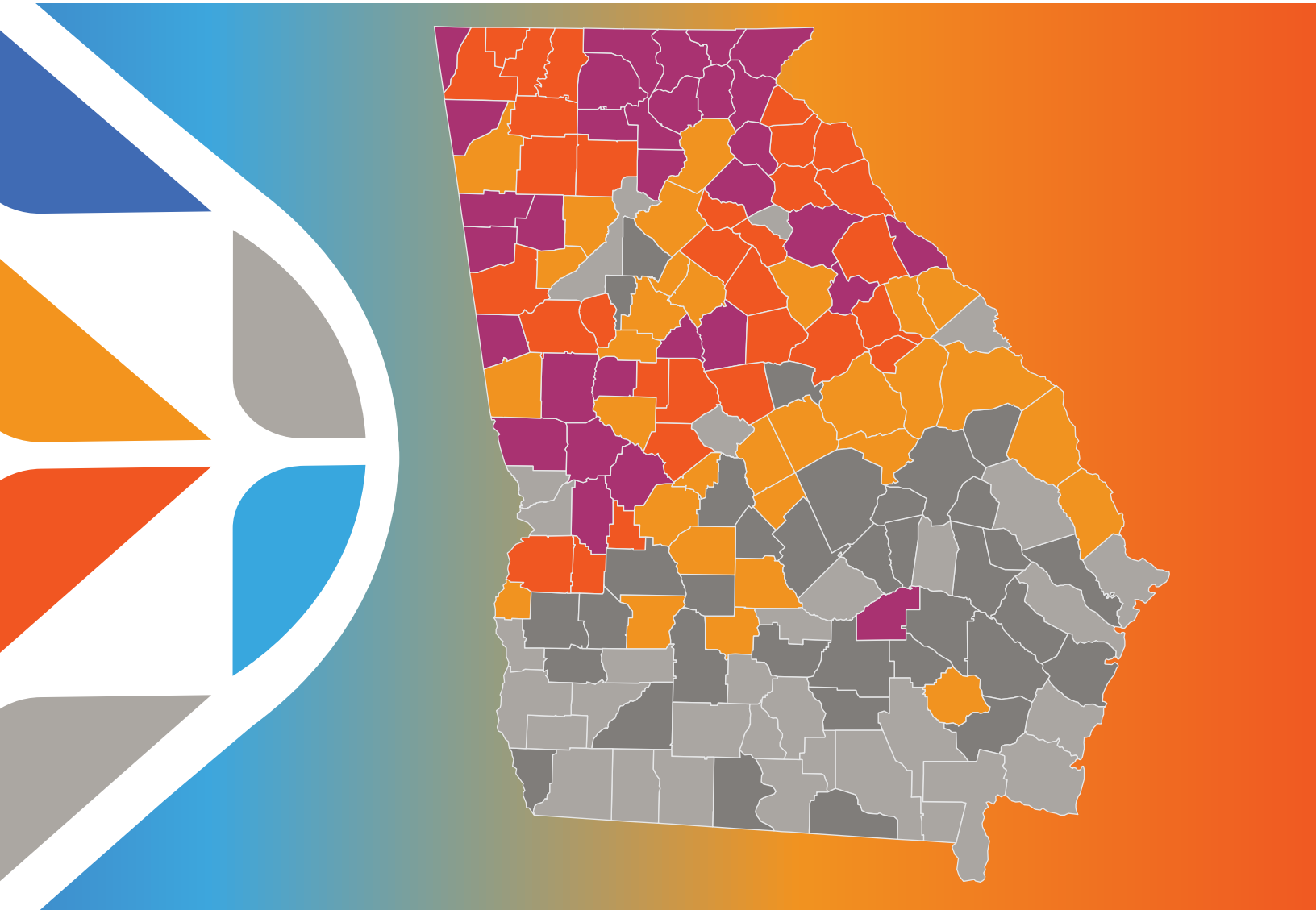
A CALL TO ACTION:
ANALYZING RURAL ENERGY BURDENS IN GEORGIA

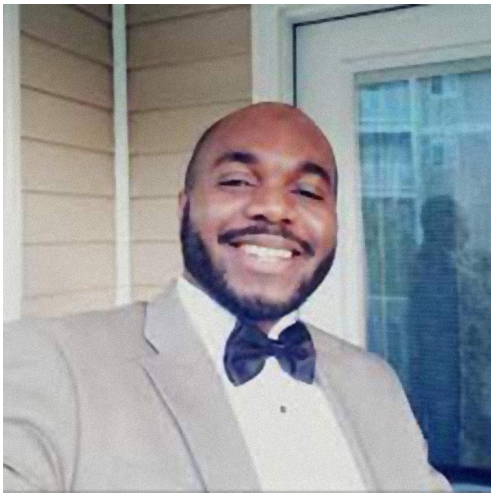


REPORT

Groundswell
COMMUNITY POWER

www.groundswell.org

A CALL TO ACTION: ANALYZING RURAL ENERGY BURDENS IN GEORGIA



ABOUT THE AUTHOR

Groundswell's data science and research efforts are led by Dr. Elvis Moleka, who joined Groundswell in 2020. He conducts research and analysis on the vertices between sustainable finance, development economics, energy economy, risk management, financial markets, monetary policy, and macroeconomic dynamics. Before joining Groundswell, he worked as a Senior Financial Consultant and supported Model Risk Management groups on model validation for major Wall Street Banks. He held Lectureship positions at the University of Warwick, University of Bath, London Metropolitan University, and the University of Buea. Dr. Moleka earned his Doctor of Philosophy in Economics from the University of Bath. He earned a Master of Science in Business Economics and Finance from London Metropolitan University and a Bachelor of Science in Economics from the University of Buea. He is also the Co-Founder and CEO of Leka Research Institute LLC and Chairs the Economic and Development Committee at BACDU USA Inc. For further information, please email: research@groundswell.org.

ACKNOWLEDGMENTS

The author gratefully acknowledges the LIFT Solar for All project, colleagues, sponsors, internal reviewers, and external reviewers who supported this research. I would like to acknowledge Clarke Bacharach for his work assisting in the research, analysis, editing and data visualization for this paper. Thanks to Kevin Goodson and Alicia Hill for providing the final editorial touches on this report.

Google With gratitude to Google, who inspired and supported this research with their values-driven desire to advance energy equity in the communities where they operate.

Date of publication: March 2022

SUBMITTED BY:
Groundswell, Inc.
80 M Street SE, 1st Floor
Washington, DC 20003

EXECUTIVE SUMMARY

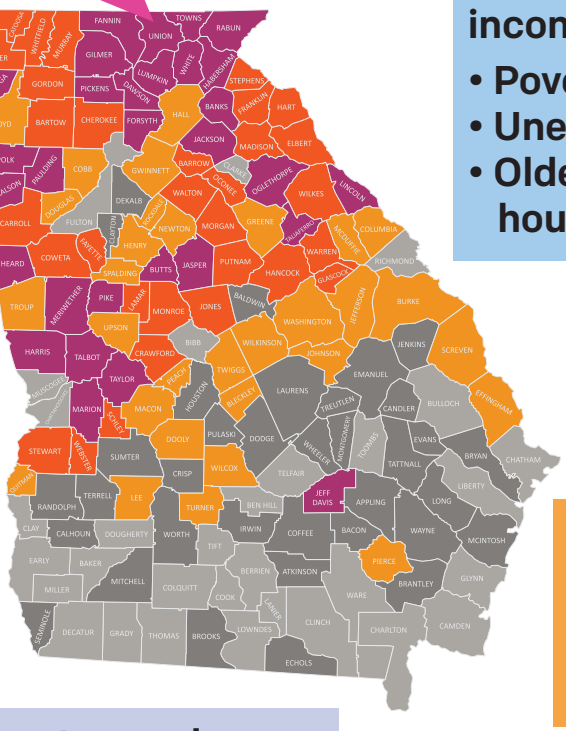
Research Highlights:

- While Georgia has lower electricity rates than the national average (of 14.12 ¢ / kWh), Georgia's statewide average energy burden for low- and moderate income (LMI) households is 19.4%.
- The average energy burden for Georgia households living at 50% of the Federal Poverty Level is 30% - five times that of Georgia households earning $55,500 (or 200% FPL) or more per year.
- Rural counties across Georgia carry the heaviest energy burdens across income brackets, driven by rural poverty, unemployment and the prevalence of older, single-family rental housing.
- Union County, a rural county on the North Carolina border with a population of 24,632, is the most energy burdened county in Georgia. Local households living under 50% of FPL spend an average of 39.1% of their total household income on electricity, and households earning up to 100% of FPL spend more than 20% of their income on electricity.

Most Energy Burdened is Union County - Households earning half of Federal Poverty Level have 39.1% Energy Burden

Reasons rural counties have heaviest energy burden across income brackets

- **Poverty**
- **Unemployment**
- **Older, single-family rental housing**



Households living at half of the Federal Poverty Level have an average Energy Burden of 30%

Electricity rates are lower than the national average. Energy burden for LMI households is 19.4%

"To reach energy-burdened rural communities, Georgia needs energy efficiency programs that serve low- and moderate-income residents... Implementing these programs will require action by the Governor, the Georgia State Legislature, local municipalities, and/or rural cooperative utilities, which could be enhanced by support through USDA initiatives including the Rural Energy Savings Program."

A Call to Action:

- A large majority of rural counties in Georgia are served by locally-owned and governed rural electric cooperative and municipal utilities – not the state's investor-owned utility, Georgia Power.
- The Georgia Public Service Commission (PSC) doesn't regulate locally owned and governed utilities, so PSC-driven energy efficiency programs don't reach most rural households suffering under high bills.
- While federally funded, statewide aid programs like LIHEAP can help pay high bills for income-qualified residents, they don't address root causes and are insufficient. In 2020, LIHEAP only served 17% of income-qualified Georgians. (https://liheappm.acf.hhs.gov/sites/default/files/private/congress/profiles/2020/FY2020GeorgiaProfile-508Compliant.pdf)
- To reach energy-burdened rural communities, Georgia needs energy efficiency programs that serve low- and moderate-income residents through rural electric cooperative and municipal utilities, or directly through statewide programs. Implementing these programs will require action by the Governor, the Georgia State Legislature, local municipalities, and/or rural cooperative utilities, which could be enhanced by support through USDA initiatives including the Rural Energy Savings Program.

Key Terms:

- **Energy Burden:** The percentage of total household income spent on household electricity bills.
- **Federal Poverty Level (FPL)**: In 2022, the FPL for a family of four is $27,750 per year in household income (https://aspe.hhs.gov/topics/poverty-economic-mobility/poverty-guidelines).

BACKGROUND

In September 2021, Groundswell published "Energy Impoverishment and Energy Insecurity in the United States." Researched and written by Dr. Elvis Moleka, this milestone study found that energy burdens for low- and moderate-income (LMI) households were higher in rural communities, and that there were seven states with average LMI energy burdens exceeding 20 percent. For example, the average LMI household in Mississippi pays 26.7% of their entire household income for electricity as shown in the table below.

Table 1

Worst LMI Energy Burdened States

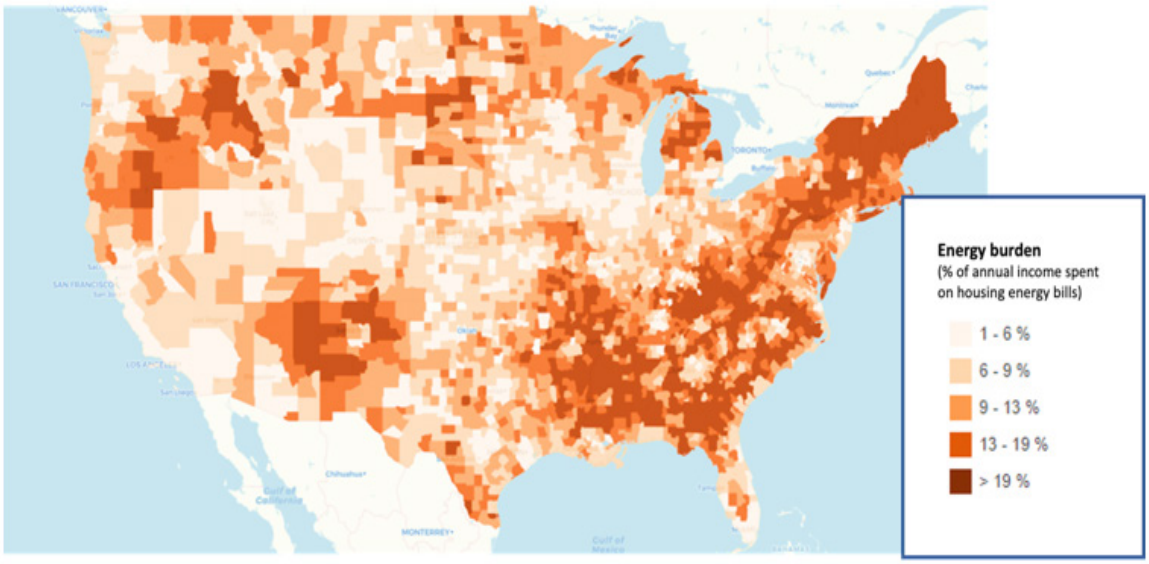
State	LMI Energy Burden (%)
Alaska	42.4%
Maine	40.4%
Vermont	27.2%
Mississippi	26.7%
Hawaii	23.1%
South Carolina	22.0%
Alabama	20.9%

Note. Retrieved from (Moleka, 2021).

In each of these states, as across the country, energy burdens were heavier in rural communities. Moreover, as data from the National Renewable Energy Laboratory shows, a band of energy burdens exceeding 13 and even 19 percent extends from the Deep South up the East Coast and throughout Maine.

Figure 1

Energy Burden (% income spent on housing energy bills)



Source: National Renewable Energy Lab, extracted from: https://blog.ucsusa.org/joseph-daniel/how-to-make-energy-burden-less-bad/

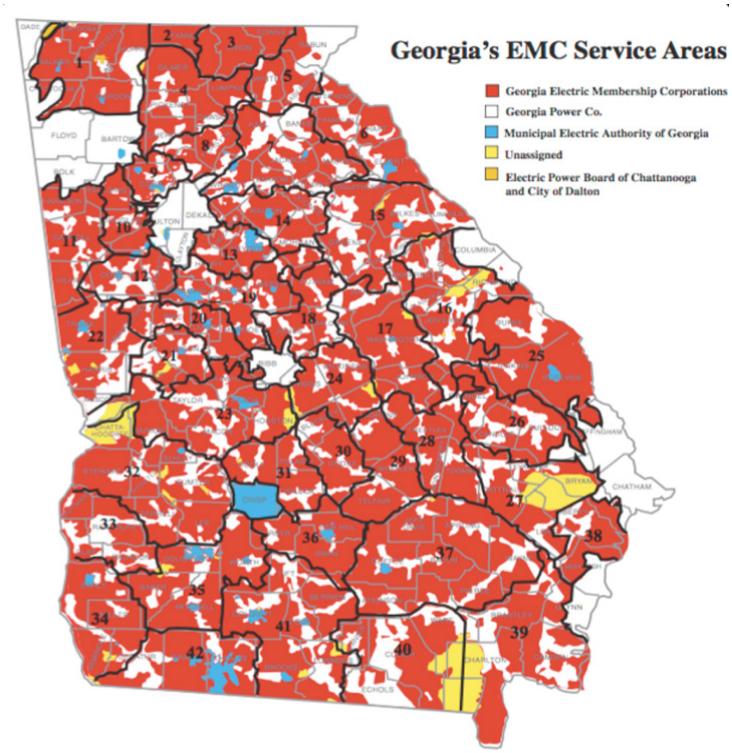
Concerned by the prevalence of energy poverty and insecurity in the US and intrigued by the lack of analysis of county-level energy burden data, Dr. Moleka initiated a series of further studies of each state and surrounding regional cluster that Groundswell serves, beginning with Georgia. The following report includes his findings.

WHO DELIVERS ELECTRICITY, AND ENERGY EFFICIENCY, TO RURAL GEORGIA COUNTIES?

Most rural Georgia counties are served by locally owned and governed rural electric cooperative and municipal utilities. Rural electric cooperatives are nonprofit utilities that are owned and intended to be governed by their member-customers through democratically elected boards. Municipal utilities are part of the local government and are typically governed by local city councils. Georgia has 42 electric cooperative and 52 municipal utilities that together serve half of the state's residents and most of its landmass. Georgia Power, the state's monopoly investor-owned utility, primarily serves urban and industrial areas.

Figure 2

Utility Service Territories in Georgia



While Georgia's statewide elected Public Service Commission regulates Georgia Power, including approving utility rates and energy efficiency programs, the state's rural electric cooperative and municipal utilities are governed at the local level by locally elected officials or boards of directors. That means that local action would be required to implement an energy efficiency or other customer-serving program through the utility.

Table 2

Proportion of Residential Customers in Georgia by Utility Type

Utility Type	#	%
Cooperative Utilities	1,883,734	42.7%
IOU (GA Power)	2,238,149	50.8%
Municipal Utilities	285,887	6.5%
Total	***4,407,770***	***100%***

As we will see in detail, the energy burdens that low- and moderate-income Georgia households carry are very high – particularly in rural counties – while Georgia's utility rates are lower than the national average. High energy burdens combined with low energy rates indicates that energy burdens are driven by high energy usage, which is linked to older and less efficient housing (Li et al., 2014 and McCormick, 2015). The table below shows residential electric utility rates in Georgia, across utility types. See appendix A for a comparison of energy rates across the country, including Georgia.

Table 3

Residential Electric Utility Rates (2019) – in cents/kWh

	Public Power (Muni)	Cooperative	IOU
Georgia	11.8	11.4	12.1
National Average	12.0	11.9	13.6

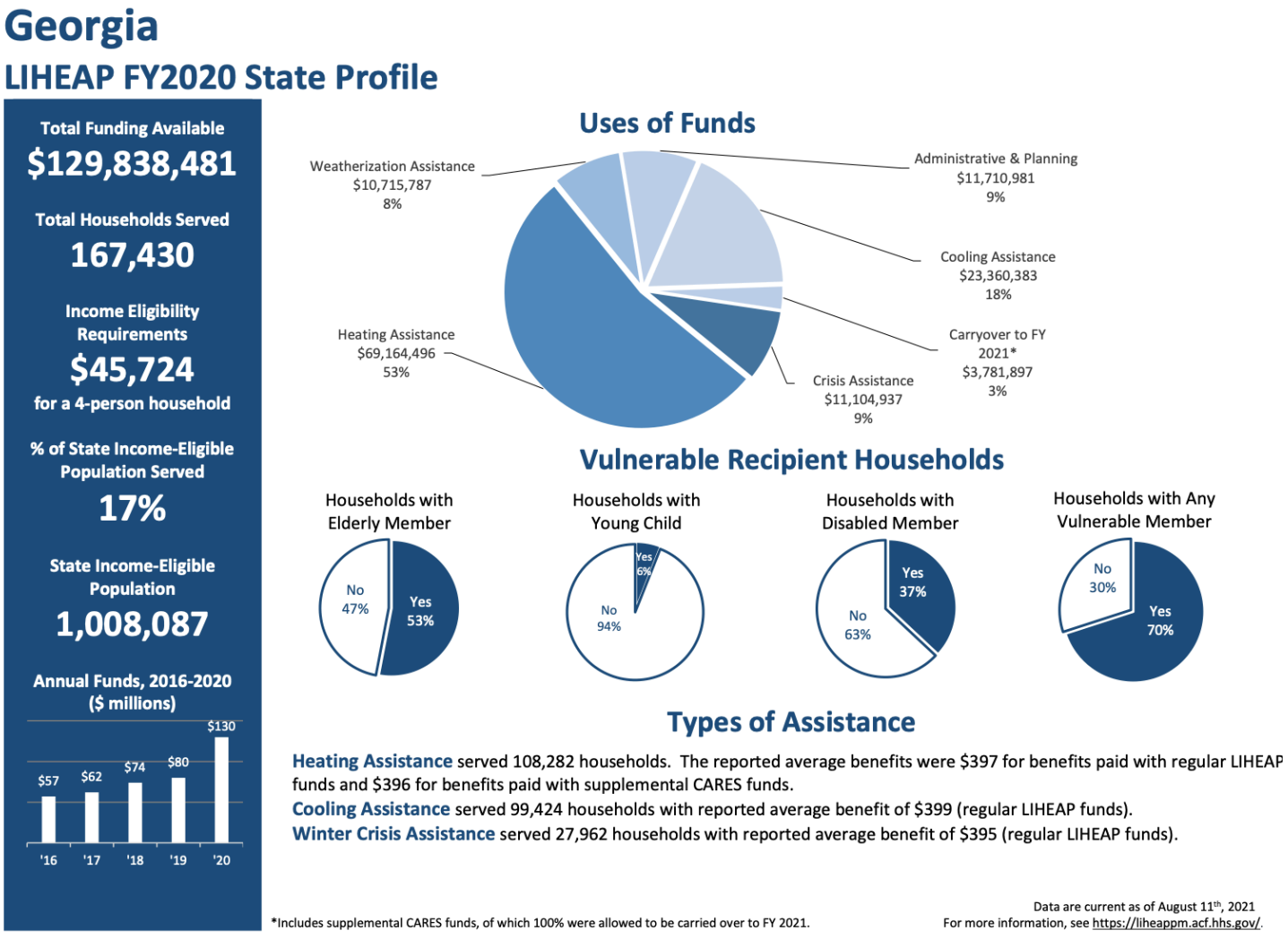
As evidenced in the literature on clean energy burdens, less efficient, older housing and broader housing disparities contribute to the high energy burdens borne by lower income households. Older, single-family houses are typical of rural rental properties. According to McCormick (2015) and Shoemaker et al. (2018), insufficient or entirely lacking insulation, old single-pane windows, and old and inefficient heating and cooling equipment are typical of homes in rural communities. As Groundswell has found in its own work deploying energy efficiency updates for LMI households in rural West Georgia, many homes have such substantial deferred maintenance and repair issues that even simple weatherization measures are not possible without large investments in structural repairs such as fixing and plumbing leaks.

ACCESS TO ENERGY EFFICIENCY

Like other states across the Southeast, low- and moderate-income Georgians have little access to energy efficiency programs that can help reduce their electricity bills. While LIHEAP, a federally funded program that can help income-qualified residents pay their bills or weatherize their homes, is available statewide, only 17 percent of eligible residents received aid in 2020. The handful of energy efficiency programs offered by Georgia Power only reach half of the state's residents and a minority of its rural counties, and few energy efficiency programs are available through Georgia's 92 rural cooperative and municipal utilities.

Figure 3

Georgia LIHEAP 2020 State Profile



This research seeks to quantify the impact of rurality on energy burdens and inform policy recommendations that highlight rural equity priorities in program development that support LMI communities in Georgia. The approach used in this report deviates from studies on clean energy equity which have predominantly focused on energy burden at the Metropolitan Statistical Area (MSA) level. The focus on MSA-level energy burden undermines understanding of rural energy burdens, which measure well above urban energy burdens. This widespread disregard of rural versus urban energy burden data differences implies that rural energy equity needs are largely unexamined and unaddressed in MSA energy burden analysis and conversation.

The results in this paper show that Georgia households with incomes of below 50% of the Federal Poverty Level (FPL) spend approximately 30% or more of their annual income on home energy bills. A strong inverse correlation was found between income and energy burden. This inverse correlation means households with lower income must spend higher percentages of household income on energy costs. In Georgia, low-income households experience energy burdens five times higher than households with income between 185% and 199% of FPL in the state. Federal assistance programs such as the Low-Income Home Energy Assistance Program (LIHEAP) cover only a fraction of the annual affordability gap for LMI households. As a result of these findings, this study recommends the development and implementation of policies and actions designed to tackle rural energy inequities and energy poverty in Georgia at the county level.

"The results in this paper show that Georgia households with incomes of below 50% of the Federal Poverty Level (FPL) spend approximately 30% or more of their annual income on home energy bills. A strong inverse correlation was found between income and energy burden. "

MOTIVATION AND CONTRIBUTIONS

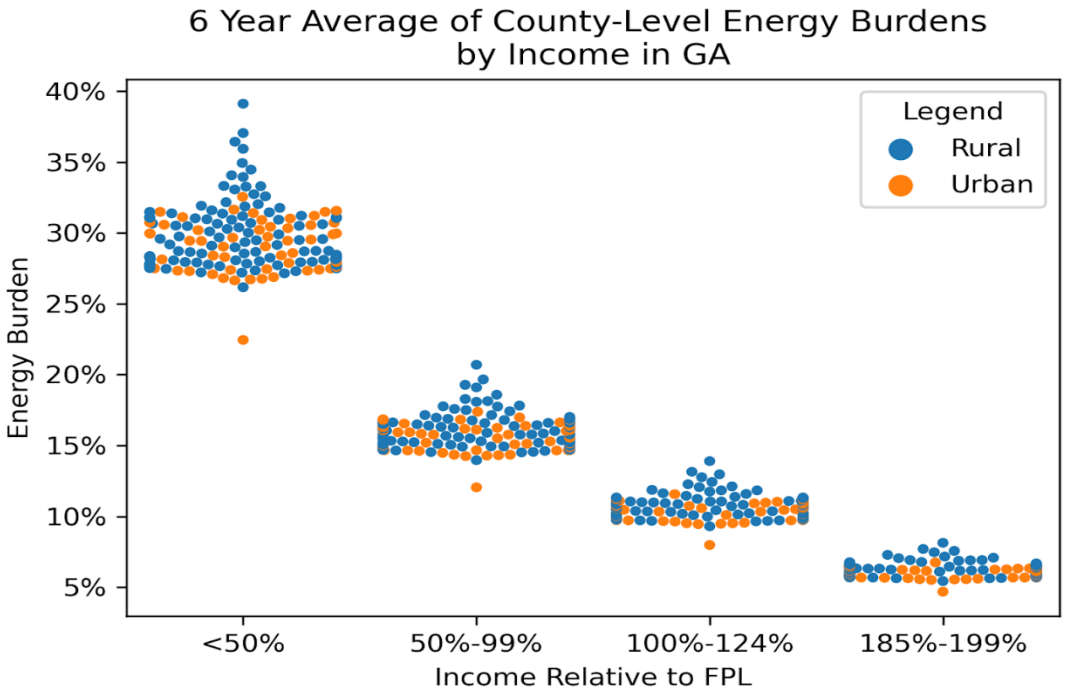
County-level home energy burden data between 2015 and 2020 was obtained from the Home Energy Affordability Gap (Fisher et al., 2020) analysis. This data was considered together with demographic and housing data from the US Census Bureau for Georgia. The Fisher et al. (2020) home energy affordability gap measures the dollar amount by which actual home energy bills exceed affordable home energy bills for each county. The values used to calculate energy burden as used in this report are the total amount spent on energy bills, including heating, cooling, and electricity. This measure of energy burden is defined simply as the percentage of total income that must be allocated to household energy costs. In Georgia, Low and Moderate-Income (LMI) households have been shown to have energy burdens exceeding 19% of their household income (Moleka, 2021; Drehobl and Ross, 2016). Additionally, Georgia has the second highest number of rural counties in the country, after Texas – meaning rural equity analysis in Georgia may reveal truths about rural energy burdens which have not been previously examined by the literature. This report makes the following contributions to the literature.

- It examines the evolution of county-level energy burdens using data between the years of 2015 and 2020. This approach has the following advantages: capturing underlying trends in energy burdens over the recent past and deriving statistical properties and representations about energy burdens at the county level.
- A classification approach was used to determine whether a county is rural or urban based on the county population. Georgia defines rural as a county population of 35,000 people or less.
- This research summarizes the worst energy burdened counties in Georgia by income levels to aid prioritization of policy measures aimed at supporting Georgia LMI households.
- This report introduces a measure of rurality, modeled alongside state-level macroeconomic variables – to reveal truths about rural energy burdens which have not been previously captured by the literature using predictive analysis. This analysis is the first-time research on energy equity has been conducted that specifically addresses the correlation between rurality and energy burdens. By implication, the report hypothesizes that if energy burdens in rural areas exceed that of urban communities, then policies and actions should be developed and implemented to tackle rural energy inequities and energy poverty in Georgia counties.

In this report, households are categorized by four income brackets which are 50% or less, between 50% and 99%, between 100% and 124% and between 185% and 199% of Federal Poverty Levels (FPL) respectively. A Swarm plot was used to depict the 6-year average energy burden for each of the four income brackets in every Georgia county – based on whether a county is rural or urban. As shown in figure 4 below, each point is grouped by income bracket along the x-axis and color-coded by its location type – whether rural or urban. Energy burden is considered as the dependent variable and plotted along the y-axis.

Figure 4

6 Year Average of County-Level Energy Burdens by Income in Georgia



"In each income bracket grouping, we see that the highest levels of energy are from rural counties – and the spread is much larger for Georgia households at the 50% or less FPL. This indicates that rural counties have higher energy burdens even when we control income."

In each income bracket grouping, we see that the highest levels of energy burden are all from rural counties – and the spread is much larger for Georgia households at the 50% or less FPL. This indicates that rural counties have higher energy burdens even when we control for income. As evidenced in Figure 4, income bracket becomes the most important factor for determining energy burden. As income rises, the energy burden decreases. Also, the group in the lowest income bracket has the broadest distribution (range) of energy burden. The trend continues as income rises; for the 100%-124% FPL group, the energy burden distribution is narrower. The 185%-199% FPL group has the narrowest energy burden distribution. Additionally, the plot shows that outliers within the rural groups are always higher energy burdens, whereas the outliers in the urban groups occur as lower energy burdens. Table 4 below shows the distribution of energy burdens by income in Georgia, while Table 5 is a summary of Georgia's most energy impoverished counties. See Appendix B for a complete list of energy burden ranking in Georgia at the county level.

Table 4:

Summary Statistics of Rurality Type and Income Brackets in Georgia by Federal Poverty Levels

Income	Rural or Urban	Count	Mean	Std	Min	25%	50%	75%	Max
<50%	Rural	106	29.93	2.41	26.17	28.02	29.42	31.17	39.12
	Urban	53	29.08	1.87	22.45	27.48	29.45	30.55	32.55
50%-99%	Rural	106	15.98	1.26	13.97	14.97	15.73	16.65	20.70
	Urban	53	15.57	1.01	12.05	14.67	15.77	16.37	17.38
100%-124%	Rural	106	10.64	0.86	9.30	9.96	10.47	11.10	13.90
	Urban	53	10.34	0.67	7.98	9.77	10.47	10.87	11.57
185%-199%	Rural	106	6.22	0.50	5.43	5.82	6.11	6.48	8.13
	Urban	53	6.04	0.39	4.68	5.70	6.12	6.33	6.75

These statistics show that the lower the household income, the higher the household energy burden. The median energy burden for households at less than 50% of the FPL is just short of 30% of total income, compared to 6% for Georgia households between 185% and 199% FPL.

Table 5

Most Energy Burdened Counties in Georgia by Federal Poverty Levels

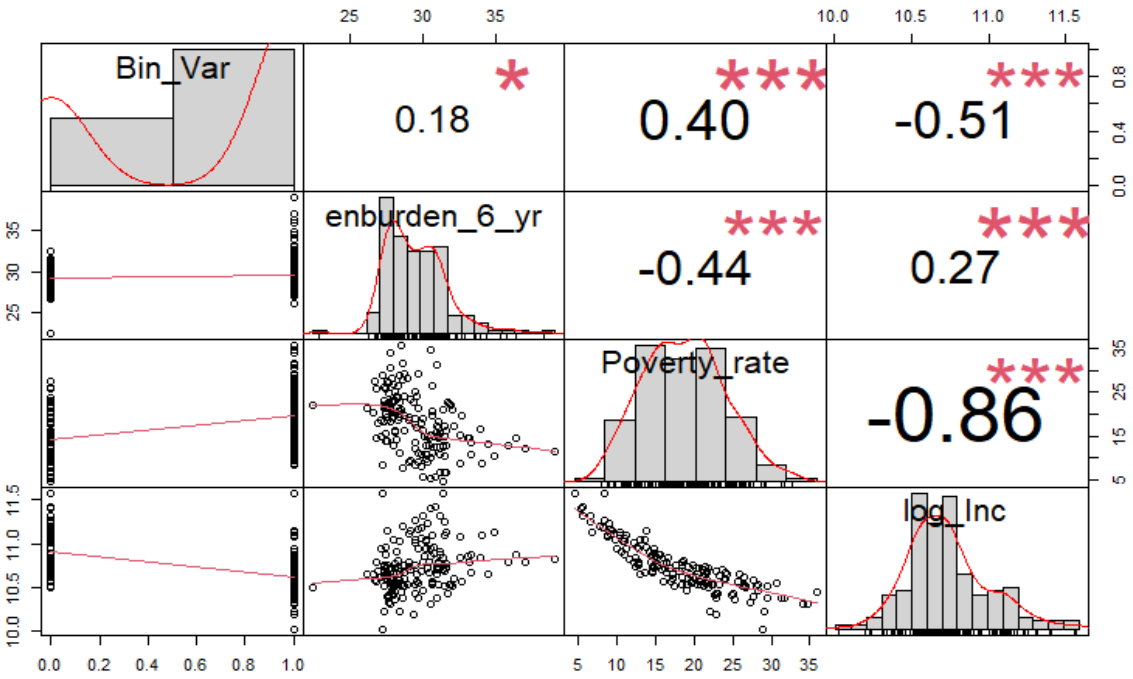
(In 2022, FPL for a family of 4 is $27,750)

Rank	Counties	Rural or Urban	<50%	50%-99%	100%-124%	185%-199%
1	Union County	Rural	39.1	20.7	13.9	8.1
2	Fannin County	Rural	37	19.7	13.2	7.7
3	Gilmer County	Rural	36.4	19.3	13	7.6
4	Towns County	Rural	35.9	19.1	12.8	7.5
5	Pickens County	Rural	34.9	18.6	12.4	7.3
6	Rabun County	Rural	34.5	18.3	12.3	7.2
7	Dawson County	Rural	34.1	18.1	12.1	7.1

As evidenced in Table 5, the results of this analysis suggest that the energy burden distributions for rural counties are much wider and skew to higher energy burdens. The data in the empirical sections that follow this section are based on 50% or less of FPL because this category represents the utility customers that are most affected by high energy burdens and income inequities – particularly households in the rural areas compared to more affluent, urban counties. Figure 5 below shows the correlation plot, with histograms, density functions, smoothed lines, and correlation coefficients for the predictor variable against energy burden, county-level poverty rate and the natural logarithm of median household income. These visualizations provide evidence of significant correlations between the dependent variable and the explanatory variables within this analysis. Rurality (the dependent – binary variable) is positively correlated with energy burden and poverty rate. However, as expected, rurality was negatively correlated with county-level median household income. This analysis confirms our hypothesis that counties with the least median household income are most likely to be energy impoverished.

Figure 5:

Spearman Correlation Analysis of Energy Burden Rurality in Georgia



METHODOLOGY AND RESULTS

In the "Baseline Model", the dependent variable, a measure of rurality is regressed against county-level energy burden, poverty rate, and the natural logarithm of median household income at the county-level on a constant term. The "Demographic Model," as used in this paper, extends the baseline model while controlling for the proportions of the African American, Asian, and Hispanic populations – as studies have shown that these groups are more susceptible to high energy burdens, compared to other demographic populations (Moleka, 2021; Drehobl and Ross, 2016). The "Population Model" controls for the variance in the entire population as an instrument. The coefficient of energy burden, poverty rate, and the natural logarithm of median household income are significant at the 5% statistical level. The results of this analysis show that energy burden's impact on racial inequality and poverty are severe in Georgia when controlling for population demographics.

Table 6

Energy Inequity and Rurality Analysis in Georgia: <50% FPL

Dependent variable: Binary outcome
(1, if Rural County, 0 otherwise)

	Baseline	Controlling for Demographic (Weights = %AfAm + %Asian + %Hisp)	Population Variance Model
Energy burden	0.604***	0.720***	0.618***
	(0.165)	(0.033)	(0.051)
Poverty rate	0.065	0.023	0.063**
	(0.096)	(0.015)	(0.030)
Log (median Income)	-5.203**	-7.162***	-5.337***
	(2.290)	(0.421)	(0.709)
Constant	37.855	56.184***	38.813***
	(27.043)	(4.847)	(8.381)
Observations	127	127	127
Log Likelihood	-54.693	-1,882.006	-574.373
Akaike Inf. Crit.	117.387	3,772.012	1,156.746
Note:			*p**p***p<0.01

Diagnostic tests were performed to validate the coefficient estimates of the results as shown in the Table 7 below. Higher order autocorrelations were conducted using the Breusch-Godfrey test, while tests for heteroskedasticity were performed using the Breusch-Pagan and Goldfeld-Quandt tests. The validity of the functional specification is shown by the Rainbow and Harvey-Collier tests. In all cases, the null hypothesis of no misspecification in the functional form cannot be rejected.

Table 7

Summary of Diagnostic Tests for Georgia

Test name	Test type	Baseline Model	Demographics Model	Population Model Controlled
Autocorrelation, order = 2	Breusch-Godfrey test	0.3978**	0.3978**	0.3978**
Autocorrelation, order = 3	Breusch-Godfrey test	0.4604**	0.4604**	0.4604**
Heteroskedasticity	Goldfeld Quandt	0.5669**	0.5669**	0.5669**
Functional form	Rainbow test	0.2183**	0.2183**	0.2183**
Functional form	Harvey-Collier test	0.6961**	0.6961**	0.6961**

Note: Do not reject since PV > 0.05 *p<0.1; **p<0.05; ***p<0.01

Additionally, Table 8 shows the logit model predicted probabilities, which are derived by inverting the logit model.

Table 8

Predicted Probabilities for Georgia

Dependent variable: Binary outcome
(1, if Rural County, 0 otherwise)

	Baseline	Controlling for Demographic (Weights = %AfAm + %Asian + %Hisp)	Population Variance Model
Energy burden	0.647***	0.673***	0.650***
	(0.165)	(0.033)	(0.051)
Poverty rate	0.516	0.506	0.516**
	(0.096)	(0.015)	(0.030)
Log (median Income)	0.005**	0.001***	0.005***
	(2.290)	(0.421)	(0.709)
Constant	1.000	1.000***	1.000***
	(27.043)	(4.847)	(8.381)
Observations	127	127	127
Log Likelihood	-54.693	-1,882.006	-574.373
Akaike Inf. Crit.	117.387	3,772.012	1,156.746
Note:			*p**p***p<0.01

CONCLUSIONS

This study examined the impact of rurality and racial disparity spreads on energy burdens in Georgia. This research fills an important gap in the literature by deviating from studies on energy equity which have predominantly focused on MSA-level data. This focus on MSA-level energy burdens undermines understanding of rural energy burdens, which measure well above urban energy burdens. This widespread disregard of rural versus urban energy burden data differences implies rural counties are almost entirely ignored in MSA energy burden analysis. The results of this analysis suggest that the energy burden distributions for rural counties are much wider and skew to higher energy burdens for LMI households. Georgia households with incomes of below 50% of the Federal Poverty Level pay approximately 30% or more of their annual income on home energy bills. Home energy burdens for households between 100% and 124% and 185% and 199% take up 11% and 6% respectively of income. This report suggests that the number of households with unaffordable energy bills over the 6-year average is higher on average in Georgia than the national average of 19.4% for LMI energy burden (Moleka, 2021). This is in contrast to the findings of Drehobl and Ross (2016) which found that energy burden for Georgia LMI households is 18.24% using MSA data for Atlanta.

As evidenced in this report, a strong inverse correlation was found between income and energy burden. This inverse correlation means that households with lower income must spend higher percentages of household income on energy costs. In Georgia, low-income families experience energy burdens five times higher than households with income between 185% and 199% of FPL in the state. Federal assistance programs, such as the Low-Income Home Energy Assistance Program (LIHEAP), address only a fraction of the annual affordability gap for LMI households. Plans to improve availability of this type of program should take into consideration racial disparity and utility governance policy as it relates to upfront and interconnection costs. As a result of these findings, this study recommends the development and implementation of policies and actions designed to tackle rural energy inequity and energy poverty in Georgia counties – specifically, programs that improve energy equity and decrease energy burdens for Georgia families at the county-level.

REFERENCES

Drehobl, A., and Ross, L. (2016). Lifting the high energy burden in America's largest cities: How energy efficiency can improve low-income and underserved communities. *ACEEE Report April 2016*. https://www.aceee.org/sites/default/files/publications/researchreports/u1602.pdf

Fisher, Sheehan, and Colton (2020). Home Energy Affordability Gap. http://www.homeenergyaffordabilitygap.com/index.html

Li, K., Lloyd, B., Liang, X-J and Wei, Y-M. (2014). Energy Poor or Fuel Poor: What Are the Differences?" *Energy Policy* 68: 476–81.

McCormick, K. (2015). Bridging the clean energy divide: Affordable clean energy solutions for today and tomorrow. New York: *Natural Resources Defense Council*.

Moleka, E. (2021). Energy impoverishment and Energy Insecurity in the United States. *Groundswell Report September 2021*.

Shoemaker, M., Gilleo, A and Ferguson, J. (2018). Reaching rural communities with energy efficiency programs. *ACEEE Research Report U1807* https://aceee.org/research-report/u1807

Appendix A:

Ranking of Energy Rates in the United States

Rank	STATE	Sep-21	Sep-20	MOVEMENT	CHANGE (%)
1	Louisiana	9.37¢ / kWh	10.19¢ / kWh	DOWN	-8.05%
2	Washington	9.79¢ / kWh	9.95¢ / kWh	DOWN	-1.61%
3	Arkansas	9.99¢ / kWh	10.73¢ / kWh	DOWN	-6.90%
4	Kentucky	10.56¢ / kWh	10.68¢ / kWh	DOWN	-1.12%
5	Idaho	10.58¢ / kWh	11.42¢ / kWh	DOWN	-7.36%
6	Utah	10.63¢ / kWh	11.48¢ / kWh	DOWN	-7.40%
7	Oklahoma	10.72¢ / kWh	10.53¢ / kWh	UP	1.80%
8	Tennessee	10.79¢ / kWh	10.93¢ / kWh	DOWN	-1.28%
9	Oregon	11.02¢ / kWh	10.97¢ / kWh	UP	0.46%
10	North Carolina	11.24¢ / kWh	11.07¢ / kWh	UP	1.54%
11	Nebraska	11.31¢ / kWh	12.06¢ / kWh	DOWN	-6.22%
12	Texas	11.36¢ / kWh	11.15¢ / kWh	UP	1.88%
13	Florida	11.37¢ / kWh	12.02¢ / kWh	DOWN	-5.41%
14	Mississippi	11.55¢ / kWh	11.40¢ / kWh	UP	1.32%
15	Kansas	11.56¢ / kWh	13.56¢ / kWh	DOWN	-14.74%
16	West Virginia	11.57¢ / kWh	11.69¢ / kWh	DOWN	-1.03%
17	Nevada	11.67¢ / kWh	11.64¢ / kWh	UP	0.26%
18	Montana	11.85¢ / kWh	11.73¢ / kWh	UP	1.02%
19	Indiana	12.02¢ / kWh	12.05¢ / kWh	DOWN	-0.25%
20	Delaware	12.05¢ / kWh	12.59¢ / kWh	DOWN	-4.29%
21	North Dakota	12.07¢ / kWh	12.34¢ / kWh	DOWN	-2.19%
22	Georgia	12.26¢ / kWh	12.53¢ / kWh	DOWN	-2.15%
23	Colorado	12.28¢ / kWh	12.75¢ / kWh	DOWN	-3.69%
24	Wyoming	12.30¢ / kWh	12.21¢ / kWh	UP	0.74%
25	South Dakota	12.39¢ / kWh	12.57¢ / kWh	DOWN	-1.43%

26	**Virginia**	12.40¢ / kWh	11.91¢ / kWh	UP	4.11%
27	**Alabama**	12.41¢ / kWh	12.79¢ / kWh	DOWN	-2.97%
28	**Illinois**	12.56¢ / kWh	12.95¢ / kWh	DOWN	-3.01%
29	**Ohio**	12.64¢ / kWh	12.67¢ / kWh	DOWN	-0.24%
30	**South Carolina**	12.91¢ / kWh	13.07¢ / kWh	DOWN	-1.22%
31	**Arizona**	13.16¢ / kWh	12.65¢ / kWh	UP	4.03%
32	**Washington DC**	13.21¢ / kWh	13.40¢ / kWh	DOWN	-1.42%
33	**Missouri**	13.23¢ / kWh	13.25¢ / kWh	DOWN	-0.15%
34	**New Mexico**	13.37¢ / kWh	13.41¢ / kWh	DOWN	-0.30%
35	**Iowa**	13.81¢ / kWh	13.92¢ / kWh	DOWN	-0.79%
36	**Maryland**	13.92¢ / kWh	14.22¢ / kWh	DOWN	-2.11%
37	**Minnesota**	14.09¢ / kWh	13.96¢ / kWh	UP	0.93%
38	**Wisconsin**	14.28¢ / kWh	15.05¢ / kWh	DOWN	-5.12%
39	**Pennsylvania**	14.38¢ / kWh	14.52¢ / kWh	DOWN	-0.96%
40	**New Jersey**	15.64¢ / kWh	15.96¢ / kWh	DOWN	-2.01%
41	**Michigan**	16.07¢ / kWh	15.86¢ / kWh	UP	1.32%
42	**Maine**	16.16¢ / kWh	16.17¢ / kWh	DOWN	-0.06%
43	**Vermont**	18.50¢ / kWh	18.02¢ / kWh	UP	2.66%
44	**Rhode Island**	18.64¢ / kWh	16.65¢ / kWh	UP	11.95%
45	**New York**	19.30¢ / kWh	18.76¢ / kWh	UP	2.88%
46	**New Hampshire**	19.63¢ / kWh	19.30¢ / kWh	UP	1.71%
47	**California**	19.90¢ / kWh	19.39¢ / kWh	UP	2.63%
48	**Massachusetts**	21.11¢ / kWh	18.56¢ / kWh	UP	13.73%
49	**Connecticut**	21.62¢ / kWh	20.47¢ / kWh	UP	5.62%
50	**Alaska**	22.54¢ / kWh	22.14¢ / kWh	UP	1.81%
51	**Hawaii**	32.76¢ / kWh	30.45¢ / kWh	UP	7.59%

Note. Retrieved from (Electric Choice).

Appendix B:

Most Energy Burdened Counties in GA for Households at 50% Federal Poverty Level