **strategy** for reducing fuel poverty and sets **targets** for **implementation**



Fuel Poverty: a Framework for Future Action



Defining Program Eligibility

LIHEAP

- 150 % Federal Poverty Line

WAP

- 200% Federal Poverty Line



Current Performance Measures/Targeting

Reciprocity Targeting Index

- Assesses whether LIHEAP eligible residents have a household member who:



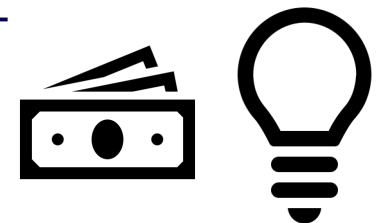
Child age ≤ 5



has a disability

Consistently not meeting goals

$$\text{Energy Burden (\%)} = \frac{\text{Expenditure on Household Energy}}{\text{Household Income}}$$





Current Performance Measures/Targeting

WAP consistently meets and **exceeds** the target range of housing units weatherized/ .year

FY 2017 Goal:

- 33,000 homes

Exceeded by 4,512 homes!





Current Program Evaluations

Program evaluations



- NO NATIONAL PROGRAM EVALUATIONS



- PY 1993
- PY 2008
- PY 2010

Assess the implementation and benefits:

- Operations
- cost-effectiveness
- non-energy benefits of WAP

WAP Past Requests for \$0 funding (Termination) since 1978

Regan

- FY 1982
- FY 1983
- FY 1984
- FY 1987
- FY 1988
- FY 1989

G.H.W. Bush

- FY 1990

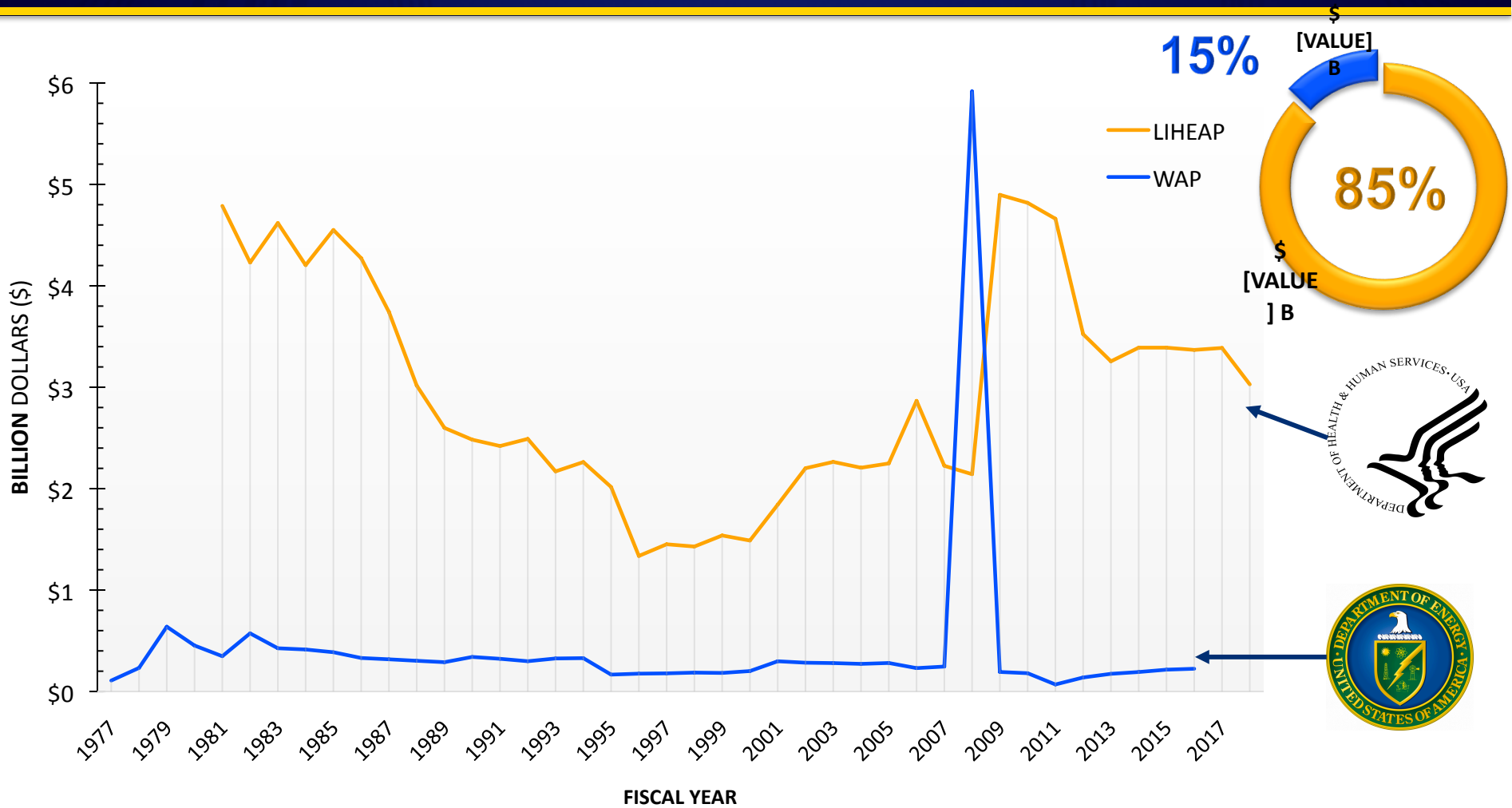
G.W. Bush

- FY 2009

Trump

- FY 2018
- FY 2019

Historical Account of Federal Funding



Weatherization Assistance Program (WAP)

7 million weatherized since 1976

Yet, **40 million** households remain income-eligible for energy efficiency assistance

*Increasing energy efficiency for
ALL
low-income households. . .*



*Would reduce **energy burdens** by
35%*

Energy Vulnerability

- “Energy vulnerability is a term that for us better captures the **variability of circumstances** and processes through which problems of **access** to sufficient and **affordable** energy are manifested, and one that has the potential to work across many different national and regional settings” (Day and Walker, 2013)



- Cooking
- Internet
- Lighting
- Appliances
 - etc.



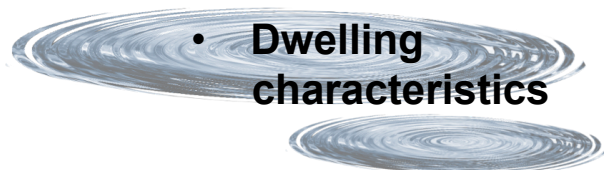
Technical



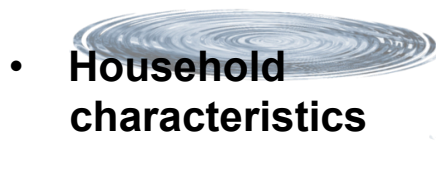
Socioeconomic



Environment/Policy



- Dwelling characteristics
- Energy infrastructure performance



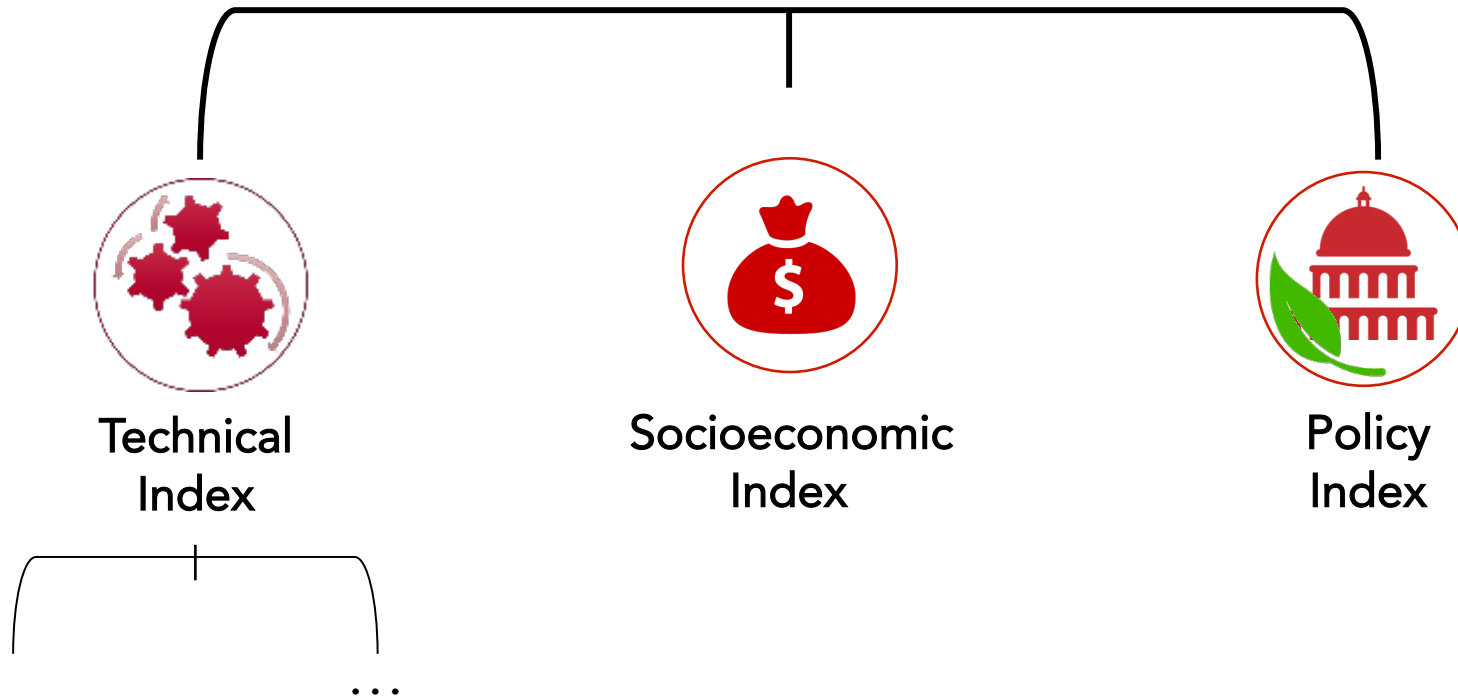
- Household characteristics
- Energy Consumption



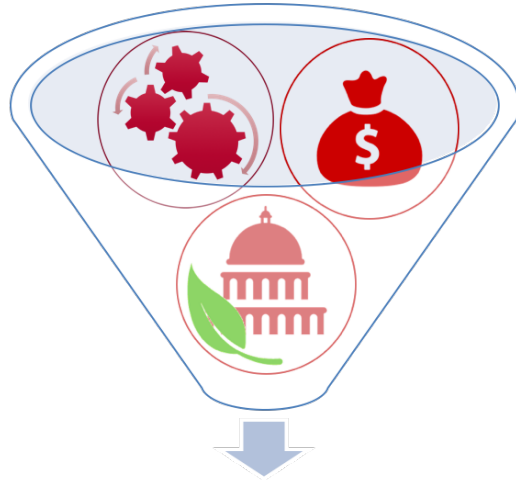
- Energy assistance services
- Household weatherization
- Clean energy alternatives

Energy Vulnerability Framework

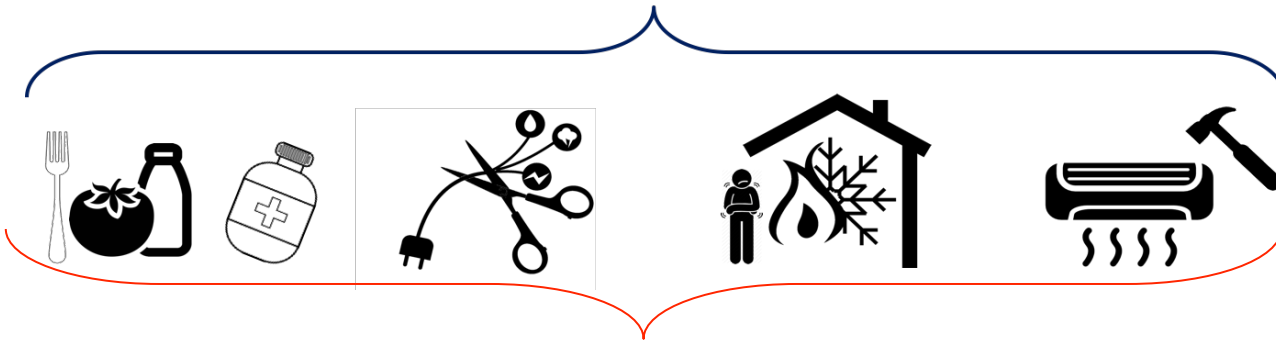
Energy Vulnerability Index



Residential Energy Vulnerability



Residential Energy Security



Risks



Probability and
Magnitude of
Consequence



Threat



Exploit Vulnerability
Damage/destroy
an asset

Harm



Assets



- House
- Well-being
- Health
- Family
- Finances





Saves the **DAE!**

Principle



- **A**ccess



- **A**dequate



- **A**ffordable

Process




- **D**efine → Target



- **A**ssess → Extent



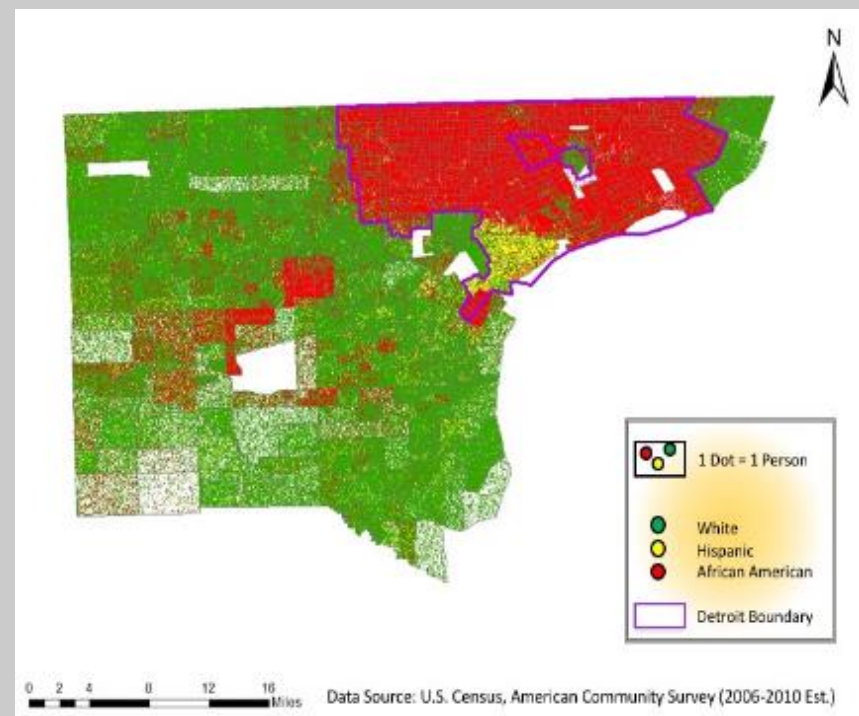
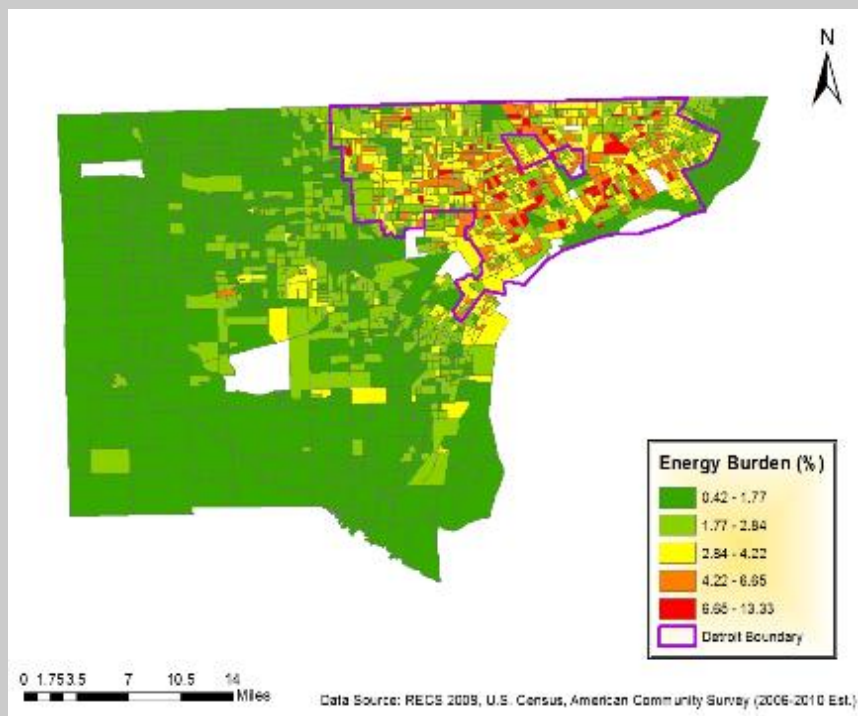
- **E**valuate → Effective



Vulnerability is the
birthplace of innovation,
creativity and change.

Brené Brown

“ quote fancy



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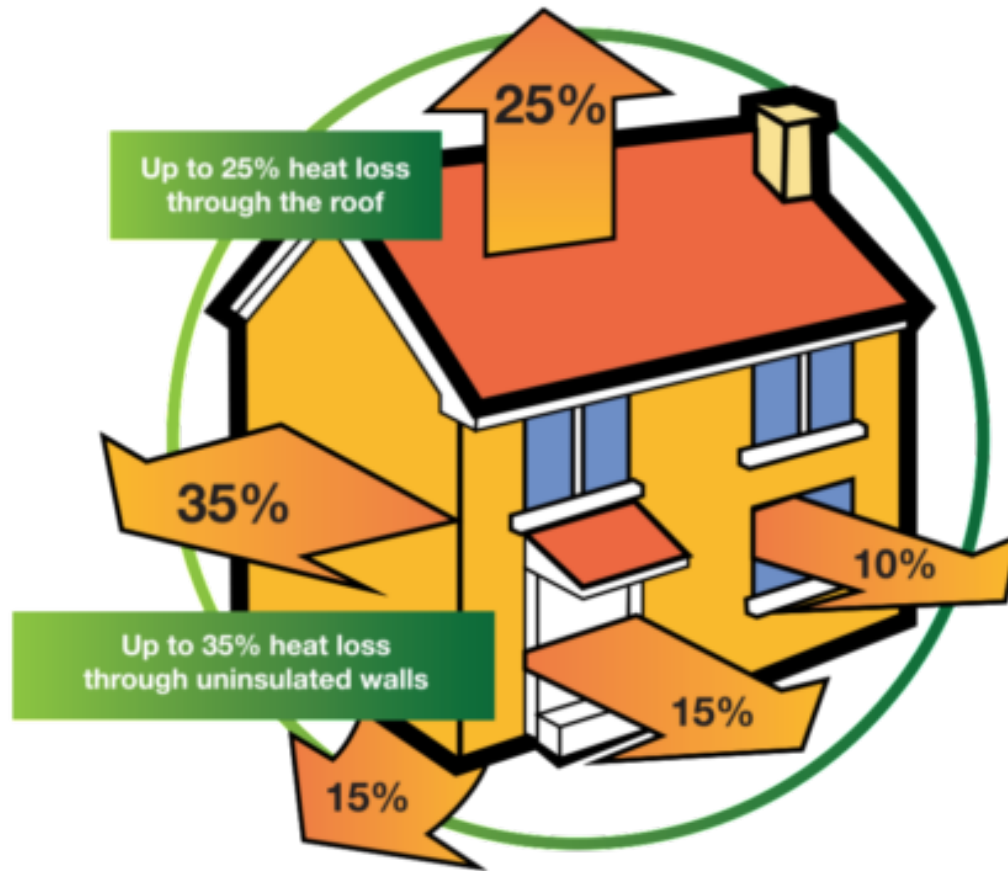
Poorest, non-home owning Blacks and Hispanics live in the most energy inefficient homes

(Bednar et al., 2017)

Energy Insecurity Defined

- Expand Hernandez's (2013, 2015, 2016) definition and define ***Energy Insecurity***

*a **state** where households are challenged by everyday situations in **meeting basic energy needs** because of an **assemblage of technical, socio-economic, and environmental-political factors.***



Owner-occupied homes in the U.S.

~ **2/3** built before 1980

40% built before 1970

17% built after 2000

2% built after 2010

Energy Vulnerability Index							
Sub-Index	Factor	Dimension	Sub-Dimension (Increasing)	Hypothesized Vulnerability Influence (↑ - Increasing)	Data Source (Year)	Scale/Spatial Level	
<u>Technical</u>	Energy Efficiency	Heating EUI	Increasing % Heating Energy Use Intensity (EUI)	↑	RECS (2015)	Household	
		Dwelling Characteristics	Increasing Age of Structure	↓	RECS (2015)	Household	
		Type of Residence	Single Family; Mobile home; Multifamily	↑↓	RECS (2015)	Household	
		Size	# of Rooms	↑↓	RECS (2015)	Household	
			Walls or windows drafty?	↑	RECS (2015)	Household	
		Energy Infrastructure	Equipped w/ Heating equipment	↓	RECS (2015)	Household	
		Heating Fuel Type	Electricity; Natural Gas; LPG;...	↓	RECS (2015)	Household	
			Equipped w/ Air conditioning unit	↓	RECS (2015)	Household	
			Household appliances	↑	RECS (2015)	Household	
		Energy Consumption	Total electricity consumption	↑↓	RECS (2015)	Household	
		Total natural gas consumption	↑↓	RECS (2015)	Household		
<u>Socioeconomic</u>	Affordability	% Energy Burden		↑	RECS (2015)/ACS (2016)	Household/Census Tract	
		Cost of living					
			Electricity Cost	\$/kWh	↑	EIA (2018)	State
			Natural Gas Costs	\$/kWh	↑	EIA (2018)	State
		Household Characteristics	Tenure Status (Rent/Own)		↑	RECS (2015)/ACS (2016)	Household/Census Tract
			Household income	↓	RECS (2015)/ACS (2016)	Household/Census Tract	
			Employment status	↑	RECS (2015)/ACS (2016)	Household/Census Tract	
			Increase # of household members	↓	RECS (2015)/ACS (2016)	Household/Census Tract	
			Increase # of minors in household	↑	RECS (2015)/ACS (2016)	Household/Census Tract	
			# of household members >60	↑	RECS (2015)/ACS (2016)	Household/Census Tract	
			Increase Education Level (Head of Household)	↓	RECS (2015)/ACS (2016)	Household/Census Tract	
			Monthly Household Rent	↑	RECS (2015)/ACS (2016)	Household/Census Tract	
			Race/ethnicity	↑↓	RECS (2015)/ACS (2016)	Household/Census Tract	
			% Persons with disabilities	↑	RECS (2015)/ACS (2016)	Household/Census Tract	
			% Female head of household	↑	RECS (2015)/ACS (2016)	Household/Census Tract	
			Area of residence	% Urban	↑	RECS (2015)/ACS (2016)	Household/Census Tract
			Energy Insecurity indicators	Report any Household Energy Insecurity		↑	RECS (2015)
	Receive disconnect notice			↑	RECS (2015)	Household	
	Keep home at unhealthy or unsafe temperatures			↑	RECS (2015)	Household	
	Reduce or forgo necessities to pay energy bill			↑	RECS (2015)	Household	
<u>Environmental - Political</u>	Flexibility	Utility Retail Choice/ Customer Choice Availability	Number of utility service providers to choose from	↓	Survey	Household/Census Tract	
	Practices	Energy Assistance Services	Knowledge of supporting energy assistance programs	↓	Survey	Household	
			Live w/in Energy Community Action Agency Jurisdiction	↑↓	RECS (2015)/ACS (2016)	Household/Census Tract	
			Distance from Energy Community Action Agency	↑	RECS (2015)/ACS (2016)	Household/Census Tract	
			Availability of LIHEAP funds	↓	US HHS	Household	
			Availability of WAP funds	↓	US DOE	Household	
		Energy Efficiency Scorecard	ACEEE Score	↓	ACEEE, State/City Efficiency Scorecard	State/City	
		Local Political Leadership	Supports Energy assistance	↓	ACEEE, State/City Efficiency Scorecard	State/City	
			Supports Energy retrofits	↓	ACEEE, State/City Efficiency Score Card	State/City	
		State Political Leadership	Date based shut off policy	↑	State Public Utility Commission	State	
			Temperature based shut off policy	↑	State Public Utility Commission	State	
		Federal Political Leadership			↓		

Do spatial disparities exist in residential energy consumption and efficiency by race, income and owner status?

March 2017

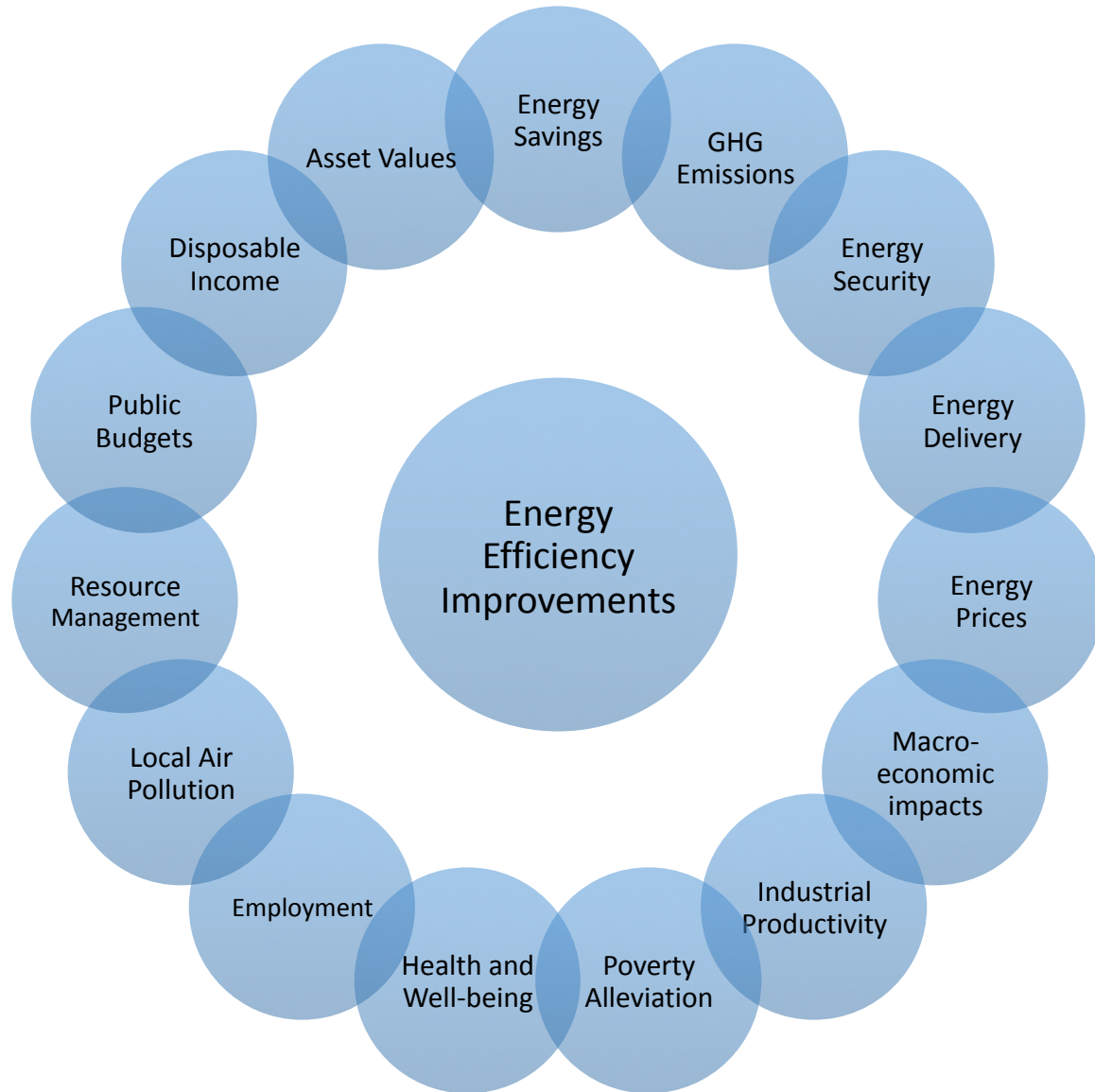


LIGHTS OUT IN THE COLD

Reforming Utility Shut-Off Policies as If Human Rights Matter

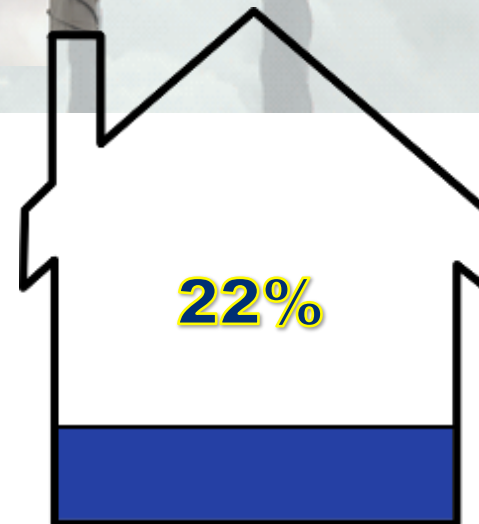
Environmental and Climate Justice Program, NAACP

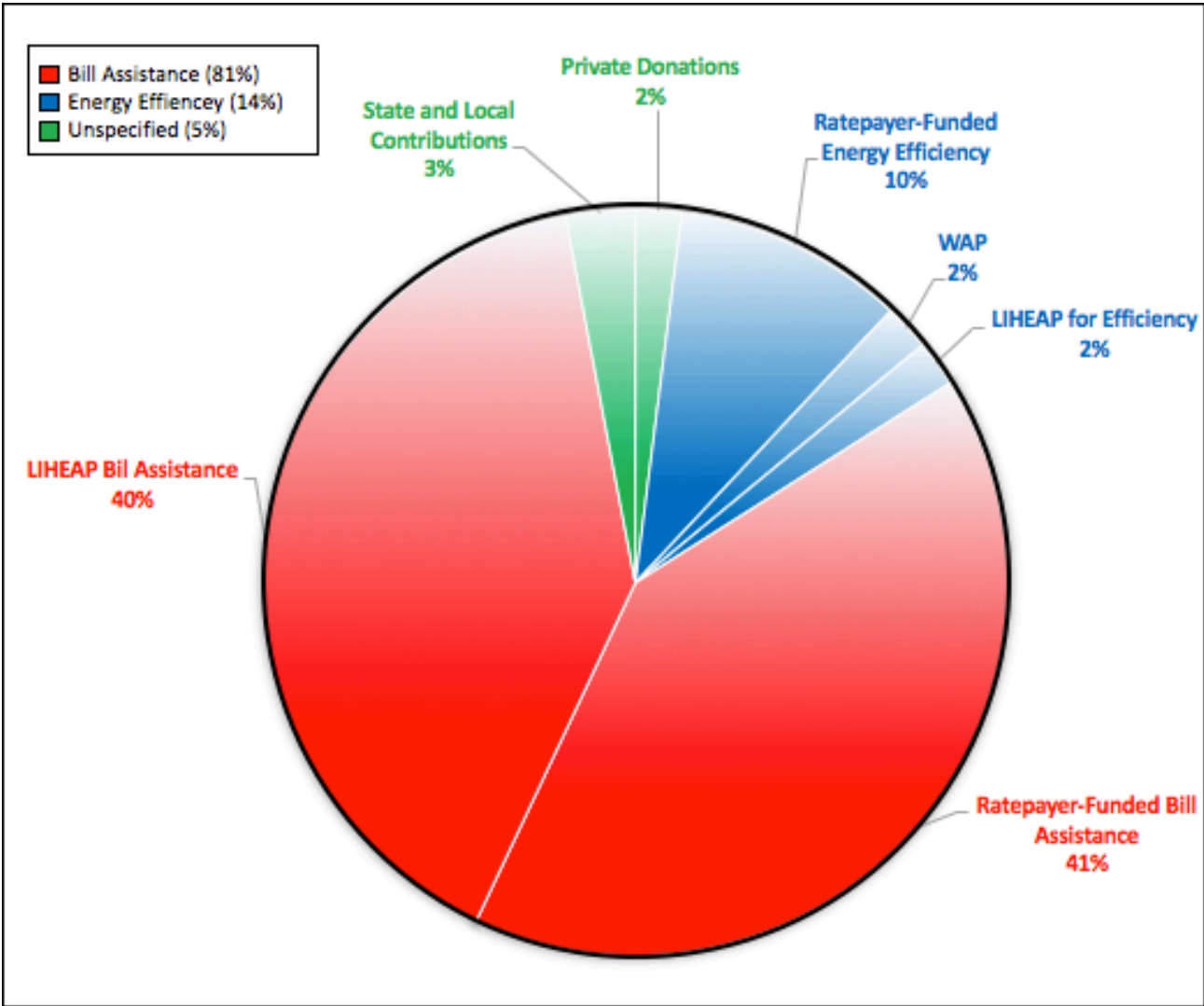
Multiple Benefits of Energy Efficiency



44.6% of United States' CO₂ emissions are from buildings!

**Residential Sector
CO₂ Emissions & Total
Energy Consumption:**





(Cluett, Amann, and Ou, 2016)

Fuel Poverty

A household is considered fuel poor when it does not have adequate financial resources to meet winter home-heating costs because the dwelling's heating system and insulation levels prove to be inadequate for achieving affordable household warmth. (Boardman, 1991)