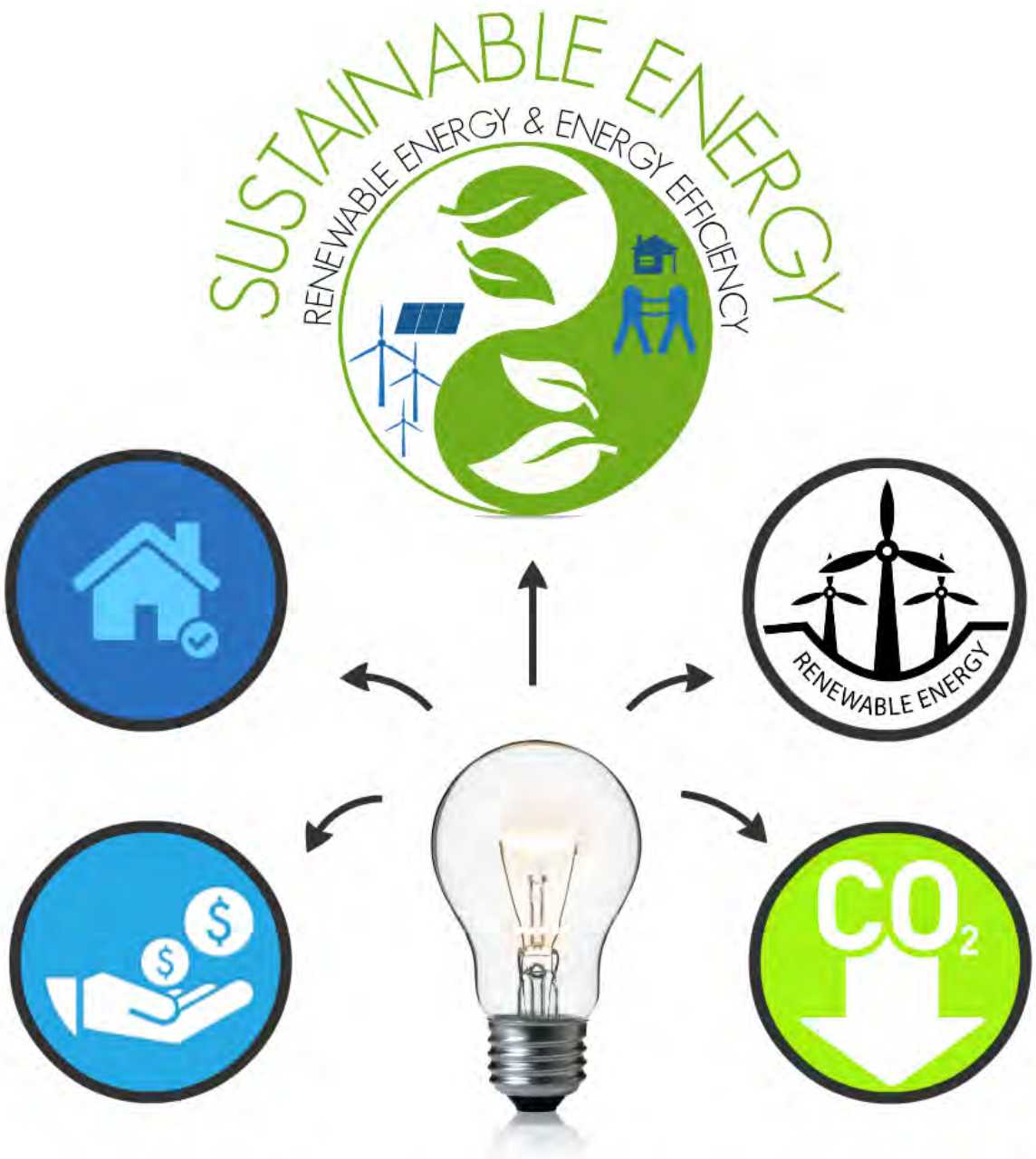
Prosperity Through Renewable Energy and Energy Efficiency

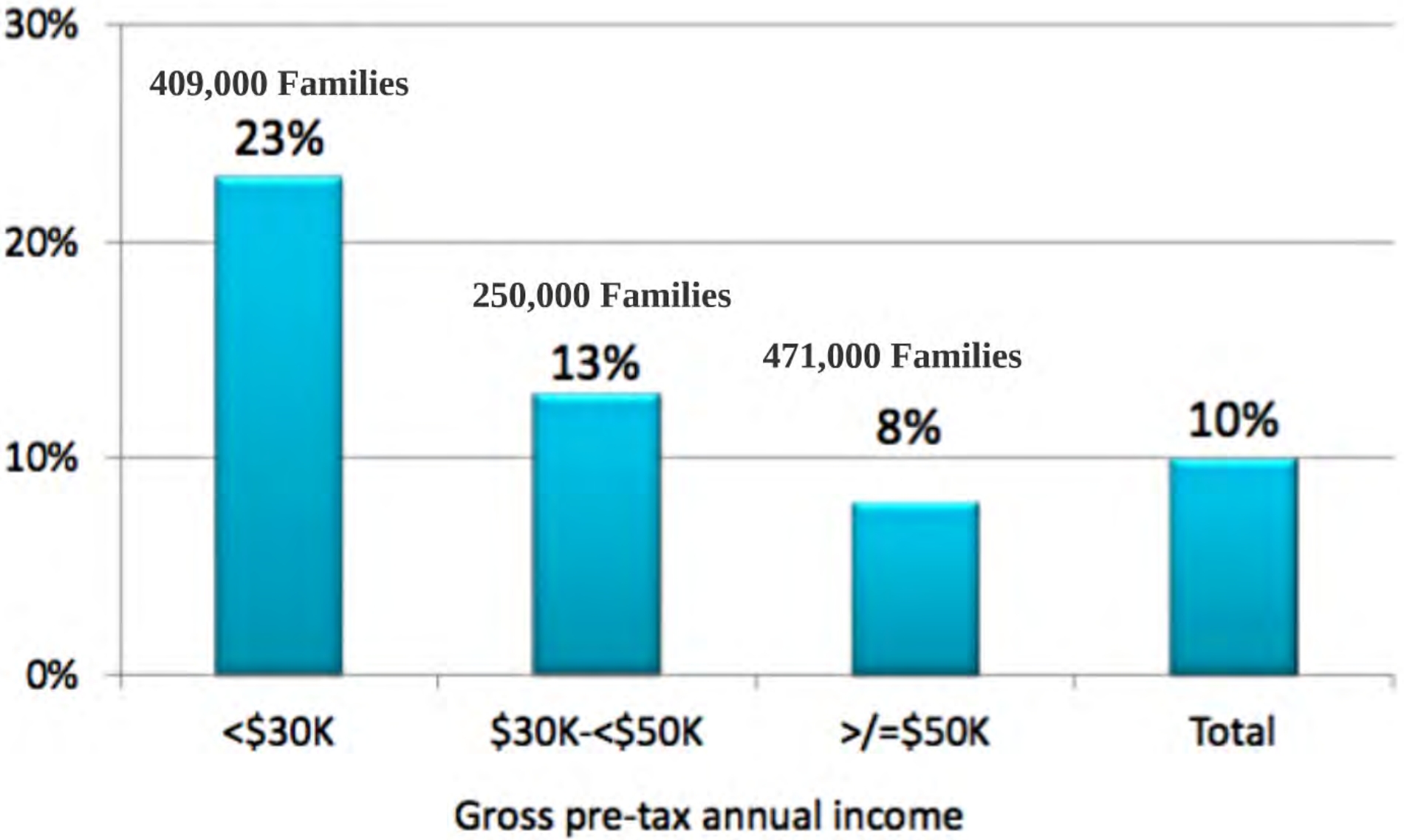
Dustin Chudy, Arkansas State University, Jonesboro



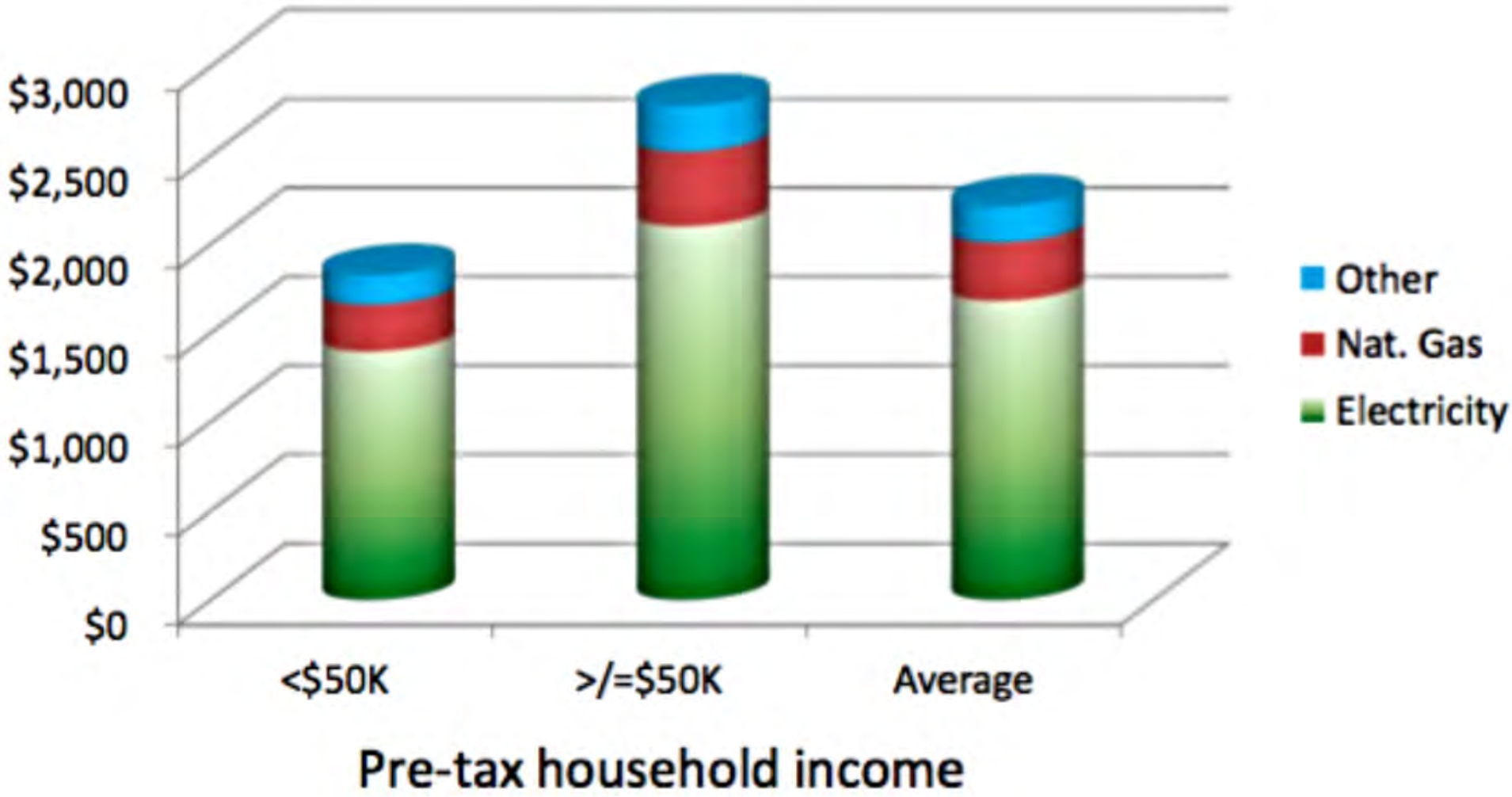
Prosperity Through Renewable Energy and Energy Efficiency

Dustin Chudy, Arkansas State University, Jonesboro

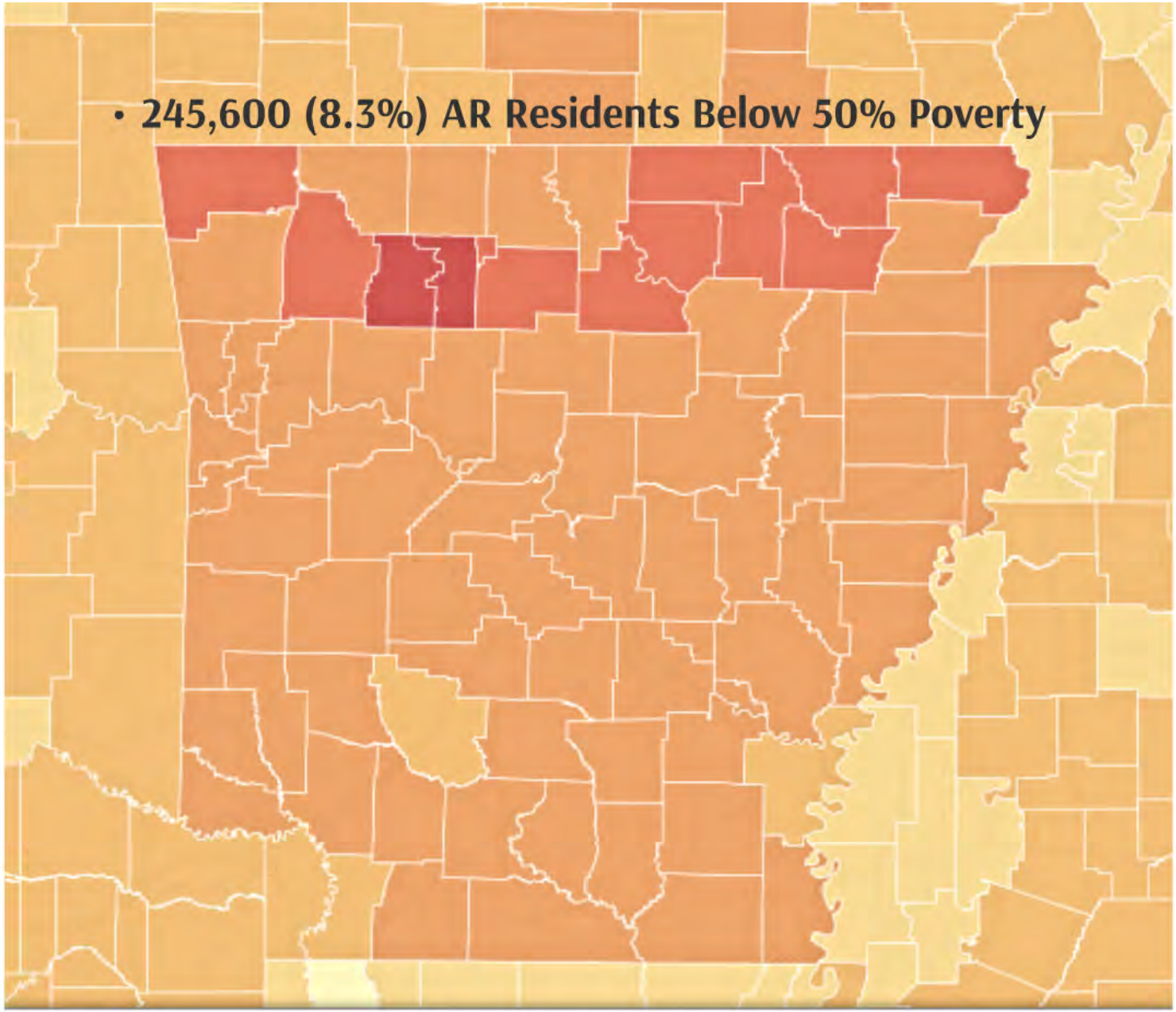
Arkansas household energy costs as percentage of after-tax income



Estimated 2015 Arkansas residential energy expenditures by pre-tax household income



Sources: U.S. DOE/EIA; U.S. Bureau of the Census.

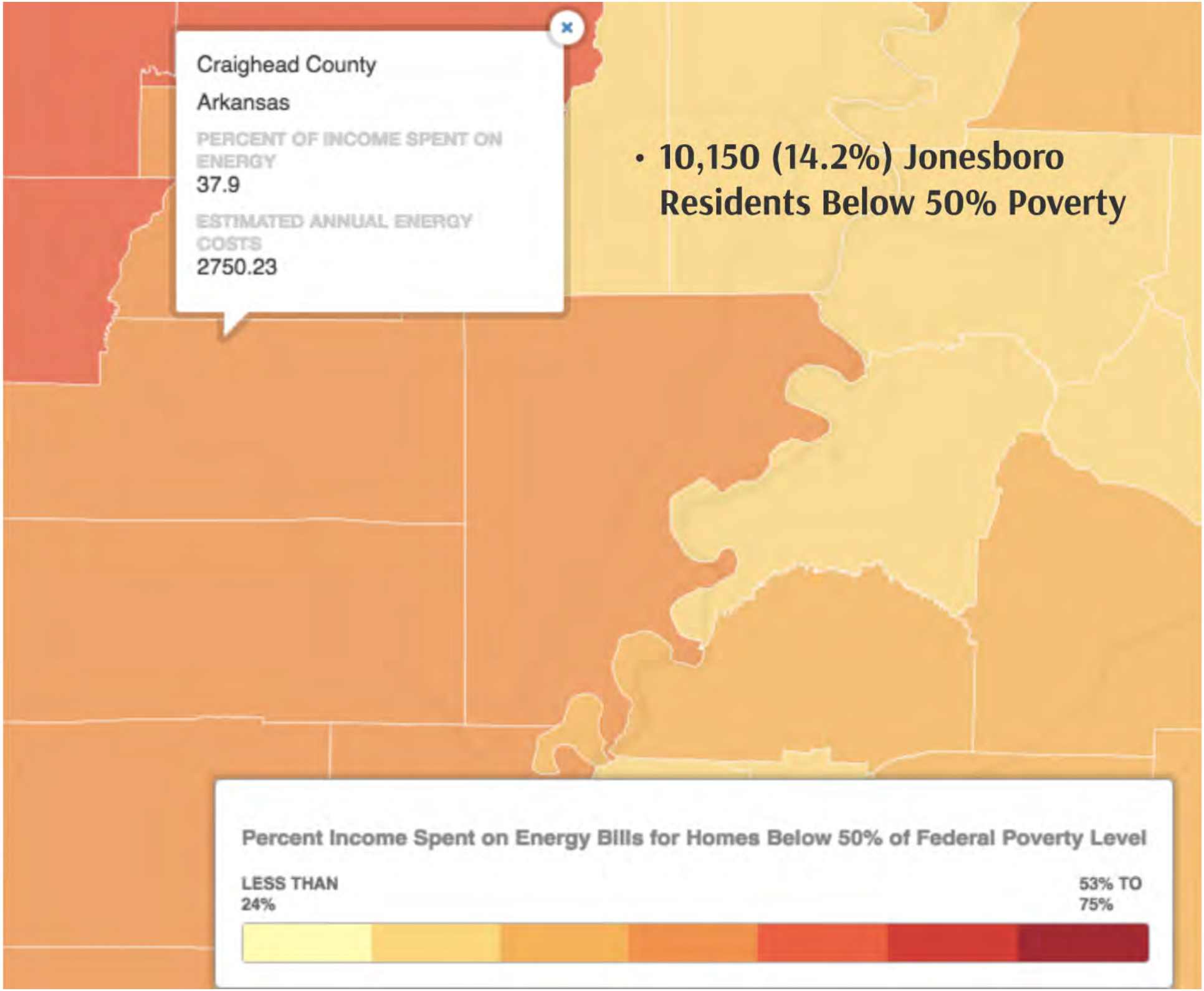


Source: theatlantic.com/energy-poverty-low-income-households

Percent Income Spent on Energy Bills for Homes Below 50% of Federal Poverty Level

LESS THAN 24%

53% TO 75%


Craighead County
Arkansas
PERCENT OF INCOME SPENT ON ENERGY
37.9
ESTIMATED ANNUAL ENERGY COSTS
2750.23
• 10,150 (14.2%) Jonesboro Residents Below 50% Poverty
Percent Income Spent on Energy Bills for Homes Below 50% of Federal Poverty Level
LESS THAN 24%
53% TO 75%

USAID
FROM THE AMERICAN PEOPLE

Low Income Home Energy Assistance Program – LIHEAP

- LIHEAP benefits have three components
  - Cash benefits are paid to provider of heating fuel
  - Crisis benefits are made to resolve heating emergency such as shut-off or being out of fuel
  - Weatherization help with repairs, insulating and weatherizing homes to reduce energy consumption
- LIHEAP funding
  - Federal block grants to states
  - State funds
  - Private donations

4 in 5
LIHEAP-eligible households
don't receive any assistance.

Tell Congress to increase funding.

Source: theatlantic.com/energy-poverty-low-income-households

HOME ENERGY SAVER™

START | DESCRIBE | COMPARE | UPGRADE | COMMUNITY

Save money, live better, help the earth!

Over 9 million visits!

Case Studies

- Everything You Wanted To Know About Solar Pool Heating
- Efficient Usage of Electricity..
- Is building a new home energy efficient?
- Your House is a System
- Living Off The Sun, Or, No Electricity Bill
- Kermit was Right! It's not easy being green...
- Case Study: Low-Pain Gain in California
- Case Study: Pacifica Coastal Cottage
- Case Study: Experiences in an All-LED Home

Energy Blogs

- Aging in Place in Energy Efficient Homes
- Fall & Winter Energy-Saving Tips
- Everything you need to know about water heaters
- How Energy-Efficient Light Bulbs Compare with Incandescents
- Home Energy Audits
- Tips for Making Your Home Safer While Saving Energy
- Making the Most Out of the End of Summer
- Which water heater is right for you?
- The Simple Dollar's Guide to Going Solar

Videos

- Energy Savings Project: Insulating Your Water Heater Tank
- Energy Savings Project: Insulating Your Hot Water Pipes
- Energy Savings Project: Lowering Your Water Heater Temperature
- Efficient Electronics: Home Office
- Living Efficiently: Kids

More resources for: Teachers... Energized Learning • Professionals... HESpro • Help implementing our recommendations... ENERGYSTAR.gov

Add/ Remove	Upgrade	Upgrade Choice & Description	Yearly Savings	Estimated Added Cost	How Much is Too Much?	Simple Payback Time	Estimated Return on Investment	Avoided Emissions (lbs. CO_2)
☐	Check/Uncheck All Upgrades	**Total for Selected Upgrades:**	**$477**	**$231**	**$9,540**	**0**	**204%**	**5,248**
☑	Thermostat	ENERGY STAR-labeled programm	$339	$ 85	$6,780	0	400%	3,731
☑	Indoor lights	CFLs in high-use fixtures	$41	$ 146	$820	4	13%	1,518
☐	Cool roof	Solar reflectance = 0.50 low-slo	$5	$ 0	$100	0	10,000%	59
☐	Heat pump	SEER=14 HSPF=8.2 ENERGY STA	$340	$ 310	$6,800	1	110%	3,750
☐	Electric water heater	EF=0.95	$33	$ 90	$660	3	36%	366
☐	Clothes washer	MEF=1.42 WF=9.5 ENERGY STAF	$30	$ 90	$600	3	32%	172
☐	Duct Sealing	Reduce leakage to 6% of total air	$119	$ 890	$2,380	7	10%	1,311
☐	Central air conditioner	SEER=14 ENERGY STAR	$22	$ 218	$440	10	5%	247
☐	Air sealing	25% air leakage reduction	$75	$ 850	$1,500	11	8%	822
☐	Windows	2-pane/solar-control low-E/argo	$37	$ 450	$740	12	7%	411
☐	Attic insulation	R-38	$96	$ 1330	$1,920	14	6%	1,057
☐	Dishwasher	EF=0.58 ENERGY STAR	$10	$ 300	$200	30	NCE	88
☐	Duct Insulation	R-6	$23	$ 910	$460	40	NCE	249
☐	Refrigerator	15% better than standard ENERG	$6	$ 244	$120	41	NCE	71
☐	Slab insulation	R-5 slab edge	$27	$ 1459	$540	54	NCE	294
☐	Ceiling fan	ENERGY STAR-labeled	$0	$ 30	$0	9,999	NCE	0
☐	Well pump	60% combined pump and motor	$0	$ 190	$0	9,999	NCE	0

HOME ENERGY SAVER™

START | DESCRIBE | COMPARE | UPGRADE | COMMUNITY

SUMMARY | DETAILS | CARBON MAP

Print: This page | Report

Building ID: 4704 Summit Ridge Dr.
Location: Jonesboro, Arkansas
Zip Code: 72404
Session: 4702334

Potential Yearly Savings

Money:	$477
Electricity	5,236 kWh
Emissions:	5,248 lb. CO_2

This reduction in greenhouse-gas emissions is like taking 0.5 car(s) off the road.

Will I make a difference?

Existing Home Configuration

YEARLY ENERGY COSTS

Providing more details will make your results more accurate.

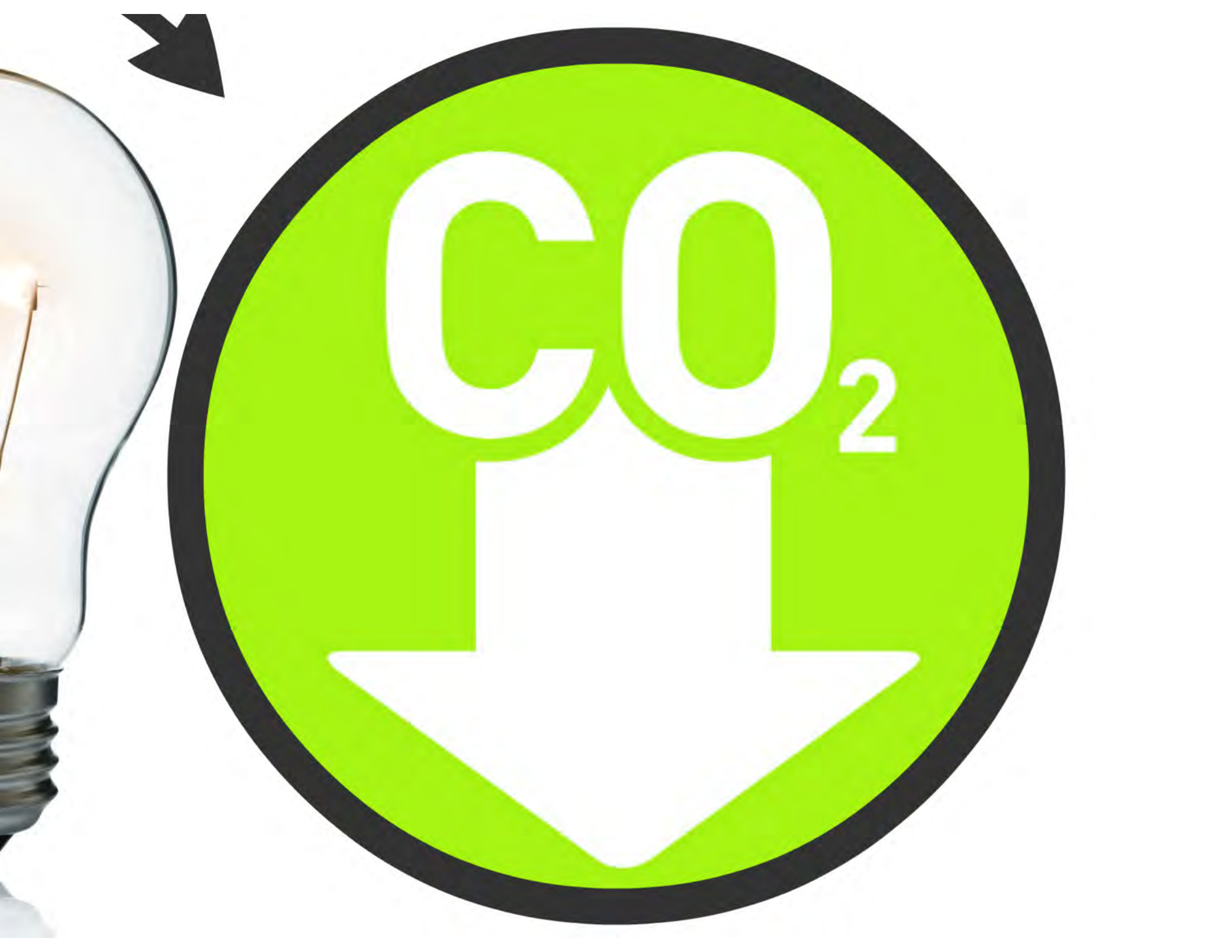
Existing Home $1,612

With Upgrades $1,135

	Total	Heating	Cooling	Hot Water	Large Appliances	Small Appliances	Lighting
Existing Home	$1,612	$484	$297	$191	$243	$218	$179
With Upgrades	$1,135	$330	$112	$191	$243	$218	$41
Savings	**$477**	**$154**	**$185**	**$0**	**$0**	**$0**	**$138**

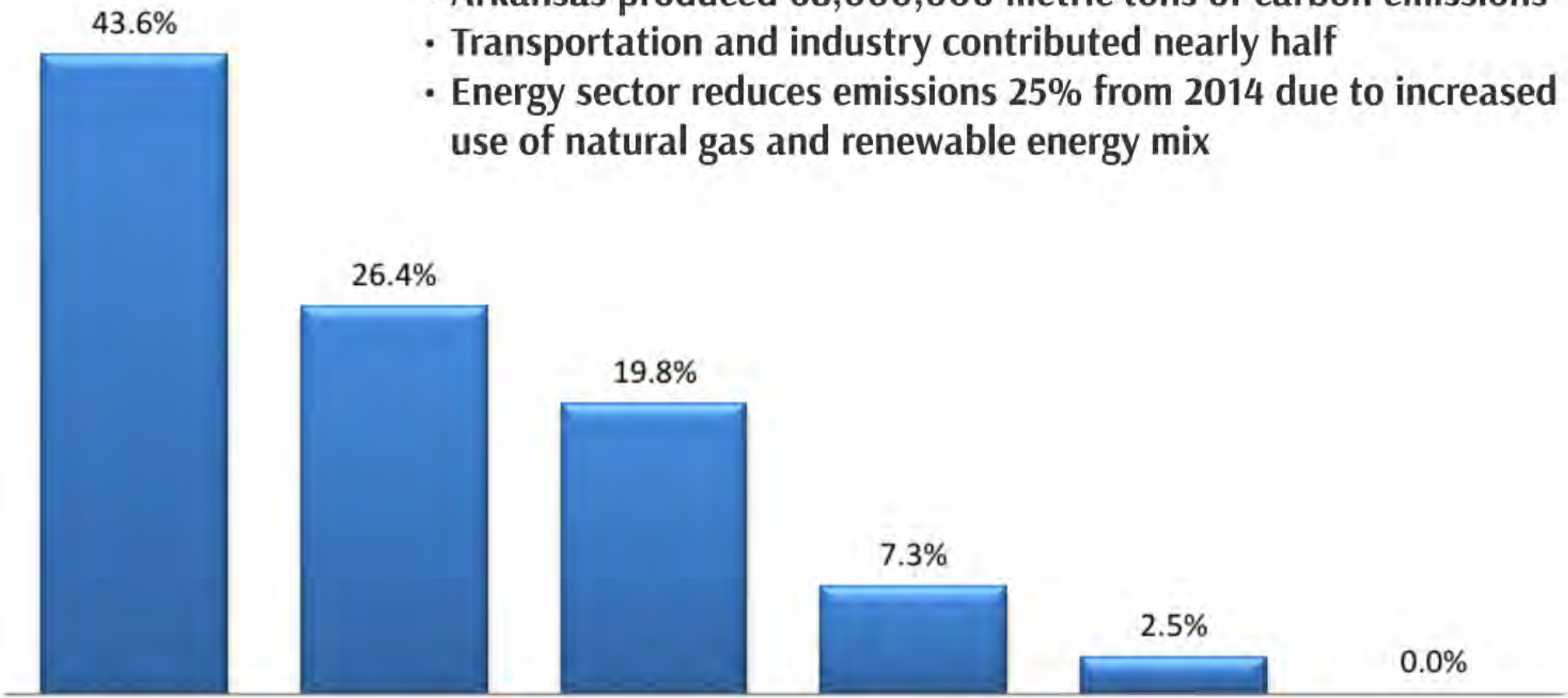
Important Note: These are initial estimates only, and results may vary. If the owner has not already done so, we strongly recommend that they retain a professional energy auditor to develop a detailed work scope and budget for improving the home. We also recommend the Home Performance with ENERGY STAR program when considering home improvements.

Comparing Results to Home's Utility Bill


CO2

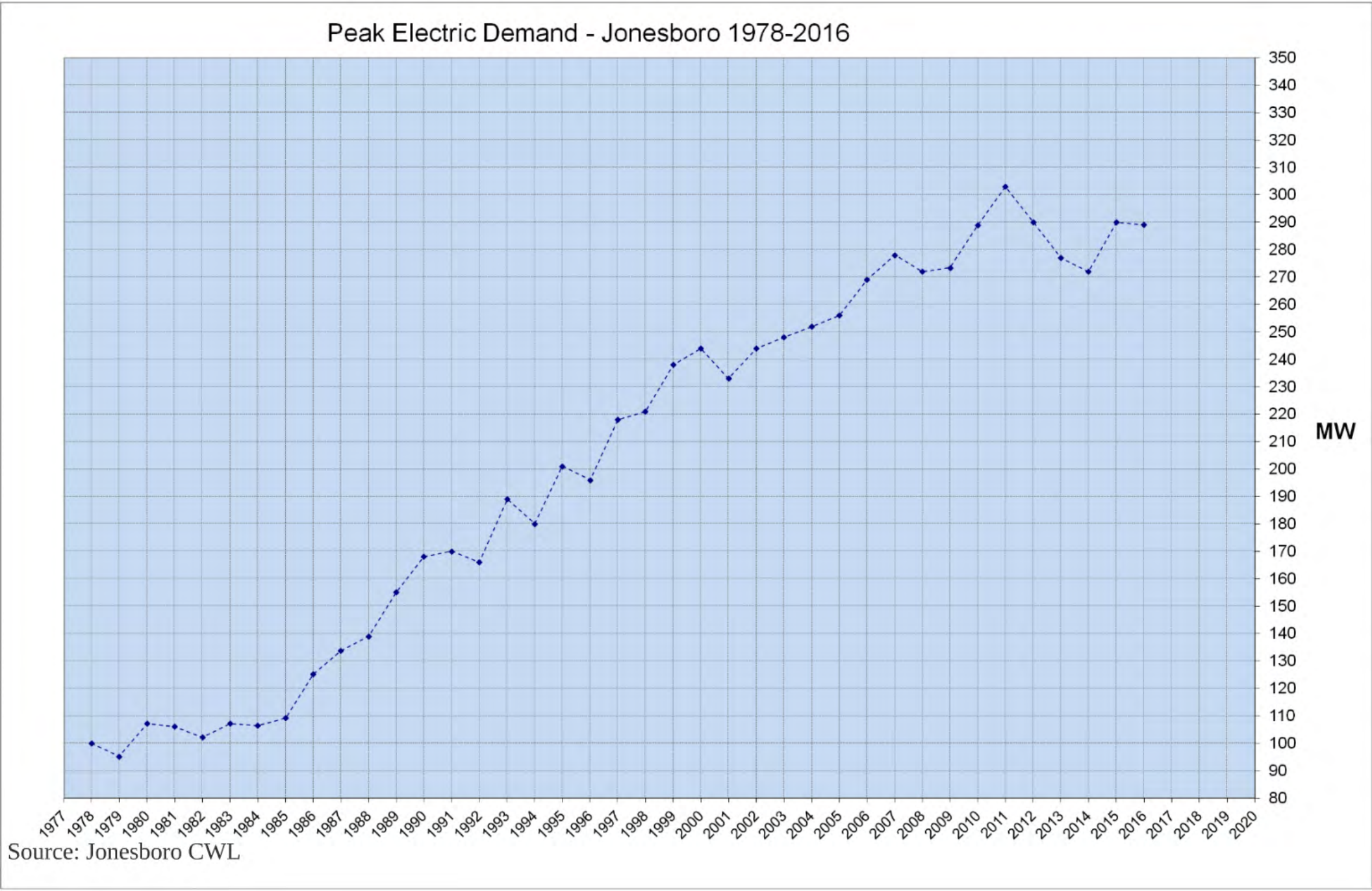
Arkansas Electricity Generation (2013)

- Arkansas produced 68,000,000 metric tons of carbon emissions
- Transportation and industry contributed nearly half
- Energy sector reduces emissions 25% from 2014 due to increased use of natural gas and renewable energy mix

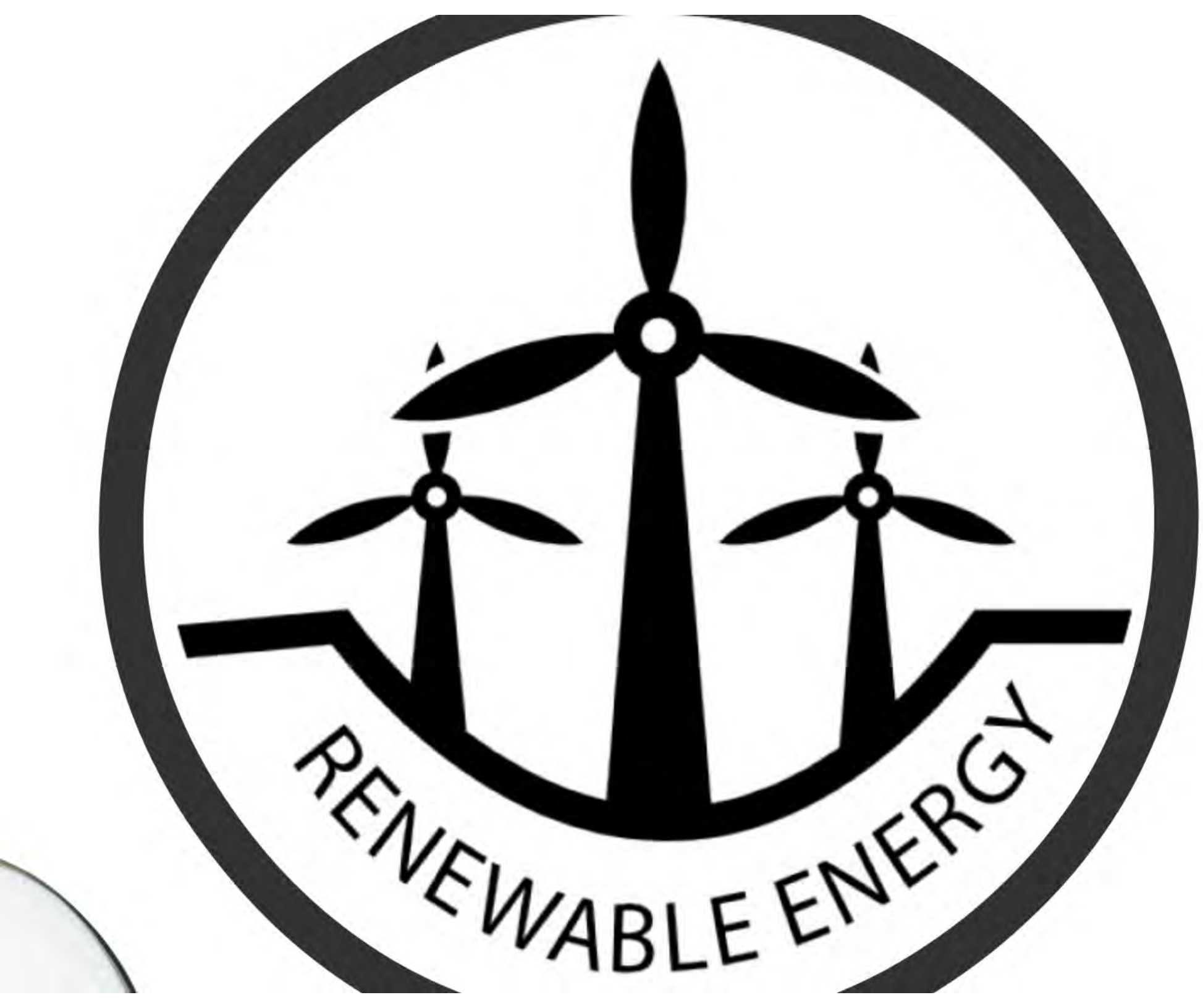


Source: instituteforenergyresearch.org

* Totals may not add to to 100 percent due to rounding and the exclsuion of very minor sources.

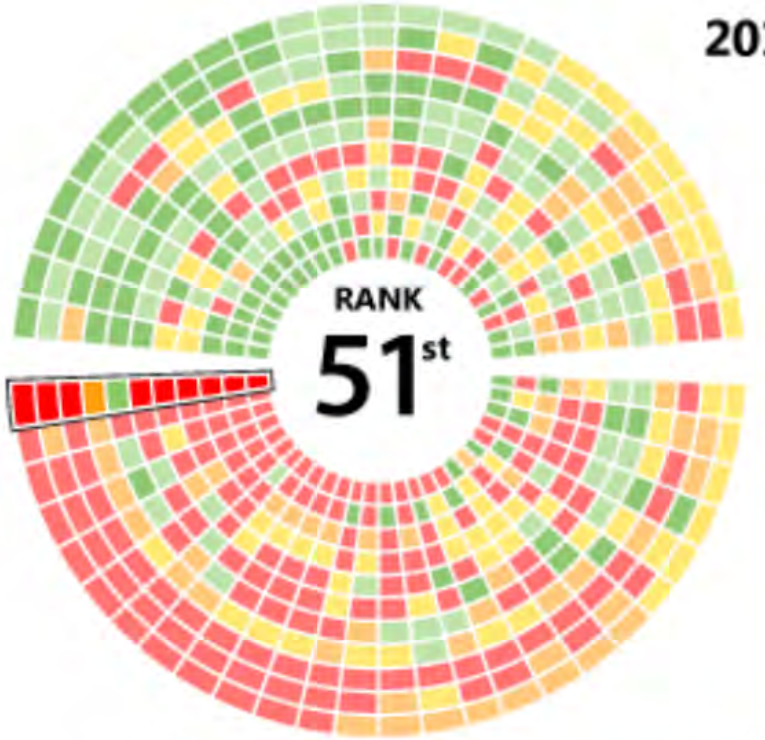


Source: Jonesboro CWL


RENEWABLE ENERGY

Arkansas

2016 SOLAR REPORT CARD



Overall Grade: F

Policy

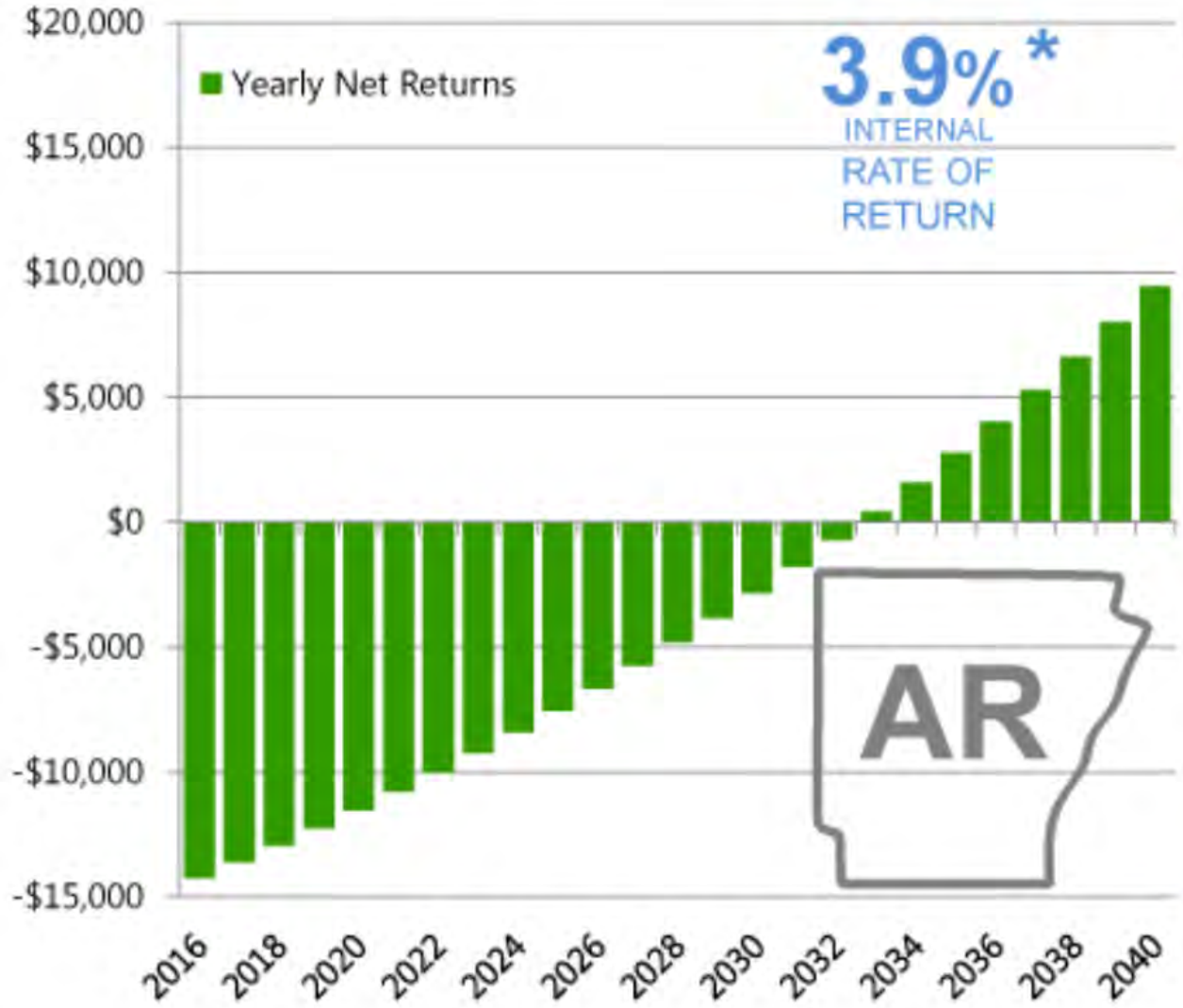
F	RPS Law
F	Solar Carve-Out
D	Electricity Cost
B	Net Metering
F	Interconnection

Incentives

F	Tax Credits
F	Rebates
F	Performance Payments
F	Property Tax Exemption
F	Sales Tax Exemption

5-kW Solar Payback Time: 18 Years

Investment Return (IRR): 3.9%



3.9% * INTERNAL RATE OF RETURN

Upfront Cost **$21,250**

Awesome Incentives **$6,999**

First Year Cost **$14,251**

$9,430 profit from 2028-2039
$12,480 increased home value
$52 monthly bill savings
113 happy trees

www.SolarPowerRocks.com

* figure does not include increased home value

ARKANSAS WIND, SOLAR PROJECTS IN THE ENERGY MIX

- 16.3 MW solar installed in AR in 2015, 640% increase over 2014
- 460 kW residential, 244 kW commercial, 15.5 MW utility-scale solar installed in 2015
- 20.1 MW total solar installed ranks AR 40th in U.S. for installed capacity
- 12 MW solar energy facility in Camden recently came online
- 81 MW solar energy facility in Stuttgart coming online in 2018
- For the first time in Arkansas, Ozarks Electric Cooperative of Fayetteville, is allowing its members a chance to purchase shares of solar output as a low-cost alternative to roof-top panels
- L'Oreal begins 1.2 MW array at their Little Rock facility
- 500 kW array in Van Buren soon to go online
- Proposed Clean Line Energy electric transmission venture expected to deliver up to 3,500 MW of wind power
- Four companies supporting the wind industry to open major facilities in AR creating 2,500 jobs

Sources: www.SEIA.org; Arkansas Business VOL. 33, NO.39

PACE AR

★Energy Efficiency ★Water Saving ★Clean Energy

- Average installed residential and commercial PV system prices have dropped by 48% from 2010
- Many Arkansans still unable to afford out-of-pocket expenses
- PACE financing allows for energy efficiency upgrades and renewable energy installations at no up-front cost

Source: www.SEIA.org

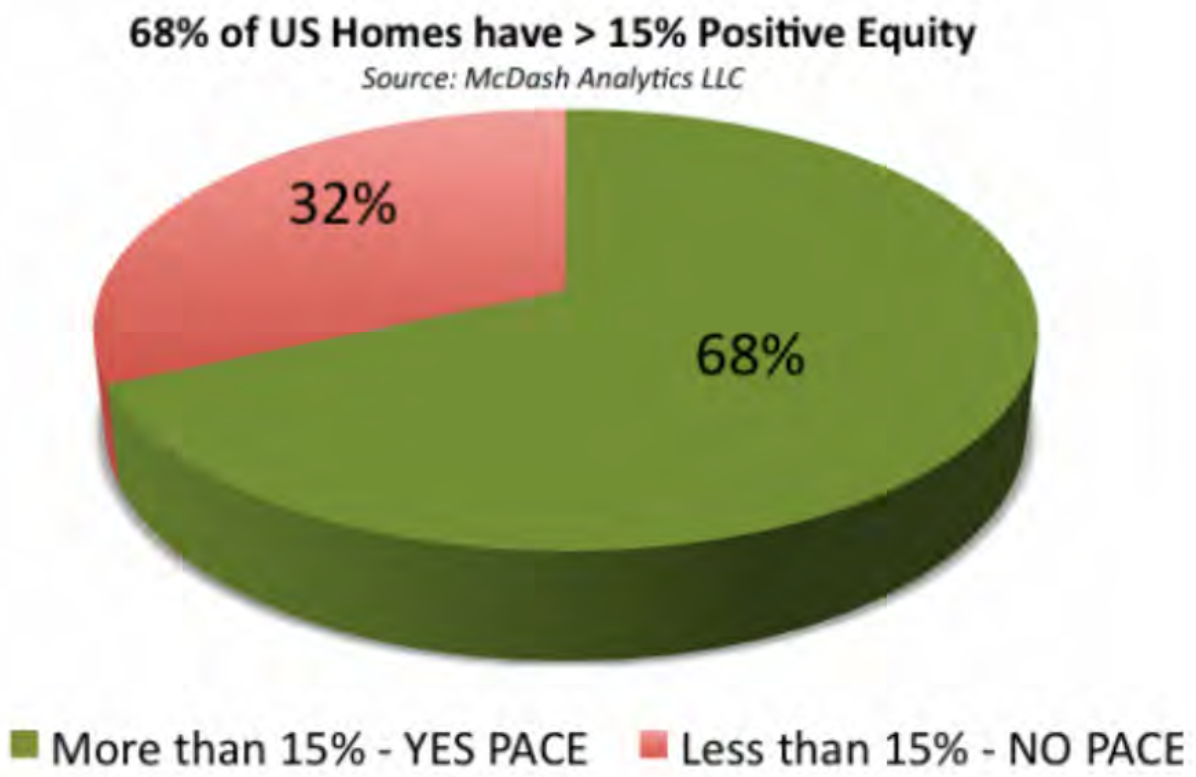
The PACE Process

1. State passes enabling legislation
2. Municipality designs local program, selects program administrator
3. Municipality raises funding &/or forms agreements with private lenders
4. Municipality markets program thru pre-qualified service providers
5. Owner develops retrofit plan and applies for special assessment
6. Work is completed; assessment payments collected on property tax bill

Source: Institute for Building Efficiency

PACE Legislation Requirements

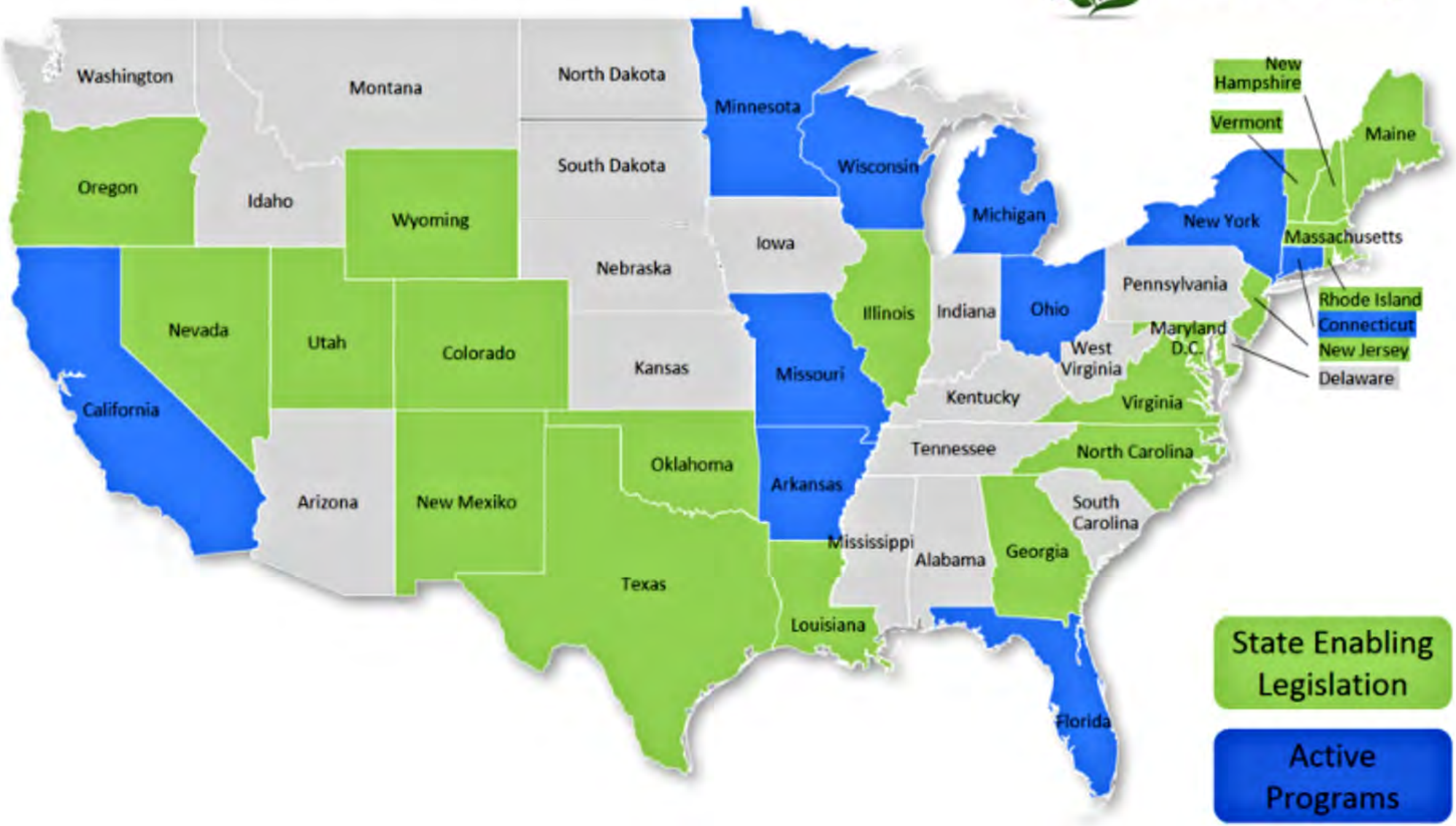
- Homeowner must have at least 15% positive equity.
- Projects capped at 10% of home value.
- Homeowner must have solid property tax payment history.
- PACE lien does not accelerate in event of default.

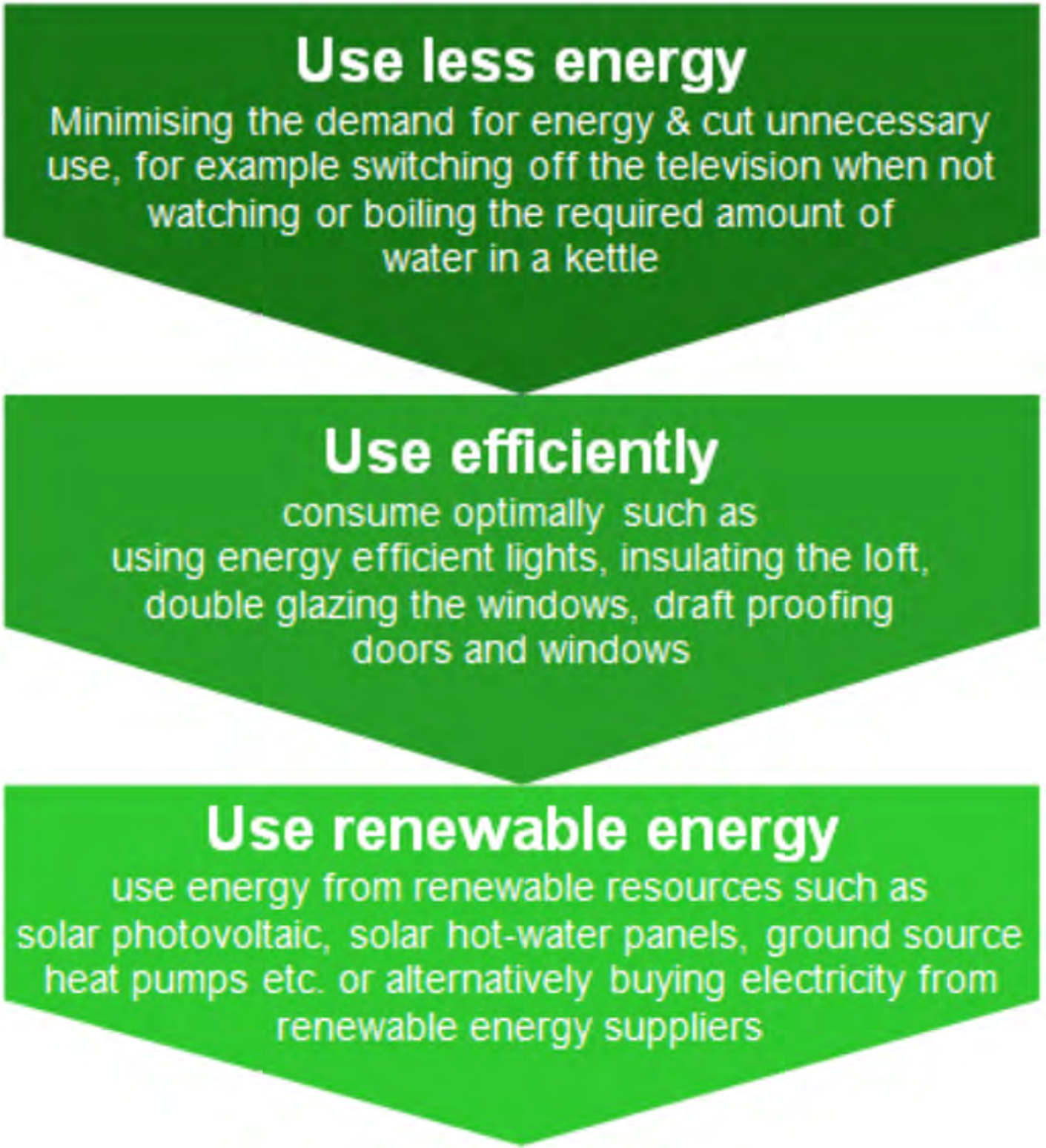


- Energy assessment must demonstrate projects pay for themselves.

Where is PACE Open for Business?

PACE Equity




Use less energy
Minimising the demand for energy & cut unnecessary use, for example switching off the television when not watching or boiling the required amount of water in a kettle
Use efficiently
consume optimally such as using energy efficient lights, insulating the loft, double glazing the windows, draft proofing doors and windows
Use renewable energy
use energy from renewable resources such as solar photovoltaic, solar hot-water panels, ground source heat pumps etc. or alternatively buying electricity from renewable energy suppliers


PEOPLE
SUSTAIN-
ABILITY
PROFIT
PLANET

Dustin Chudy, Arkansas State Univrsity, Jonesboro