Wisconsin Energy Burden Metrics Report

Kevin McGrath, Katey Beaton, and Levi Kingery

November 2024

Acknowledgment

This material is based upon work supported by the Department of Energy's Office of Energy Efficiency and Renewable Energy (EERE) under the State Energy Program under Award Number DE-EE0010052.

Disclaimer

Table of Contents

Wisconsin Energy Burden Metrics Report 1

Introduction 1

Key Terminology 1

National Landscape Analysis 2

Wisconsin Landscape Analysis 8

Framework for Wisconsin-Specific Energy Affordability Metrics 10

- Overview of Data Sources Recommended for Framework 11
- Overview of Recommended Metrics 15
- Analysis Using Recommended Framework 21

Conclusion 51

References 54

Appendix A 56

Appendix B 59

Introduction

The Wisconsin Public Service Commission ("Commission") has contracted with VEIC to conduct an analysis of energy burden metrics and to develop an actionable plan for short and long-term deployment of energy burden metrics in Commission programs and processes. This work builds on prior efforts by the Commission and others to understand energy burden definitions, collect and receive energy burden data, and develop metrics relating to customer affordability more generally.

This Energy Burden Metrics Report identifies options for Wisconsin to define, calculate, and track energy burden metrics. The report identifies and discusses specific sources of data to be used to calculate energy burden at detailed levels, and it considers tradeoffs of different data sources and approaches. It is informed by prior work including stakeholder input from Commission proceedings and workshops and similar efforts in other states, and the report offers options for the Commission to consider in how to define, calculate, and track energy affordability metrics throughout Wisconsin. This report is focused on residential energy burden and affordability, where most existing literature on the topic is focused and data are most readily available. However, these concepts could be applied or adapted to other customer segments including small businesses if the necessary data inputs were available.

A separate Energy Burden Action Plan, which will build off the analysis in this Energy Burden Metrics Report, will be completed in phase 2 of this research. This plan will identify the different Commission processes that may be informed by energy burden metrics and develop strategies for incorporating energy burden metrics into those processes. The intent of the Energy Burden Action Plan is to identify and discuss actionable options and feasible, targeted strategies and goals the Commission could consider that would reduce energy burden, including recommendations on how to display energy burden data to track performance on metrics. The plan also will identify stakeholders that are likely to be substantially impacted by work done to reduce energy burden and provide options for utilities and the Commission to engage with these stakeholders with a goal towards equity.

Key Terminology

The following key terminology is used throughout this report.

Energy Burden: Energy burden is the ratio between annual energy costs and annual income. It can be calculated for an individual household (i.e., dividing an individual household's annual energy costs by their annual income) or a group of households (i.e., calculating the average annual energy costs and average annual income for a group of households and dividing the average energy costs by average income).

Energy Affordability: Energy affordability indicates whether energy costs are affordable in the context of other household necessities. This often is expressed as an energy burden target, with six percent energy burden being a common target used for determining energy affordability. Under this scenario, energy burdens of six percent or less are considered affordable and those greater than six percent are considered unaffordable. However, while six percent energy burden is a common energy affordability target, it is not the only threshold researchers or policymakers have identified or set for defining an energy affordability (see additional discussion under National Landscape Analysis). Nonetheless, six percent energy burden is used in this report for defining an energy affordability target and establishing an energy affordability gap.

Energy Insecurity: Energy insecurity relates to the vulnerability of households to energy expenses, often expressed in terms of energy service disconnections, late payments, and arrearages. Energy insecurity can also be expressed by taking account of adverse household responses to energy expenses, such as forgoing other expenses to pay an energy bill or leaving the home at an unhealthy temperature because energy costs are high.

National Landscape Analysis

There is an increasing body of literature on energy burden and affordability challenges throughout the United States. A 2020 report by researchers at the American Council for an Energy-Efficient Economy (ACEEE) provides a national perspective on energy burden across the United States. The report, which utilizes 2017 American Housing Survey (AHS) data, provides a snapshot at the national and regional levels, as well as for select metropolitan areas.[1] Consistent with many other analyses, the report uses six percent of income as the threshold for high energy burden, with 10 percent of income the threshold for severe energy burden.[2] In the East North Central Census Division where Wisconsin is located, the analysis estimates a median energy burden of 3.4 percent for all households but over nine percent for low-income households (defined as having income below 200 percent of the federal poverty level) (Drehobl et al 2020).[3]

The following key points are made in the ACEEE report (Drehobl et al 2020):

- Policymakers, utilities, and advocates increasingly view the ability to meet basic heating, cooling, and energy needs in the home as a major equity issue.

[1] The AHS is conducted every two years and provides modeled energy costs based on characteristics of households.
[2] Using six percent as the threshold for high energy burden is based on analysis by Roger Colton of Fisher, Sheehan, and Colton, who proposed this standard based on housing affordability being considered 30 percent of income, and average energy costs representing approximately 20 percent of housing costs (30% * 20% = 6%). Other analysts have proposed different thresholds for high energy burden, but six percent is the threshold most commonly referenced. See APPRISE and Fisher, Sheehan, and Colton (2007) for additional discussion of high energy burden.
[3] The Milwaukee metropolitan statistical area was not included in the 2020 analysis by ACEEE. A 2016 analysis by ACEEE using the 2011 AHS and 2013 AHS estimated that the median energy burden in Milwaukee was approximately two times that of the statewide average for Wisconsin (Drehobl and Ross 2016).

- Energy burden is a useful metric for visualizing energy affordability challenges and can be used to identify population groups facing disproportionately higher burdens than others and target policies and investments to those groups.
- Energy burden is not experienced uniformly across the populations—racial/ethnic minorities, particularly Black and Hispanic communities, face higher energy burdens than other groups, as do renters, low-income households, and older adults.

With increased attention and emphasis on energy burden and affordability, some jurisdictions have set explicit goals or targets for energy burden of residential customers. For example, New York has set an energy affordability goal that no New Yorker spend more than six percent of their household income on energy. As a result, New York's Energy Affordability Program (EAP), which provides discounts to income-qualified households on their electricity and natural gas bills, has set an energy burden target level at or below six percent for all low-income utility customers statewide.[4] Across the United States, several energy affordability programs have explicitly incorporated energy burden targets into their design. Table 1 provides examples identified in a report for the Office of the People's Counsel of the District of Columbia. Six percent energy burden is a common target, but some programs have chosen higher or lower targets, and others have not explicitly incorporated energy burden into their design at all (APPRISE 2020).

Table 1. Energy Burden Targets in Affordability Programs

State	**Energy Burden Target**	**Targeting Procedures**
District of Columbia	3%	Benefit Matrix / Rate Discount
Illinois	6%	Client Option – Benefit Matrix or Utility Bill Analysis
New Jersey	6%	Utility Bill Analysis
Ohio	10%	Utility Bill Analysis
Pennsylvania	6%+	Utility Bill Analysis

Source: adapted from Table 6 in APPRISE (2020).

At a local level, several cities have established energy burden goals and strategies. For example, in 2013, Saint Paul, Minnesota set a 10-year goal that no household spend more than 4 percent of income on energy, and in 2018, Cincinnati, Ohio set a goal of reducing household energy burdens by 10 percent compared to current levels (Drehobl et al 2020).

Recent analyses of energy burden provide examples of how the Commission might examine energy affordability in Wisconsin. Reports by VEIC for the State of Vermont and Operation Fuel in Connecticut examined electricity, heating, and transportation costs and burden using a

[4] Information on New York State's EAP program is available at: **https://dps.ny.gov/energy-affordability-program**

combination of data sources. Data sources used in the Vermont energy burden report included the following.[5]

- Electricity costs: average electricity costs by town provided by utilities.
- Heating costs: average heating costs by town from the Low Income Energy Affordability Data (LEAD) Tool published by the National Renewable Energy Laboratory (NREL).
- Transportation costs: vehicle miles traveled from the Housing and Transportation Affordability (H&T) Index from the Center for Neighborhood Technology, averaged across census block groups to create estimates for towns, combined with statewide average fuel efficiency and gasoline prices.
- Income: median income estimates by town from the ACS.

For the Operation Fuel report, actual utility data were unavailable, and the LEAD Tool was used for both electricity and heating costs as a result, with fuel price adjustments made using data from the Energy Information Administration (EIA) to project energy costs to the same period as the income data used.[6]

Authors of those reports noted the following with respect to analyzing energy burden and other affordability metrics at a community level: "We have generated estimates of energy burden aggregated at the community level. While this is a common practice, the limitation of this approach is that it can falsely lower the average energy burden calculated in communities with more significant income variation, since energy spending does not increase proportionally with income." (Sears and Lucci 2023) The implication is that where income varies substantially across a community, examining average energy burden in aggregate can mask energy affordability challenges faced by individuals because income has a greater impact on energy burden calculations than energy costs. Additionally, the authors noted challenges with high margins of error in small communities, and in the Vermont analysis, excluded towns with fewer than 50 households to address this concern.

The LIHEAP Home Energy Notebook, published by the federal LIHEAP office, provides another approach to examining energy burden and affordability over time. This report, published for over a decade and a half, uses data on energy use, energy costs, and income from the Residential Energy Consumption Survey (RECS) and the Current Population Survey (CPS) Annual Socioeconomic Supplement (ASEC) to examine group average and individual energy costs and burden. These estimates are provided nationally and regionally; for total energy usage, heating energy use, and cooling energy use; and by household group (all households, low-income households, and LIHEAP recipient households). Trends over time are shown as well as point-in-

[5] For more information, see: **https://www.efficiencyvermont.com/Media/Default/docs/landing-pages/energy-burden-report/2023-EfficiencyVermont-EnergyBurdenReport.pdf**

[6] For more information, see: **https://operationfuel.org/wp-content/uploads/2023/11/VEIC-affordability-study-May-2023.pdf**

time estimates adjusted from the RECS year to a target fiscal year using weather data and fuel price adjustment factors with the RECS data.

In addition to this regular publication, the federal LIHEAP office has published multiple special studies on energy insecurity using the RECS, and on program participation rates by poverty level and vulnerability using household participation data and state-level income-eligible population estimates from the American Community Survey.[7]

More recently, the LIHEAP Performance Measures report, collected by the federal LIHEAP office from all state grantees, has enabled analysis of (1) group average energy burden before and after LIHEAP benefits, and (2) analysis of prevention and restoration of utility disconnections. These data are reported at a statewide level for LIHEAP recipients and require collection of bill data from utilities and fuel vendors in each state.

FUTURE CONSIDERATIONS FOR A CHANGING LANDSCAPE

This energy burden metrics report focuses on energy burden resulting from residential end uses—heating, cooling, cooking, refrigeration, and other appliances. The report does not focus on transportation fuel costs and burden since most vehicles on the road today are gasoline- or diesel-powered and those fuels are not subject to Commission oversight. However, as the share of electric vehicles driven by Wisconsin households increases, an increasing share of transportation fuel costs not currently under the oversight of the Commission, nor considered in most energy burden frameworks, will become part of residential electricity bills or fees for using public charging infrastructure. Accordingly, additional research may be justified in the future to determine how best to incorporate transportation costs into an energy affordability framework. Reports by VEIC for the State of Vermont (Sears and Lucci 2023) and Operation Fuel in Connecticut (Sears and Badger 2023) provide examples of how transportation costs can be incorporated into an energy burden framework, and a 2024 topic brief by ACEEE provides additional context (Bell-Pasht 2024).

Expanding the framework for examining energy affordability to include metrics on arrearages and disconnections, several states have developed robust data collection and reporting procedures. Table 2 provides an overview of the arrearage and disconnection reporting frameworks from select states, including the customer segments, geographic detail, time period covered, and frequency of reporting. Examples of metrics collected include:

- Number of customers in arrears

[7] For more information on the LIHEAP Home Energy Notebook and Special Studies, see: **https://liheappm.acf.hhs.gov/notebooks/**

- Dollar value of arrears
- Accounts in arrears for up to 30 days, 30-60 days, and more than 60 days
- Number of customers with deferred payment agreements
- Number of disconnect notices
- Number of disconnections
- Number of reconnections

Examples of the metrics available are included in Appendix A.

Table 2. Arrearage and Utility Disconnection Information Reported by Select States

	Illinois	**Michigan**	**Maryland**	**District of Columbia**	**Wisconsin**
Required under	State Law[8]	Commission Order[9]	Commission Order[10]	Commission Order	Commission Order
Time period reported	Monthly	Monthly	Monthly	Monthly	Quarterly
Reporting frequency	Monthly	Monthly	Monthly	Monthly	Annual
Geography	Zip code	Whole service territory	Zip code	Whole service territory	Whole service territory
Customer segments	Residential, non-residential	Residential low-income, residential non-low-income, residential senior non-low-income	Residential low-income, residential non-low-income, non-residential[11]	Residential low-income, all residential[12]	Residential

[8] Illinois Compiled Statutes **220 ILCS 5/8-201.10 (b)**.
[9] MI PSC Order U-20757
[10] MD PSC Order 89542 established arrearage management programs in response to the COVID-19 pandemic. Subsequently, Order 89636 established initial reporting requirements beginning November 1, 2020. Reporting requirements were updated in Order 90728 establishing a consistent reporting template across electricity and natural gas utilities.
[11] Residential low-income customers are determined via data sharing with the Maryland Office of Home Energy Programs. For reporting purposes, customers participating in a verified low-income energy program (e.g., LIHEAP, WAP, universal service program, etc.) are considered residential low-income for 12 months following date of grant approval.
[12] Residential low-income based on customers enrolled in utility's rate discount program.

	Illinois	Michigan	Maryland	District of Columbia	Wisconsin
Public availability	**Interactive dashboard**	**Interactive dashboard**	PDFs from Commission docket filing system	PDFs from Commission docket filing system	Excel files from Commission annual report filing system

Additionally, several states have begun or implemented Performance-Based Regulation (PBR) proceedings, with energy affordability metrics incorporated into their frameworks. Examples include:

- Hawaii: in response to the state's PBR framework that went into effect in June 2021, Hawaiian Electric implemented the following energy affordability metrics:[13]
    - Low-to-Moderate Income (LMI) energy burden metric, based on the average residential electricity bill per island and the income level corresponding to 150% Federal Poverty Guidelines.
    - Payment Arrangement Metric, based on the number of customers entered into a payment arrangement by customer class by zip code.
    - Disconnections Metric, based on the number of customers with a disconnection notice by customer class and zip code.
- Minnesota: in 2020, the Minnesota Public Utilities Commission (PUC) required Xcel Energy, the largest investor-owned utility in the state, to report on the following metrics:[14]
    - Average monthly bills for residential customer, reported annually.
    - Rates per kWh based on total revenue by customer class.
- Illinois: in 2021, Illinois passed the Climate and Equitable Jobs Act directing the Illinois Commerce Commission (ICC) to transition to a PBR framework. The following affordability-related metric was introduced:[15]
    - Percent of residential customers with arrearages over 90 days.
- Washington: in response to a 2021 law, the Washington Utilities and Transportation Commission is reviewing how utilities report information for a PBR framework. Metrics related to affordability under consideration include:[16]
    - Increases in energy burden
    - Cost of service

[13] For more information on Hawaiian Electric's metrics, see: **https://www.hawaiianelectric.com/about-us/performance-scorecards-and-metrics/affordability**

[14] For more information on Minnesota's metrics, see: **https://efiling.web.commerce.state.mn.us/edockets/searchDocuments.do?method=showPoup&documentId=%7bD05E2479-0000-C71A-9A90-2F3283EF01A6%7d&documentTitle=20214-173702-01**

[15] For more information on Illinois' metrics, see: **https://www.icc.illinois.gov/docket/P2022-0067/documents/319663/files/556377.pdf**

[16] For more information on Washington's PBR investigations, see: **https://www.utc.wa.gov/performancebased**

- Rate stability

Wisconsin Landscape Analysis

Within Wisconsin's regulatory context, energy affordability has been a topic in several Commission dockets. Table 3 provides an overview of recent dockets addressing this topic.

Table 3. Wisconsin Public Service Commission Dockets Pertaining to Energy Affordability[17]

Docket number	Docket name	Key affordability-related aspects of recent orders and investigations
5-EI-158	Roadmap to Zero Carbon – Performance Based Regulation Investigation	Investigation of performance-based regulation and affordability metrics. Recommended metrics from stakeholder convenings in this investigation include total energy burden (tracked at census tract or zip code level), total residential disconnections, and number/share of eligible customers enrolled in income-qualified programs. Additional metrics considered include total arrearages, comparison of Wisconsin utility rates to other states, enrollment in arrearage management programs, number of customers sent to collection, enrollment in budget billing programs, and number of disconnections avoided due to utility outreach.

[17] In addition to the regulatory proceedings listed in Table 3 that explicitly address or investigate energy affordability, as part of the Focus on Energy program quadrennial planning process (5-FE-104), the Commission approved establishing performance goals related to enhancing service to underserved customers. The framework that the Focus on Energy program proposed to the Commission will track program participation and impacts geographically in "Communities of Focus," which incorporates census tracts with higher energy burdens (among other demographic factors).

Docket number	Docket name	Key affordability-related aspects of recent orders and investigations
5-UI-120	Investigation on the Commission's Own Motion to Ensure Safe, Reliable and Affordable Access to Utility Services During Declared Public Health Emergency for COVID-19	Collection of customer arrearage and disconnection data. Requirements regarding Deferred Payment Agreements (DPAs) for low-income customers and customer disconnection procedures.
5-UI-121, 6690-UI-101	Investigation of WEC Energy Group on Alternative Low-Income Programs	Examination of potential low-income energy assistance programs including Percentage of Income Payment Program (PIPP) pilot
3270-UI-101 (MGE), 6680-UI-100 (WPL)	Investigations into Development of Alternative Programs to Address Customer Affordability and Energy Burden Investigation	Utilities and stakeholders will meet and discuss different programs to address customer affordability.
5-TU-100 (WEC), 3270-TU-100 (MGE), 5820-TE-101/5820-TG-101 (SWLP), 6680-TE-106 (WPL)	Arrearage Management Program (AMP) applications by utilities	Designs for arrearage forgiveness programs and utility-specific reporting frameworks for program metrics.
5-UR-110 (WEC), 6680-UR-124 (WPL), 3270-UR-125 (MGE)	Electric and natural gas rate cases	Discussion of energy affordability of rate designs, leading to further investigations

Beyond these utility proceedings, Wisconsin's most recent Strategic Energy Assessment, published in 2022, notes that residential customers in the state are charged higher average rates than neighboring states and national averages, but that energy bills were less due to lower average energy usage.[18] Several research efforts have been undertaken to examine energy burden and affordability challenges in Wisconsin.[19]

[18] For more information on Wisconsin's Strategic Energy Assessment, see Docket 5-ES-111: **https://apps.psc.wi.gov/ERF/ERFsearch/default.aspx**

[19] In addition to the research noted in the body of this section, as the topic of energy burden has come up in rate cases, some utilities have conducted their own supporting analyses of energy burden analyses. An example is the rebuttal by Dr. Sanem Sergici of The Brattle Group on behalf of WPL, part of Docket 6680-UR-124: **https://apps.psc.wi.gov/ERF/ERFview/viewdoc.aspx?docid=479388**

- A 2021 report by graduate researchers from the La Follette School of Public Affairs to the Office of Energy Innovation at the Wisconsin Public Service Commission found that low-income households have low elasticity of demand for energy, and that areas with high energy burdens were less likely to have partner retailers or higher, income-based incentives provided by the Focus on Energy program (Downer et al 2021). Data used in this analysis included energy burden estimates from the LEAD Tool and Focus on Energy program data, examined at both the county and census tract level.
- A 2021 report on energy burden in Milwaukee found major disparities among racial and ethnic groups, with the average energy burden in Black and Hispanic/Latinx neighborhoods approximately double that of predominantly white neighborhoods (Sierra Club 2021). A 2024 update came to similar conclusions (Sierra Club 2024). Both analyses draw upon energy cost and burden estimates from the LEAD Tool.
- Historically, Fisher Sheehan & Colton have published a *Home Energy Affordability Gap* for each state, which uses a bottom-up approach to project estimated residential energy bills for low-income household segments by county, determines what an affordable energy bill would be (using 6 percent energy burden as the threshold) for each household segment, and determines the affordability gap (difference between estimated bills and affordable bills) for each household segment.[20] The most recent *Home Energy Affordability Gap* was published in April 2023 for the 2022 calendar year. Table 4 provides an overview of Fisher, Sheehan & Colton's *Home Energy Affordability Gap* identified for Wisconsin for the three most recent years available.

Table 4. Wisconsin Energy Affordability Gap Reported by Fisher Sheehan & Colton

	2020	2021	2022
Home Energy Affordability Gap (millions)	$782.3	$834.9	$1,073.6
Home Energy Affordability Gap Index (2011 = 100)	86.5	92.3	118.7

Source: Fisher Sheehan & Colton, Home Energy Affordability Gap

Framework for Wisconsin-Specific Energy Affordability Metrics

The project team recommends a multipronged framework for assessing energy affordability among Wisconsin residential ratepayers. Many of the recommended metrics are consistent with what stakeholders have identified in Wisconsin's PBR work conducted for the Roadmap to Zero

[20] For more information on Fisher, Sheehan & Colton's *Home Energy Affordability Gap,* see: **http://www.homeenergyaffordabilitygap.com/index.html**

Carbon.[21] The following section provides a description of data sources for the framework, an overview of the recommended metrics, a description of the relevant data sources, and a preliminary analysis using the framework and data sources.

Overview of Data Sources Recommended for Framework

This section provides an overview of data sources to be used in calculating metrics recommended for the energy affordability framework.

1. **Residential Energy Consumption Survey (RECS).** The RECS is a nationally representative household survey, administered by the Energy Information Administration (EIA) within the U.S. Department of Energy, that collects energy use and expenditures data along with household and housing unit characteristics. The RECS is fielded periodically (typically every four or five years), with 2020 being the most recent iteration of the survey. The sample size of the 2020 RECS was sufficient to allow for state-level analyses. Using the public use microdata allows for custom analysis of energy use and expenditures in Wisconsin (with some caveats around the sample size of some subgroups of households). The next iteration of the RECS will begin fielding in September 2024. It is expected that the sample size of the 2024 RECS also will allow for state-level analysis. EIA plans to release initial data from the 2024 RECS in early 2026.[22]
2. **American Community Survey (ACS).** The ACS is an annual survey conducted by the U.S. Census Bureau that gathers data on the U.S. population. Data are available at multiple levels of geography, including state, county, census tract, and zip code equivalents, using summary tables published by the U.S. Census Bureau. Custom analysis is possible using the Public Use Microdata Sample (PUMS) file for states and public use microdata areas (PUMAs). The ACS is a useful source of household income information that can be combined with the RECS to examine group average energy burdens for different household segments. The ACS also collects self-reported energy cost data from respondents and serves as an input to the LEAD Tool (description below).
3. **Low Income Energy Affordability Data (LEAD) Tool.** The LEAD Tool is maintained by the National Renewable Energy Laboratory (NREL) and is "designed to help states, communities and other stakeholders create better energy strategies and programs by improving their understanding of low-income housing and energy characteristics."[23] ACS data are used as inputs to the LEAD Tool, which allows users to examine average energy costs and burden by state, county, city, census tract, and tribal area. Estimate of energy expenditures in the LEAD Tool are based on a combination of estimates from the ACS

[21] Wisconsin PSC Docket 5-EI-158: **https://apps.psc.wi.gov/APPS/dockets/content/detail.aspx?id=5&case=EI&num=158**
[22] More information on the 2024 RECS status is available at: **https://www.eia.gov/consumption/residential/status/**
[23] About LEAD Tool: **https://www.energy.gov/scep/slsc/lead-tool**

Public Use Microdata Sample (PUMS) files and Summary Tables.[24] Currently, the LEAD Tool is updated approximately every two ACS years (e.g., 2018 ACS 5-year data, 2020 ACS 5-year data, etc.). The energy burden examples in this report derived using the LEAD Tool are based on 2020 ACS 5-year data. However, a new version of the LEAD Tool was published in mid-July 2024 using 2022 ACS 5-year data.

4. **WHEAP Data.** As part of its federal reporting requirements to the U.S. Department of Health and Human Services, the Division of Energy, Housing and Community Resources (DEHCR) within Wisconsin's Department of Administration (DOA) reports data annually on the number of households served by the WHEAP program, the energy bills and burdens of those households, and the number of disconnections restored or prevented as a result of households receiving federally-funded WHEAP benefits. Energy bill data covering a 12-month period is gathered by DEHCR from utility and fuel vendors for individual WHEAP recipients and combined with household income and WHEAP benefit data for that fiscal year to analyze average energy burden across households. In addition to reporting on households served by WHEAP using federal funds, DEHCR publishes caseload and payment/services reports that cover both federally-funded and Public Benefits (PB) charge-funded heating, non-heat electric assistance, crisis assistance, and HVAC benefits.
5. **Utility Annual Reports.** Regulated utilities in Wisconsin report data on residential arrearages and disconnections with the Commission in their annual reports. In 2021 and 2022, these data were reported as annual totals; beginning in 2023, utilities were required to report disconnection and arrearage data as quarterly totals in their annual reports. The data are reported in aggregate for each regulated utility's service territory. In addition, investor-owned utilities report data on average electricity costs and average natural gas costs by census tract where the IOUs have residential customers. These data are combined with median income estimates from the ACS to estimate average energy burden for the census tract, as well as income amounts corresponding to different thresholds of the HHS poverty guidelines, to project the affordability of average energy bills for customer groups at different income levels.

While each of these data sources provides valuable information to assess the energy affordability challenges faced by Wisconsin households, each has limitations.

- RECS:
    - Survey conducted periodically, not annually
    - Limited geographic precision, statewide estimates only
    - Small sample sizes for certain subgroups
- ACS:
    - Energy costs self-reported, not based on analysis of actual utility bills

[24] A detailed discussion of the LEAD Tool methodology is available at: **https://www.nrel.gov/docs/fy19osti/74249.pdf**

    - Electricity and natural gas costs collected for previous month and annualized multiplying by 12 months; limits ability to examine individual energy burdens, and accuracy of averages depends on how well the sample aligns with the population
- LEAD:
    - Based on self-reported energy costs from ACS, inherits limitations of ACS
    - Projections from larger geographic area to smaller geographic area using an algorithm resulting in unknown precision/uncertainty; areas with small populations likely with high uncertainty[25]
    - Can only examine group average burden, not individual burdens
    - Based on 5-year ACS data, limiting ability to track changes over time with annual updates
- WHEAP data:
    - Energy burden data reported publicly provide group averages only and statewide outcomes and impacts. However, the granularity of the data collected by the WHEAP program (annual energy bills, income, and benefits for individual clients) would allow for analysis of the distribution of energy burdens or regional breakdowns.
    - The WHEAP program only collects these data for low-income households receiving WHEAP benefits. Data for other low-income households not participating in the program are not collected, and likewise for non-low-income households or nonresidential customers.
- Utility annual report data: the project team reviewed data reported by utilities and identified data quality issues and conceptual limitations in the current framework.
    - Arrearage and disconnection data:
        - Incorrect reporting of quarterly totals—some utilities have reported a running total, while others have reported distinct totals by quarter as instructed by the Commission.
        - Reporting service territory totals but not finer geographic resolution (e.g., totals by zip code or census tract) limits the ability to identify areas facing disproportionate energy insecurity challenges.
        - Reporting totals for residential customers only limits the ability to identify areas with non-residential customers facing disproportionate energy insecurity challenges.
        - Reporting all residential customers as a single group, rather than disaggregating by customers participating in energy assistance programs

[25] NREL has conducted assessments of how well the estimates in the LEAD Tool align with other public data sources and generally found agreement. However, they noted areas of small populations being of concern, and updated assessments have not been published for more recent versions of the LEAD Tool.

versus those not participating, limits the ability to identify the impacts of energy assistance programs.
        - Reporting quarterly totals facilitates temporal analysis of energy insecurity issues but submitting the data in an annual report (and not at the conclusion of the quarter) limits the ability to use the data to address energy insecurity issues while they occur. Reporting quarterly totals on a quarterly basis would provide greater ability to understand temporal issues and address them more quickly; reporting monthly totals on a monthly basis would provide even greater ability to understand and address energy affordability challenges.
    - Energy cost data and burden estimates:
        - Including data for residential customers who did not have accounts with the utility for the full year (e.g., customers who moved into or out of the service territory during the year). Including partial year customers reduces the average annual electricity and natural gas costs where prevalent, and this impact likely is uneven throughout the state (e.g., areas with a greater share of renters).
        - Data for census tracts where the utility has a limited number of customers. These data may not be representative of the entire census tract.
        - Utility reported number of customer accounts that exceed the estimated number of households in a census tract. In some cases, this may be an indicator that the data include residential customers with partial year data (because there may be multiple customers at a single residence in a given year when customers move into and out or service territories). However, when the difference between utility reported number of customer accounts and estimated number of households is substantial, this may also be an indicator that data were queried incorrectly.
        - Data quality issues implied by outliers., e.g. extremely low or extremely high average electricity or natural gas costs for a census tract. In some cases, IOUs consistently reported average electricity or natural gas costs much lower than statewide averages or census tract estimates from different sources (i.e., RECS, LEAD Tool).
        - For combined utilities providing both electricity and natural gas to customers, adding together the average electricity and natural gas costs presents conceptual challenges unless the underlying customer base for those estimates is the same (i.e., every customer in the census tract has an electric and natural gas account with that utility). The reporting framework would be improved if combined utilities reported separately on (1) customers with only an electric account, (2) customers with only a natural

gas account, and (3) customers with both an electric and natural gas account.

- Inability to tell which customers are electric heat. A utility that only provides electricity to a customer does not know whether the customer heats with electricity or another fuel (e.g., propane or fuel oil, or with natural gas if another utility serves the area with natural gas). (Note: it may be possible for utilities to infer if a customer uses electricity as their primary heating fuel based on usage analysis, but it would be a complicated procedure that would place considerable administrative burden on the utilities.) This impacts the ability to assess energy burden in a census tract comprehensively.
- Multiple utilities providing the same service in a census tract. To assess electricity costs and burden or natural gas costs and burden in a census tract with multiple utilities providing services, the Commission may need to calculate a weighted average cost.

If IOU-reported energy cost data are to be incorporated into the framework, the project team recommends first addressing these data quality and conceptual concerns.

Overview of Recommended Metrics

Energy Burden

Based on data currently available, the project team recommends the following framework for examining energy burden:

1. **Establish statewide energy burden baselines:** Examine statewide baseline average energy costs, average energy burden, and distribution of energy burdens for key household segments using data from the Residential Energy Consumption Survey RECS and ACS. Because the RECS is conducted periodically, if incorporated into the framework, the Commission could update baseline estimates from the RECS to a target year using weather and fuel price adjustments, adjusting weather-dependent consumption and expenditures (heating and cooling usage) based on the ratio of target year weather data to RECS year weather data; and further adjusting based on the ratio of target year fuel prices to RECS year fuel prices.[26] While this adjustment procedure does not capture other changes in energy consumption made following the RECS (e.g., energy efficiency improvements), it would provide estimates that are sensitive to major factors influencing energy costs and burden.

[26] The LIHEAP Home Energy Notebook: Low Income Home Energy Data Report published by the Division of Energy Assistance, Office of Community Services, Administration for Children & Families and the U.S. Department of Health & Human Services provides an example of updating RECS estimates with weather and fuel price adjustment factors: **https://www.acf.hhs.gov/sites/default/files/documents/ocs/RPT_LIHEAP_HEN01HEData_FY2020.pdf**

2. **Examine regional average energy burdens:** At present, the project team views the LEAD Tool as the best source for examining and tracking average energy costs and burden regionally at the county-level and by census tract. Reexamining these estimates as the LEAD Tool is updated by NREL on a regular basis will enable the Commission to assess average energy costs and burden for key household segments (e.g., low-income, moderate-income, and higher income households; owners and renters; households using electricity or natural gas as their primary heating fuel; etc.) and identify areas where energy affordability challenges are most pronounced.

Opportunities for Improvement

The project team also recommends that the Commission consider the following to improve the framework over the long term:

1. **Use updated LEAD Tool estimates.** At the time that the project team gathered data from the LEAD Tool, users could not download the census tract estimates in bulk with natural gas costs/burden, electricity costs/burden, and other fuel costs/burden separated out from total energy costs/burden. NREL has since updated the LEAD Tool to incorporate this functionality, and the LEAD Tool also has been updated to use 2022 ACS data. Using LEAD Tool data with fuel costs/burden broken down by fuel type would enable more granular analysis of heating fuel and electricity costs, and better comparison with IOU-reported average energy costs by census tract.
2. **Partner with DEHCR to analyze energy burden of WHEAP recipient households in more detailed ways than currently available through public reports.** As mentioned in the overview of data sources, the DEHCR already collects detailed utility bill and income information for households participating in DEHCR energy affordability programs. While the public reports that the DEHCR submits to the federal LIHEAP program provide insight into the average energy costs and burden of these households, more granular analysis is possible using these data including (1) analysis of the distribution energy burdens and the share of WHEAP-assisted households with an unaffordable energy burden before and after factoring in program benefits, (2) regional analysis, and (3) examining the combined impacts of federally-funded benefits and benefits coming from the state's public benefits charge. While the data from DEHCR do not represent all residential customers, the data collected by DEHCR can provide unique insights into the energy affordability challenges among lower income households accessing energy assistance programs administered by DEHCR.
3. **Work with utilities to improve reporting of average electricity and natural gas costs by census tract.** Based on the limitations noted above with respect to the energy cost data reported by IOUs, the project team views certain improvements as necessary before incorporating the data into an energy burden framework. However, these improvements will place additional administrative burden on utilities; before deciding whether to implement this recommendation, the Commission should consider the tradeoff between

the additional administrative burden and the value added relative to what is available through the LEAD Tool and/or data available for low-income households served by DEHCR programs.

- **Top areas to address with the utilities include**:
  - Ensuring average bills are based on customers with bill data covering the full analysis period (i.e., 12 months of data). If this were implemented, utilities should still report the total customers in each census tract for the Commission to understand where the utilities are providing services, but also report a separate number of customers with bill data covering the full analysis year.
  - For combined utilities, report separately on customers with only an electric account, only a natural gas account, and both an electric and natural gas account.
  - Ensuring proper and consistent quality assurance checks are used, e.g. examining data outliers such as customers with very low or very high energy bills, or census tracts with a number of accounts vastly excluding the household population.
- **Additional items for the Commission to consider post-reporting include**:
  - Calculating the energy burden estimates instead of utilities to ensure that the median income and poverty guideline estimates are used correctly and consistently.
  - Suppressing data for census tracts where a utility only serves a limited number of customers. Making these data publicly available can lead to impressions that these data are representative of the census tract as a whole, and in cases where there are very few customers reported, could make the information identifiable.
  - Calculating weighted average energy costs for census tracts where multiple utilities operate.

Energy Affordability

Based on data currently available, the project team recommends the following framework for examining energy affordability:

1. **Track energy assistance and weatherization program participation:** Use data on WHEAP and Weatherization Assistance Program participation reported by DEHCR to track share of the income-eligible population served.
2. **Track energy burden outcomes for households participating in energy assistance programs:** Use energy costs and burden reported by DEHCR on WHEAP participants to track how the program impacts this subset of low-income households.
3. **Estimate and track energy affordability gap:** Estimate the energy affordability gap using multiple methods to develop a range of estimates. Use the 2020 RECS to estimate

the energy affordability gap using individual energy burdens and 2020 RECS in combination with the ACS to estimate the energy affordability gap using group average energy burdens.

Opportunities for Improvement

The project team also recommends that the Commission consider the following to improve the framework over the long term:

1. **Consider what an appropriate energy affordability target is for Wisconsin.** This report uses a six percent energy burden target for affordability, consistent with many other jurisdictions and the target commonly assumed by the industry. However, this target is based on decades-old national research. Energy costs in 2024 in Wisconsin differ from the nation, the state may have different goals when it comes to affordability, and a changing landscape might necessitate setting a different target for Wisconsin. For example:
    - What is an appropriate energy burden target for a household who drives an electric vehicle and charges at home?
    - Should the Commission have ***separate*** energy burden goals with respect to natural gas usage and electricity usage?
- Stakeholder engagement and additional research would be warranted if considering a different energy burden target.
2. **Partner with the DEHCR to examine energy affordability at a more granular level for WHEAP participants, including:**
    - **Examining distributions of individual energy costs and burden and the share of WHEAP participants with an unaffordable burden before and after receiving WHEAP benefits**. The data currently reported by DEHCR are group average values, which mask individual outcomes. Examining the distribution of energy costs and burden across WHEAP participating households would develop a more robust picture of individual energy burdens and the share of households with affordable/unaffordable bills than is possible using the RECS alone.[27]
    - **Developing an energy cost and burden report for non-heat electric WHEAP participants**, and a combined report across both heating and non-heat electric WHEAP recipient households. The energy cost and burden report data publicly available only includes WHEAP heating/crisis recipient households and corresponding benefits. Replicating this report for non-heat electric recipient households would provide a more robust picture of energy affordability outcomes and impacts in Wisconsin.

[27] For example, an energy burden analysis conducted for the District of Columbia LIHEAP program found that, while the group average energy burden of LIHEAP recipient households using natural gas as their main heating fuel was 4.8% after considering the LIHEAP benefit amounts, at an individual level, over one-third of the households had an unaffordable net energy burden (greater than six percent) after receiving their LIHEAP benefits (APPRISE 2018).

- **Examining energy costs and burden for WHEAP participants by utility and/or regionally**. This would provide insights into how energy affordability challenges among WHEAP-assisted households, and the impacts of energy assistance, vary among utilities and regions of the state.
- **Updating WHEAP applications to collect information on participation in utility affordability programs offered by IOUs**. This would provide insights into how those programs impact energy affordability for enrolled customers, in addition to the impacts DEHCR is able to assess for households receiving assistance through WHEAP.

Energy Insecurity

Based on data currently available, the project team recommends the following framework for examining energy insecurity:

1. **Track utility-reported arrearages:** Examine data on residential arrearages (number of customers with arrears, total amount of arrearages) reported by IOUs and other regulated utilities and calculate the average arrears per customer. Analyzing these data year-over-year for the same period, as well as across the seasons within a year, would provide information on whether energy insecurity challenges are growing and decreasing for residential customers. Given the winter moratorium on utility disconnections, examining how customer arrearages change throughout the moratorium (October to April) and after the moratorium could provide useful information on customer behaviors when facing energy affordability challenges.
2. **Track utility-reported disconnections and notices:** Examine data on residential disconnection notices and disconnections reported by IOUs and other regulated utilities. Analyzing these data year-over-year for the same period, as well as across the seasons within a year, would provide information on whether energy insecurity challenges are growing or decreasing for residential customers. Given the timeframe of the state's winter moratorium on utility disconnections, examining residential disconnection data in mid-April, July, and October, in the current and previous years, would provide a useful framework.
3. **Track WHEAP-reported service loss prevention/restoration occurrences and HE+ HVAC services:** Examine data on the prevalence of service loss prevention versus service loss restoration to assess whether the WHEAP program is reaching customers before or after service loss occurs by calculating the share of interventions where service loss was prevented (as opposed to restored), and examine Home Energy Plus (HE+) HVAC participation to understand how the program addresses inoperable or unsafe HVAC equipment among income-qualified residents.

Opportunities for Improvement

The project team also recommends that the Commission consider the following to improve the framework over the long term:

1. **Work with utilities to improve reporting of arrearage and disconnection data.** Utilities have reported quarterly arrearage and disconnection data differently—some reporting a discrete total for the quarter and others reporting a cumulative (running) total from start of the year to end of that quarter. Clarifying the instructions across utilities, conducting pre-reporting meetings as needed, and conducting quality assurance checks are needed to ensure that the quarterly data pulled into this framework are reported consistently across utilities.
2. **Partner with DEHCR to examine energy insecurity at a more granular level for WHEAP participants.** Work with DEHCR to assess service loss prevention/restoration data collected for WHEAP-assisted households by utility and/or regionally to understand where there are differences in the rate of service loss prevention versus restoration.
3. **Consider changes to data and frequency reported by utilities, including having utilities:**
    - Report monthly totals rather than quarterly totals to improve the granularity of the data and ability to track and understand changes (e.g., impacts of price changes and other events) over time more precisely. Requiring utilities to report monthly totals rather than quarterly totals also would align with a proposed data collection by EIA at the national level to collect monthly disconnection and reconnection data from electric and natural gas utilities in a new annual survey.[28]
    - Report data to the Commission on a quarterly or monthly basis in addition to their annual report. This would provide more real-time access to assess energy insecurity challenges and identify issues as they arise as opposed to after the fact.
    - Report arrearage and disconnection data separately for residential customers where the utility has received a WHEAP benefit and residential customers where the utility has not. While customers receiving WHEAP benefits do not represent all low-income households in the state, having utilities report their data separately for these groups of customers could still be useful to track and compare the number and percent of residential accounts in arrears or with disconnections based on whether or not they are WHEAP recipients. Areas where there are high numbers or shares of non-WHEAP residential customers in arrears or with disconnections could be an indicator that existing affordability programs are not reaching these customers and outreach or other actions are needed.

[28] EIA has proposed a new effort to collect data on termination notices, disconnections, and reconnections due to bill nonpayment for residential customers (including multifamily) from electric and natural gas utilities above a certain size. The comment period for this data collection effort closes on August 19, 2024. More information is available in the EIA's Federal Register Notice (Vol. 89, No. 119): **https://www.federalregister.gov/documents/2024/06/20/2024-13457/agency-information-collection-proposed-new-survey**

- Report arrearage and disconnection data for nonresidential customers to understand energy insecurity challenges among other customer classes.
- Report arrearage and disconnection data by zip code or census tract. This would provide more granular information on geographic locations where there are energy insecurity issues.
- Report additional tracking metrics including customers on DPAs or participating in AMPs, number of reconnections, and accounts in arrears for 30, 60, and more than 60 days.

4. **Updating Commission reporting system and make data publicly available in more usable formats.** Based on current functionality of the Commission reporting system, having utilities provide arrearage and disconnection data at a more regular frequency and/or by zip code or census tract in Excel-based files that are made publicly-available for download following review by the Commission would provide valuable information to stakeholders to identify priority areas for outreach and advocacy. Over the longer term, developing a reporting system where utilities can upload their data in a standardized format, from which data points could be combined for analysis (e.g., combining customer counts with arrearage and disconnection data from separate sections of reports) and visualized in an interactive, web-based tool could provide a valuable means for tracking these data over time and identifying priority areas.

Analysis Using Recommended Framework

This section is intended to provide an overview of the types of analyses possible, and the current state of energy burden, affordability, and insecurity challenges in Wisconsin, using the framework discussed above.

Energy Burden

Statewide Energy Burden Analysis

Table 5 to Table 12 provide an overview of residential energy costs and burden statewide. These estimates, derived from the 2020 RECS (in combination with the 2021 ACS where noted), provide a starting point for understanding energy burden in Wisconsin. For demonstrating the types of analyses to inform an energy burden metrics framework, the estimates in these tables are based on the unadjusted 2020 RECS and therefore represent the costs and burden in 2020. As noted above, the RECS is fielded periodically (typically every four or five years), with the next iteration being fielded in Fall 2024 with initial data slated to be released in 2026. To inform a framework that tracks energy burden and affordability on an annual basis, weather and price adjustments could be made to the RECS to project energy costs and burden to a target period, as discussed above.

While the Commission has oversight over most electricity and natural gas usage in the state, the following section includes analysis of energy costs and burden for all fuel types (as well as households using electricity or natural gas as their primary heating fuels) to provide a more holistic view. While the Commission does not have oversight over the propane or other delivered fuels some households use for heating and water heating, those households still face a significant electricity burden over which the Commission often does have regulatory oversight.

Table 5 shows average total residential energy costs and burden by main heating fuel, and Table 6 shows the same for additional household and housing unit characteristics. Overall, total residential energy costs averaged just under $1,800 in 2020. Based on average (mean) income from the 2021 ACS, this equates to an average group total residential energy burden of about two percent. However, when examining individual energy burdens calculated from the 2020 RECS (based on using the midpoint of the income category reported by the respondent), the average of individual energy burdens is approximately 5.6 percent. The difference between the group average and individual average energy burdens suggests that while residential energy costs are affordable to the group as a whole, this can mask energy affordability challenges of individual households, who may face very different energy burdens than the group average. (This is examined further below in analysis of the distribution of individual energy burdens in Table 11 and Table 12.)

Average total residential energy costs are lower for households using electricity as their main heating fuel compared to those using natural gas or propane. However, these households have lower average income and have a similar average group total residential energy burden to households using natural gas as their main heating fuel.

Table 5. Total Residential Energy Costs and Burden by Main Heating Fuel

Main Heating Fuel	Number of Households (ACS)	Mean Total Residential Energy Costs (RECS)	Mean Income (ACS)	Mean Group Total Residential Energy Burden (RECS / ACS)	Mean Individual Total Residential Energy Burden (RECS)
Natural gas	1,594,035	$1,755	$92,949	1.89%	5.11%
Electricity*	418,667	$1,299	$72,069	1.80%	6.31%
Propane*	297,980	$2,506	$91,497	2.74%	6.24%
Total	2,449,970	$1,779	$88,326	2.01%	5.62%

Sources: 2021 ACS, 2020 RECS; *sample size less than 50 in RECS; other heating fuels not shown separately but included in 'Total' row; mean individual energy burden calculated using income midpoint in 2020 RECS.

While total residential energy costs are lower on average for households with lower incomes, their average energy burden is much higher due to disproportionately lower income levels. For

example, households with income at or below 30 percent of state median income (SMI) have an average group residential energy burden that of about 13 percent and an average individual residential energy burden greater than 21 percent. Their average group total residential energy burden is eight times higher than that of households with income greater than 80 percent SMI, and 10 times higher when measured using the average individual total residential energy burden. Table 6 (next page) provides additional group and individual average energy burden estimates across income levels, homeownership status, and housing type.

Table 6. Total Residential Energy Costs by Additional Characteristics

Household Group	Number of Households (ACS)	Mean Total Residential Energy Costs (RECS)	Mean Income (ACS)	Mean Group Total Residential Energy Burden (RECS / ACS)	Mean Individual Total Residential Energy Burden (RECS)
State Median Income (SMI) Level					
At or below 30% SMI	267,326	$1,320	$10,336	12.77%	21.05%
At or below 60% SMI	643,017	$1,470	$22,374	6.57%	12.21%
At or below 80% SMI	945,062	$1,510	$30,607	4.93%	9.71%
Above 80% SMI	1,504,908	$2,009	$124,572	1.61%	2.12%
HHS Poverty Guidelines (HHSPG)					
0-100% HHSPG*	231,845	$1,348	$9,404	14.34%	23.39%
>100-200% HHSPG	331,155	$1,477	$28,207	5.23%	5.73%
>200-300% HHSPG	389,085	$1,655	$47,512	3.48%	3.63%
>300-400% HHSPG	383,515	$1,893	$66,819	2.83%	3.05%
>400% HHSPG	1,114,370	$2,073	$144,263	1.44%	1.60%
Tenure					
Owner	1,673,135	$2,026	$104,304	1.94%	3.79%
Renter	745,514	$1,195	$54,267	2.20%	8.91%
Housing Unit Type					
Single-family detached	1,634,221	$2,052	$103,894	1.98%	4.52%
Single-family attached*	115,853	$1,743	$79,793	2.18%	11.32%
Multifamily 5+ units*	391,278	$1,058	$53,049	2.00%	6.76%

Sources: 2021 ACS, 2020 RECS; *sample size less than 50 in 2020 RECS; households occupying their home without payment of rent are not included due to small sample size; estimates specific to households residing in mobile homes or 2-4 unit apartment buildings are not shown under 'Housing Unit Type' due to small size sizes; SMI and HHSPG categories determined based on income midpoint and household size in 2020 RECS; mean individual energy burden calculated using income midpoint in 2020 RECS.

Table 7 to Table 10 take a more detailed look at costs for end uses and fuel types. Table 7 shows average residential space heating costs and burden by main heating fuel. This includes all energy costs attributed to space heating end uses, including both primary and supplemental heating fuels. Across all fuel types, Wisconsin households spent on average about $633 on space heating costs in 2020, equating to an average group residential space heating burden of about 1.3 percent. Average space heating costs for households using natural gas or electricity were lower on average, about $576 and $540, respectively, with average group space heating burdens less than one percent.

Table 7. Residential Space Heating Costs by Main Heating Fuel

Main Heating Fuel	Number of Households (ACS)	Mean Residential Space Heating Energy Costs (RECS)**	Mean Income (ACS)	Mean Group Residential Space Heating Energy Burden (RECS / ACS)	Mean Individual Residential Space Heating Energy Burden (RECS)
Natural gas	1,594,035	$576	$92,949	0.62%	1.55%
Electricity*	418,667	$540	$72,069	0.75%	2.35%
Propane*	297,980	$1,163	$91,497	1.27%	2.75%
Total	2,436,389	$633	$88,433	0.72%	2.08%

Sources: 2021 ACS, 2020 RECS; *sample size less than 50 in 2020 RECS; **includes usage from heating equipment and air handler to supply heat, excludes humidifiers and fans; other heating fuels not shown separately but included in 'Total' row; excludes households who do not heat their homes; mean individual energy burden calculated using income midpoint in 2020 RECS.

Table 8 shows average electricity costs and burden by main heating fuel type. Of note, the average electricity costs for households using natural gas as their main heating fuel are similar to the average energy costs of households using electricity as their main heating fuel. This is largely driven by type of housing unit and size of home, with households using electricity as their main heating fuel more likely to reside in large multifamily buildings with five or more units and have homes that are about 60 percent the size of those of households using natural gas as their main heating fuel, based on conditioned floor area.

Table 8. Residential Electricity Costs and Burden by Main Heating Fuel Type

Main Heating Fuel	Number of Households (ACS)	Mean Electricity Costs (RECS)	Mean Income (ACS)	Mean Group Electricity Burden (RECS / ACS)	Mean Individual Electricity Burden (RECS)
Natural gas	1,594,035	$1,191	$92,949	1.28%	3.47%

Main Heating Fuel	Number of Households (ACS)	Mean Electricity Costs (RECS)	Mean Income (ACS)	Mean Group Electricity Burden (RECS / ACS)	Mean Individual Electricity Burden (RECS)
Electricity*	418,667	$1,236	$72,069	1.71%	6.17%
Propane*	297,980	$1,434	$91,497	1.57%	3.79%
Total	2,449,970	$1,233	$88,326	1.40%	4.02%

Sources: 2021 ACS, 2020 RECS; *sample size less than 50 in 2020 RECS; other heating fuels not shown separately but included in 'Total' row; mean individual energy burden calculated using income midpoint in 2020 RECS.

Table 9 shows the breakdown of average fuel costs by main heating fuel. This table shows that households typically incur energy costs for their main heating fuel and electricity only—while some households use additional fuels (e.g., a home heated with electricity may use natural gas or propane for water heating or cooking), that usage is minimal on average.

Table 9. Residential Fuel Costs by Main Heating Fuel

Main Heating Fuel	Average Main Heating Fuel Costs	Average Electricity Costs	Average Other Fuel Costs	Average Total Residential Energy Costs
Natural gas	$559	$1,191	$4	$1,755
Electricity*	$1,236	n/a	$63	$1,299
Propane*	$1,071	$1,434	$0	$2,506

Source: 2020 RECS; *sample size less than 50 in 2020 RECS.

Table 10 shows the share of households using air conditioning in Wisconsin (92 percent) and the average residential space cooling costs and burden. Air conditioning costs are about nine percent of the average total residential energy costs for households that use air conditioning and contribute about 0.4 percent energy burden on average for individual households.

Table 10. Residential Air Conditioning (Cooling) Costs and Burden[29]

Primary AC Equipment Type	Share of Households Using Air Conditioning (RECS)	Mean Residential Space Cooling Energy Costs (RECS)*	Mean Income (ACS)	Mean Group Residential Space Cooling Energy Burden (RECS / ACS)	Mean Individual Residential Space Cooling Energy Burden (RECS)
Total	92%	$164	$88,326	0.19%	0.42%

Sources: 2021 ACS, 2020 RECS; *includes usage from air conditioning equipment and air handler to supply cooling, excludes dehumidifiers and fans.

Table 11 and Table 12 show the distribution of households by individual energy burdens, for all households, low-income households, and main heating fuel. Overall, about 80 percent of Wisconsin households have an energy burden below six percent. However, only 44 percent of low-income households have energy burdens below this threshold.

Table 11. Individual Total Residential Energy Burden: Share of Households by Income Group

Total Energy Burden	All Households	Low-Income Households
0-<3%	54.1%	11.0%
3-<6%	26.9%	32.8%
6-<10%	10.5%	30.8%
10-<15%	2.5%	7.4%
15-<20%	0.9%	2.6%
20%+	5.1%	15.5%
Total	100.0%	100.0%

Source: 2020 RECS; low-income households based on income at or below 60% State Median Income (SMI), the income-eligibility standard for Wisconsin's LIHEAP program; individual energy burden calculated using income midpoint in 2020 RECS.

Table 12. Individual Total Residential Energy Burden: Share of Households by Main Heating Fuel Type

Total Energy Burden	Natural Gas	Electricity*	Propane*
0-<3%	57.3%	50.4%	38.7%
3-<6%	27.1%	14.9%	40.4%
6-<10%	9.7%	13.3%	10.4%
10-<15%	1.4%	8.8%	2.5%

[29] The average residential space cooling costs for households using air conditioning equipment varies by type of equipment used. For households who primary equipment is a portable AC unit, the average annual space cooling costs were $93. For households using central ducted AC as their primary equipment, the average annual space cooling costs were $191.

Total Energy Burden	Natural Gas	Electricity*	Propane*
15-<20%	0.0%	6.3%	0.0%
20%+	4.4%	6.3%	8.1%
Total	100.0%	100.0%	100.0%

Source: 2020 RECS; *sample size less than 50 in 2020 RECS; individual energy burden calculated using income midpoint in 2020 RECS.

Countywide Energy Burden Analysis

The following tables and charts provide analysis of average total residential energy costs and burden across counties in Wisconsin, based on the LEAD Tool. Results are shown for different household groups (e.g., all households, households using utility gas as their main heating fuel, households using utility gas or electricity as their main heating fuel with income at or below 80 percent area median income (AMI), etc.). This is useful to developing a more geographically-granular understanding of average energy costs and burden than the RECS can provide, and for setting benchmarks against which utility-reported average energy costs can be assessed.

Table 13 shows the mean across countywide average energy costs, that is, the average and a set of averages. It also shows the median value and range (minimum and maximum) of average energy costs countywide for different groups of households. Figure 1 shows the distribution of average energy costs visually for a subset of household groups.

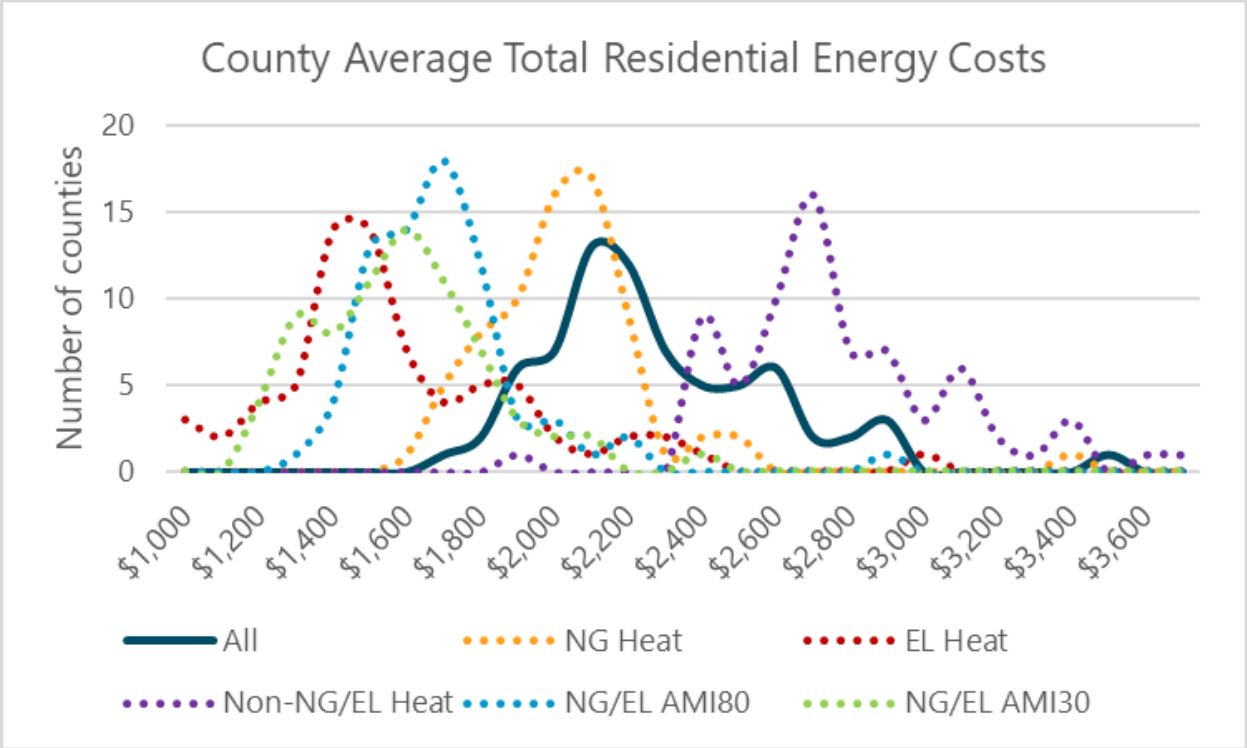
Table 13. Distribution of Average Total Residential Energy Costs Across Counties

Household group*	Number of counties	Average energy costs across counties				
		Mean	Standard deviation	Median	Range	
All	72	$2,227	$312	$2,154	$1,670	$3,443
Utility gas heat	71	$1,985	$246	$1,974	$1,515	$3,329
Electricity heat	70	$1,523	$356	$1,454	$850	$2,975
Non-utility gas/electricity heat	72	$2,728	$312	$2,672	$1,831	$3,614
Utility gas or electricity heat	71	$1,643	$240	$1,623	$1,270	$2,812
<=80% AMI	71	$1,643	$224	$1,623	$1,270	$2,812
<=30% AMI	71	$1,538	$231	$1,513	$1,138	$2,361
Owner	72	$2,079	$266	$2,032	$1,570	$3,555
Renter	71	$1,350	$252	$1,321	$993	$2,451
Home built 1979 or earlier	71	$1,926	$251	$1,905	$1,441	$3,381
Home built 1980-1999	71	$1,785	$235	$1,773	$1,368	$2,816

Household group*	Number of counties	Average energy costs across counties				
		Mean	Standard deviation	Median	Range	
Home built 2000 to present	70	$1,922	$268	$1,896	$1,341	$2,914
Single-family detached home	72	$2,097	$272	$2,071	$1,577	$3,592
Single-family attached home	49	$1,625	$170	$1,610	$1,299	$1,998
Multifamily 2-4 unit building	68	$1,416	$346	$1,317	$965	$2,781
Multifamily 5+ unit building	70	$800	$195	$790	$497	$1,537
Mobile/manufactured home	63	$1,813	$238	$1,819	$1,249	$2,730

Source: LEAD (based on 2020 ACS 5-year data); *excludes estimates for counties where less than 100 households in household group

Figure 1. Distribution of County Average Total Residential Energy Costs by Household Group



Source: LEAD Tool (based on 2020 ACS 5-year data)

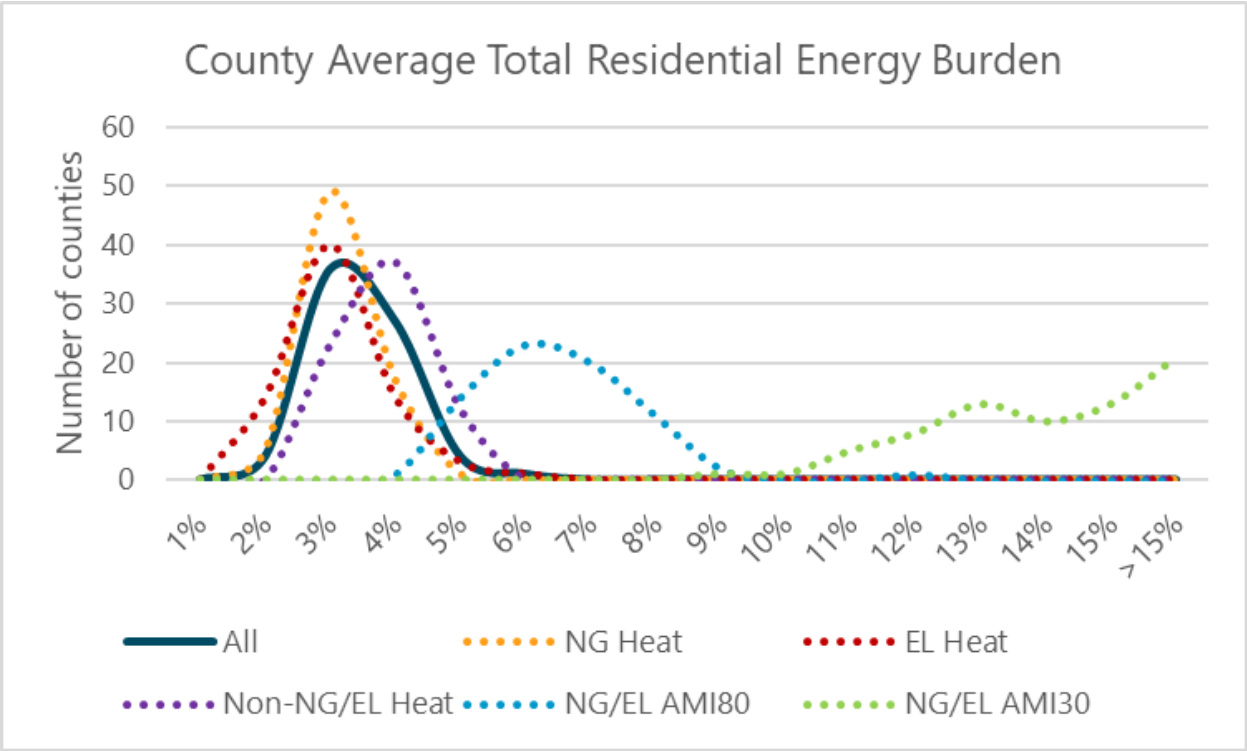
Like the previous table, Table 14 shows the mean, median, and range of average energy burdens across counties for different groups of households. Figure 2 shows the distribution of average energy burdens visually for a subset of household groups.

Table 14. Distribution of Average Total Residential Energy Burden Across Counties

Household group*	Number of counties	Average energy burden across counties				
		Mean	Standard deviation	Median	Range	
All	72	2.97%	0.69%	2.84%	1.68%	5.05%
Utility gas heat	71	2.65%	0.56%	2.55%	1.67%	4.95%
Electricity heat	70	2.70%	0.81%	2.65%	1.43%	5.83%
Non-utility gas/electricity heat	72	3.37%	0.62%	3.31%	2.24%	4.98%
Utility gas or electricity heat	71	5.98%	0.59%	5.87%	3.62%	11.27%
<=80% AMI	71	5.98%	1.21%	5.87%	3.62%	11.27%
<=30% AMI	71	13.89%	2.36%	13.70%	8.92%	21.35%
Owner	72	2.51%	0.53%	2.38%	1.53%	4.69%
Renter	71	3.29%	0.93%	3.14%	1.77%	6.81%
Home built 1979 or earlier	71	2.99%	0.59%	2.89%	1.99%	5.53%
Home built 1980-1999	71	2.34%	0.52%	2.25%	1.46%	4.36%
Home built 2000 to present	70	2.09%	0.55%	1.97%	1.22%	4.51%
Single-family detached home	72	2.56%	0.57%	2.44%	1.57%	4.94%
Single-family attached home	49	2.41%	0.54%	2.38%	1.46%	3.73%
Multifamily 2-4 unit building	68	3.42%	1.04%	3.18%	1.92%	7.30%
Multifamily 5+ unit building	70	2.40%	0.79%	2.30%	1.29%	5.54%
Mobile/manufactured home	63	4.07%	0.63%	4.06%	2.47%	5.60%

Source: LEAD Tool (based on 2020 ACS 5-year data); *excludes estimates for counties where less than 100 households in household group

Figure 2. Distribution of County Average Total Residential Energy Burden by Household Group



Source: LEAD Tool (based on 2020 ACS 5-year data)

Census Tract Energy Burden Analysis

Like the previous section, the following tables and charts provide analysis of average total residential energy costs and burden in Wisconsin, based on the LEAD Tool, but for census tracts. This is the most granular look at average energy costs and burden available using the LEAD Tool and provides a useful way for understanding the energy affordability challenges faced by different groups of households geographically throughout the state. Like the countywide estimates, it can also be viewed as a benchmark against which utility-reported average energy costs can be assessed.

Table 15 shows the mean, median, and range of average energy costs across census tracts for different groups of households. Figure 3 maps the distribution of average energy costs for a subset of household groups. Areas shaded blue have average total residential energy costs of $1,500 or less; areas shaded red have average total residential energy costs greater than $2,000, and areas shaded gold are in between. Table 17 and Table 18 show the top 10 census tracts based on highest average energy costs, for all households and households using utility gas or electricity as their main heating fuel, respectively.

Table 15. Distribution of Average Total Residential Energy Costs Across Census Tracts

Household group*	Number of census tracts	Average energy costs across census tracts				
		Mean	Standard deviation	Median	Range	
All	1,521	$2,040	$457	$2,046	$616	$4,996
Utility gas heat	1,467	$2,005	$342	$1,988	$739	$4,732
Electricity heat	1,169	$1,386	$490	$1,314	$555	$4,011
Non-utility gas/electricity heat	782	$2,552	$619	$2,587	$345	$6,382
Utility gas or electricity heat	1,496	$1,899	$378	$1,883	$618	$4,521
<=80% AMI	1,447	$1,649	$381	$1,643	$619	$3,894
<=30% AMI	887	$1,500	$489	$1,454	$538	$3,541
Owner	1,444	$2,124	$342	$2,081	$819	$5,303
Renter	1,290	$1,352	$414	$1,289	$479	$3,621
Home built 1979 or earlier	1,461	$1,925	$367	$1,916	$647	$4,527
Home built 1980-1999	1,076	$1,727	$458	$1,734	$527	$4,198
Home built 2000 to present	800	$1,841	$555	$1,843	$484	$5,057
Single-family detached home	1,451	$2,170	$344	$2,124	$1,361	$5,257
Single-family attached home	358	$1,678	$312	$1,651	$1,005	$3,426
Multifamily 2-4 unit building	756	$1,556	$444	$1,491	$544	$3,967
Multifamily 5+ unit building	852	$821	$257	$784	$57	$2,936
Mobile/manufactured home	82	$1,742	$387	$1,667	$1,182	$3,266
DOE DAC areas	290	$1,919	$409	$1,956	$797	$4,521

Source: LEAD Tool (based on 2020 ACS 5-year data); *excludes estimates for census tracts where less than 100 households in household group

Table 16 shows the mean, median, and range of average energy burdens across census tracts for different groups of households. Maps in Figure 4 show how average energy burdens vary geographically for different subsets of household groups (by heating fuel and income levels). Areas shaded blue have average energy burdens six percent or less; areas shaded gold and red have average energy burdens greater than six percent. Figure 5 shows how average energy costs and burden differ when estimates are countywide versus at the census tract level, using estimates for households using natural gas as their primary heating fuel in the southeastern corner of Wisconsin as an example; when viewed at a county level, average energy costs and

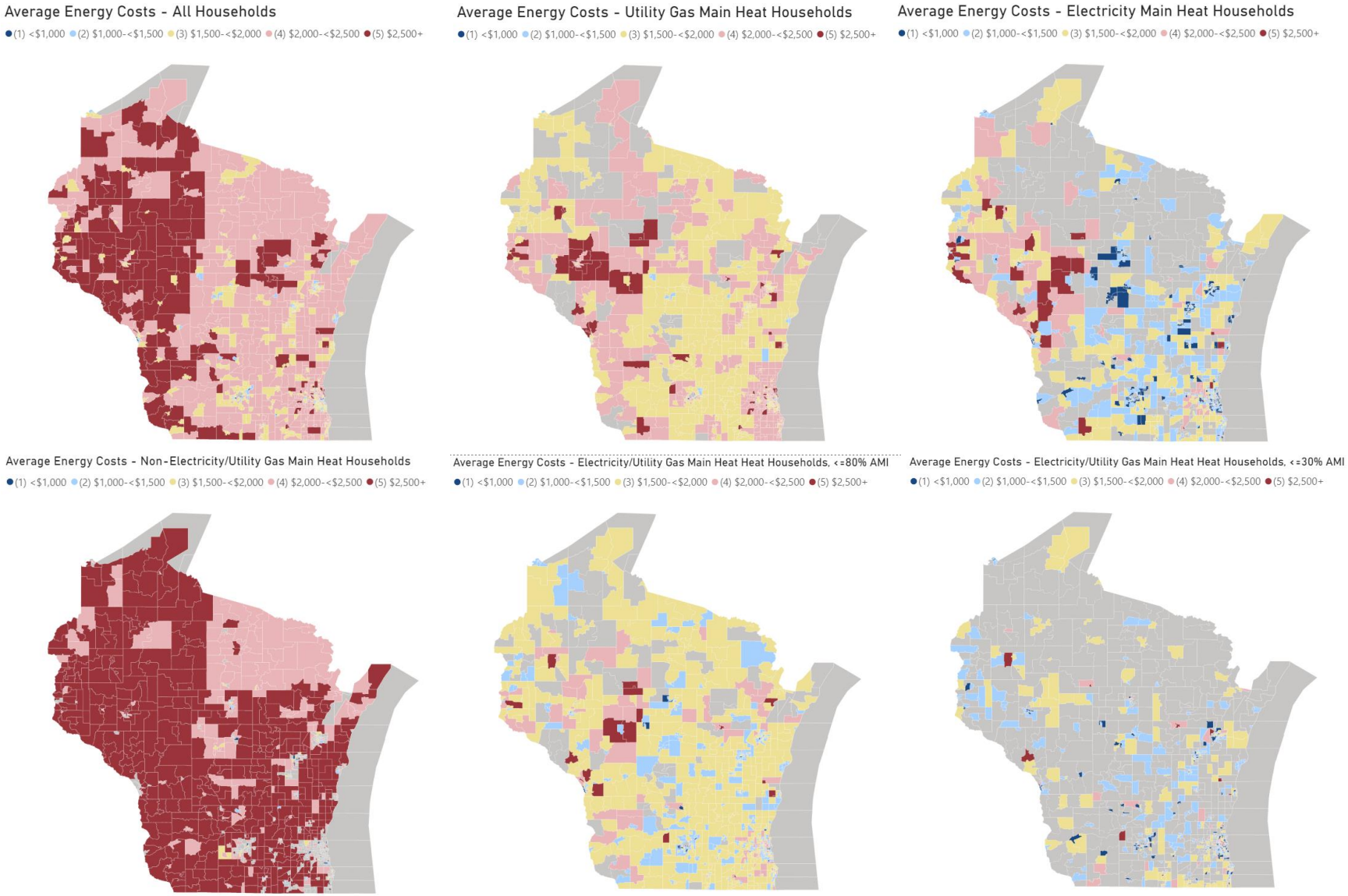
burden appear more uniform than when viewed at more granular geographic level. Table 19 and Table 20 show the top 10 census tracts based on highest average energy burdens, for all households and households using utility gas or electricity as their main heating fuel, respectively.

Table 16. Distribution of Average Total Residential Energy Burden Across Census Tracts

Household group*	Number of census tracts	Average energy burden across census tracts				
		Mean	Standard deviation	Median	Range	
All	1,521	2.76%	1.09%	2.53%	0.81%	9.40%
Utility gas heat	1,467	2.67%	1.13%	2.39%	0.96%	9.63%
Electricity heat	1,169	2.32%	1.03%	2.10%	0.70%	10.54%
Non-utility gas/electricity heat	782	3.21%	0.92%	3.10%	0.36%	8.37%
Utility gas or electricity heat	1,496	2.62%	1.07%	2.37%	0.82%	9.40%
<=80% AMI	1,447	5.55%	1.57%	5.31%	2.16%	14.01%
<=30% AMI	887	13.50%	5.28%	12.64%	4.38%	53.53%
Owner	1,444	2.43%	0.90%	2.26%	0.69%	8.68%
Renter	1,290	3.05%	1.41%	2.78%	0.69%	10.73%
Home built 1979 or earlier	1,461	2.87%	1.06%	2.62%	0.83%	9.76%
Home built 1980-1999	1,076	2.10%	0.68%	1.98%	0.66%	6.41%
Home built 2000 to present	800	1.80%	0.71%	1.71%	0.62%	10.77%
Single-family detached home	1,451	2.56%	1.08%	2.31%	0.96%	9.48%
Single-family attached home	358	2.39%	0.98%	2.15%	0.99%	7.21%
Multifamily 2-4 unit building	756	3.52%	1.64%	3.12%	0.84%	12.56%
Multifamily 5+ unit building	852	2.10%	1.09%	1.84%	0.27%	8.16%
Mobile/manufactured home	82	4.07%	1.78%	3.82%	1.76%	17.30%
DOE DAC areas	290	3.95%	1.37%	3.60%	1.73%	9.40%

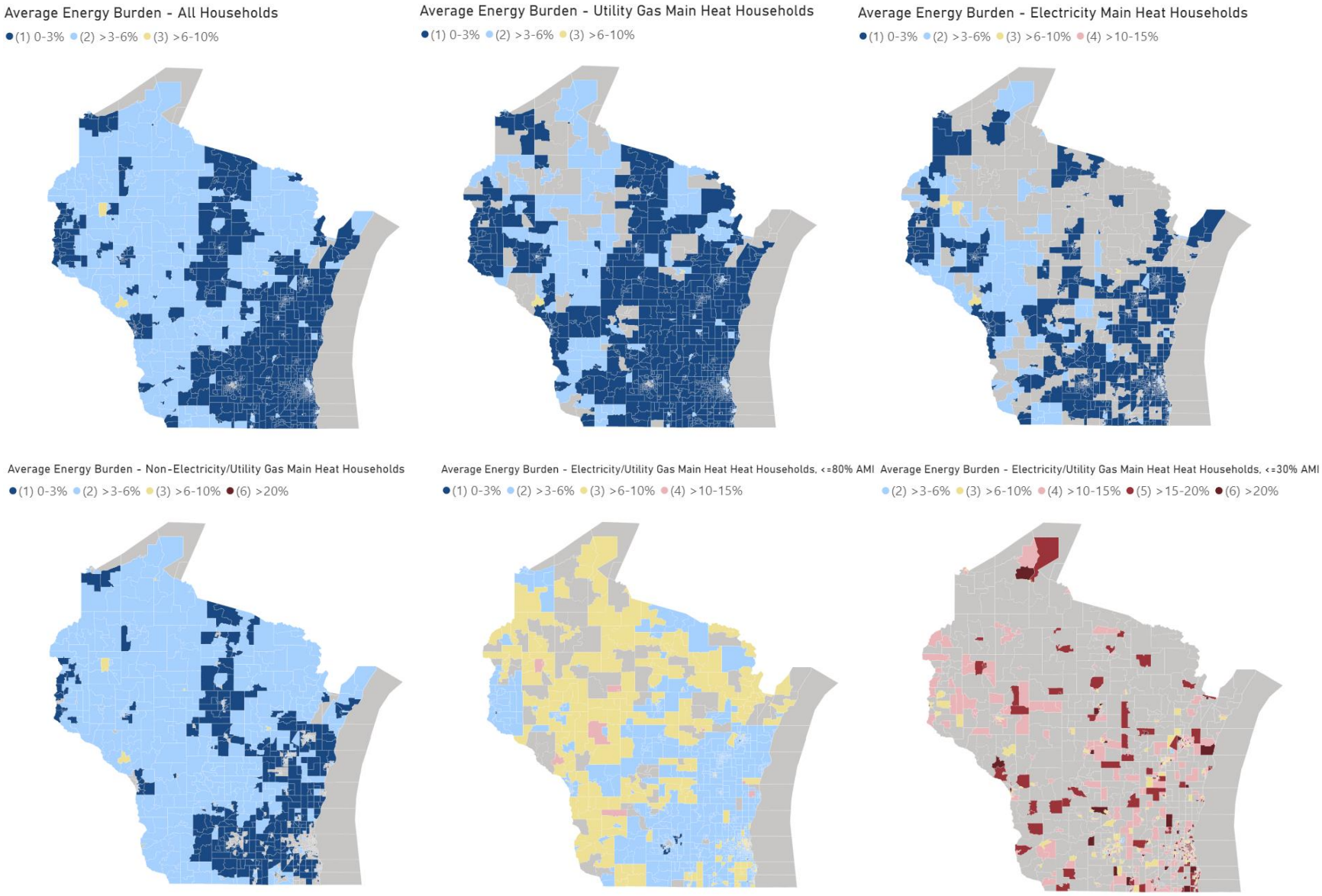
Source: LEAD Tool (based on 2020 ACS 5-year data); *excludes estimates for census tracts where less than 100 households in household group

Figure 3. Average Total Residential Energy Costs by Census Tract



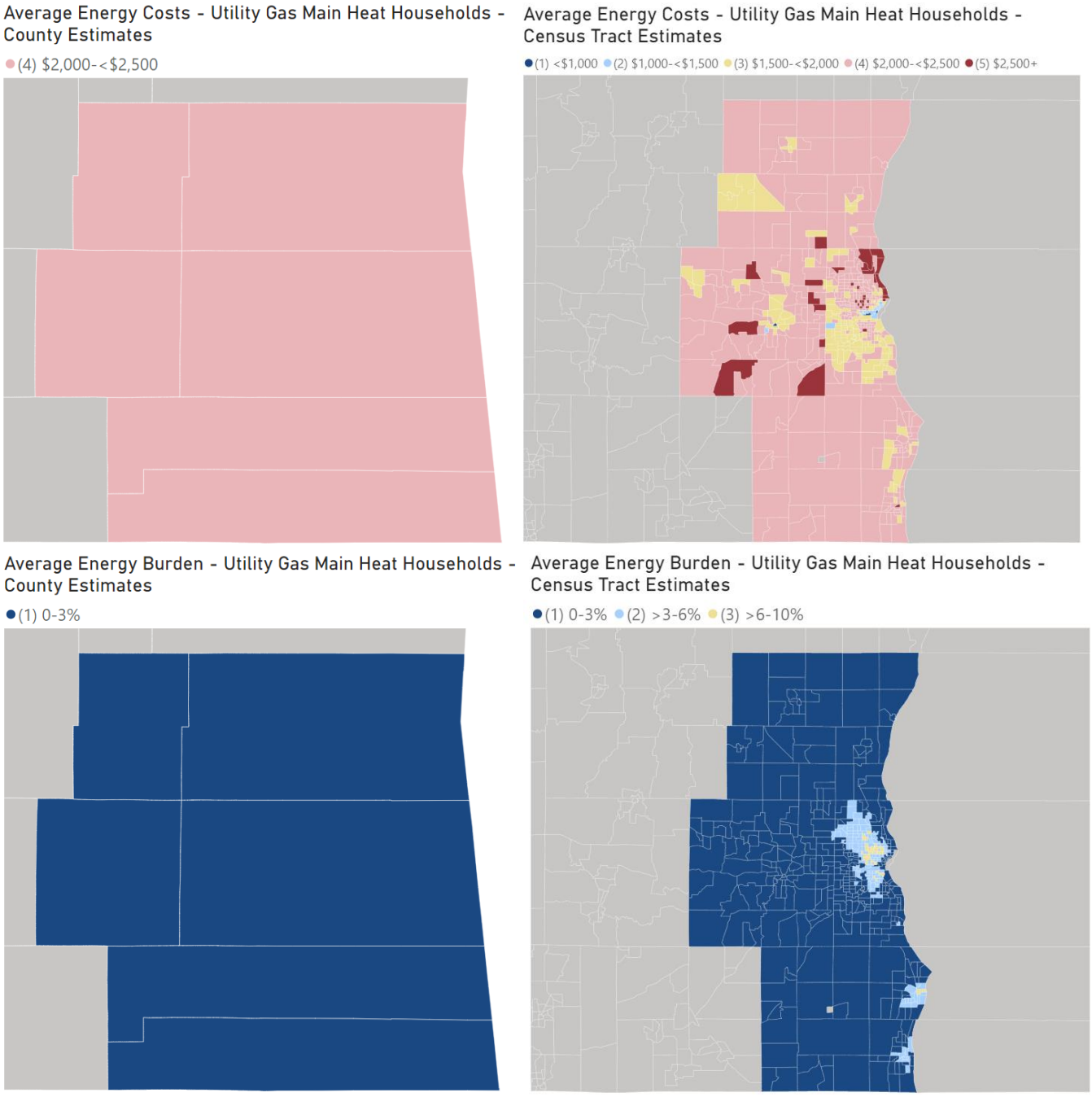
Source: LEAD Tool (based on 2020 ACS 5-year data); excludes census tracts where less than 100 households in household group.

Figure 4. Average Total Residential Energy Burden by Census Tract



Source: LEAD Tool (based on 2020 ACS 5-year data); excludes census tracts where less than 100 households in household group.

Figure 5. Average Total Residential Energy Costs and Burden in Southeast Wisconsin – County Level Estimates vs Census Tract Estimates – Household Using Natural Gas Main Heat



Source: LEAD Tool (based on 2020 ACS 5-year data); energy cost estimates shown in top maps (primarily shaded red); energy burden estimates shown in bottom maps (primarily shaded blue); county-level estimates shown on the left and census tract-level estimates shown on the right.

Table 17. Top 10 Census Tracts Based on Highest Average Annual Energy Costs—All Households*

Census Tract Number	Census Tract Name	Disadvantaged Community?**	Total Households	Average Annual Total Residential Energy Costs	Average Annual Income	Average Annual Total Residential Energy Burden
55121100600	Census Tract 1006, Trempealeau County	Yes	1,533	$4,996	$66,428	7.52%
55135101100	Census Tract 1011, Waupaca County	No	2,304	$4,074	$63,457	6.42%
55117010601	Census Tract 106.01, Sheboygan County	No	2,612	$4,007	$70,826	5.66%
55119960400	Census Tract 9604, Taylor County	No	2,044	$3,957	$72,343	5.47%
55005000400	Census Tract 4, Barron County	No	1,962	$3,943	$63,736	6.19%
55117010602	Census Tract 106.02, Sheboygan County	No	1,852	$3,860	$76,501	5.05%
55053960400	Census Tract 9604, Jackson County	No	1,663	$3,851	$76,909	5.01%
55071010700	Census Tract 107, Manitowoc County	No	1,657	$3,835	$76,047	5.04%
55019950800	Census Tract 9508, Clark County	No	1,378	$3,670	$71,615	5.12%
55119960500	Census Tract 9605, Taylor County	No	1,328	$3,612	$60,665	5.95%

Source: LEAD Tool (based on 2020 ACS 5-year data); *excludes census tracts with less than 100 households in household group; **Disadvantaged Community (DAC) indicator from Justice 40 Initiative.

Table 18. Top 10 Census Tracts Based on Highest Average Annual Energy Costs—Households Using Utility Gas or Electricity Main Heat*

Census Tract Number	Census Tract Name	Disadvantaged Community?**	Total Households	Average Annual Total Residential Energy Costs	Average Annual Income	Average Annual Total Residential Energy Burden
55121100600	Census Tract 1006, Trempealeau County	Yes	1,152	$4,521	$63,093	7.17%
55117010601	Census Tract 106.01, Sheboygan County	No	2,547	$4,000	$70,827	5.65%
55135101100	Census Tract 1011, Waupaca County	No	2,040	$3,991	$63,769	6.26%
55071010700	Census Tract 107, Manitowoc County	No	1,479	$3,696	$73,466	5.03%
55119960500	Census Tract 9605, Taylor County	No	1,227	$3,559	$60,926	5.84%
55117010602	Census Tract 106.02, Sheboygan County	No	1,442	$3,509	$72,941	4.81%
55119960400	Census Tract 9604, Taylor County	No	1,055	$3,360	$65,208	5.15%
55053960400	Census Tract 9604, Jackson County	No	201	$3,345	$73,647	4.54%
55005000400	Census Tract 4, Barron County	No	1,123	$3,295	$58,589	5.62%
55025013100	Census Tract 131, Dane County	No	1,468	$3,270	$98,027	3.34%

Source: LEAD Tool (based on 2020 ACS 5-year data); *excludes census tracts with less than 100 households in household group; **Disadvantaged Community (DAC) indicator from Justice 40 Initiative.

Table 19. Top 10 Census Tracts Based on Highest Average Annual Energy Burden—All Households*

Census Tract Number	Census Tract Name	Disadvantaged Community?**	Total Households	Average Annual Total Residential Energy Costs	Average Annual Income	Average Annual Total Residential Energy Burden
55079009000	Census Tract 90, Milwaukee County	Yes	673	$2,845	$30,280	9.40%
55079008700	Census Tract 87, Milwaukee County	Yes	371	$2,190	$23,332	9.39%
55079006500	Census Tract 65, Milwaukee County	Yes	758	$2,619	$30,889	8.48%
55079007000	Census Tract 70, Milwaukee County	Yes	1,073	$2,214	$28,862	7.67%
55121100600	Census Tract 1006, Trempealeau County	Yes	1,533	$4,996	$66,428	7.52%
55079006800	Census Tract 68, Milwaukee County	Yes	793	$2,149	$29,420	7.30%
55079012300	Census Tract 123, Milwaukee County	Yes	554	$1,780	$24,863	7.16%
55079008500	Census Tract 85, Milwaukee County	Yes	399	$2,477	$35,332	7.01%
55079002100	Census Tract 21, Milwaukee County	Yes	899	$2,084	$30,029	6.94%
55079006400	Census Tract 64, Milwaukee County	Yes	623	$2,481	$35,790	6.93%

Source: LEAD Tool (based on 2020 ACS 5-year data); *excludes census tracts with less than 100 households in household group; **Disadvantaged Community (DAC) indicator from Justice 40 Initiative.

Table 20. Top 10 Census Tracts Based on Highest Average Annual Energy Burden—Households Using Utility Gas or Electricity Main Heat*

Census Tract Number	Census Tract Name	Disadvantaged Community?**	Total Households	Average Annual Total Residential Energy Costs	Average Annual Income	Average Annual Total Residential Energy Burden
55079009000	Census Tract 90, Milwaukee County	Yes	668	$2,846	$30,278	9.40%
55079008700	Census Tract 87, Milwaukee County	Yes	346	$2,209	$23,601	9.36%
55079006500	Census Tract 65, Milwaukee County	Yes	743	$2,586	$30,809	8.39%
55079007000	Census Tract 70, Milwaukee County	Yes	1,073	$2,214	$28,862	7.67%
55079006800	Census Tract 68, Milwaukee County	Yes	786	$2,148	$29,387	7.31%
55079012300	Census Tract 123, Milwaukee County	Yes	533	$1,784	$24,662	7.23%
55121100600	Census Tract 1006, Trempealeau County	Yes	1,152	$4,521	$63,093	7.17%
55079008500	Census Tract 85, Milwaukee County	Yes	390	$2,477	$35,408	7.00%
55079006400	Census Tract 64, Milwaukee County	Yes	611	$2,476	$35,887	6.90%
55079002100	Census Tract 21, Milwaukee County	Yes	870	$2,081	$30,293	6.87%

Source: LEAD Tool (based on 2020 ACS 5-year data); *excludes census tracts with less than 100 households in household group; **Disadvantaged Community (DAC) indicator from Justice 40 Initiative.

Energy Affordability

The following section examines energy affordability, starting with data reported by DEHCR for federally-funded WHEAP benefits reported as part of the LIHEAP Performance Measures initiative. These data, showing the share of the income-eligible population served and energy burden impacts of federally-funded WHEAP benefits, provide insights into how the WHEAP program helps address energy affordability issues among the population most likely to experience energy burden and affordability challenges.

LIHEAP

Table 21 and Table 22 provide snapshots of trends in participation in Wisconsin's Home Energy Assistance Program (WHEAP). Table 21 shows the number of Wisconsin households statewide that applied to and received energy assistance through DEHCR programs from 2022 to 2024, based on the Payments and Services Report.[30] Average benefit amounts by funding source also are available in this report, and the data can be examined down to the county level. Table 22 shows data reported by DEHCR to HHS as part of their federal reporting requirements, combined with estimates of the income-eligible population that HHS developers, to provide context on the share of low-income households accessing the program, including by poverty level. Together, these tables show that approximately 30 percent of income-eligible households receive energy assistance in a given year—much higher than the national average of about 20 percent of the income-eligible population served—and households at lower poverty levels are more likely to participate, supporting earlier analysis of RECS and LEAD estimates that lower income households face greater energy burdens and affordability challenges.

Table 21. Number of Households Applying to and Participating in DEHCR Energy Assistance Programs

Year	2022	2023	2024
Total households applied for Energy Assistance	249,225	244,305	228,746
Total households paid Energy Assistance (PB + Federal Funding)	201,848	197,029	189,848
Total households paid Heating Benefit (Federal Funding)	194,669	189,792	182,569
Total households paid a Non-Heating Electric Benefit (PB)	197,471	193,528	186,753
Total households paid a Crisis Benefit (PB + Federal Funding)	49,342	27,447	82,338
Total households paid an HVAC Benefit (PB + Federal Funding)	4,741	4,342	4,343

Source: DEHCR Payments and Services Report

[30] DEHCR's Payment and Services report can be accessed at: **https://energyandhousing.wi.gov/Pages/Reports/reports.aspx**

Table 22. Households Income-Eligible for WHEAP and Number Served (Federally-Funded)[31]

Federal Fiscal Year	2019	2020	2021*	2022*	2023*
State Income-Eligible Households	660,036	649,508	666,630	647,306	616,489
Total Served (Any Type of Assistance)	195,986	207,024	189,837	196,982	189,941
Percent Served Any Type of Assistance	29.69%	31.87%	28.48%	30.43%	30.81%
Served with Heating Assistance	190,723	205,275	139,992	194,705	186,017
Percent Served with Heating Assistance	28.90%	31.60%	21.00%	30.08%	30.17%
Heating Assistance <=100% HHSPG	38.56%	44.20%	33.42%	45.65%	43.20%
Heating Assistance 101-125% HHSPG	36.08%	36.75%	21.86%	37.87%	36.95%
Heating Assistance 126-150% HHSPG	28.73%	30.96%	18.10%	30.92%	32.97%
Heating Assistance >150% HHSPG	17.80%	19.09%	11.73%	16.29%	17.59%

Source: LIHEAP Performance Management Website; *non-final data.

Table 23 shows average annual energy bills, WHEAP benefits, and energy burdens for Wisconsin households that received federally-funded benefits in federal fiscal years 2020-2023. These data are reported by DEHCR to HHS as part of its federal reporting requirements and provide a snapshot into statewide energy affordability outcomes for low-income households that participate in WHEAP. Between FY 2020-2022, annual heating fuel bills across all heating fuel types averaged about $800 and annual electricity bills were typically about $1,000 for this group of households. However, in FY 2023, the average annual heating bill for WHEAP recipient households increase to over $1,000, driven by increases in natural gas, propane, and heating fuel oil bills (as shown in Figure 6). Average residential energy burden has fluctuated between 9 and 10 percent before WHEAP benefits are factored in. After factoring in WHEAP benefits, average residential energy burden for this group of households typically is about 7 percent (with the exception of 2021 when benefit amounts were much higher than normal due to COVID-related increases in funding). Overall, the WHEAP program helped reduce energy burdens and improve energy affordability for low-income households in Wisconsin.

Table 23. Average Annual Energy Bills, WHEAP Benefits, and Energy Burden for WHEAP Recipients (Federally-Funded), FY 2020-2023

All Heating Fuel Types	2020	2021	2022*	2023*
Total households receiving WHEAP bill payment assistance	205,295	186,010	196,572	189,175
Households with complete energy burden data	183,635	151,351	175,804	144,135
Average annual income	$19,330	$19,920	$19,469	$20,697

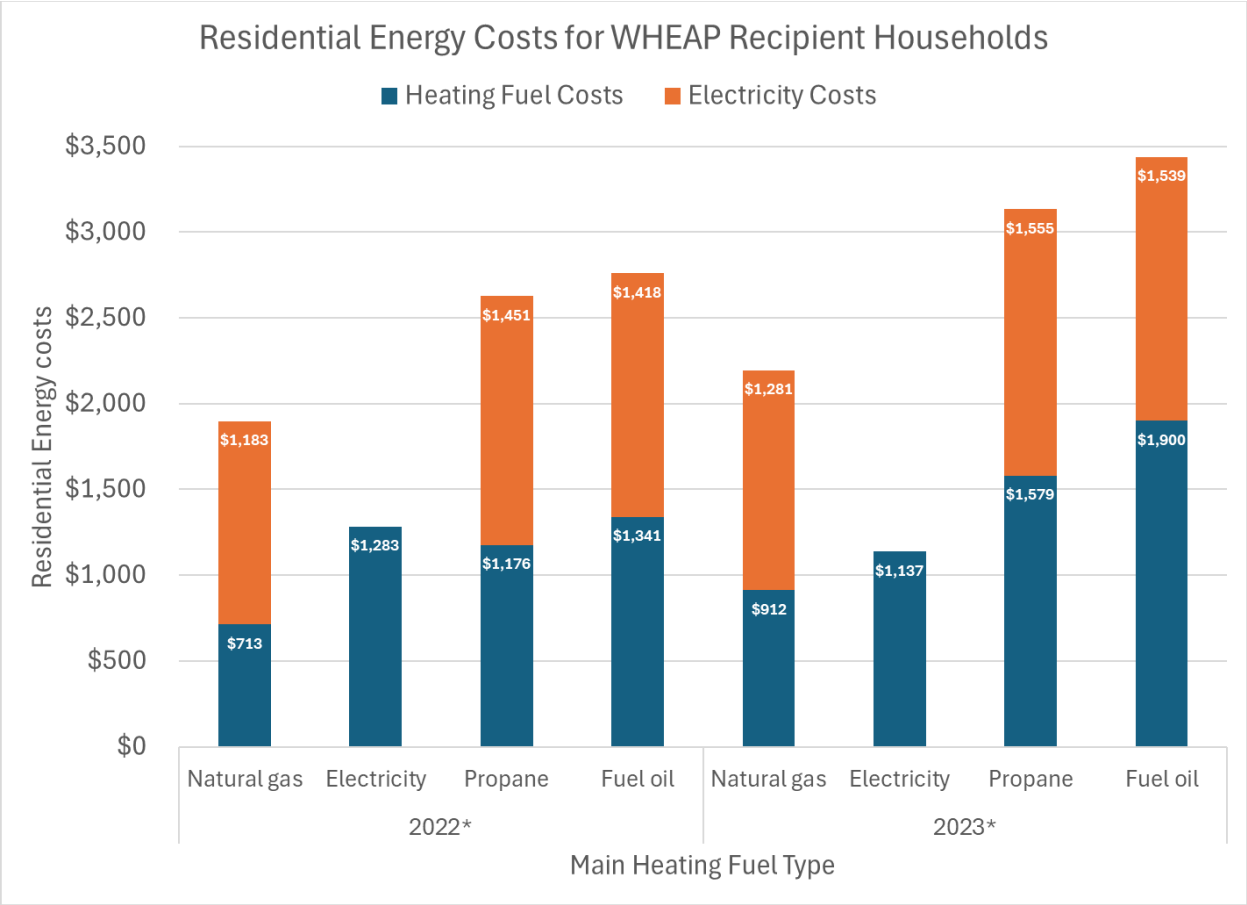
[31] The number of households served shown in Table 22 are based on the federal fiscal year (October 1—September 30) and may differ from those shown in Table 21.

All Heating Fuel Types	2020	2021	2022*	2023*
Average annual heating fuel bill	$805	$766	$863	$1,033
Average annual electricity bill	$981	$1,057	$1,020	$1,084
Average annual total residential energy bill	$1,786	$1,823	$1,884	$2,117
Average annual energy burden before WHEAP	9.24%	9.15%	9.67%	10.23%
Average annual total WHEAP benefit	$409	$1,024	$584	$707
Average annual energy burden after WHEAP	7.12%	4.01%	6.68%	6.81%
Share of total residential energy bill paid by WHEAP	22.89%	56.18%	30.98%	33.40%

Source: LIHEAP Performance Management Website; *non-final data.

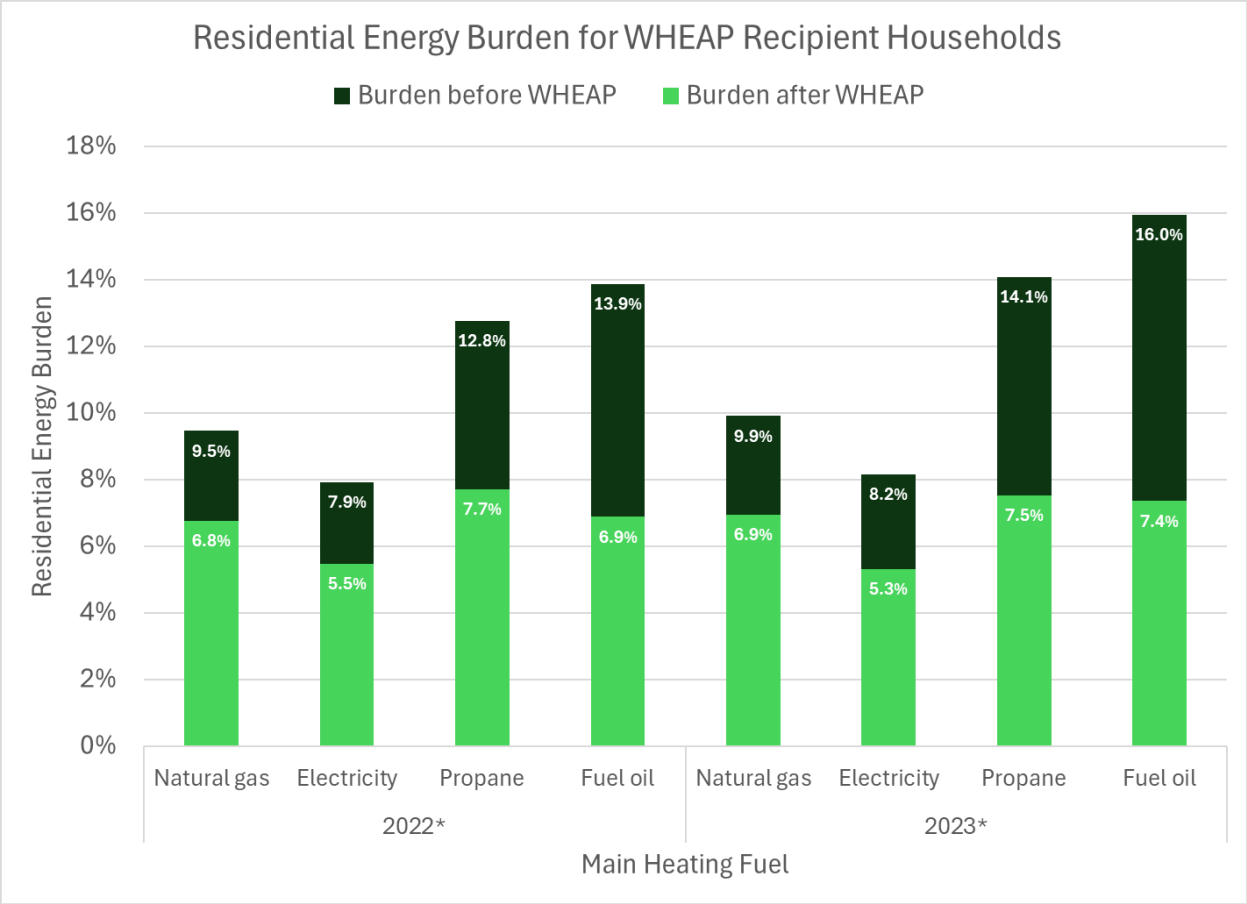
Figure 6 and Figure 7 show changes in average annual heating fuel costs, electricity costs, and residential energy (heating fuel and electric) burden for WHEAP recipient households by main heating fuel. Tracking this information over time is a useful way for understanding how the program impacts energy burden and affordability for low-income households participating in WHEAP. Examining outcomes by main heating fuel type can help identify areas where there are program gaps.

Figure 6. Average Annual Residential Energy Costs for WHEAP Recipient Households in Wisconsin (Federally-Funded), FY 2022-2023



Source: LIHEAP Performance Management Website; LIHEAP grantees report electricity bills for households using electric heat under main heating fuel costs; *non-final data.

Figure 7. Average Annual Residential Energy Burden for WHEAP Recipient Households in Wisconsin (Federally-Funded), FY 2022-2023[32]



Source: LIHEAP Performance Management Website; *non-final data.

Affordability Gap

Table 24 through Table 26 provide estimates of the energy affordability gap—the funding needed to achieve a targeted energy burden across households—in Wisconsin, using different sources and methods. Note that these tables show estimates of the gross energy affordability gap—funding allocated to energy assistance is not deducted to show net energy affordability gap. Across these analyses, the energy affordability gap ranges from approximately $211

[32] In FY 2021, passage of the American Rescue Plan Act provided the federal LIHEAP program with $4.5 billion additional funding, more than double the regular block grant allocation for the year. As a result, state LIHEAP programs, including Wisconsin's WHEAP, received additional funding in FY 2021. This enabled the WHEAP program to provide higher benefits to recipient households and in turn, achieve a lower average annual energy burden after LIHEAP in FY 2021 than in prior or subsequent years.

million to $463 million. Note that these estimates are substantially lower than the Home Energy Affordability Gap published by Fisher Sheehan & Colton for Wisconsin.[33]

Table 24 calculates the energy affordability gap based on individual energy costs and burdens using the 2020 RECS. Because the 2020 RECS provides income categories, a range is shown based on the income midpoint and minimum/maximum income for the category. Using this approach, the energy affordability gap in 2020 was between $273 million and $392 million.

Table 24. Wisconsin Energy Affordability Gap Based on Individual Energy Costs and Burden

Total Energy Burden	Mean Individual Total Energy Burden	Excess Total Energy Bill (6% Individual Energy Burden Target)			Aggregate Excess Total Energy Bill (millions)		
		Income midpoint	Income maximum	Income minimum	Income midpoint	Income maximum	Income minimum
Less than 6%	2.61%	$0	$0	$2	$0	$0	$4.5
6% or more	18.46%	$722	$602	$855	$327.1	$272.9	$387.7
Total	5.62%	$137	$114	$164	$327.1	$272.9	$392.2

Source: project team using estimates from 2020 RECS

Table 25 calculates the energy affordability gap based on group average energy costs and average income, based on the 2020 RECS and 2021 ACS, respectively. Average energy costs and income are calculated for households at different poverty levels to assess the affordability gap, which is then summed across household segments. Based on this approach, the energy affordability gap in 2020 was approximately $211 million.

Table 25. Wisconsin Energy Affordability Gap Based on Group Average Energy Costs and Burden

HHS Poverty Guidelines	Number of households (ACS)	Average Income (ACS)	Target Average Energy Bill (6% Maximum Burden)	Difference between Actual and Target Energy Bill	Affordability Gap (millions)
0-100%	231,845	$9,404	$564	$784	$181.8
>100-150%	155,849	$23,271	$1,396	$190	$29.7
>150-200%	175,306	$32,596	$1,385	$0	$0.0
>200-250%	191,716	$43,356	$1,956	$0	$0.0
>250-300%	197,369	$51,549	$1,518	$0	$0.0
>300-350%	183,082	$61,906	$1,798	$0	$0.0
>350-400%	200,433	$71,306	$2,005	$0	$0.0
>400%	1,114,370	$144,263	$2,073	$0	$0.0
Total	2,449,970	$88,326	$1,779	$0	$211.4

[33] Fisher Sheehan & Colton, Home Energy Affordability Gap: **http://www.homeenergyaffordabilitygap.com/**

Source: project team using 2020 RECS and 2021 ACS

Table 26 calculates the energy affordability gap using average energy bills and income reported for WHEAP recipient households and applying those values to the entire population of low-income households.[34] Based on this approach, the affordability gap ranged from approximately $406 million to $463 million between 2019 and 2022.

Table 26. Wisconsin Energy Affordability Gap Based on WHEAP Program Data (Federally-Funded Benefits)

All Fuels	2019	2020	2021*	2022*
Income-eligible households	660,036	649,508	666,630	647,306
Average income WHEAP recipient households	$19,294	$19,330	$19,920	$19,469
Target average energy bill (6% energy burden maximum)	$1,158	$1,160	$1,195	$1,168
Difference between target and actual bill for WHEAP recipient households	$668	$626	$628	$716
Affordability gap	$441.1	$406.7	$418.5	$463.4

Source: project team using data from LIHEAP Performance Management Website

Energy Insecurity

Arrearages

Table 27 through Table 32 summarize data reported by Wisconsin IOUs on residential arrearages—number of customers with arrears, total amount of arrearages, and average arrears per customer in arrears—for Q4 of the previous three years. (Municipal and cooperative utilities regulated by the Commission also report these data but are not shown here due to the number of utilities.) These tables provide examples of the analyses possible using currently available data, focusing on year-over-year changes for the same period.

Table 27. Number of Residential Customers with Arrears—Electric IOUs

Utility	End of Q4-2021	End of Q4-2022	End of Q4-2023	Change 2023-2022
Wisconsin Public Service Corporation	63,258	64,967	64,321	-1%
Wisconsin Power And Light Company	36,766	39,313	39,352	0%
Wisconsin Electric Power Company	217,297	228,767	232,984	2%
Superior Water Light And Power Company	2,126	2,321	2,334	1%
Northern States Power Company (WIS)	33,558	36,356	32,863	-10%

[34] Affordability gap using WHEAP program data assumes average income and average energy bills for WHEAP recipient households are representative of all income-eligible households. However, estimated average income is slightly higher for all income-eligible households, based on 2021 ACS data, while average energy bills are likely to be slightly higher based on analysis of 2020 RECS data.

Utility	End of Q4-2021	End of Q4-2022	End of Q4-2023	Change 2023-2022
Madison Gas And Electric Company	n/a	n/a	26,094	n/a
Other IOUs	1,444	4,247	2,643	-38%

Source: Wisconsin utility annual reports (as of November 20, 2024); n/a = suppressed due to duplicate customer counts resulting from a system upgrade, as noted in 2023 annual report

Table 28. Aggregate Residential Arrearages (Thousands $)—Electric IOUs

Utility	End of Q4-2021	End of Q4-2022	End of Q4-2023	Change 2023-2022
Wisconsin Public Service Corporation	$25,220	$24,027	$22,898	-5%
Wisconsin Power And Light Company	$12,697	$14,218	$16,054	13%
Wisconsin Electric Power Company	$104,763	$99,269	$98,289	-1%
Superior Water Light And Power Company	$808	$826	$914	11%
Northern States Power Company (WIS)	$16,546	$20,337	$19,178	-6%
Madison Gas And Electric Company	$10,055	$10,602	$11,165	5%
Other IOUs	$696	$553	$487	-12%

Source: Wisconsin utility annual reports (as of November 20, 2024)

Table 29. Average Residential Customer Arrears—Electric IOUs

Utility	End of Q4-2021	End of Q4-2022	End of Q4-2023	Change 2023-2022
Wisconsin Public Service Corporation	$399	$370	$356	-4%
Wisconsin Power And Light Company	$345	$362	$408	13%
Wisconsin Electric Power Company	$482	$434	$422	-3%
Superior Water Light And Power Company	$380	$356	$392	10%
Northern States Power Company (WIS)	$493	$559	$584	4%
Madison Gas And Electric Company	n/a	n/a	$428	n/a
Other IOUs	$482	$130	$184	42%

Source: Wisconsin utility annual reports (as of November 20, 2024); n/a = suppressed due to duplicate customer counts resulting from a system upgrade, as noted in 2023 annual report

Table 30. Number of Residential Customers with Arrears---Gas IOUs

Utility	End of Q4-2021	End of Q4-2022	End of Q4-2023	Change 2023-2022
Wisconsin Public Service Corporation	12,442	12,765	12,271	-4%
Wisconsin Power And Light Company	15,650	17,522	16,721	-5%

Utility	End of Q4-2021	End of Q4-2022	End of Q4-2023	Change 2023-2022
Wisconsin Gas LLC	132,715	141,633	142,151	0%
Wisconsin Electric Power Company	30371	20,073	15,219	-24%
Superior Water Light And Power Company	1,534	1,828	1,713	-6%
Northern States Power Company (WIS)	33,558	36,356	32,863	-10%
Madison Gas And Electric Company	n/a	n/a	26,094	n/a
Midwest Natural Gas; Inc.	2,455	2,426	2,262	-7%
City Gas Company	415	439	404	-8%
St Croix Valley Natural Gas Company; Inc	694	715	716	0%

Source: Wisconsin utility annual reports (as of November 20, 2024); n/a = suppressed due to duplicate customer counts resulting from a system upgrade, as noted in 2023 annual report

Table 31. Aggregate Residential Arrearages (Thousands $)—Gas IOUs

Utility	End of Q4-2021	End of Q4-2022	End of Q4-2023	Change 2023-2022
Wisconsin Public Service Corporation	$2,658	$2,585	$1,923	-26%
Wisconsin Power And Light Company	$1,894	$2,731	$2,751	1%
Wisconsin Gas LLC	$31,624	$35,078	$31,229	-11%
Wisconsin Electric Power Company	$6,034	$6,026	$6,191	3%
Superior Water Light And Power Company	$442	$429	$322	-25%
Northern States Power Company (WIS)	$16,546	$20,337	$19,178	-6%
Madison Gas And Electric Company	$10,055	$10,602	$11,165	5%
Midwest Natural Gas; Inc.	$225	$213	$142	-33%
City Gas Company	$31	$42	$33	-22%
St Croix Valley Natural Gas Company; Inc	$81	$73	$53	-28%

Source: Wisconsin utility annual reports (as of November 20, 2024)

Table 32. Average Residential Customer Arrears—Gas IOUs

Utility	End of Q4-2021	End of Q4-2022	End of Q4-2023	Change 2023-2022
Wisconsin Public Service Corporation	$214	$203	$157	-23%
Wisconsin Power And Light Company	$121	$156	$165	6%
Wisconsin Gas LLC	$238	$248	$220	-11%
Wisconsin Electric Power Company	$199	$300	$407	36%
Superior Water Light And Power Company	$288	$235	$188	-20%
Northern States Power Company (WIS)	$493	$559	$584	4%

Madison Gas And Electric Company	n/a	n/a	$428	n/a
Midwest Natural Gas; Inc.	$91	$88	$63	-29%
City Gas Company	$75	$97	$81	-16%
St Croix Valley Natural Gas Company; Inc	$117	$102	$74	-28%

Source: Wisconsin utility annual reports (as of November 20, 2024); n/a = suppressed due to duplicate customer counts resulting from a system upgrade, as noted in 2023 annual report

Disconnections

Beginning with 2023, utilities were instructed by the Commission to report disconnection data as discrete quarterly totals. However, some reported as instructed while others reported cumulatively across quarters. Table 33 provides an example for one utility that reported quarterly totals of how these data might be combined for analysis, looking at its disconnection data for 2023 in combination with the average number of residential customers reported in their annual report.

Table 33. Residential Disconnections & Notices by Quarter by Example IOU, 2023

Average number of residential customers in 2023	413,884			
	Q1	**Q2**	**Q3**	**Q4**
Number of disconnection notices	0	33,320	43,311	10,621
Share of residential customers receiving disconnection notice	0.0%	8.1%	10.5%	2.6%
Number of disconnections	0	5,251	5,472	2,127
Share of residential customers disconnected	0.0%	1.3%	1.3%	0.5%

Source: Wisconsin utility annual reports

Table 34 shows the frequency with which Wisconsin households reported receiving a disconnection notice, based on the 2020 RECS. Approximately five percent of all households received a disconnection notice at any point during the year, compared to 12.5 percent of low-income households and 11.3 percent of households with energy burden greater than six percent. Over seven percent of low-income households and five percent of households with high energy burdens reported receiving a disconnection notice almost every month.

Table 34. Frequency of Wisconsin households receiving a disconnection notice as reported in 2020 RECS

Frequency	**All**	**Not Low-Income**	**Low-Income**	**Not High Burden**	**High Burden**
Never	95.3%	99.2%	87.5%	96.6%	89.7%
1 or 2 months	0.1%	0.0%	0.4%	0.0%	0.7%
Some months	1.6%	0.0%	4.7%	0.9%	4.4%
Almost every month	3.0%	0.8%	7.4%	2.5%	5.2%

Source: 2020 RECS; low-income status based on income midpoint from RECS being at or below 60% State Median Income (SMI); high burden defined using 6% energy burden threshold.

Table 35 shows the number of service loss preventions and restorations resulting from federally-funded WHEAP benefits. Data are reported by fuel type where the service loss would or did occur. The table also calculates the share of interventions where service loss was prevented (as opposed to restored), which is a more ideal outcome for customers. Tracking these data over time is a useful way for assessing how well energy assistance is reaching energy insecure customers before service is terminated or they run out of fuel. It is worth noting that during the pandemic years of 2020 and 2021, households were able to access crisis funding from the WHEAP program without showing a disconnect notice.

Table 35. Number of Service Loss Prevention and Restoration Occurrences Resulting from WHEAP Benefits (Federally-Funded)

Fuel Type	Service Loss Prevention or Restoration	2020	2021	2022*	2023*
Natural Gas	Restoration	29	1,569	779	1,368
	Prevention	1,587	101,380	9,214	13,971
	% Prevention	98.2%	98.5%	92.2%	91.1%
Electricity	Restoration	434	3,154	1,674	1,647
	Prevention	10,559	39,033	31,992	54,289
	% Prevention	96.1%	92.5%	95.0%	97.1%
Delivered Fuels	Restoration	366	275	485	580
	Prevention	2,878	6,061	7,629	12,570
	% Prevention	88.7%	95.7%	94.0%	95.6%

Source: LIHEAP Performance Management Website

Other Measures of Energy Insecurity

In addition to the measures above examining energy insecurity by tabulating counts of customers experiencing disconnections and arrearages, other measures of energy insecurity provide a more holistic focus by exploring how energy affordability challenges impact the ability of households to afford other necessities or maintain a safe and healthy living environment. Table 36 and Table 37 provide examples of these types of measures of energy insecurity as reported in the 2020 RECS—frequency of forgoing basic home necessities due to energy bills, and the frequency of keeping the home at an unhealthy temperature. Low-income and high burden households were considerably more likely to report forgoing basic home necessities and slightly more likely to report keeping the home at an unhealthy temperature than their counterparts. As with other estimates derived from the RECS, while these measures of energy insecurity can help understand affordability challenges more holistically, the ability to dig in and understand where and when these issues occur is limited by the geographic precision and periodic nature of the RECS. Exploring these concepts at a more granular level in Wisconsin would require separate efforts by the Commission.

Table 36. Frequency of Wisconsin households forgoing basic necessities due to home energy bills as reported in 2020 RECS.

Frequency	All	Not Low-Income	Low-Income	Not High Burden	High Burden
Never	84.4%	93.1%	67.1%	89.1%	64.5%
1 or 2 months	3.0%	0.9%	7.2%	1.9%	7.7%
Some months	7.6%	2.5%	17.8%	4.8%	19.6%
Almost every month	5.0%	3.6%	7.9%	4.2%	8.3%

Source: 2020 RECS; low-income status based on income midpoint from RECS being at or below 60% State Median Income (SMI); high burden defined using 6% energy burden threshold.

Table 37. Frequency of Wisconsin households keeping home at an unhealthy temperature as reported in 2020 RECS.

Frequency	All	Not Low-Income	Low-Income	Not High Burden	High Burden
Never	93.4%	96.4%	87.4%	94.5%	88.7%
1 or 2 months	1.5%	1.9%	0.5%	1.6%	1.0%
Some months	2.4%	1.3%	4.6%	1.8%	5.0%
Almost every month	2.7%	0.4%	7.5%	2.2%	5.3%

Source: 2020 RECS; low-income status based on income midpoint from RECS being at or below 60% State Median Income (SMI); high burden defined using 6% energy burden threshold.

Conclusion

The energy burden and affordability framework recommended in this report is multifaceted and includes metrics that fall under three categories: (1) energy burden, (2) energy affordability, and (3) energy insecurity.

In the short-term, the following framework is recommended for these metrics.

1. Energy burden
    a. Establish statewide energy burden baselines using the RECS and ACS.
    b. Examine regional average energy burdens using the LEAD Tool.
2. Energy affordability
    a. Track energy assistance and weatherization program participation using DEHCR data.
    b. Track energy burden outcomes for households participating in energy assistance programs using DEHCR data.
    c. Estimate and track the energy affordability gap using the RECS and ACS.
3. Energy insecurity
    a. Track utility-reported arrearage and disconnection data provided in annual reports.

b. Track service loss prevention/restoration data reported by DEHCR for the WHEAP and HE+ programs.

The following opportunities for improvements represent ways in which to improve the framework over the longer term.

1. Energy burden
    a. Use updated LEAD Tool estimates and examine total residential energy costs and disaggregated energy costs and burden by fuel type.
    b. Partner with DEHCR to analyze energy burden of WHEAP recipient households in more detailed ways than currently available through public reports.
    c. Work with utilities to improve reporting of average electricity and natural gas costs by census tract. Top areas to address are ensuring average bills are based on customers with bill data for the full year, reporting separately on single fuel customers (natural gas or electricity) and combined fuel customers (natural gas and electricity), and ensuring quality assurance checks are in place.
    d. Examine regional average energy burdens using the LEAD Tool.
2. Energy affordability
    a. Consider establishing a Wisconsin-specific energy affordability target threshold, including whether a separate threshold for different fuel types is appropriate.
    b. Partner with the DEHCR to examine energy burden at a more granular level for WHEAP participants, including examining distributions of individual energy costs and burden, replicating energy burden reports for non-heat electric WHEAP participants, examining data by utility provider and/or regionally, and updating DEHCR program applications to collect information on participation in affordability programs offered by the IOUs.
3. Energy insecurity
    a. Work with utilities to improve reporting of arrearage and disconnection data including ensuring data are reported consistently across utilities (e.g., discrete quarterly total disconnections rather than cumulative totals).
    b. Partner with DEHCR to examine energy insecurity at a more granular level for WHEAP participants.
    c. Consider changes to the data and frequency of reporting by utilities, including reporting monthly totals on a monthly basis, disaggregating residential customers by whether they receive WHEAP assistance, reporting on nonresidential customers, reporting data by zip code or census tract, and reporting additional tracking metrics including customers on DPAs or participating in AMPs, number of reconnections, and accounts in arrears for 30, 60, and more than 60 days.

Both the recommended short-term framework and opportunities for improvements over the longer term will be explored in more detail with stakeholders during the Energy Burden Action Plan, including feasibility, priority, and ease of implementation.

References

APPRISE and Fisher, Sheehan, and Colton (2007). Ratepayer-Funded Low-Income Energy Programs: Performance and Possibilities. **https://www.appriseinc.org/reports/NLIEC%20Multi-Sponsor%20Study.pdf**

APPRISE (2018). District of Columbia LIHEAP Energy Burden Analysis. **https://doee.dc.gov/sites/default/files/dc/sites/ddoe/service_content/attachments/DC%202018%20LIHEAP%20Analysis%20-%20Energy%20Burden%20Report.pdf**

APPRISE (2020). Energy Affordability Study: Survey of Programs—In-Depth Analysis. Prepared for the Office of the People's Counsel of the District of Columbia. **https://opc-dc.gov/wp-content/uploads/2022/03/DC-OPC-Energy-Affordability-Study-State-Energy-Assistance-Programs-FINAL-12-7-2020.pdf**

Bell-Pasht (2024). Combined Energy Burdens: Estimating Total Home and Transportation Energy Burdens. **https://www.aceee.org/topic-brief/2024/05/combined-energy-burdens-estimating-total-home-and-transportation-energy-burdens**

Downer, L., S. Leffin, M. McFarland, and N. Schaefer (2021). Addressing Energy Poverty in Wisconsin Communities. La Follete School of Public Affairs, University of Wisconsin-Madison. **https://lafollette.wisc.edu/research/addressing-energy-poverty-in-wisconsin-communities/**

Drehobl, A and L. Ross (2016). Lifting the High Energy Burden in America's Largest Cities: How Energy Efficiency Can Improve Low Income and Underserved Communities. ACEEE. **https://www.aceee.org/research-report/u1602**

Drehobl, A., L. Ross, and R. Ayala (2020). How High Are Household Energy Burdens? An Assessment of National and Metropolitan Energy Burden across the United States. ACEEE. **https://www.aceee.org/research-report/u2006**

Sears, J. and L. Badger (2023). Mapping Household Cost Burdens. VEIC. **https://operationfuel.org/wp-content/uploads/2023/11/VEIC-affordability-study-May-2023.pdf**

Sears, J. and K. Lucci (2023). 2023 Vermont Energy Burden Report. Efficiency Vermont. **https://www.efficiencyvermont.com/Media/Default/docs/landing-pages/energy-burden-report/2023-EfficiencyVermont-EnergyBurdenReport.pdf**

Sierra Club (2021). Energy Burden in Milwaukee: Study Reveals Major Disparities & Links to Redlined Areas. **https://www.sierraclub.org/sites/default/files/sce-authors/u560/2392%20MilwaukeeEnergy_Report_06_high%20%281%29.pdf**

Sierra Club (2024). It's been 3 years since Energy Burden in Milwaukee was released. What has changed? **https://www.sierraclub.org/sites/default/files/2024-04/EB%20report%20update%202024%20%281%29.pdf**

Tarekegne, B., G. Pennell, D. Preziuso, and R. O'Neill (2021). Review of Energy Equity Metrics. PNNL. **https://www.pnnl.gov/main/publications/external/technical_reports/PNNL-32179.pdf**

Appendix A

Examples of arrearage and utility disconnection reporting in other states.

Maryland—Number of Accounts in Arrears—Template

A - Number of Accounts in Arrears for up to 30 days, 30 - 60 days, and more than 60 days

REPORTING EXAMPLE IS IN GREEN TEXT

Customer Type	County or Location	Zip Code	# of Accounts in Arrears for up to 30 days	# of Accounts in Arrears for 30 - 60 days	# of Accounts in arrears for more than 60 days
Residential Non-Low-Income	Baltimore County	21030	30000	15000	25000
		21093	10000	7000	15000
	Harford County	21014	10000	5000	8000
		21013	2000	1500	500
Total	N/A	N/A	52000	28500	48500

Customer Type	County or Location	Zip Code	# of Accounts in Arrears for up to 30 days	# of Accounts in Arrears for 30 - 60 days	# of Accounts in arrears for more than 60 days
Residential Low-Income	Baltimore County	21030	5000	3000	4000
		21093	1000	500	750
	Harford County	21014	2000	500	1000
		21013	30	10	5
Total	N/A	N/A	8030	4010	5755

Customer Type	County or Location	Zip Code	# of Accounts in Arrears for up to 30 days	# of Accounts in Arrears for 30 - 60 days	# of Accounts in arrears for more than 60 days
Non-Residential	Baltimore County	21030	5000	3000	4000
		21093	1000	500	750
	Harford County	21014	2000	500	1000
		21013	30	10	5
Total	N/A	N/A	8030	4010	5755

Illinois—Credit, Collections and Arrearages Report—May 2024

Overview Dashboard | Customer Dashboard | Deposits Dashboard | Disconnects Dashboard | Arrearages Dashboard | Zip Code Data Dashboard

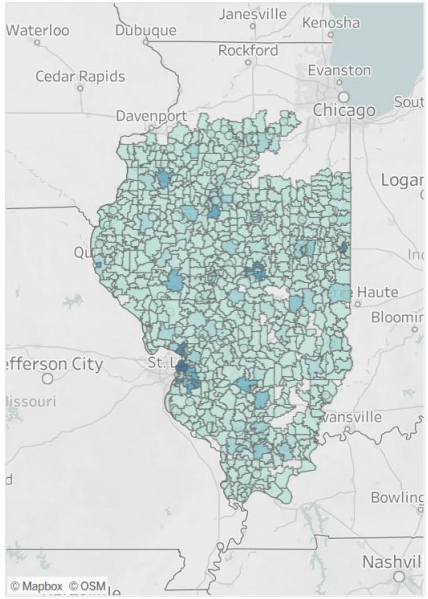
Public Utilit... (All) | Reporting P... May ... | Service Type Electric | Customer T... Residential

Monthly Totals Summary

Public Utility Name	Service Type	Year of Reporting Period	Month of Reporting Period	Customer Type	(1) Customer Count	(2) Customers Receiving Disconnect Notice	(3) Customers Disconnected for Non-Payment	(4) Customers Reconnected (Fully Paid or w/ DPA)
Ameren IL	Electric	2024	May	Residential	1,059,953	39,958	6,615	5,563
				Total:	**1,059,953**	**39,958**	**6,615**	**5,563**
ComEd	Electric	2024	May	Residential	3,682,588	15	0	0
				Total:	**3,682,588**	**15**	**0**	**0**
MidAmerican Energy	Electric	2024	May	Residential	73,155	3,510	223	151
				Total:	**73,155**	**3,510**	**223**	**151**
Mt. Carmel Public Utility	Electric	2024	May	Residential	4,338	563	11	10
				Total:	**4,338**	**563**	**11**	**10**

Overview Dashboard | Customer Dashboard | Deposits Dashboard | Disconnects Dashboard | Arrearages Dashboard | Zip Code Data Dashboard

Dollar Volume of Past Due > 30 days w DPA (1st of month)



Public Utility Name: Ameren IL

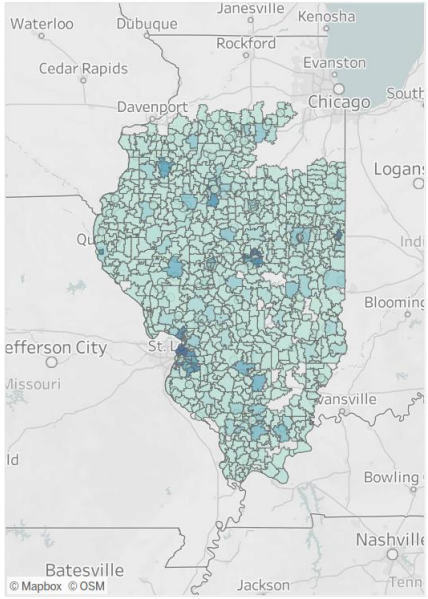
Month, Year of Reporting Period: January 2024

Service Type: (All)

Customer Type Set: (All) | Non-Residential | Residential

Arrearages Select Map View Field: Dollar Volume of Past Due > 30 days w D...

Dollar Volume of Past Due > 30 days w/ DPA (1st of month)



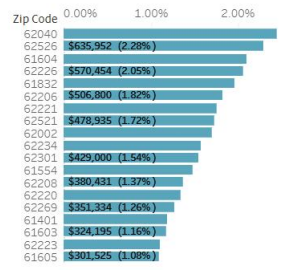
Public Utility Name: Ameren IL

Month, Year of Reporting Period: January 2023

Service Type: (All)

Customer Type Set: (All) | Non-Residential | Residential

Arrearages Select Map View Field: Dollar Volume of Past Due > 30 days w/ ...



English

District of Columbia—Pepco ARDIR Report—January 2024 through May 2024

DC PSC Case 813-1043 Order Nos. 14293 and 15134	January	February	March	April	May	June
the number of residential customers	316,383	316,812	317,391	317,645	317,990	
the number of **low income** residential customers	20,063	21,226	21,678	22,606	22,488	
the number of residential customers in arrears and total dollars						
# customers in arrears	71,639	70,996	74,831	73,416	72,859	
$ customers in arrears	$35,650,128	$35,635,096	$38,099,046	$36,103,847	$34,948,358	
the number of **low income** residential customers in arrears and total dollars						
# customers in arrears	16,451	18,325	18,679	18,151	18,226	
$ customers in arrears	$9,763,713	$10,294,509	$10,834,598	$10,188,729	$9,956,140	
the number of residential terminations for nonpayment	595	549	241	377	545	
the number of **low income** residential terminations for nonpayment	48	91	40	74	100	
the number of residential service arrearage related restorations	224	342	133	181	252	
the number of **low income** residential service arrearage related restorations	52	49	28	54	69	
the total dollar amount of residential accounts determined uncollectible						
# deem as Bad Debt	2,811	2,905	2,534	880	1,162	
$ deem as Bad Debt	$1,874,508	$1,869,163	$1,602,313	$658,819	$734,009	
the total dollar amount of **low income** residential accounts determined uncollectible						
# deem as Bad Debt	660	698	590	284	312	
$ deem as Bad Debt	$842,114	$759,150	$672,946	$372,884	$355,268	
the number of disconnection notices issued to residential customers	15,106	10,493	13,335	13,476	12,286	
the number of disconnection notices issued to **low income** residential customers	2,547	2,128	3,098	2,756	2,542	
the total revenues from residential	$32,984,593	$32,167,814	$26,384,990	$24,614,196	$24,491,564	
the total revenues from **low income** residential customers	$2,120,362	$2,086,187	$1,428,933	$1,490,376	$1,339,693	
the number & total dollars of residential customers with deferred payment agreements						
# Time Payment Arrangement (TPA)	6,812	7,029	7,323	7,194	6,972	
$ Time Payment Arrangements (TPA)	$4,840,089	$5,058,971	$ 5,603,028	$ 5,380,716	$5,237,968	
the number & total dollars of **low income** residential customers deferred payment agreements						
# Time Payment Arrangement (TPA)	1,432	1,530	1,645	1,871	1,779	
$ Time Payment Arrangements (TPA)	$1,253,878	$1,385,141	$1,547,166	$1,715,745	$1,659,542	

Note: The total number residential customers includes the total number of low income customers

Appendix B

Top 10 Census Tracts Based on Highest Average Annual Energy Costs—Households Using Utility Gas Main Heat*

Census Tract Number	Census Tract Name	Disadvantaged Community?**	Total Households	Average Annual Total Residential Energy Costs	Average Annual Income	Average Annual Total Residential Energy Burden
55121100600	Census Tract 1006, Trempealeau County	Yes	813	$4,732	$68,544	6.90%
55135101100	Census Tract 1011, Waupaca County	No	1,732	$4,242	$68,081	6.23%
55117010601	Census Tract 106.01, Sheboygan County	No	2,199	$4,072	$75,075	5.42%
55071010700	Census Tract 107, Manitowoc County	No	1,160	$3,758	$74,634	5.04%
55117010602	Census Tract 106.02, Sheboygan County	No	1,141	$3,613	$76,788	4.71%
55119960500	Census Tract 9605, Taylor County	No	929	$3,595	$65,983	5.45%
55119960400	Census Tract 9604, Taylor County	No	671	$3,524	$71,094	4.96%
55025013100	Census Tract 131, Dane County	No	1,267	$3,380	$101,689	3.32%
55005000400	Census Tract 4, Barron County	No	840	$3,309	$63,040	5.25%
55021970300	Census Tract 9703, Columbia County	No	932	$3,225	$84,551	3.81%

Source: LEAD Tool (based on 2020 ACS 5-year data); *excludes census tracts with less than 100 households in household group; **Disadvantaged Community (DAC) indicator from Justice 40 Initiative.

Top 10 Census Tracts Based on Highest Average Annual Energy Burden—Households Using Utility Gas Main Heat*

Census Tract Number	Census Tract Name	Disadvantaged Community?**	Total Households	Average Annual Total Residential Energy Costs	Average Annual Income	Average Annual Total Residential Energy Burden
55079009000	Census Tract 90, Milwaukee County	Yes	602	$2,928	$30,420	9.63%
55079008700	Census Tract 87, Milwaukee County	Yes	346	$2,209	$23,601	9.36%
55079186100	Census Tract 1861, Milwaukee County	Yes	495	$2,069	$23,445	8.82%
55079006500	Census Tract 65, Milwaukee County	Yes	727	$2,603	$30,828	8.44%
55079014600	Census Tract 146, Milwaukee County	Yes	524	$1,404	$17,058	8.23%
55079008800	Census Tract 88, Milwaukee County	Yes	400	$2,583	$31,432	8.22%
55079007000	Census Tract 70, Milwaukee County	Yes	959	$2,345	$29,030	8.08%
55079012300	Census Tract 123, Milwaukee County	Yes	478	$1,856	$24,096	7.70%
55079006800	Census Tract 68, Milwaukee County	Yes	679	$2,301	$30,847	7.46%
55079013700	Census Tract 137, Milwaukee County	Yes	504	$1,837	$24,905	7.38%

Source: LEAD Tool (based on 2020 ACS 5-year data); *excludes census tracts with less than 100 households in household group; **Disadvantaged Community (DAC) indicator from Justice 40 Initiative.

Top 10 Census Tracts Based on Highest Average Annual Energy Costs—Households Using Electricity Main Heat*

Census Tract Number	Census Tract Name	Disadvantaged Community?**	Total Households	Average Annual Total Residential Energy Costs	Average Annual Income	Average Annual Total Residential Energy Burden
55121100600	Census Tract 1006, Trempealeau County	Yes	339	$4,011	$49,682	8.07%
55019950800	Census Tract 9508, Clark County	No	170	$3,623	$68,130	5.32%
55053960400	Census Tract 9604, Jackson County	No	143	$3,584	$75,546	4.74%
55119960500	Census Tract 9605, Taylor County	No	298	$3,483	$42,678	8.16%
55109120904	Census Tract 1209.04, St. Croix County	No	192	$3,412	$137,170	2.49%
55117010601	Census Tract 106.01, Sheboygan County	No	348	$3,405	$37,391	9.11%
55109120906	Census Tract 1209.06, St. Croix County	No	181	$3,361	$158,412	2.12%
55071010700	Census Tract 107, Manitowoc County	No	319	$3,348	$66,919	5.00%
55005000400	Census Tract 4, Barron County	No	283	$3,284	$44,458	7.39%
55127000902	Census Tract 9.02, Walworth County	No	214	$3,159	$48,719	6.48%

Source: LEAD Tool (based on 2020 ACS 5-year data); *excludes census tracts with less than 100 households in household group; **Disadvantaged Community (DAC) indicator from Justice 40 Initiative.

Top 10 Census Tracts Based on Highest Average Annual Energy Burden—Households Using Electricity Main Heat*

Census Tract Number	Census Tract Name	Disadvantaged Community?**	Total Households	Average Annual Total Residential Energy Costs	Average Annual Income	Average Annual Total Residential Energy Burden
55079016700	Census Tract 167, Milwaukee County	Yes	146	$2,045	$19,409	10.54%
55117010601	Census Tract 106.01, Sheboygan County	No	348	$3,405	$37,391	9.11%
55005000500	Census Tract 5, Barron County	No	511	$2,080	$24,625	8.45%
55119960500	Census Tract 9605, Taylor County	No	298	$3,483	$42,678	8.16%
55121100600	Census Tract 1006, Trempealeau County	Yes	339	$4,011	$49,682	8.07%
55005000400	Census Tract 4, Barron County	No	283	$3,284	$44,458	7.39%
55079006800	Census Tract 68, Milwaukee County	Yes	107	$1,219	$16,695	7.30%
55005000602	Census Tract 6.02, Barron County	No	494	$2,616	$35,996	7.27%
55101000400	Census Tract 4, Racine County	Yes	134	$1,918	$26,700	7.18%
55135101100	Census Tract 1011, Waupaca County	No	308	$2,471	$34,771	7.11%

Source: LEAD Tool (based on 2020 ACS 5-year data); *excludes census tracts with less than 100 households in household group; **Disadvantaged Community (DAC) indicator from Justice 40 Initiative.