



# KENTUCKY ENERGY AFFORDABILITY DASHBOARD

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## Technical Notes

The Kentucky Energy Affordability Dashboard (KEAD) is produced by the Kentucky Center for Statistics (KYSTATS) utilizing data provided by the Office of Energy Policy (OEP), the United States Census Bureau's Public Use Microdata Sample (PUMS), American Community Survey (ACS), and the Office of Energy Efficiency and Renewable Energy's Low Income Energy Affordability Data (LEAD).

Occasionally, data from one source will not conform to data from another source because of differences in cohorts, how variables are defined, how variables are calculated, the treatment of missing data, and other factors. This means that data published in this report may not be comparable to data published in other reports. For specific details about metric formulas, please refer to Appendix A.

From the Office of Energy Policy:

Energy affordability and energy burden are extremely complex topics with many components and factors. When access to energy becomes difficult, the burden is felt in every facet of life—housing, mobility, health, work, education, and much more. To better understand the complexities of these variables, the Office of Energy Policy will utilize the Kentucky Energy Affordability Dashboard created by KYSTATS. This new visualization tool displays Kentucky-specific geographic areas, housing stock, and other demographic factors that impact energy usage. The dashboard is designed as an interactive tool for community leaders, policy makers, citizens, and OEP to collectively identify gaps, aid in program development, identify areas for cost allocations, and other solutions for communities experiencing disproportionately high energy burdens.

# Dashboard Walkthrough



## KENTUCKY ENERGY AFFORDABILITY



This Dashboard was created by the Kentucky Center for Statistics (KYSTATS). For information on K-12, postsecondary, and more, follow us @KYSTATS or visit <https://www.kystats.ky.gov>. Energy-use data were provided by the Office of Energy Policy.

[Data Download](#) [TECHNICAL NOTES](#)

### Kentucky Overview

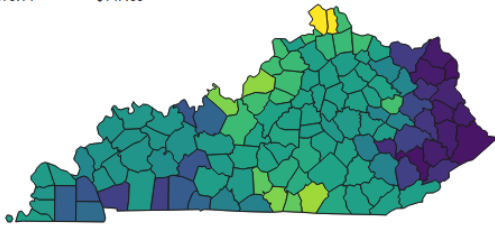
This section provides a side-by-side comparison of utility costs across Kentucky to various demographics within those counties. Users can filter the utility bill type map by year while the demographic map is set to latest data available.

Select a Utility Bill Type  
Average Monthly Electric Bill (USD)

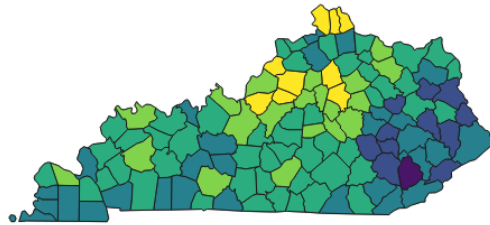
Select a Utility Bill Year  
2020

Select a County Demographic  
Average Energy Burden (% of Income)

Average Monthly Electric Bill (USD) (2020)



Average Energy Burden (% of Income) (2019)



Select a County to Filter the County Profile Charts  
Fayette

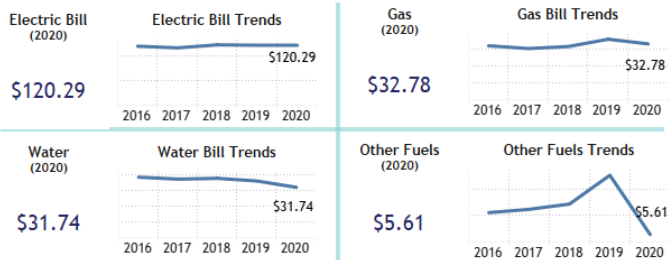
### Fayette County Profile

This section provides a look into specific counties in Kentucky. Users can view general demographic information about the residents in this county, the average monthly utility costs, and housing characteristics. Housing characteristics can also be filtered by year.

#### Latest County Demographics

Average Energy Burden (% of Income)	2.0%
Median Household Income (2019)	\$57,291
Percent Below Poverty Level	16.8%
Working Age Population (Age 18 to 64)	212,011
Working Age, Less than HS Diploma	8.03%
Working Age, Associate or Higher	45.3%
Working Age, Bachelor's or Higher	38.5%
Cooling Degree Days (E. South Central, 2019)	1,886
Heating Degree Days (E. South Central, 2019)	3,180

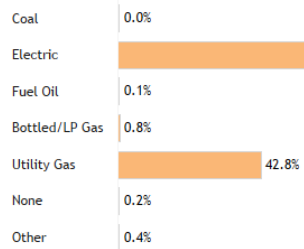
#### Average Monthly Utilities



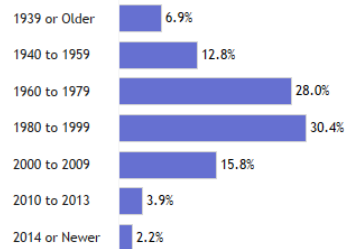
#### Housing Characteristics

Select a Year for Housing Characteristics  
2019

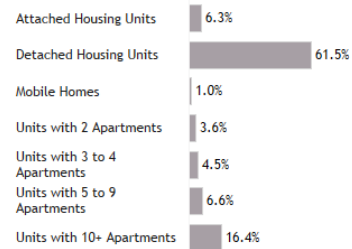
#### Heating Sources (2019)



#### Year House Built (2019)



#### Housing Units (2019)



This dashboard is split into two sections: a Kentucky Overview and a County Profile. The Kentucky Overview displays two maps. Users can download aggregate data for all the

visualizations in this dashboard by clicking the Data Download button at the top of the page. Users can also access Technical Notes that include sources, definitions, and walkthroughs.

The first map, Average Monthly Utility Costs, allows users to filter the average monthly electric, gas, water, and other fuels for each county in Kentucky between 2016 and 2020. The second map compares various demographics, including average energy burden as a percent of income, median household income, the percent below poverty level, the percent of 18 to 64 year olds without a high school diploma, the percent of 18 to 64 year olds with an associate degree or higher, the percent of 18 to 64 year olds with a bachelor's degree or higher, and the percent of houses with primary heating as electric or utility gas.

The county profile allows a user to select any of the counties in Kentucky and view snapshots and trends of various metrics. Users will find a table that includes the demographics above as well as cooling and heating degree days, latest snapshots, trends for average monthly utility bills, housing characteristics such as primary heating sources, distribution of the year houses were built, and the type of housing units; all able to filter by year.

## APPENDIX A: METRIC FORMULAS

### Data sources:

#### **Energy Information Administration (EIA) Form 861 - Annual Electric Power Industry**

**Report:** Form EIA-861 contains data from distribution utilities and power marketers of electricity. This survey is a census of all United States electric utilities. It contains comprehensive information on utility sales, revenue, and customers for every distributor of electricity and power marketer in the United States. Only the results that have been finalized are used in this dashboard. A link to tabular versions of this data can be found [here](#).

**U.S. Department of Energy Low Income Energy Affordability Data Tool (LEAD):** The LEAD tool is an interactive dashboard developed by the U.S. Department of Energy. It also contains data on housing, building type, and building age by county for every state in the United States. Data was downloaded from the tool and merged with additional data at the county level. See their [methodology](#) for more information.

**United States Census Bureau American Community Survey (ACS), 5 Year and 1 Year Estimates (ACS):** ACS is an ongoing survey that collects information about the lives of the American people in every state and region of the United States. It contains data on the social, economic, housing, and demographic aspects of every American community. The data are available in both the Census API and in a tabular format from the [Census website](#).

**United States Census Bureau Public Use Microdata (PUMS), 5 Year and 1 Year Estimates:** PUMS are data contained within the ACS program. While ACS data contains estimates aggregated from survey responses, the PUMS contains a sample of responses for ACS, allowing analysts to calculate their own estimates for each PUMS area, a geographical region defined by the census for each U.S. state. You can find PUMS data via the Census API or in a [tabular format](#).

## Metrics:

### Kentucky Overview

**Average Monthly Electric Bill (USD):** Average monthly electricity bills were calculated by dividing utility revenue from residential customers by the number of residential customers. Those numbers were then merged with utility territory data at the county level. Average bills were calculated with a weighted mean, with weights being the number of customers at each utility.

**Data Source:** EIA-861

**Data Elements:** residential\_revenues, residential\_customers

**Average Monthly Utility Gas Costs (USD):** Monthly Utility Gas Costs are calculated from PUMS. They are calculated by taking the weighted average of the monthly gas costs reported by survey respondents (GASP) and using the provided household weights (WGTP). Please note that 2020 fuel and water costs come from the Census Bureau's 2020 PUMS samples with experimental weights. This data is an early release and can be subject to change in the future as more data are processed.

**Data Source:** PUMS

**Data Elements:** GASP, WGTP

**Average Monthly Water Costs (USD):** Monthly Water Costs are calculated from PUMS. They are calculated by taking the weighted average of the monthly water costs reported by survey respondents (WATP) and using the provided household weights (WGTP). Please note that 2020 fuel and water costs come from the Census Bureau's 2020 PUMS samples with experimental weights. This data is an early release and can be subject to change in the future as more data are processed.

**Data Source:** PUMS

**Data Elements:** WATP, WGTP

**Average Monthly Costs of Other Fuels (USD):** Average Monthly Costs of other fuels are calculated from PUMS. They are calculated by taking the weighted average of the monthly fuel costs reported by survey respondents (FULP) and using the provided household weights (WGTP). Please note that 2020 fuel and water costs come from the Census Bureau's 2020 PUMS samples with experimental weights. This data is an early release and can be subject to change in the future as more data are processed.

**Data Source:** PUMS

**Data Elements:** FULP, WGTP

**Average Energy Burden (% of Income):** Energy burden is defined as the percentage of income a person or household spends on electricity and other fuels. The energy burden metric comes from data provided by the LEAD Tool, courtesy of the U.S. Department of Energy.

**Data Source:** LEAD

**Data Element:** Average Energy Burden (% of Income)

**Median Household Income:** The Census defines a household as any group of related or unrelated individuals living together other than in group quarters such as dormitories, prisons, or military barracks. Half of all households have an income higher than the median, and half have an income lower than the median. The Census calculates median household incomes for counties, states, and the nation, but there is no way to mathematically combine medians, so

we are unable to report median household incomes for Workforce Planning Regions or Local Workforce Areas.

**Data Source:** U.S. Census Bureau, American Community Survey, “Income in the Past 12 Months,” Table S1901

**Data Element:** Median Income

**Below Poverty Level (%):** Percent of individuals whose family income in the last 12 months was below the poverty line for a family of that size.

**Data Source:** U.S. Census Bureau, American Community Survey, “Poverty Status in the Past 12 Months,” Table S1701

**Data Element:** Percent Below Poverty Level

**18-64 Year Olds without a High School Diploma (%):** Working age population without a high school diploma or equivalent.

**Data Source:** U.S. Census Bureau, American Community Survey, “Educational Attainment,” Table S1501

**Data Elements:** B15002\_005 + B15002\_013 + B15002\_021 + B15002\_029 + B15002\_046 + B15002\_054 + B15002\_062 + B15002\_070

**18-64 Year Olds with Associate Degree or Higher (%):** Working age population with an associate degree, bachelor degree, or graduate level degree.

**Data Source:** U.S. Census Bureau, American Community Survey, “Educational Attainment,” Table S1501

**Data Elements:** B15002\_008 + B15002\_016 + B15002\_024 + B15002\_032 + B15002\_049 + B15002\_057 + B15002\_065 + B15002\_073

**18-64 Year Olds with a Bachelor’s Degree or Higher (%):** Working age population with a bachelor degree, or graduate level degree.

**Data Source:** U.S. Census Bureau, American Community Survey, “Educational Attainment,” Table S1501

**Data Element:** B15002\_009 + B15002\_017 + B15002\_025 + B15002\_033 + B15002\_050 + B15002\_058 + B15002\_066 + B15002\_074

### Housing Characteristics

**Houses with Primary Heating as Electric (%):** Percentage of houses using electricity as a primary heating fuel is extracted from ACS 5 year estimates using an API call, named S2504\_C01\_034E within the tabular Census Data. This field contains an estimate of the amount of households using electricity as a primary heating fuel. To calculate this field as it is seen in the dashboard, divide it by the total number of occupied housing units within the county, named S2504\_C01\_001E in the tabular data.

**Data Source:** ACS

**Data Elements:** S2504\_C01\_034E, S2504\_C01\_001E

**Houses with Primary Heating as Utility Gas (%):** Percentage of houses using utility natural gas as a primary heating fuel is extracted from ACS 5 year estimates using an API call. It is named S2504\_C01\_034E within the tabular Census Data. This field contains an estimate of the amount of households using utility natural gas as a primary heating fuel. To calculate this field as it is seen in the dashboard, divide it by the total number of occupied housing units within the county, named S2504\_C01\_001E in the tabular data.

**Data Source:** ACS

**Data Elements:** S2504\_C01\_034E, S2504\_C01\_001E

**Houses with Primary Heating as Fuel Oil (%):** Percentage of houses using utility Fuel Oil as a primary heating fuel is extracted from the ACS 5 year estimates using an API call. It is named S2504\_C01\_035E within the tabular Census Data. This field contains an estimate of the amount of households using Fuel Oil as a primary heating fuel. To calculate this field as it is seen in the dashboard, divide it by the total number of occupied housing units within the county, named S2504\_C01\_001E in the tabular data.

**Data Source:** ACS

**Data Elements:** S2504\_C01\_035E, S2504\_C01\_001E

**Houses with Primary Heating as Bottled/LP Gas (%):** Percentage of houses using Bottled/LP Gas as a primary heating fuel is extracted from the ACS 5 year estimates using an API call. It is named S2504\_C01\_033E within the tabular Census Data. This field contains an estimate of the amount of households using Bottled/LP as a primary heating fuel. To calculate this field as it is seen in the dashboard, divide it by the total number of occupied housing units within the county, named S2504\_C01\_001E in the tabular data.

**Data Source:** ACS

**Data Elements:** S2504\_C01\_033E, S2504\_C01\_001E

**Houses with Primary Heating as Coal (%):** Percentage of houses using Coal as a primary heating fuel is extracted from the ACS 5 year estimates using an API call. It is named S2504\_C01\_036E within the tabular Census Data. This field contains an estimate of the amount of households using Coal as a primary heating fuel. To calculate this field as it is seen in the dashboard, divide it by the total number of occupied housing units within the county, named S2504\_C01\_001E in the tabular data.

**Data Source:** ACS

**Data Elements:** S2504\_C01\_036E, S2504\_C01\_001E

**Houses with No Primary Heating (%):** Percentage of houses using no primary heating fuel is extracted from the ACS 5 year estimates using an API call. It is named S2504\_C01\_038E within the tabular Census Data. This field contains an estimate of the amount of households using no primary heating fuel. To calculate this field as it is seen in the dashboard, divide it by the total number of occupied housing units within the county, named S2504\_C01\_001E in the tabular data.

**Data Source:** ACS

**Data Elements:** S2504\_C01\_038E, S2504\_C01\_001E

**Year House Built, 1939 or Older:** Percentage of houses built in 1939 or earlier is extracted from the ACS 5 year estimates using an API call. It is named S2504\_C01\_015E within the tabular Census Data. This field contains an estimate of the amount of households built in 1939 or earlier. To calculate this field as it is seen in the dashboard, divide it by the total number of occupied housing units within the county, named S2504\_C01\_001E in the tabular data.

**Data Source:** ACS

**Data Elements:** S2504\_C01\_015E, S2504\_C01\_001E

**Year House Built, 1940-1959:** Percentage of houses built between 1939 and 1959 is extracted from the ACS 5 year estimates using an API call. It is named S2504\_C01\_014E within the tabular Census Data. This field contains an estimate of the amount of households built

between 1939 and 1959 earlier. To calculate this field as it is seen in the dashboard, divide it by the total number of occupied housing units within the county, named S2504\_C01\_001E in the tabular data.

**Data Source:** ACS

**Data Elements:** S2504\_C01\_014E, S2504\_C01\_001E

**Year House Built, 1960-1979:** Percentage of houses built between 1960 and 1979 is extracted from the ACS 5 year estimates using an API call. It is named S2504\_C01\_013E within the tabular Census Data. This field contains an estimate of the amount of households built between 1960 and 1979. To calculate this field as it is seen in the dashboard, divide it by the total number of occupied housing units within the county, named S2504\_C01\_001E in the tabular data.

**Data Source:** ACS

**Data Elements:** S2504\_C01\_013E, S2504\_C01\_001E

**Year House Built, 1980-1999:** Percentage of houses built between 1980 and 1999 is extracted from the ACS 5 year estimates using an API call. It is named S2504\_C01\_012E within the tabular Census Data. This field contains an estimate of the amount of households built between 1980 and 1999. To calculate this field as it is seen in the dashboard, divide it by the total number of occupied housing units within the county, named S2504\_C01\_001E in the tabular data.

**Data Source:** ACS

**Data Elements:** S2504\_C01\_012E, S2504\_C01\_001E

**Year House Built, 2000-2009:** Percentage of houses built between 2000 and 2009 is extracted from the ACS 5 year estimates using an API call. It is named S2504\_C01\_011E within the tabular Census Data. This field contains an estimate of the amount of households built between 2000 and 2009. To calculate this field as it is seen in the dashboard, divide it by the total number of occupied housing units within the county, named S2504\_C01\_001E in the tabular data.

**Data Source:** ACS

**Data Elements:** S2504\_C01\_011E, S2504\_C01\_001E

**Year House Built, 2010-2013:** Percentage of houses built between 2010 and 2013 is extracted from the ACS 5 year estimates using an API call. It is named S2504\_C01\_010E within the tabular Census Data. This field contains an estimate of the amount of households built between 2010 and 2013. To calculate this field as it is seen in the dashboard, divide it by the total number of occupied housing units within the county, named S2504\_C01\_001E in the tabular data.

**Data Source:** ACS

**Data Elements:** S2504\_C01\_010E, S2504\_C01\_001E

**Year House Built, 2014 or Later:** Percentage of houses built in 2014 or later is extracted from the ACS 5 year estimates using an API call. It is named S2504\_C01\_009E within the tabular Census Data. This field contains an estimate of the amount of households built between 2014 or Later. To calculate this field as it is seen in the dashboard, divide it by the total number of occupied housing units within the county, named S2504\_C01\_001E in the tabular data.

**Data Source:** ACS

**Data Elements:** S2504\_C01\_009E, S2504\_C01\_001E



**Housing Units, Attached Housing Units:** Percentage of houses classified as Attached is extracted from the ACS 5 year estimates using an API call. It is named S2504\_C01\_003E within the tabular Census Data. This field contains an estimate of the amount of housing units classified as Attached. To calculate this field as it is seen in the dashboard, divide it by the total number of occupied housing units within the county, named S2504\_C01\_001E in the tabular data.

**Data Source:** ACS

**Data Elements:** S2504\_C01\_003E, S2504\_C01\_001E

**Housing Units, Detached Housing Units:** Percentage of houses classified as Detached is extracted from the ACS 5 year estimates using an API call. It is named S2504\_C01\_002E within the tabular Census Data. This field contains an estimate of the amount of housing units classified as Detached. To calculate this field as it is seen in the dashboard, divide it by the total number of occupied housing units within the county, named S2504\_C01\_001E in the tabular data.

**Data Source:** ACS

**Data Elements:** S2504\_C01\_002E, S2504\_C01\_001E

**Housing Units, Mobile Homes:** Percentage of houses classified as Mobile Homes is extracted from the ACS 5 year estimates using an API call. It is named S2504\_C01\_008E within the tabular Census Data. This field contains an estimate of the amount of housing units classified as Mobile Homes. To calculate this field as it is seen in the dashboard, divide it by the total number of occupied housing units within the county, named S2504\_C01\_001E in the tabular data.

**Data Source:** ACS

**Data Elements:** S2504\_C01\_008E, S2504\_C01\_001E

**Housing Units, Apartments (2 or Less):** Percentage of houses classified as Apartments with 2 Units or Less is extracted from the ACS 5 year estimates using an API call. It is named S2504\_C01\_004E within the tabular Census Data. This field contains an estimate of the amount of housing units classified as Apartments with 2 Units or Less. To calculate this field as it is seen in the dashboard, divide it by the total number of occupied housing units within the county, named S2504\_C01\_001E in the tabular data.

**Data Source:** ACS

**Data Elements:** S2504\_C01\_004E, S2504\_C01\_001E

**Housing Units, Apartments (2 or Less):** Percentage of houses classified as Apartments with 2 Units or Less is extracted from the ACS 5 year estimates using an API call. It is named S2504\_C01\_004E within the tabular Census Data. This field contains an estimate of the amount of housing units classified as Apartments with 2 Units or Less. To calculate this field as it is seen in the dashboard, divide it by the total number of occupied housing units within the county, named S2504\_C01\_001E in the tabular data.

**Data Source:** ACS

**Data Elements:** S2504\_C01\_004E, S2504\_C01\_001E

**Housing Units, Apartments (3 to 4):** Percentage of houses classified as Apartments with 3 to 4 Units is extracted from the ACS 5 year estimates using an API call. It is named S2504\_C01\_005E within the tabular Census Data. This field contains an estimate of the amount of housing units classified as Apartments with 3 to 4 Units. To calculate this field as it

is seen in the dashboard, divide it by the total number of occupied housing units within the county, named S2504\_C01\_001E in the tabular data.

**Data Source:** ACS

**Data Elements:** S2504\_C01\_005E, S2504\_C01\_001E

**Housing Units, Apartments (5 to 9):** Percentage of houses classified as Apartments with 5 to 9 Units is extracted from the ACS 5 year estimates using an API call. It is named S2504\_C01\_006E within the tabular Census Data. This field contains an estimate of the amount of housing units classified as Apartments with 5 to 9 Units. To calculate this field as it is seen in the dashboard, divide it by the total number of occupied housing units within the county, named S2504\_C01\_001E in the tabular data.

**Data Source:** ACS

**Data Elements:** S2504\_C01\_006E, S2504\_C01\_001E

**Housing Units, Apartments (10 or More):** Percentage of houses classified as Apartments with 10 or More Units is extracted from the ACS 5 year estimates using an API call. It is named S2504\_C01\_007E within the tabular Census Data. This field contains an estimate of the amount of housing units classified as Apartments with 10 or More Units. To calculate this field as it is seen in the dashboard, divide it by the total number of occupied housing units within the county, named S2504\_C01\_001E in the tabular data.

**Data Source:** ACS

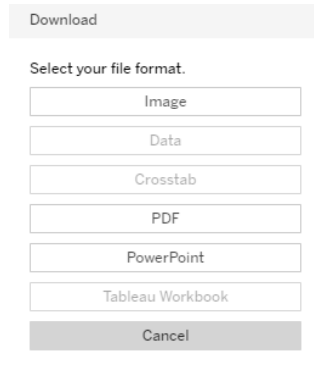
**Data Elements:** S2504\_C01\_007E, S2504\_C01\_001E

## APPENDIX B: PRINTING

### Printing - Download a dashboard to PDF



1. Click Download
2. On the Download screen - click PDF

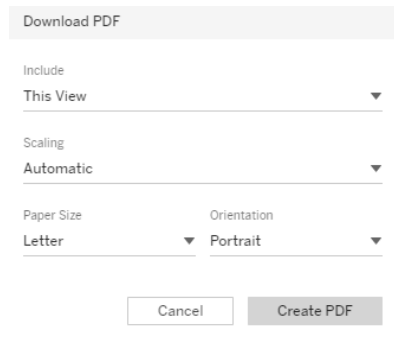


3. On the Download PDF screen. Set what you want to include, the scaling paper size, and orientation, **then click create PDF.**

This View under Include, prints the current page.

Specific sheets from this dashboard (the displayed page) allows you to select specific sheets.

Specific sheets from this workbook (select from all dashboards) allows you to select specific workbooks.



4. Once your PDF has been generated. Click **Download.**

