USDA Food and Nutrition Service

U.S. DEPARTMENT OF AGRICULTURE

Updating Standardized State Heating and Cooling Utility Allowance Values

Supplemental Nutrition Assistance Program Report

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I. Introduction

This report documents research for the U.S. Department of Agriculture's (USDA) Food and Nutrition Service (FNS) to update standardized State heating and cooling standard utility allowances (HCSUAs) used to calculate Supplemental Nutrition Assistance Program (SNAP) eligibility and benefits. Although SNAP is a Federal program, States share responsibility for and the cost of administering the program by accepting applications, verifying eligibility, and calculating benefit amounts using parameters established by Federal law. Benefits are funded entirely by the Federal Government.

By design, most eligibility parameters are set at the Federal level with little variation or discretion at the State level or among households with similar income or household size. One exception to this is in the area of shelter costs; program rules allow households to deduct shelter expenses that exceed 50 percent of net income, recognizing that households with high shelter expenses may have less income available to purchase food. One component of shelter expenses, and the component over which States have some discretion, is the standard utility allowance (SUA). States establish SUAs, which households may use in lieu of actual expenses when calculating total shelter costs. The purpose of this memorandum is to update standardized State HCSUAs that FNS previously developed.

I.A. Overview of SNAP

The Supplemental Nutrition Assistance Program (SNAP) has been a foundation of the Nation's nutrition safety net for more than 30 years. The goal of SNAP is to help low-income households buy the food they need for a healthy and nutritious diet.

The Food and Nutrition Act of 2008, as amended, establishes uniform national eligibility standards for SNAP and defines the parameters (e.g., countable income and assets, allowable deductions from gross income, and maximum benefit levels) used to calculate SNAP benefits. State agencies partner with FNS to administer SNAP. While FNS funds 100 percent of benefit costs, State agencies share with FNS the cost of administering the program. State eligibility workers accept SNAP applications, verify eligibility, and calculate benefit amounts (called the household's allotment) using parameters established by Federal law.

For a given household, benefits are calculated by subtracting 30 percent of the household's net income from the maximum allowable benefit for that household size. Net income is calculated

by deducting certain allowable deductions from gross monthly income.[1] Allowable deductions include:

- A standard deduction that is available to all households.

- An earned income deduction for households with earnings.

- A dependent care deduction for certain out-of-pocket dependent care expenses.

- A medical deduction for households with elderly or disabled members.

- A child support payment deduction for child support payments made to non-household members.

- An excess shelter expense deduction, available to households with shelter costs that exceed 50 percent of their income after other deductions. This deduction has a maximum limit, which is adjusted annually for inflation. The limit does not apply to households with an elderly or disabled member.

I.B. Standard Utility Allowances

As can be seen, the amount of benefits received is inversely related to net income. Net income is calculated by deducting certain allowable deductions, noted above, from gross monthly income. The excess shelter deduction is one such deduction and is allowable if a household's total shelter costs exceed 50 percent of its income after all other deductions have been taken. In such cases, shelter expenses that exceed 50 percent of the household's income are deducted to determine net income.

Shelter expenses include the basic cost of housing, as well as utilities and other allowable expenses. To simplify program administration, States are permitted to establish SUAs that households may use in lieu of actual utility expenses. SUAs may include such expenses as fuel for heating and/or cooling, electricity and fuel for purposes other than heating or cooling, water, sewage, well and septic installation and maintenance, telephone, and trash collection.

While the use of SUAs simplifies the application process from the perspective of both the State agency and the applicant, program simplification needs to be balanced with other SNAP goals of ensuring benefit adequacy and program integrity. Simply stated, SUAs need to be set at a

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[1] For further explanation of the SNAP eligibility and benefit determination, refer to *Characteristics of Supplemental Nutrition Assistance Program Households: Fiscal Year 2011,* available online at www.fns.usda.gov/fns/research.htm, or visit the SNAP Website, http://www.fns.usda.gov/snap/.

high enough level to ensure that households with high shelter costs receive adequate benefits, but not so high that benefit levels are inflated for households with relatively small utility costs.

States have the option of *requiring* that households use SUAs (rather than documenting actual utility costs), and most State agencies (47) do have mandatory SUAs.[2] However, if States require the use of SUAs, they must establish a minimum of two SUAs: one for households with heating and/or cooling expenses and another for households with no heating or cooling expenses.

States may establish multiple SUAs to reflect differences in households' circumstances. Households only need to incur utility costs in order to receive the SUA. Types of SUAs include:

- A Heating and Cooling SUA (HCSUA), for households that pay heating and/or cooling expenses separate from their rent or mortgage. The HCSUA includes the costs of fuel for heating and/or cooling, as well as electricity and fuel for purposes other than heating or cooling, water, sewage, well and septic installation and maintenance, telephone, and trash collection.

- A Limited Utility Allowance (LUA), for households that do not pay any heating or cooling expenses separate from their rent or mortgage. The LUA includes expenses for at least two allowable utility costs but does not include heating/cooling costs.

- A telephone-only allowance, for households that have no utility expenses other than telephone.

- Single Utility Standards (SUSs), for households with a single utility expense (other than heating/cooling or telephone) separate from rent or mortgage.

States may also set different SUA amounts based on geographic location within the State or household size.

There is quite a bit of State-to-State variation in the SUAs, as States use different methodologies to calculate and update them. FNS does not require that States use a particular methodology when developing SUAs. In general, their methodologies fall into two categories: (1) methodologies that rely on State-specific recent utility data and (2) methodologies that adjust a base

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[2] When States require that households use SUAs rather than document actual utility costs, those households with actual costs below the standard get a higher benefit than they otherwise would, whereas those households with actual costs above the standard get a lower benefit than they otherwise would.

number using an inflation measure such as the Consumer Price Index (CPI) of utility costs. Some States use a methodology that combines both approaches. Within these methodologies, there is considerable variation. For example, some States only use data for low-income households, while others gather data for all households. States incorporate a variety of fuel types, and some assign weights to the different fuel types while others do not. Over time, FNS has found some variation between established HCSUA values and average household utility expenses in many States.

I.C. Study Objectives

In 2013, FNS conducted a study (the *SUA Study*[3]) to identify and review available data sources that could be used to develop standardized methodologies for constructing and updating SUAs. In October 2019, FNS published a proposed rule which would revise SNAP regulations to standardize the methodology states use for calculating standard utility allowances consistent with the recommended methodology in the *SUA Study*, with two important extensions. First, the rule would set HCSUAs at the 80th percentile of low-income households' utility costs in the State as estimated using the study methodology. The second extension involves replacing the *SUA Study's* methodology for computing a basic telephone SUA with a broader telecommunications SUA that would include basic Internet service.

The primary objectives of this study are to (1) Expand on the previous study by conducting a review of available data on internet access and costs to determine typical costs for internet access at various connection speeds; and (2) Using the previous study methodology and more recent data, estimate one new HCSUA value for each State. Using the results of this study, FNS will be better able to develop consistency across States in establishing SUAs.

The SP Group Team submitted an earlier memorandum that addressed the first study objective. The purpose of this memorandum is to address the second study objective which entails updating the standardized State HCSUAs. Section II reviews the relevant data sources that are used to tabulate the HCSUAs, and notes changes in the data which had minor ramifications on the methodology that was used. Section III describes the methods used to develop the HCSUA. Section IV presents the results. The Appendices contain detailed data and information used to develop the HCSUAs.

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[3] The *SUA Study* was prepared by SP Group's subcontractor, Econometrica Inc. in 2013.

II. Review of Relevant Data Sources

This section provides an overview of the data sources needed to compute standardized State HCSUAs using the methodology recommended in the *SUA Study*[4].

II.A. Residential Energy Consumption Survey

The U.S. Energy Information Administration's (EIA) Residential Energy Consumption Survey (RECS) is the most accurate and detailed source on U.S. residential energy consumption. The data characterize residential energy use and expenditures by a number of different factors such as:

- Type of Fuel.
- Appliances Used.
- Location (Census Region, urban vs. rural, metropolitan or micropolitan statistical area).
- Climate Region.
- Type of Housing (single family attached/detached, multifamily small/large, mobile home).
- Owned vs. Rented.
- Age.
- Square Footage.
- Household Size.
- Household Income.
- Income Relative to Poverty Line.
- Payment Method (all paid by household, some in rent, all in rent).

The survey was first conducted in 1978 and has been repeated approximately every 4 years. The survey is based on a nationally representative sample; in 2015, it collected data from 5,686 households designed to represent 118.2 million primary residences in the Nation. The data produce reliable estimates for the 4 Census regions and 9 Census divisions that vary in terms of geography, climate, and population size. The 2015 sample was not large enough to be able to provide representative estimates at the State level. The sample is believed to provide sufficient

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[4] The *SUA Study* developed and evaluated two alternative methodologies for estimating the energy component of standardized State HCSUAs: one based entirely on the Residential Energy Consumption Survey (RECS) and one based primarily on the American Community Survey (ACS) which also incorporated RECS. Based on its evaluations of the two methodologies, the *SUA Study* recommended using the ACS-based approach for computing standardized State HCSUAs.

data to construct statistical models that can estimate utility consumption for different structure types and climate conditions.

In administering the survey, EIA uses different models and survey instruments designed to collect both different types of data as well as overlapping data that can be validated against each other. These instruments include:

- Household Survey (HS) consisting of in-person interviews with householders of sampled housing units.

- Survey/interview of rental agents for sampled rental units where some or all of the energy costs are included in the rent.

- Energy Supplier Survey (ESS) in which energy suppliers are asked to provide 12 months of consumption and expenditure data for the sampled housing units.

For the 2015 survey, EIA used the HS and ESS data in energy engineering models that disaggregates total energy consumption into energy consumption by end-use categories (heating, cooling, cooking, refrigeration, lighting, etc.). ***RECS is the only source that provides information on how occupants pay for these different end-uses, a critical factor needed to be able to develop the SUAs.***

In addition to the level of detail it provides, one of the biggest strengths of RECS is that it does not rely upon respondent recall to estimate consumption and expenditures for different fuel types and uses. This is important, as past Census research has shown that utility cost estimates based on respondent recall are usually higher than actual costs.[5] In the HS, the interviewers review actual billing statements, and use portable devices to scan the sampled household utility bills. A statistical procedure then matches and compares the ESS and HS consumption and expenditure figures for the sampled households.[6]

RECS does have several limitations, notably:

- Representative State-level estimates are not available. The most detailed geographic level for which representative estimates are available is the Census Division.

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[5] Riley & Associates and Alan Fox Consulting, 2009, page 14.

[6] For example, see Energy Information Administration, U.S. Department of Energy, *Assessment of consumption and expenditure data collected from energy suppliers against bill data obtained from interviewed households: Case study with 2009 RECS*, February 2013.

- The survey is administered approximately every 4 years, but in some cases there are longer lags between the releases. For example, the two latest releases were in 2009 and 2015.

- There is a significant lag between the data reference year and when the final data for that reference year are released. For example, the end-use estimates are not released until approximately three years after the survey is initiated.

- The sample size is too small to be able to produce reliable estimates if the data are divided into numerous subcategories. For example, in order to develop SUAs, it is necessary to categorize the data by State, income group, type of fuel, end-use, and who paid for the expenditure; in some instances, this amount of categorization leads to very few or no observations in the subcategories.

II.B. American Community Survey (ACS)

The American Community Survey is a continuous survey of the American populace administered by the U.S. Census Bureau. It collects information from approximately 3.5 million households per year on a wide range of topics, including information that was previously gathered on the long form of the decennial census. Other than the decennial census, it is the largest survey administered by the Census Bureau. The estimates are published fairly quickly after the reference period: for example, the Census released estimates for 2012 in December of 2013.

The ACS publishes two types of estimates:

- 5-year estimates: These estimates are based on 60 months of collected data for areas of all population sizes. Of the three types of estimates published, these rely upon the largest samples (and are therefore the most reliable and most accurate) and also allow for the analysis of small populations. However, the estimates are not very current.

- 1-year estimates: These estimates are based on 12 months of data for areas with populations exceeding 65,000 people. These estimates are the most current and can be used to analyze relatively large populations, but they are not as precise or reliable as the 3-year or 5-year estimates.

The ACS is representative at the State level, includes most utility expenses (the exceptions being trash and telephone), includes SNAP participation and poverty status variables, and uses a sufficiently large sample size to be able to produce reliable estimates by various demographic categories (e.g., household size, income group, structure type) and for sub-State regions. It can also be used to compute estimates for quartiles or percentage ranges. Finally, there is no need to convert quantity estimates to costs (since the ACS captures expenditures) or to make location adjustments to account for different climate conditions.

One problem with the ACS is that the cost estimates are based on customer recall rather than on actual utility bills or supplier data. As noted earlier, there is some evidence that Census-based utility cost estimates are higher than they should be because individual respondents tend to remember the highest monthly expenditures rather than average expenditures.[7] According to 2006 ACS technical documentation:

> Research has shown that respondents tended to overstate their expenses for electricity and gas when compared to utility company records. There is some evidence that this overstatement is reduced when yearly costs are asked rather than monthly costs. Caution should be exercised in using these data for direct analysis because costs are not reported for certain kinds of units such as renter-occupied units with all utilities included in the rent and owner-occupied condominium units with utilities included in the condominium fee.[8]

This is supported by an analysis in the Department of Housing and Urban Development (HUD) *Comparative Study* (cited previously), which found that electric and natural gas heating cost estimates based on the ACS were 12–19 percent higher than comparable costs derived from RECS.[9]

Nevertheless, HUD uses ACS and Census data to periodically re-benchmark its Fair Market Rents, so there is both a precedent for a Government-wide program to use the ACS, as well as a rationale supporting consistency and comparability across agencies.

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[7] HUD and the Census have also confronted and have attempted to deal with this issue in the American Housing Survey (AHS). According to a 2009 study on AHS survey design, "Respondents frequently do not have good recall about utility expenses and even when recall is good, it can be affected by seasonal fluctuations in utility bills. The few studies that have been conducted regarding respondent error suggest that residents overestimate their utility costs." See U.S. Department of Housing and Urban Development, *Streamlining the American Housing Survey*, report prepared by Frederick J. Eggers of Econometrica, June 2009.

[8] U.S. Census Bureau, *American Community Survey Definitions, 2006*, page 22.

[9] Riley & Associates and Alan Fox Consulting, 2009.

II.C. Consumer Expenditure Survey

The Consumer Expenditure Survey (CEX) is a data collection program administered by the U.S. Bureau of Labor Statistics (BLS), although the data are actually collected by the Census Bureau. The data allow for detailed analysis of different expenditure patterns by income level and other demographic characteristics (notably, SNAP participation and household size for purposes of this study). The main problem with the CEX is that the data are not representative at the State level and cannot be used to produce accurate State-level estimates.

For purposes of developing the HCSUAs, the CEX is the only readily available data source that contains information on trash expenditures. We used the CEX data in conjunction with national level ACS data, therefore, to develop a scaling factor that is applied to and escalates the State-level water and sewage expenditure estimates derived from the ACS.

II.D. Short Term Energy Outlook (STEO)

EIA's Short Term Energy Outlook (STEO) includes monthly forecasts of energy consumption data (quantity, price, and expenditures) for the Nation and Census Divisions. The forecasts cover residential consumption of electricity, natural gas, and renewable fuels and extend approximately 6 quarters into the future. STEO also provides forecasts for corresponding macroeconomic indicators and climate (Heating Degree Days (HDDs) and Cooling Degree Days (CDDs)).[10]

In the previous *SUA Study*, the STEO was used to extrapolate the base year estimates to the target year. However, validation assessments indicated that an alternative extrapolation method based upon the Consumer Price Index (CPI) might produce more accurate results and would be easier to implement. We considered using the CPI for this update; however, the CPI has been heavily influenced by the COVID 19 pandemic, and we do not believe that using the most recent CPI data will be as accurate as using the STEO's model-based approach for extrapolating 2019-year data to FY 2022.

II.E. Broadband

The term "broadband," commonly referred to as high-speed internet access, was established in Section 706 of the Telecommunications Act of 1996 (the Act). Its overall objective was to encourage companies to compete to offer telecommunications services, including internet services, by removing regulatory barriers. The Act requires the FCC to "encourage the deployment

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[10] HDDs and CDDs are metrics that reflect the quantity of energy needed to heat or cool a building, respectively. The metrics compare average temperatures over a specific period of time with base temperatures in which heating or cooling is not required.

on a reasonable and timely basis of advanced telecommunications capability to all Americans." The Act defines advanced telecommunications capability as enabling "users to originate and receive high-quality voice, data, graphics, and video telecommunications."[11] The FCC standard for broadband internet speed, established in 2015, is a minimum of 25 Mbps for download speed and 3 Mbps for upload speed (25 Mbps/3 Mbps)[12].

The Federal Communications Commission (FCC) and the U.S. Census Bureau's ACS regularly publish data on the availability and use of broadband-speed internet in the United States. There is, however, no regularly published data on the costs of internet service plans or internet service expenditures. Most internet service providers offer multiple internet plans and their pricing varies by region.

In the absence of such data, SP Group compiled data aggregated by private third parties to estimate the broadband component of the HCSUAs. As described in Section III, we collected data from two private data sources (Allconnect and BroadbandSearch) that use automated data tools and Internet Service Provider partnerships to estimate costs of internet service plans. We then made adjustments to these estimates to account for FCC's Lifeline subsidy so as to avoid double counting of federal subsidies available for broadband. We used data from Universal Service Administrative Co. regarding participation rates in each State for the FCC's Lifeline subsidy.

II.F. Changes in Data Sources Since the Last SUA Study

To implement the recommended methodology presented in the *SUA Study*, it was necessary to examine the previously utilized data sources for any changes that may have occurred that could impact development of the FY 2022 HCSUAs. Examples of potential changes we evaluated include the addition or dropping of variables, alterations to the wording of survey questions, changes in sample sizes and/or the geographic levels at which the data are representative. Some minor changes were detected, necessitating changes to the computer code that was developed to process data. These changes entailed how different data sets were linked and how the survey responses were weighted.

Specific changes to utilized data sets are described below and in Appendix A.

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[11] FCC. *Telecommunications Act of 1996.* Retrieved from https://www.fcc.gov/general/telecommunications-act-1996.

[12] FCC. *2015 Broadband Progress Report.* Retrieved from https://www.fcc.gov/reports-research/reports/broadband-progress-reports/2015-broadband-progress-report.

Department of Energy's Residential Energy Consumption Survey (RECS)

- In the 2009 survey, RECS provided a variable indicating whether the household was at or below 150% of the poverty line. This variable is not provided in the 2015 survey. In addition, the number of household income categories has been reduced from 24 categories to 8 categories (see Appendix Table A-1 for more information). The computer programs that process the RECS data were revised to incorporate a concordance between the 8 income groups and the latest poverty threshold definitions by household size.

- The 2009 RECS survey provided representative estimates for 16 States and 11 multi-State regions. The 2015 survey is representative at the Census Division level (see Appendix Table A-2 for a comparison of the 2009 and 2015 statistically representative geographic units). The computer programs that link RECS data to State-level ACS data were revised to incorporate the changes in geographic definitions.

- In the 2009 RECS survey, the expenditure for each energy utility was allocated to several different end uses (e.g., heating) and an "all other purposes" category. In the 2015 RECS survey, the number of end uses has been expanded, and the variable name for "all other purposes" has been changed (See Appendix Table A-3 for more information). The computer programs were revised to reflect these changes.

- In the 2009 RECS survey, data on how utility expenditures were paid for (e.g., directly paid for by household, included in rent, some paid by household and some included in rent, etc.) were provided by type of utility and end use (e.g., heating). In the 2015 survey, the data have been consolidated to remove the end use detail, and our computer programs were revised to reflect those changes.

  We believe that the impacts of this survey change are minimal. There is a small possibility that a few records that would have been included in tabulations based on the 2009 survey design are now being excluded: for example, in situations where a rental tenant is responsible for paying electricity expenses for heating and cooling, but whose other electricity expenditures are included in rent. In the 2015 survey data, such records are now generically coded as "some of the electricity expenditure is paid for by the household and some of it is included in rent", and it is not possible to determine if such households are paying for heating and cooling expenses. However, these situations are very rare; an analysis of the 2015 RECS data shows that for each fuel type less than 1% of respondents are in the category of paying for some the energy expenses and having some of it included in their rent/condo fee.

U.S. Census Bureau's American Community Survey (ACS)

- No variables were removed or added.
- There have been no changes in how variables were coded and/or defined.
- The poverty status variable that was previously created under the prior study was updated to reflect changes in the poverty threshold definitions.

Energy Information Administration's Short-Term Energy Outlook (STEO)

- The latest STEO provides the same variables and level detail that were used in the previous study.
- STEO provides monthly forecasts for through 2022.

BLS and Census Bureau's Current Population Survey (CPS)

- No changes have been made to the household and population variables and definitions that were used in the last study.

Census Population Projections

- The units of analysis and definitions used in the Census Bureau's population projections have not changed since the last study.
- The most recent population projections were released in 2017 and extend out to 2060.

BLS Consumer Expenditure Survey (CEX)

- The CEX still provides detail on trash expenditures separate from water and sewer expenditures, which is needed to develop a scaling factor for the ACS water and sewage expenditures by State.
- Data for 2019 were released in September 2020.

III. Methodology for Developing the HCSUAs

This section provides an overview of the methodology used to re-estimate State HCSUAs using more recent data.[13] As one of the requirements of this contract, we use the methodology recommended in the previous *SUA Study*, which relied on combining data from both the ACS and RECS. In general, the approach starts by developing for each State an average utility expenditure estimate for low-income households with out-of-pocket heating and cooling expenses. These estimates are developed using the latest year (i.e., base year) of available data (2019 for the ACS). The utility expenditures are divided into three broad categories: energy, water/sewage/trash, and broadband. Due to differences in the data for these three categories, we use separate methodologies to develop the base-year estimates for each utility category.

Next, we extrapolate these estimates to the target year (FY 2022), which is necessary due to lags between the target year and the year of the data being used. Growth in average household utility expenditures consists of three components: change in the price of the utility, change in the quantity consumed (e.g., cubic feet or kilowatt hours), and change in the number of households. The relationship between these growth factors is summarized in Equation 1 (Appendix B contains a more detailed description of this relationship):

Equation 1: Household Utility Expenditures and Component Growth Rates

$$UtilityExpenditures\_per\_Household_{t+1} \ = \ UtilityExpenditures\_per\_Household_t$$
$$\times \quad Average\ Annual\ Growth\ Rate\ (AAGR)\ in\ Prices$$
$$\times \quad AAGR\ in\ Quantity\ Consumed$$
$$\div \quad AAGR\ in\ Number\ of\ Households$$

This formula shows that average household utility expenditures change as a result of changing prices, consumer response to price changes and other factors (e.g., weather) in terms of how

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[13] The data sources that can be used to support the development of a standardized methodology for estimating State HCSUAs do not provide information for Guam or the U.S. Virgin Islands.

much of the utility is purchased, and growth in the number of households.[14] These components and their relationship to each other play an important part in the development of the HCSUAs.

After the base year estimates for each State have been extrapolated, the target year household (low-income) utility expenditures for each broad utility category are added to produce a total utility expenditure estimate for each State. We then multiply these estimates by scaling factors, developed using detailed ACS data, that convert the estimated average household utility expenditures into the HCSUAs, which are set at a level to meet or exceed the utility expenses of 80 percent of low-income households with out-of-pocket heating and/or cooling expenses.

The following sections describe these steps in more detail.

III.A. Energy

This section describes the methodology used to develop for each State the energy expenditure component of the HCSUAs. The approach incorporates the methodology presented in Section IV.E.1 of the SUA Study, and includes some slight modifications and extensions needed to develop the HCSUAs for FY 2022.

Using data from the ACS and RECS, we estimate the average energy expenditures for households that incur heating and/or cooling expenses and directly pay for all of their energy end-uses. Base-year estimates for 2019 are developed by source (electricity, natural gas, other) and extrapolated to the target year (FY 2022) using recent forecasts published in the STEO.

The method to develop the energy component of the HCSUA utilizes data both from the ACS and from RECS. The ACS collects expenditure data for energy usage by energy source (electricity, natural gas, and other fuels) but does not provide detail by end-use (e.g., heating, cooling, lighting, cooking, media usage, etc.). Therefore, it is not possible to use the ACS directly to estimate energy expenditures for those households that incur heating and cooling expenses, a requirement for computing the HCSUAs. RECS does provide residential energy expenditure information by end-use., as well as the method by which payments are provided (e.g., directly or through rent). The information that RECS provides is also more accurate than that provided by the ACS and other sources because it is validated against data on customer billings from utility company records rather than being based exclusively on respondent recall. However, RECS has

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[14] Since the average expenditure per household is essentially total expenditures divided by the number of households, we have to take into account the extrapolated number of households in order to compute the extrapolated expenditure per household.

several limitations which make it unsuitable for being the only data source used to develop the energy expenditure estimates of the HCSUAs. Notably, those limitations include the following:

- RECS does not provide representative estimates at the State level.
- RECS is based on a sample that is much smaller than the one used for the ACS.
- RECS is not updated regularly or frequently, and the data are released on a slower timeframe than the ACS, resulting in a greater lag between data collection and data release. The data vintages for the last two releases of RECS were 2009 and 2015, whereas the ACS is updated yearly with the last release being for 2019.

As a result, we use data both from the ACS and RECS to estimate the energy expenditures of those low-income households that do incur heating and cooling expenses. The method used to develop these estimates consists of the following four steps:

1. First, we used the ACS to tabulate by State the average household energy expenditure (all fuel sources combined) for low-income households (shown in Appendix Table F-4).

2. Next, we developed an adjustment parameter that can be used to isolate expenditures incurred by households that have heating/cooling expenses. This adjustment is necessary because the average energy expenditure tabulations based solely on the ACS data include households with heating and cooling expenses and households without heating and cooling expenses; therefore, in most cases, the ACS average will be slightly lower than an average derived only from households that have heating and cooling expenses. Because RECS is the only reliable source that provides energy expenditure information by end-use, we used it to develop the adjustment parameter (shown in Appendix Table G-1). The parameter is defined as the ratio between total energy expenditures of low-income households that have heating and cooling expenses—tabulated using 2015 RECS data—and total average energy expenditures of all low-income households—tabulated using 2015 ACS data. The parameter essentially converts the ACS data into RECS equivalents, addressing at the same time any potential upward bias in the ACS estimates due to the fact that they are based on customer recall. Separate adjustment parameters are calculated for each U.S. Census Division.

3. Third, we multiplied the 2019 ACS energy expenditure estimates (shown in Appendix F) by the adjustment parameters to develop base year (2019) estimates of low-income household energy expenditures (all fuels combined) by those households that incur heating and cooling expenses.

4. Finally, we escalated these figures to the target year (FY 2022) by multiplying them by the applicable expenditure growth rates (calculated using the STEO) presented in Appendix E-3 and dividing by the low-income household formation growth rates presented in Appendix D. The results are presented in Appendix Table G-2.

Figure 1 illustrates how the energy component of the HCSUA for Colorado was developed.

FIGURE 1: USE OF ACS AND RECS TO DEVELOP THE FY2022 ENERGY COMPONENT OF THE COLORADO HCSUA
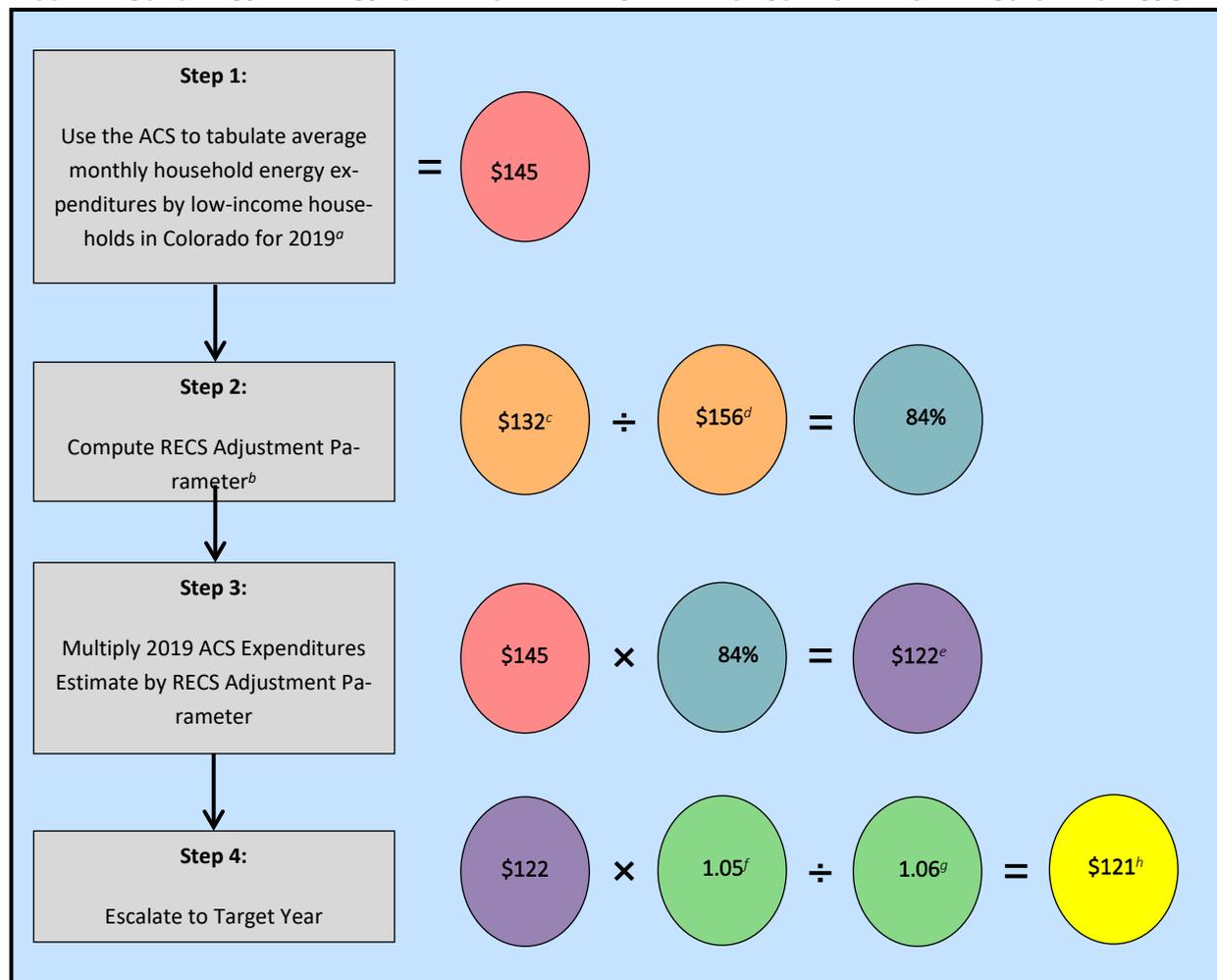
[a] Shown in column 4, Appendix Table G-2.
[b] Shown in column 6 of Appendix Table G-2.
[c] 2015 RECS estimate of average monthly energy expenses paid for directly by low-income households that incur heating and cooling expenses (shown in Appendix Table G-1, column 4).
[d] 2015 ACS estimate of average monthly energy expenditures (all end-uses and fuel types) by low-income households (shown in Appendix Table G-1, column 5).
[e] Shown in column 6, Appendix Table G-2.
[f] Expenditure growth rate, shown in column 7, Appendix Table G-2.
[g] Household formation growth rate, shown in column 8, Appendix Table G-2.
[h] Shown in column 9, Appendix Table G-2.

III.B. Water, Sewage, and Trash

This section reports on the method used to develop the water/sewage/trash component of the HCSUAs. The approach is based on the methodology presented in Section IV.B of the *SUA Study*. The method utilizes ACS data on expenditures by low-income households for water and sewage services combined.[15] To address the lack of data on trash expenditures, we used a simple scaling factor. The CEX provides expenditure data for water/sewage/garbage services combined, and a comparison of these national-level data with ACS national-level data for water and sewage suggest that garbage expenditures add approximately 37 percent to the combined expenditures for water and sewage.

The State-level 2019 ACS data for water and sewage expenditures (shown in Appendix Table F-5) are extracted and then adjusted using the 37-percent scaling factor mentioned above. The results are then extrapolated to FY 2022 using average historical growth rates for low-income households derived from the ACS data. These growth rates were computed for each State using the average growth in water/sewage expenditures over three 3-year periods: FY 2019 / CY 2016, FY 2018 / CY 2015, and FY 2017 / 2014. To convert the CY data in the numerators to a FY basis, we used linear interpolation based on the number of months in the respective FY that overlap its two constituent CYs: e.g., FY 2019 = (25% * CY 2018) + (75% * CY 2019) where the 25% parameter reflects the three months of October-December and the 75% parameter reflects the nine months of January-September. The use of average 3-year growth rates is appropriate since we are extending the 2019 data out 3 years to FY 2022.

The results for all States are presented in Appendix Table H-1. To illustrate the methodology, consider the State of Colorado. The third column of the table shows that low-income households spent on average $39.68 per month for water and sewage services combined. This figure is based upon 2019 ACS data obtained from Appendix Table F-5. The average expenditure growth rate used to escalate the average monthly expenditure is shown in the eighth column and is 1.03; it was calculated as the simple average of the three 3-year growth rates presented in columns 5–7, which were derived from the data in Appendix Table F-5. The final result is produced by increasing the 2019 average monthly expenditure by 37 percent to account for trash expenditures, and then multiplying by the 1.03 average 3-year household expenditure growth

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[15] As noted previously, there is some evidence that survey respondents overstate their utility costs when their answers are based on recall. This issue is particularly relevant when utility charges vary over time due to seasonal fluctuations in usage or energy prices, as respondents tend to more easily remember their relatively "higher" utility bills. We do not have any evidence but suspect that this potential bias is less of an issue for water/sewage/trash expenditures, which do not exhibit the same seasonal fluctuations.

rate reported in Column 8. The result shown in the last column suggests that low-income households in Colorado will spend $56.17 per month on average for water, sewage, and trash services combined. This example is provided in the following graphic.

FIGURE **2**: DEVELOPMENT OF **FY 2022 W**ATER**/S**EWAGE**/T**RASH **SUS** FOR **C**OLORADO

Step 1:

Use the ACS to tabulate average monthly water and sewage expenditures by low-income households in Colorado for 2019[a]

= $40

Step 2:

Add Adjustment for Trash Expenditures

$40 × 1.37 = $54

Step 3:

Escalate to Target Year

$54 × 1.03[b] = $56[c]
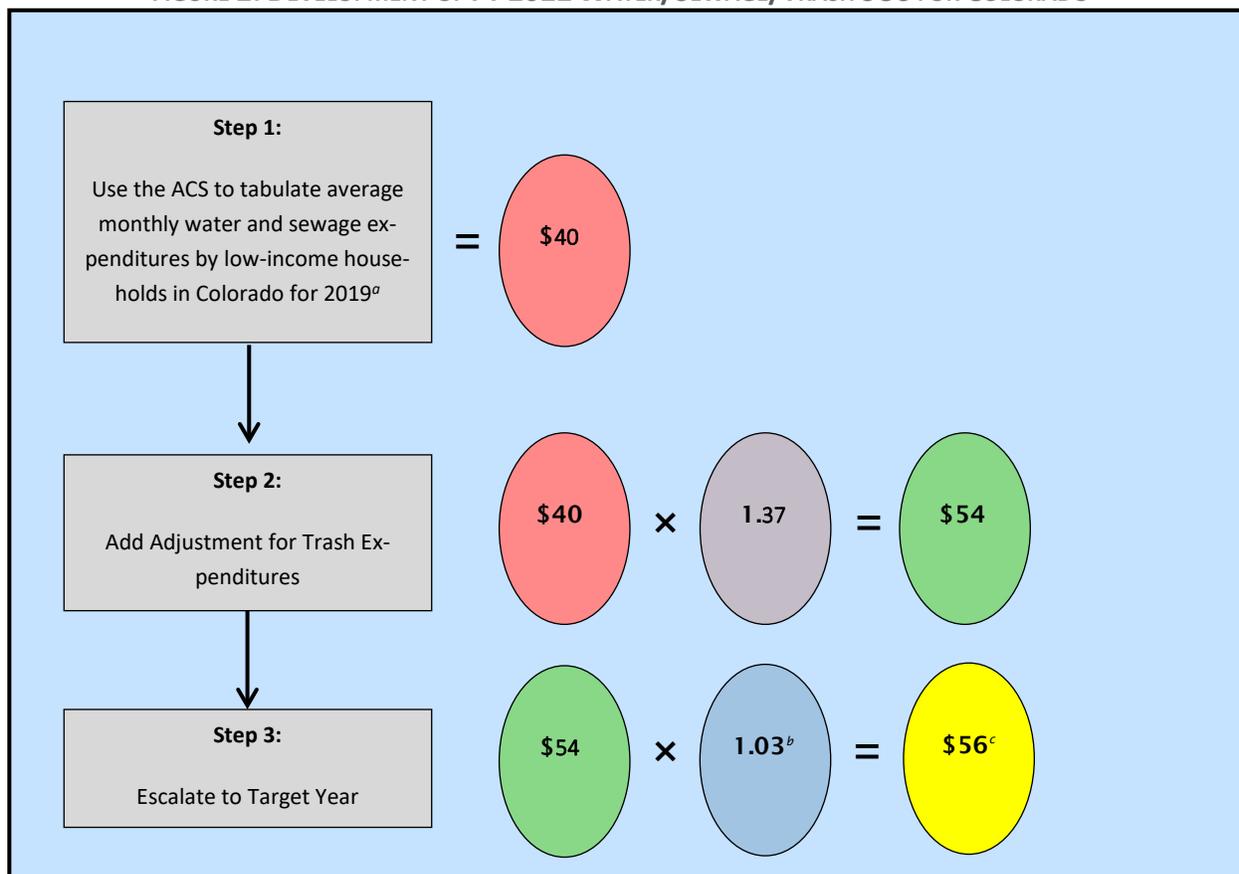
[a] Shown in column 3, Appendix Table H-1.
[b] Expenditure growth rate, shown in column 8, Appendix Table H-1.
[c] Shown in column 9, Appendix Table H-1.

III.C. Broadband

In October 2019, FNS published a proposed rule that would standardize the methodology for calculating standard utility allowances. The proposed rule would also make the cost of basic internet service an allowable expense and would replace the telephone standard with a broader telecommunications SUA that would consist of costs for one telephone, basic internet service, or both.

Although the previous *SUA Study* developed and implemented a methodology for standardizing telephone SUAs, that procedure was hampered by a lack of Federal nationwide data on the

costs of basic telephone service at the State-level. As a result, the method used a data disaggregation routine that allocated national level telephone service expenditure data to the States based on differences in personal income. Given these limitations, under the current effort we are replacing the telephone component of the standardized State HCSUAs with a broadband component.

As part of this study, the SP Group Team conducted an extensive literature review to identify data sources that could be used to estimate the costs of basic internet service to low-income households. Although Federal data on these costs is still publicly unavailable, we developed a standardized approach that we believe will be easy to replicate in the future and provides a reasonable estimate of the costs of basic internet service to low-income households. The five-step approach uses cost data gleaned from two data aggregation web sites that give consumers the ability to compare the costs of internet service plans offered by different internet service providers. Average cost estimates are developed and then adjusted to take into account the FCC's Lifeline program, which provides low-income households with a subsidy of up to $9.25 per month for "Broadband Support"[16].

The five steps used in the approach consist of the following:

Step 1: Collect Data from Source #1 - Allconnect

Allconnect is a company that aggregates information about the costs and available speeds of internet plans across the United States. It obtains this information using automated data collection and partnerships with "more than 30 internet… providers". Allconnect provides users with internet plan comparisons based on their geographic location. Allconnect also aggregates internet plan options on the State-level and lists two to six of the cheapest internet plans available in the State. Each internet plan option listed by Allconnect is based on the advertised price from the Internet Service Provider.

The SP Group Team collected data from Allconnect's website in March 2021 regarding the advertised costs in each State for the cheapest internet plans with 25 Mbps download speed (shown in Appendix Table I-1). This data included information on the cheapest plans from multiple service providers in order to account for the fact that most service providers do not have coverage for an entire State. State averages of the Allconnect data are presented in Appendix Table I-2.

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[16] https://www.highspeedinternet.com/resources/are-there-government-programs-to-help-me-get-internet-service

Step 2: Collect Data from Source #2 - BroadbandSearch.net

BroadbandSearch.net is similar to Allconnect in that it uses data tools, research, and internet service provider partnerships to provide users with comparisons of internet plans based on geographic location. BroadbandSearch.net produced estimates for the average cost of internet per Mbps by internet type (i.e., cable, DSL, Fiber) for each State, seen in the graphic provided[17].

FIGURE 3: MAP OF COST OF CABLE INTERNET BY STATE FROM BROADBANDSEARCH.NET
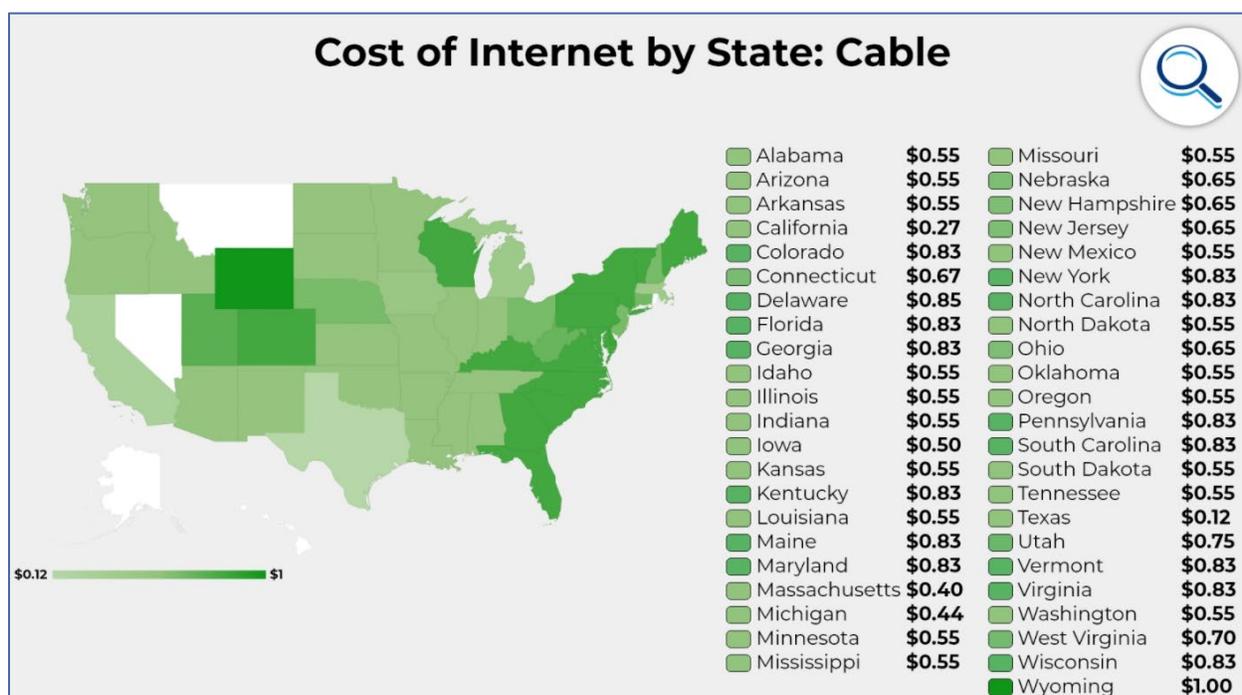
The SP Group Team used this data to develop a second estimate of the cost of basic internet service to low-income households in each State (shown in Appendix Table I-3). For example, BroadbandSearch.net shows Iowa has an average cost of cable internet of $0.50 per Mbps. Based on this price estimate, we computed the average internet cost for 25 Mbps download speed internet in Iowa to be $12.50 per month.

Step 3: Average the Estimates

We then computed an average cost of basic internet service to low-income households in each State using the estimated costs of the internet service plan(s) from Allconnect as well as the estimated internet costs derived from BroadbandSearch.net. This approach ensures that we are

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[17] https://www.broadbandsearch.net/blog/internet-cost-by-state

not reliant on a single data source and accounts for the range of internet plans that are often offered across one State. The results are presented in column 5 of Appendix Table I-4.

Step 4: Account for FCC's Lifeline Program Subsidy

The FCC Lifeline Program for low-income consumers provides low-income households with a subsidy of up to $9.25 per month for "Broadband Support"[18]. The program includes SNAP participation as a criterion for eligibility. Approximately 25 percent of eligible households participate in the Lifeline Program nationwide; the percent of eligible households participating in the program varies by State[19].

Since households who receive the Lifeline subsidy do not bear the full cost of the internet service plans offered by internet service providers, it is necessary to remove the Lifeline subsidy amounts from the advertised rates to estimate the costs that are incurred by low-income households. We used the Lifeline participation rate as an adjustment factor for this purpose. This adjustment consists of using the Lifeline participation rate to compute the following weighted average cost for each State:

$$IC_s = ((FC_s - LifelineSubsidy) * LPR_s) + (FC_s*(1-LPR_s)),$$

where IC refers to "Incurred Cost", FC refers to "Full Cost", LPR refers to "Lifeline Participation Rate", and the subscript "s" refers to the State. The Lifeline participation rate and weighted average calculation for each State is shown in columns 6 and 7 of Appendix Table I-4.

For example, assume that the averaged internet cost from Step 3 for a State is $20 per month and that the Lifeline participation rate for the State is 10%. Therefore, at current participation we would estimate that 10% of the SNAP-eligible population is paying $10.75 per month out of pocket (after accounting for the $9.25 subsidy from Lifeline). The remaining 90% of the SNAP-eligible population would be paying $20 per month. Taking into account the Lifeline subsidy, we would estimate the internet cost to be $19.08 for the State:

Calculation: (90% x $20) + (10% x $10.75) = $19.08

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[18] https://www.highspeedinternet.com/resources/are-there-government-programs-to-help-me-get-internet-service

[19] https://www.usac.org/lifeline/learn/program-data/

Step 5: Escalate to Target Year

In this step, we escalate the results from Step 4 to the target year for the HCSUAs: FY 2022. Unlike the other components of the HCSUAs, the data for these utility costs are on a household rate basis rather than an aggregate expenditure basis; therefore, it is not necessary to apply adjustments for household formation or changes in quantity demanded as shown in Equation 1. However, changes in price still need to be taken into account. To extrapolate the basic internet costs incurred by low-income households to the target year, we used the STEO's macroeconomic forecast of the consumer price index (CPI), which it reports on a monthly basis. The growth rate is calculated as the average monthly CPI for FY 2022 divided by the average monthly CPI for November 2020 – January 2021 (the most recent actual data available corresponding to when the internet cost estimates were obtained). The result is 1.03 (i.e., 2.70 ÷ 2.62). The final results are presented in column 8 of Appendix Table I-4.

Figure 4 illustrates how the broadband component of the HCSUA for Colorado was developed, as an example.

Figure 4: Developing the FY2022 Broadband Component of the Colorado HCSUA

Step 1:

Review Allconnect data to identify the average monthly cost associated with inexpensive internet plans in each state

$=$ $33.31[a]

Step 2:

Compute average broadband estimates using cost per Mbps from BraodbandSearch.net

$0.83[b] × 25 Mpbs $=$ $20.75[c]

Step 3:

Compute the average of estimates from Step 1 and Step 2

Avg($33.31 , $20.75) $=$ $27.03[d]

Step 4:

Account for state participation in FCC's Lifeline program subsidy

$17.78 × 16%[e] + $27.03 × 84% $=$ $25.55[f]

Step 5:

Escalate to Target Year

$25.55 × 1.03 $=$ $26.32[g]

[a] Shown in column 3, Appendix Table I-2.
[b] Shown in column 3 of Appendix Table I-3.
[c] Shown in column 4 of Appendix Table I-3.
[d] Shown in column 5 of Appendix Table I-4.
[e] Shown in column 6 of Appendix Table I-4.
[f] Shown in column 7 of Appendix Table I-4.
[g] Shown in column 8 of Appendix Table I-4.

III.D. Computation of HCSUAs

To compute the FY 2022 HCSUAs, for each State, we first construct an average of the total monthly utility expenditures by low-income households that incur heating and/or cooling expenses and directly pay for all of their energy end-uses. This is accomplished by simply adding the estimates for the three major components of the HCSUAs discussed above: energy, water/sewage/trash, and broadband. These estimates are provided in Appendix Table J-1. To continue the example for Colorado, Appendix Table J-1 shows that low-income households with heating and cooling expenses are expected to spend the following per month on utilities:

Energy		$121.47
Water/Sewage/Trash	+	$56.17
Broadband	+	$26.32
Total	=	$203.96

In the previous *SUA Study*, one important finding was that almost all of the actual HCSUAs being implemented by the States exceed by a considerable amount the total monthly utility expenditures of households that incur heating and/or cooling expenses. One explanation for this discovery is that States set their HCSUAs higher than the average cost to minimize benefit loss for households with high utility expenses. Consistent with this finding, FNS has proposed that the standardized State HCSUAs be set at a level to meet or exceed the utility expenses of 80 percent of low-income households with out-of-pocket heating and/or cooling expenses.

As a result, it is necessary to escalate the total monthly utility expenditures presented in Appendix Table J-1 to a level which would meet or exceed the total utility expenditures of 80 percent of the low-income households with out-of-pocket heating and/or cooling expenses. We used ACS data on the distribution of low-income household total utility expenditures to compute scaling factors for this purpose. The ACS is the only available data source that is large enough to provide utility expenses that are representative at the State-level and for different income groups. Note that the RECS sample is not large enough to be able to develop percentile estimates for income groups or State-level estimates.

To compute the scaling parameter, we tabulated the following for each State:

- average utility expenditures (all utilities combined) by low-income households.
- utility expenditures (all utilities combined) defining the 80th percentile of low-income households.

We then constructed a ratio for each State by dividing the 80th percentile expenditures by the mean expenditures. These factors are presented in Appendix Table J-2.

In the final step, we applied these ratios to the corresponding figures in Appendix Table J-1 (total FY 2022 monthly utility expenditures by low-income households that incur heating and/or cooling expenses and directly pay for all of their energy end-uses) to escalate them to an 80th percentile estimate, shown in Appendix Table J-3.

To account for the possibility that the final rule may stipulate a percentile other than 80%, we also provide in Appendix Table J-2 scaling parameters based on the 85th percentile, the 90th percentile, and the 95th percentile. These scalars will allow the HCSUAs to be set at levels corresponding to those percentiles; however, if the Final Rule stipulates a percentile other than those provided, such as 83%, FNS will need to calculate the scalars using the ACS data and apply them to the mean estimates to produce the desired HCSUAs.

IV. Results

Table 1 below presents the standardized FY 2022 HCSUAs for each State, based on a level that would meet or exceed total utility expenditures of 80% of the low-income population (Appendix Table J-3 presents potential standardized State HCSUAs based on other percentile ranges). As can be seen by the following comparisons, these values are generally lower than the actual FY 2021 HCSUAs developed by the States using their own methodologies:

	Actual HCSUAs[20] FY 2021	Proposed Standardized State HCSUAs FY 2022
Minimum Value	$275	$262
Maximum Value	$850	$497
Average Value	$470	$327

On average, the FY 2022 values in Table 1 are also lower than the respective values for FY 2014. An analysis of those differences produced the following findings:

- 33 States show average monthly utility costs for FY 2022 that are lower those presented for FY 2014.

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[20] https://www.fns.usda.gov/sites/default/files/media/file/SNAP_SUA_Table_FY2021.xlsx.

- The telephone/broadband component is the main determinant of the lower values, with all States showing a lower broadband cost in FY 2022 than the telephone cost in FY 2014. The average State difference between the two years is -$30. The change in the telephone/broadband component is responsible for 22 of the States that show lower values in FY 2022 than in FY 2014.

- Eleven States show lower values in FY 2022 due to reduced energy expenditures. Two important factors that contribute to this result are the baseline data and changes in the RECS adjustment parameters. In six States, the ACS reports lower energy expenditures by low-income households for 2019 compared to 2011 (the base years for the two analyses). The changes in the RECS survey methodology also may have been a factor as 27 States show declines in the RECS adjustment parameter between the two studies.

- There is also a slightly negative difference in the scaling factors used to escalate the average utility expenditures of low-income households to the 80th percentile of low-income households. 48 States exhibit lower escalation factors for FY 2022 when compared to the respective factors computed for the FY 2014 study. For those 48 States that do show lower escalation factors, the FY 2022 value is on average approximately 95% of the value computed for the FY 2014 study.

TABLE 1: PROPOSED HCSUAS

FIPS	State	FY2022 Average Monthly Utility Expenditures for Low-Income Households	FY2022 HCSUA Based on the Utility Expenditures of the 80th Percentile of Low-Income Households
1	Alabama	$238	$329
2	Alaska	$295	$497
4	Arizona	$220	$319
5	Arkansas	$225	$320
6	California	$209	$310
8	Colorado	$204	$296
9	Connecticut	$312	$490
10	Delaware	$236	$350
11	District of Columbia	$183	$284
12	Florida	$195	$277
13	Georgia	$234	$325
15	Hawaii	$277	$427
16	Idaho	$197	$287
17	Illinois	$198	$295
18	Indiana	$226	$326
19	Iowa	$202	$295
20	Kansas	$214	$307

21	Kentucky	$229	$318
22	Louisiana	$214	$295
23	Maine	$264	$394
24	Maryland	$243	$358
25	Massachusetts	$236	$381
26	Michigan	$218	$320
27	Minnesota	$168	$265
28	Mississippi	$222	$297
29	Missouri	$203	$292
30	Montana	$231	$341
31	Nebraska	$193	$271
32	Nevada	$233	$341
33	New Hampshire	$248	$400
34	New Jersey	$214	$335
35	New Mexico	$202	$286
36	New York	$188	$292
37	North Carolina	$223	$312
38	North Dakota	$173	$262
39	Ohio	$210	$302
40	Oklahoma	$237	$327
41	Oregon	$206	$302
42	Pennsylvania	$239	$352
44	Rhode Island	$249	$382
45	South Carolina	$226	$306
46	South Dakota	$198	$317
47	Tennessee	$208	$290
48	Texas	$225	$319
49	Utah	$206	$290
50	Vermont	$257	$423
51	Virginia	$224	$319
53	Washington	$218	$335
54	West Virginia	$238	$336
55	Wisconsin	$188	$274
56	Wyoming	$217	$310

Appendix A: Changes in Data Used to Estimate HCSUAs

APPENDIX TABLE A-1: RECS HOUSEHOLD INCOME CATEGORY CHANGES

RECS Household Income Groups	
2009	**2015**
Less than $2,500	Less than $20,000
$2,500 to $4,999	$20,000 - $39,999
$5,000 to $7,499	$40,000 - $59,999
$7,500 to $9,999	$60,000 to $79,999
$10,000 to $14,999	$80,000 to $99,999
$15,000 to $19,999	$100,000 to $119,999
$20,000 to $24,999	$120,000 to $139,999
$25,000 to $29,999	$140,000 or more
$30,000 to $34,999	
$35,000 to $39,999	
$40,000 to $44,999	
$45,000 to $49,999	
$50,000 to $54,999	
$55,000 to $59,999	
$60,000 to $64,999	
$65,000 to $69,999	
$70,000 to $74,999	
$75,000 to $79,999	
$80,000 to $84,999	
$85,000 to $89,999	
$90,000 to $94,999	
$95,000 to $99,999	
$100,000 to $119,999	
$120,000 or More	

APPENDIX TABLE A-2: RECS GEOGRAPHIC CHANGES

Smallest Geographic Unit with Statistical Representativeness	
2009 States and Groups of States	**2015 Census Divisions**
(CT, ME, NH, RI, VT)	New England (CT, MA, ME, NH, RI, VT)
MA	Middle Atlantic (NJ, NY, PA)
NY	East North Central (IL, IN, MI, OH, WI)
NJ	West North Central (IA, KS, MN, MO, ND, NE, SD)
PA	South Atlantic (DC, DE, FL, GA, MD, NC, SC, VA, WV)
IL	East South Central (AL, KY, MS, TN)
(IN, OH)	West South Central (AR, LA, OK, TX)
MI	Mountain North (CO, ID, MT, UT, WY)
WI	Mountain South (AZ, NM, NV)
(IA, MN, ND, SD)	Pacific (AK, CA, HI, OR, WA)
(KS, NE)	
MO	
VA	
(DE, DC, MD, WV)	
GA	
(NC, SC)	
FL	
(AL, KY, MS)	
TN	
(AR, LA, OK)	
TX	
CO	
(ID, MT, UT, WY)	
AZ	
(NV, NM)	
CA	
(AK, HI, OR, WA)	

APPENDIX TABLE A-3: CHANGES IN RECS END-USE CATEGORIES

Changes in Expenditure End-Use Categories			
2009 Variable	**2009 Description**	**2015 Variables**	**2015 Descriptions**
DOLELOTH	Electricity expenditures for end-uses other than air conditioning, space heating, refrigerators, and water heating.	DOLELFRZ	Electricity cost for freezers
		DOLELCOK	Electricity cost for cooking (stoves, cooktops, and ovens)
		DOLELMICRO	Electricity cost for microwaves
		DOLELCW	Electricity cost for clothes washers
		DOLELCDR	Electricity cost for clothes dryers
		DOLELDWH	Electricity cost for dishwashers
		DOLELLGT	Electricity cost for indoor and out-door lighting
		DOLELAHUHEAT	Electricity cost for air handlers and boiler pumps used for heating
		DOLELAHUCOL	Electricity cost for air handlers used for cooling
		DOLELCFAN	Electricity cost for ceiling fans
		DOLELDHUM	Electricity cost for dehumidifiers
		DOLELHUM	Electricity cost for humidifiers
		DOLELPLPMP	Electricity cost for swimming pool pumps
		DOLELHTBPMP	Electricity cost for hot tub pumps
		DOLELHTBHEAT	Electricity cost for hot tub heaters
		DOLELNEC	Electricity cost for other devices and purposes not elsewhere classified
DOLNGOTH	Natural gas expenditures for end-uses other than space heating and water heating.	DOLNGCOK	Natural gas cost for cooking (stoves, cooktops, and ovens)
		DOLNGCDR	Natural gas cost for clothes dryers

		DOLNGPLHEAT	Natural gas cost for swimming pool heaters
		DOLNGHTBHEAT	Natural gas cost for hot tub heaters
		DOLNGNEC	Natural gas cost for other devices and purposes not elsewhere classified
DOLLPOTH	LPG/Propane expenditures for end-uses other than space heating and water heating.	DOLLPCOK	Propane cost for cooking (stoves, cooktops, and ovens)
		DOLLPCDR	Propane cost for clothes dryers
		DOLLPNEC	Propane cost for other devices and purposes not elsewhere classified

Appendix B: Household Utility Expenditures and Component Growth Rates

Household Utility Expenditures and Component Growth Rates

$$U_0 \ = \ \frac{E_t}{H_t} = \frac{P_t \times Q_t}{H_t},$$

$$U_{t+1} = \frac{E_{t+1}}{H_{t+1}} = \frac{(E_t \times AAGR_E)}{(H_t \times AAGR_H)},$$

$$U_{t+1} = \frac{E_{t+1}}{H_{t+1}} = \frac{P_{t+1} \times Q_{t+1}}{H_{t+1}} = \frac{(P_0 \times AAGR_P) \times (Q_0 \times AAGR_Q)}{(H_0 \times AAGR_H)} = U_0 \times \frac{AAGR_P \times AAGR_Q}{AAGR_H},$$

Where U_t refers to average utility expenditures per household at time "t," E refers to total utility expenditures, H refers to the number of households, P refers to the utility price, Q refers to the quantity of the utility consumed, $AAGR_E$ refers to the average annual growth rate in utility expenditures, $AAGR_P$ refers to the average annual growth rate in utility prices between time "t" and time t+1, $AAGR_Q$ refers to the average annual growth rate in the quantity of the utility consumed, and $AAGR_H$ refers to the average annual growth rate in the number of households. The last term in the third equation shows how future household utility expenditures are related to current household utility expenditures and the average annual growth rates for prices, quantities, and the number of households.

Appendix C: Procedures Used to Extrapolate Base Year Standard Utility Allowances to Target Year

The SUAs are first developed using the latest available data. Due to the lag between the last year of available data and the target year (2022), these base year SUAs are then extended to the target year using a combination of extrapolation procedures that take into account the different growth rates for prices, quantities, and household formation (explained in Equation 1 and Appendix B).

For example, at the time of writing, data for 2019 was the most recent available from the ACS; for RECS, it was 2015. The extrapolations address changes in prices, consumption (i.e., quantity such as kilowatt hours) and household growth expected to take place between these base years and the 2022 target year.

For the household and energy expenditure extrapolations, we felt that it was important to base the extrapolation procedures on an official Government projection if possible. For the household procedure, we were able to utilize the Census Bureau's population projections. To extrapolate energy expenditures, we relied on EIA's Short Term Energy Outlook (STEO).[21]

Extrapolation of Households

The procedure used to extrapolate the number of low-income households by State relies on national population projections from the Census Bureau to forecast the number of households for the Nation.[22] These household projections are then allocated to income groups and States using a disaggregation procedure.

To forecast the total number of households for the Nation, we utilized population and household data from the Current Population Survey (CPS). There are several different sources and definitions of population and household data; we chose to use the CPS because it provides both data series using a consistent definition (civilian non-institutionalized population). The historical data for the series were evaluated and used to develop a regression relationship with households as the dependent variable and population as the independent variable**.** Appendix Figure

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[21] EIA also produces the Annual Energy Outlook; however, it lacks the useful regional information provided in the STEO.

[22] Note that the Census Bureau no longer produces population projections by State.

C-1 depicts the relationship and shows the linear regression that was estimated. It can be seen that there is a strong relationship between the two variables.

FIGURE C-1: U.S. HOUSEHOLDS AGAINST U.S. POPULATION: 1980–2019

$y = 0.455x - 2E+07$
$R^2 = 0.9961$
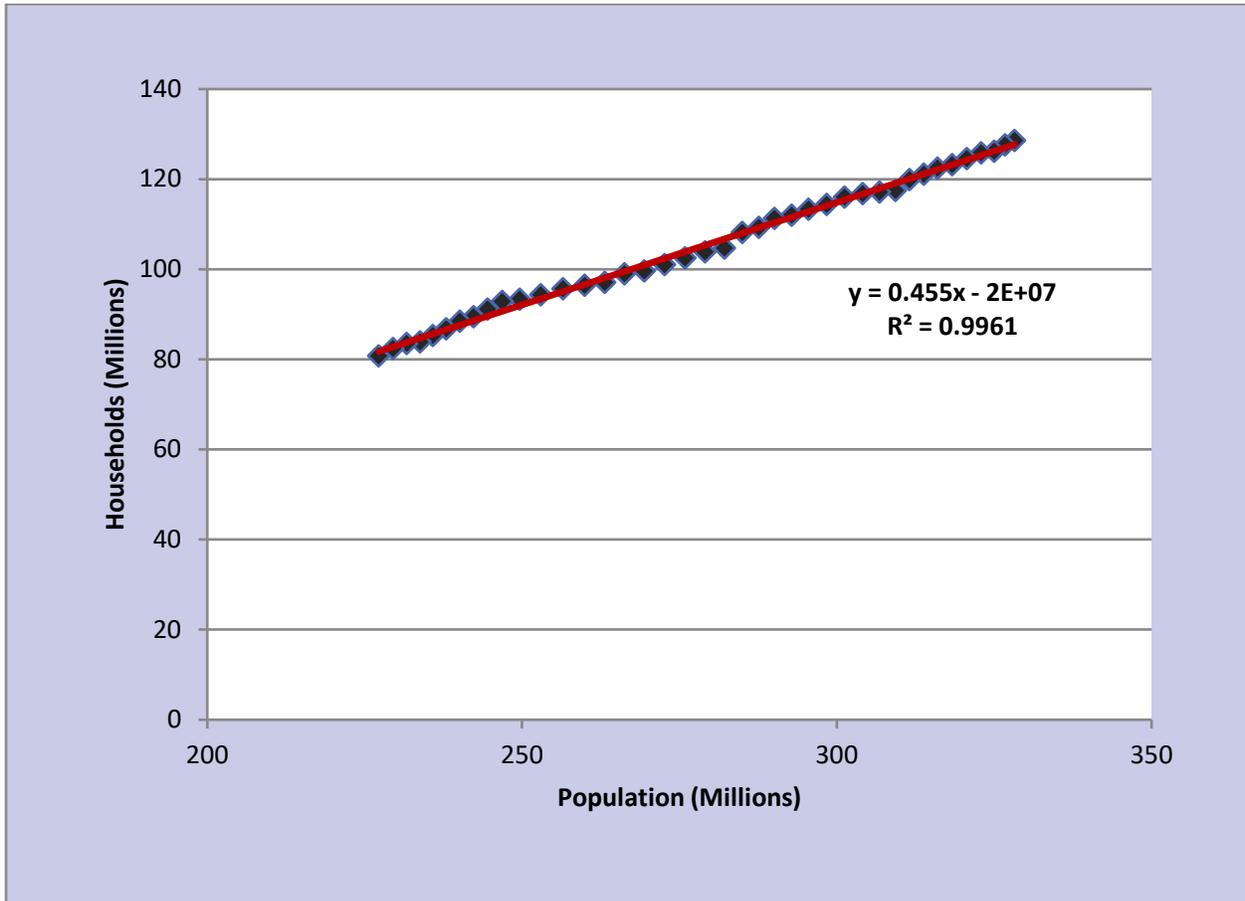
The parameters estimated in the regression were then used in conjunction with the Census Bureau's projections of the U.S. resident population to extrapolate the number of households. Because the resident population definitions used in the CPS and in the Census Bureau's population projections are slightly different, we computed the growth rates in the population projections and applied those to the CPS historical data to generate a forecast that is consistent with the underlying historical data. These CPS-based population forecasts were then used in the regression equation to estimate total households for the Nation. The results of the calculations are presented in Appendix Table C-1.

APPENDIX TABLE C-1: EXTRAPOLATION OF TOTAL HOUSEHOLDS FOR THE NATION

Calendar Year	Resident Population Projection	Annual Growth Rates	Extrapolation of Civilian Noninstitutional Population	
			Population	Households
2016	323,127,513		322,941,311	125,283,992
2017	325,511,184	1.0074	325,323,608	126,367,842
2018	327,891,911	1.0073	327,702,964	127,450,353
2019	330,268,840	1.0072	330,078,523	128,531,138
2020	332,639,102	1.0072	332,447,419	129,608,891
2021	334,998,398	1.0071	334,805,355	130,681,657
2022	337,341,954	1.0070	337,147,561	131,747,267

The extrapolated number of total households in the Nation was then apportioned into low-income households and other households, where low income was defined as having income at or below 150 percent of the poverty line[23]. Data from the ACS show that low-income households constitute a fairly stable percentage of total households, ranging between 18.8 percent and 23.1 percent between 2005 and 2019. It is difficult to detect any trend in this percentage over that period, so we calculated the average for the last three years (2017–2019)—19.7 percent—and applied that percentage to the extrapolated number of total households to produce a forecast for the number of low-income households in the Nation (shown in Appendix Table C-2).

APPENDIX TABLE C-2: PROJECTION OF LOW-INCOME HOUSEHOLDS FOR THE NATION

Year	Low-Income Households
2016	26,475,633
2017	25,841,143
2018	25,383,045
2019	24,139,350
2020	25,552,870
2021	25,764,370
2022	25,974,459

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[23] To be consistent with the previous study, we defined low-income households as having household income at or below 150 percent of the U.S. Federal Poverty Guidelines (https://aspe.hhs.gov/poverty-guidelines) issued by the U.S. Department of Health and Human Services.

Finally, we allocated the projected number of low-income households to each State using each State's historical share of low-income households in the country. Analysis of ACS data indicates that State shares of low-income households in the country remained fairly constant between 2013 and 2019. Using data for 2017–2019, we computed each State's average share and then applied those averages to the forecast number of low-income households in the Nation. The results are shown in Appendix D.

Extrapolation of Energy Expenditures

To reiterate, we need to extrapolate the energy expenditures to the target year (FY 2022) to take into account the lag between the vintage year of the most recent data available and the target year. For the ACS, the vintage of the most recent data available at the time of writing was 2019. The expenditure extrapolations address changes in prices and consumption (i.e., quantity such as kilowatt-hours) that take place between the vintage year of the data and the target year.

For the household and energy expenditure extrapolations, we felt that it was important to base the extrapolation procedures on an official Government projection if possible. For the house-hold procedure, we were able to utilize the Census Bureau's population projections. To extrapolate energy expenditures, we relied on EIA's STEO.[24]

The latest STEO provides monthly price and consumption forecasts by energy source and market sector out through 2022t; however, not all energy sources are covered and some of the forecasts do not provide detail by geographic region and/or market sector (e.g., residential, commercial, industrial). Therefore, as explained below, we had to use several different approaches to adapt the forecasts to this effort.

The monthly detail provided by the STEA helps facilitate converting the calendar year data to a fiscal year basis as part of the extrapolation process. We use the monthly data to calculate annual estimates for calendar year 2019 and fiscal year 2022, and then develop and apply growth rates that are the ratios of FY 2022 estimates to CY 2019 estimates.

Electricity

The STEO provides price forecasts for the residential electricity sector by Census Division and forecasts of residential consumption of electricity for the entire U.S. EIA does maintain separate

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[24] EIA also produces the Annual Energy Outlook; however, it lacks the useful regional information provided in the STEO

historical State-level data on residential electricity consumption,[25] which we used to compute State-level shares and allocate the STEO's national level consumption forecast. The price and consumption forecast for each State were multiplied to produce the expenditure estimates for CY 2019 and FY 2022.

Natural Gas

The STEO provides price forecasts for the residential natural gas sector by Census Division but provides natural gas consumption estimates for the residential sector only for the entire Nation. Similar to what was seen with electricity, EIA maintains separate historical State-level data on residential consumption of natural gas,[26] which we used to compute State-level shares and allocate the STEO's national level consumption forecast. The price and consumption forecast for each State were multiplied to produce the expenditure estimates for CY 2019 and FY 2022.

Total Energy

Total energy growth rates needed to produce the HCSUAs were developed using the electricity and natural gas expenditure forecasts for each State. We first summed the electricity and natural gas expenditure estimates for CY 2019 and FY 2022 to produce total energy expenditure estimates for each period and State. Growth rates were then tabulated by dividing the FY 2022 estimates by the CY 2019 estimates.

Conversion of Calendar Year (CY) Data to Fiscal Year (FY) Estimates

Under current law, most States update their SUAs at the beginning of the fiscal year. To convert annual CY data to a FY basis, we use a prorating procedure in which the data for 2 calendar years are weighted according to the number of months in the fiscal year. For example, for the 2019 FY beginning on October 1, 2018, the 2019 FY estimate would be computed as the weighted average of the 2018 and 2019 CY data, with the weights being 25 percent (3 months: October-December) for CY 2018 and 75 percent (9 months: January-September) for CY 2019.

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[25] https://www.eia.gov/electricity/data.php#sales, Monthly Form EIA-861M (formerly EIA-826) detailed data (1990 - present): Revenue, sales, customer counts, and retail price by state and sector.

[26] http://www.eia.gov/dnav/ng/ng_cons_sum_a_epg0_vgt_mmcf_m.htm, Monthly Natural Gas Delivered to Consumers, ng_cons_sum_a_epg0_vgt_mmcf_m.xls.

Appendix D: Projected Number of Low-Income Households by State

STATE	2016	2017	2018	2019	2020	2021	2022	FY2022	Growth Rate FY2022 / CY2019
Alabama	535,719	523,430	513,660	504,028	522,743	527,070	531,368	530,294	1.05
Alaska	35,958	39,696	41,770	39,238	40,946	40,946	40,946	40,946	1.04
Arizona	595,313	570,682	547,348	537,717	561,510	561,510	561,510	561,510	1.04
Arkansas	343,659	332,763	336,240	327,439	338,051	338,051	338,051	338,051	1.03
California	2,800,487	2,621,861	2,527,749	2,355,954	2,543,728	2,543,728	2,543,728	2,543,728	1.08
Colorado	378,451	348,813	340,666	325,405	344,109	344,109	344,109	344,109	1.06
Connecticut	208,740	209,614	228,095	231,479	227,310	227,310	227,310	227,310	0.98
Delaware	64,944	73,035	65,031	63,445	68,282	68,282	68,282	68,282	1.08
District of Columbia	65,390	55,920	56,737	50,656	55,345	55,345	55,345	55,345	1.09
Florida	1,828,574	1,792,133	1,721,994	1,624,885	1,741,896	1,741,896	1,741,896	1,741,896	1.07
Georgia	913,018	892,960	867,630	843,984	883,279	883,279	883,279	883,279	1.05
Hawaii	70,457	75,822	67,872	70,806	72,751	72,751	72,751	72,751	1.03
Idaho	148,655	139,336	137,475	123,765	135,729	135,729	135,729	135,729	1.10
Illinois	1,032,059	980,983	964,615	899,380	964,384	964,384	964,384	964,384	1.07
Indiana	570,691	561,545	554,443	520,934	554,957	554,957	554,957	554,957	1.07
Iowa	239,712	235,079	241,066	233,216	240,669	240,669	240,669	240,669	1.03
Kansas	232,797	226,318	233,912	214,534	228,789	228,789	228,789	228,789	1.07
Kentucky	497,222	484,856	466,142	454,246	476,518	476,518	476,518	476,518	1.05
Louisiana	525,356	542,663	514,536	505,236	529,803	529,803	529,803	529,803	1.05
Maine	115,649	111,447	117,498	108,796	114,551	114,551	114,551	114,551	1.05
Maryland	332,814	318,031	313,972	314,966	321,322	321,322	321,322	321,322	1.02
Massachusetts	445,209	461,668	449,711	416,735	450,125	450,125	450,125	450,125	1.08
Michigan	883,595	864,620	851,625	796,610	851,852	851,852	851,852	851,852	1.07
Minnesota	352,776	346,242	357,770	325,083	348,887	348,887	348,887	348,887	1.07
Mississippi	353,069	352,838	355,188	338,180	354,816	354,816	354,816	354,816	1.05

Missouri	542,753	530,774	535,603	533,217	542,827	542,827	542,827	542,827	1.02
Montana	98,760	90,406	93,243	91,856	93,499	93,499	93,499	93,499	1.02
Nebraska	141,825	134,423	150,582	134,998	142,472	142,472	142,472	142,472	1.06
Nevada	236,030	225,230	232,489	228,711	232,955	232,955	232,955	232,955	1.02
New Hampshire	66,522	70,773	76,684	71,915	74,436	74,436	74,436	74,436	1.04
New Jersey	555,717	528,420	518,255	496,012	523,101	523,101	523,101	523,101	1.05
New Mexico	229,231	226,291	237,555	211,295	228,859	228,859	228,859	228,859	1.08
New York	1,627,038	1,624,377	1,579,419	1,495,399	1,593,069	1,593,069	1,593,069	1,593,069	1.07
North Carolina	982,892	950,981	919,877	906,119	941,861	941,861	941,861	941,861	1.04
North Dakota	58,528	57,012	52,619	56,483	56,379	56,379	56,379	56,379	1.00
Ohio	1,063,638	1,035,013	1,031,108	982,188	1,033,725	1,033,725	1,033,725	1,033,725	1.05
Oklahoma	391,953	384,815	367,398	359,848	377,099	377,099	377,099	377,099	1.05
Oregon	330,275	334,293	302,738	289,754	314,016	314,016	314,016	314,016	1.08
Pennsylvania	1,027,760	1,052,371	1,020,456	976,194	1,033,757	1,033,757	1,033,757	1,033,757	1.06
Rhode Island	91,372	85,208	83,897	70,627	81,159	81,159	81,159	81,159	1.15
South Carolina	477,365	488,635	476,841	448,523	479,334	479,334	479,334	479,334	1.07
South Dakota	66,958	68,478	68,940	60,574	67,078	67,078	67,078	67,078	1.11
Tennessee	662,021	651,587	653,113	592,192	642,890	642,890	642,890	642,890	1.09
Texas	2,298,924	2,231,171	2,238,366	2,138,655	2,241,171	2,241,171	2,241,171	2,241,171	1.05
Utah	168,905	166,243	156,290	159,344	163,466	163,466	163,466	163,466	1.03
Vermont	51,501	48,354	50,192	43,813	48,240	48,240	48,240	48,240	1.10
Virginia	554,293	523,769	540,331	500,200	530,454	530,454	530,454	530,454	1.06
Washington	482,663	465,348	451,140	426,726	455,343	455,343	455,343	455,343	1.07
West Virginia	211,604	219,442	211,615	200,298	214,017	214,017	214,017	214,017	1.07
Wisconsin	443,143	439,139	422,873	395,696	426,270	426,270	426,270	426,270	1.08
Wyoming	43,647	46,239	38,677	41,998	43,039	43,039	43,039	43,039	1.02
Total	26,475,633	25,841,143	25,383,045	24,139,350	25,552,870	25,557,197	25,561,495	25,560,421	1.06

Appendix E: Forecasts and Calculated Expenditure Growth Rates from the Short-Term Energy Outlook (STEO)

APPENDIX TABLE E-1: SHORT TERM ENERGY OUTLOOK -- RESIDENTIAL ELECTRICITY

STATE	Census Division	Residential Electricity					
		Price		Consumption		Expenditures	
		(Cents per Kilowatt Hour)		(billion kilowatt hours)		($ millions)	
		2019	FY 2022	2019	FY 2022	2019	FY 2022
Alabama	Pacific	15.64	17.68	2.0	2.1	$313	$372
Alaska	East South Central	11.38	11.66	32.1	33.7	$3,658	$3,934
Arizona	West South Central	11.17	11.22	18.5	19.4	$2,064	$2,176
Arkansas	Mountain	11.78	11.92	34.8	36.5	$4,101	$4,354
California	Pacific	15.64	17.68	89.6	94.0	$14,016	$16,624
Colorado	Mountain	11.78	11.92	19.2	20.2	$2,268	$2,408
Connecticut	New England	21.15	23.29	12.7	13.4	$2,694	$3,115
Delaware	South Atlantic	11.93	12.13	2.5	2.7	$302	$322
District of Columbia	South Atlantic	11.93	12.13	4.9	5.2	$591	$630
Florida	South Atlantic	11.93	12.13	125.7	131.9	$14,994	$15,997
Georgia	South Atlantic	11.93	12.13	58.4	61.3	$6,964	$7,430
Hawaii	Pacific	15.64	17.68	2.7	2.9	$426	$505
Idaho	West North Central	11.90	11.99	14.5	15.2	$1,721	$1,820
Illinois	Mountain	11.78	11.92	8.7	9.1	$1,023	$1,086
Indiana	East North Central	13.43	13.89	45.7	48.0	$6,144	$6,667
Iowa	East North Central	13.43	13.89	33.4	35.0	$4,484	$4,866
Kansas	West North Central	11.90	11.99	13.7	14.4	$1,632	$1,726
Kentucky	East South Central	11.38	11.66	26.6	27.9	$3,026	$3,255
Louisiana	West South Central	11.17	11.22	31.1	32.6	$3,473	$3,662
Maine	New England	21.15	23.29	19.8	20.8	$4,186	$4,839
Maryland	South Atlantic	11.93	12.13	27.5	28.8	$3,276	$3,495

Massachusetts	New England	21.15	23.29	4.8	5.0	$1,016	$1,175
Michigan	East North Central	13.43	13.89	34.1	35.8	$4,585	$4,975
Minnesota	West North Central	11.90	11.99	22.4	23.5	$2,666	$2,819
Mississippi	West North Central	11.90	11.99	35.7	37.4	$4,246	$4,488
Missouri	East South Central	11.38	11.66	18.6	19.6	$2,121	$2,281
Montana	Mountain	11.78	11.92	5.3	5.5	$622	$661
Nebraska	South Atlantic	11.93	12.13	59.7	62.6	$7,117	$7,593
Nevada	West North Central	11.90	11.99	5.1	5.3	$604	$638
New Hampshire	West North Central	11.90	11.99	10.2	10.7	$1,215	$1,284
New Jersey	New England	21.15	23.29	4.6	4.8	$965	$1,116
New Mexico	Middle Atlantic	15.81	16.44	28.9	30.3	$4,562	$4,978
New York	Mountain	11.78	11.92	6.8	7.1	$799	$848
North Carolina	Mountain	11.78	11.92	13.2	13.8	$1,553	$1,649
North Dakota	Middle Atlantic	15.81	16.44	50.8	53.4	$8,039	$8,773
Ohio	East North Central	13.43	13.89	52.6	55.2	$7,060	$7,662
Oklahoma	West South Central	11.17	11.22	23.4	24.6	$2,617	$2,760
Oregon	Pacific	15.64	17.68	19.6	20.5	$3,062	$3,632
Pennsylvania	Middle Atlantic	15.81	16.44	54.4	57.1	$8,604	$9,389
Rhode Island	New England	21.15	23.29	3.1	3.2	$649	$750
South Carolina	South Atlantic	11.93	12.13	31.0	32.5	$3,696	$3,943
South Dakota	West North Central	11.90	11.99	4.9	5.2	$589	$622
Tennessee	East South Central	11.38	11.66	42.4	44.5	$4,826	$5,191
Texas	West South Central	11.17	11.22	153.5	161.1	$17,142	$18,078
Utah	Mountain	11.78	11.92	9.7	10.2	$1,146	$1,217
Vermont	South Atlantic	11.93	12.13	46.6	48.9	$5,555	$5,926
Virginia	New England	21.15	23.29	2.1	2.2	$442	$511
Washington	Pacific	15.64	17.68	36.7	38.5	$5,734	$6,801
West Virginia	East North Central	13.43	13.89	22.1	23.2	$2,963	$3,216
Wisconsin	South Atlantic	11.93	12.13	11.2	11.8	$1,339	$1,428
Wyoming	Mountain	11.78	11.92	2.8	3.0	$331	$352

APPENDIX TABLE E-2: SHORT TERM ENERGY OUTLOOK -- NATURAL GAS

STATE	Census Division	Natural Gas					
		Price ($ per 1000 cubic feet)		Consumption (billion cubic feet)		Expenditures ($ millions)	
		2019	FY 2022	2019	FY 2022	2019	FY 2022
Alabama	Pacific	12.41	14.57	13.28	12.67	$165	$185
Alaska	East South Central	14.99	16.11	126.19	120.46	$1,891	$1,941
Arizona	West South Central	14.33	14.81	62.11	59.29	$890	$878
Arkansas	Mountain	9.60	10.22	70.49	67.29	$677	$688
California	Pacific	12.41	14.57	386.95	369.38	$4,801	$5,383
Colorado	Mountain	9.60	10.22	73.40	70.07	$705	$716
Connecticut	New England	15.91	14.44	48.68	46.47	$775	$671
Delaware	South Atlantic	17.60	16.40	5.42	5.17	$95	$85
District of Columbia	South Atlantic	17.60	16.40	17.49	16.70	$308	$274
Florida	South Atlantic	17.60	16.40	270.86	258.57	$4,768	$4,240
Georgia	South Atlantic	17.60	16.40	133.89	127.81	$2,357	$2,096
Hawaii	Pacific	12.41	14.57	0.60	0.57	$7	$8
Idaho	West North Central	11.54	11.80	77.22	73.72	$891	$870
Illinois	Mountain	9.60	10.22	20.55	19.62	$197	$200
Indiana	East North Central	11.57	11.37	197.73	188.75	$2,287	$2,145
Iowa	East North Central	11.57	11.37	151.63	144.74	$1,754	$1,645
Kansas	West North Central	11.54	11.80	48.33	46.14	$558	$545
Kentucky	East South Central	14.99	16.11	56.46	53.89	$846	$868
Louisiana	West South Central	14.33	14.81	281.03	268.27	$4,027	$3,972
Maine	New England	15.91	14.44	80.48	76.83	$1,280	$1,109
Maryland	South Atlantic	17.60	16.40	47.77	45.60	$841	$748
Massachusetts	New England	15.91	14.44	8.21	7.84	$131	$113
Michigan	East North Central	11.57	11.37	171.00	163.24	$1,978	$1,856
Minnesota	West North Central	11.54	11.80	87.76	83.78	$1,013	$989

Mississippi	West North Central	11.54	11.80	54.50	52.03	$629	$614
Missouri	East South Central	14.99	16.11	99.16	94.65	$1,486	$1,525
Montana	Mountain	9.60	10.22	14.50	13.84	$139	$141
Nebraska	South Atlantic	17.60	16.40	101.51	96.91	$1,787	$1,589
Nevada	West North Central	11.54	11.80	13.25	12.65	$153	$149
New Hampshire	West North Central	11.54	11.80	31.93	30.48	$368	$360
New Jersey	New England	15.91	14.44	9.64	9.20	$153	$133
New Mexico	Middle Atlantic	13.73	13.15	138.28	132.00	$1,899	$1,736
New York	Mountain	9.60	10.22	32.15	30.69	$309	$314
North Carolina	Mountain	9.60	10.22	54.94	52.44	$527	$536
North Dakota	Middle Atlantic	13.73	13.15	237.55	226.76	$3,262	$2,982
Ohio	East North Central	11.57	11.37	195.28	186.41	$2,259	$2,119
Oklahoma	West South Central	14.33	14.81	113.56	108.40	$1,627	$1,605
Oregon	Pacific	12.41	14.57	48.13	45.94	$597	$670
Pennsylvania	Middle Atlantic	13.73	13.15	225.30	215.07	$3,093	$2,828
Rhode Island	New England	15.91	14.44	17.77	16.96	$283	$245
South Carolina	South Atlantic	17.60	16.40	58.37	55.72	$1,028	$914
South Dakota	West North Central	11.54	11.80	15.04	14.36	$174	$169
Tennessee	East South Central	14.99	16.11	67.80	64.73	$1,016	$1,043
Texas	West South Central	14.33	14.81	701.13	669.30	$10,047	$9,909
Utah	Mountain	9.60	10.22	39.34	37.56	$378	$384
Vermont	South Atlantic	17.60	16.40	114.02	108.85	$2,007	$1,785
Virginia	New England	15.91	14.44	2.46	2.34	$39	$34
Washington	Pacific	12.41	14.57	58.39	55.74	$725	$812
West Virginia	East North Central	11.57	11.37	99.17	94.67	$1,147	$1,076
Wisconsin	South Atlantic	17.60	16.40	18.16	17.33	$320	$284
Wyoming	Mountain	9.60	10.22	16.74	15.98	$161	$163

APPENDIX TABLE E-3: SHORT TERM ENERGY OUTLOOK —GROWTH RATES OF COMBINED RESIDENTIAL ELECTRICITY AND NATURAL GAS EXPENDITURES

STATE	Census Division	Total Energy		
		Expenditures		Change
		($ millions)		(percent)
		2019	FY 2022	Growth Rate
Alabama	Pacific	$478	$556	1.16
Alaska	East South Central	$5,549	$5,875	1.06
Arizona	West South Central	$2,954	$3,054	1.03
Arkansas	Mountain	$4,777	$5,042	1.06
California	Pacific	$18,817	$22,007	1.17
Colorado	Mountain	$2,972	$3,124	1.05
Connecticut	New England	$3,469	$3,786	1.09
Delaware	South Atlantic	$397	$407	1.02
District of Columbia	South Atlantic	$898	$904	1.01
Florida	South Atlantic	$19,762	$20,237	1.02
Georgia	South Atlantic	$9,321	$9,526	1.02
Hawaii	Pacific	$433	$513	1.18
Idaho	West North Central	$2,613	$2,690	1.03
Illinois	Mountain	$1,220	$1,287	1.05
Indiana	East North Central	$8,431	$8,813	1.05
Iowa	East North Central	$6,238	$6,511	1.04
Kansas	West North Central	$2,190	$2,270	1.04
Kentucky	East South Central	$3,873	$4,123	1.06
Louisiana	West South Central	$7,500	$7,634	1.02
Maine	New England	$5,467	$5,949	1.09
Maryland	South Atlantic	$4,117	$4,243	1.03
Massachusetts	New England	$1,147	$1,288	1.12
Michigan	East North Central	$6,563	$6,831	1.04
Minnesota	West North Central	$3,679	$3,808	1.03

Mississippi	West North Central	$4,875	$5,103	1.05
Missouri	East South Central	$3,607	$3,806	1.06
Montana	Mountain	$762	$802	1.05
Nebraska	South Atlantic	$8,904	$9,182	1.03
Nevada	West North Central	$757	$788	1.04
New Hampshire	West North Central	$1,583	$1,644	1.04
New Jersey	New England	$1,119	$1,249	1.12
New Mexico	Middle Atlantic	$6,461	$6,714	1.04
New York	Mountain	$1,108	$1,162	1.05
North Carolina	Mountain	$2,081	$2,185	1.05
North Dakota	Middle Atlantic	$11,300	$11,754	1.04
Ohio	East North Central	$9,319	$9,781	1.05
Oklahoma	West South Central	$4,244	$4,365	1.03
Oregon	Pacific	$3,660	$4,302	1.18
Pennsylvania	Middle Atlantic	$11,697	$12,217	1.04
Rhode Island	New England	$932	$995	1.07
South Carolina	South Atlantic	$4,724	$4,857	1.03
South Dakota	West North Central	$762	$792	1.04
Tennessee	East South Central	$5,843	$6,234	1.07
Texas	West South Central	$27,189	$27,987	1.03
Utah	Mountain	$1,524	$1,601	1.05
Vermont	South Atlantic	$7,562	$7,711	1.02
Virginia	New England	$481	$545	1.13
Washington	Pacific	$6,459	$7,614	1.18
West Virginia	East North Central	$4,111	$4,292	1.04
Wisconsin	South Atlantic	$1,658	$1,712	1.03
Wyoming	Mountain	$492	$515	1.05

Appendix F: ACS Average Utility Expenditures by Low-Income Households

APPENDIX TABLE F-1: AVERAGE *MONTHLY* ELECTRICITY COSTS PER LOW-INCOME HOUSEHOLD FOR ALL END-USES

FIPS	STATE	2011	2012	2013	2014	2015	2016	2017	2018	2019
1	Alabama	178	165	166	175	176	170	166	180	186
2	Alaska	116	148	134	133	124	131	130	128	136
4	Arizona	133	137	136	133	136	139	140	142	142
5	Arkansas	136	132	140	142	149	135	138	147	143
6	California	85	87	89	90	94	99	105	106	108
8	Colorado	93	101	105	105	105	104	107	103	107
9	Connecticut	132	122	126	133	146	132	130	142	150
10	Delaware	184	174	158	177	170	147	136	150	146
11	District of Columbia	131	109	97	120	121	108	120	139	118
12	Florida	153	142	139	146	147	144	142	144	145
13	Georgia	168	158	156	162	167	161	157	164	164
15	Hawaii	164	170	166	180	145	148	150	137	159
16	Idaho	100	103	106	117	109	104	115	109	115
17	Illinois	113	106	103	106	110	112	111	117	114
18	Indiana	123	123	130	140	136	130	138	146	144
19	Iowa	112	103	114	128	120	122	124	125	133
20	Kansas	125	122	130	140	132	134	136	148	147
21	Kentucky	136	128	139	148	148	143	143	155	147
22	Louisiana	158	141	146	160	151	146	147	160	151
23	Maine	99	98	95	99	107	102	99	103	107
24	Maryland	158	149	152	159	164	156	157	153	154
25	Massachusetts	88	86	90	98	112	105	104	118	113
26	Michigan	118	121	125	126	126	127	128	135	131
27	Minnesota	100	100	105	105	104	105	104	113	113

28	Mississippi	160	146	150	169	168	151	147	163	163
29	Missouri	134	132	135	143	143	143	141	150	149
30	Montana	96	101	99	102	99	101	112	110	110
31	Nebraska	115	112	122	126	122	131	125	135	129
32	Nevada	134	133	128	130	132	124	129	132	129
33	New Hampshire	89	100	96	106	104	101	103	110	111
34	New Jersey	145	135	139	138	140	135	130	131	134
35	New Mexico	91	97	95	96	99	101	107	102	106
36	New York	126	122	127	131	129	121	120	126	119
37	North Carolina	150	145	148	156	160	151	147	160	156
38	North Dakota	95	100	96	108	105	112	101	108	111
39	Ohio	109	105	107	113	116	113	108	118	112
40	Oklahoma	138	136	131	140	141	133	133	145	141
41	Oregon	110	114	114	114	111	111	125	117	118
42	Pennsylvania	114	109	112	116	121	120	113	122	121
44	Rhode Island	91	82	90	103	110	99	103	111	117
45	South Carolina	171	162	165	174	180	175	172	186	176
46	South Dakota	102	104	117	112	117	130	129	134	136
47	Tennessee	166	151	155	169	164	159	155	169	166
48	Texas	154	142	140	151	151	139	139	151	153
49	Utah	88	89	96	95	96	95	94	96	93
50	Vermont	103	103	102	110	103	105	112	116	114
51	Virginia	149	141	141	151	157	145	144	153	151
53	Washington	110	114	113	115	112	115	125	119	117
54	West Virginia	129	122	140	132	134	145	143	151	144
55	Wisconsin	119	112	119	125	122	118	117	127	122
56	Wyoming	94	99	103	109	110	105	109	108	100
	U.S. Average	129	124	126	132	134	130	130	137	136

APPENDIX TABLE F-2: AVERAGE *MONTHLY* NATURAL GAS COSTS PER HOUSEHOLD FOR ALL END-USES

FIPS	STATE	2011	2012	2013	2014	2015	2016	2017	2018	2019
1	Alabama	109	94	97	104	91	77	76	95	90
2	Alaska	107	155	112	101	139	116	123	102	112
4	Arizona	59	58	55	53	58	53	52	53	52
5	Arkansas	88	77	87	89	89	70	67	88	78
6	California	46	44	46	44	42	44	48	46	51
8	Colorado	70	71	78	77	74	69	67	69	71
9	Connecticut	122	106	105	113	117	105	107	113	118
10	Delaware	122	108	113	108	117	91	99	99	105
11	District of Columbia	100	94	87	118	101	98	96	84	79
12	Florida	69	64	60	60	63	60	54	61	61
13	Georgia	100	91	94	101	94	80	83	94	89
15	Hawaii	68	89	65	70	84	65	66	57	66
16	Idaho	73	63	69	64	62	55	60	65	56
17	Illinois	104	89	95	112	99	85	95	97	100
18	Indiana	94	85	90	106	101	80	83	93	93
19	Iowa	89	76	92	97	84	77	76	87	88
20	Kansas	84	76	85	98	79	67	75	87	83
21	Kentucky	92	82	87	98	102	82	83	107	91
22	Louisiana	65	60	60	69	62	55	53	61	57
23	Maine	89	86	82	88	106	76	95	110	125
24	Maryland	108	99	97	113	100	92	102	97	101
25	Massachusetts	110	94	101	114	113	93	99	118	115
26	Michigan	114	102	107	111	107	91	93	99	98
27	Minnesota	100	88	92	116	99	86	87	97	98
28	Mississippi	92	87	88	97	93	76	74	83	84
29	Missouri	104	92	98	110	100	83	87	100	94
30	Montana	90	78	84	89	78	69	87	84	86

31	Nebraska	88	79	88	102	91	90	89	93	94
32	Nevada	60	59	58	56	57	56	51	54	53
33	New Hampshire	109	117	94	128	123	119	114	114	122
34	New Jersey	106	95	105	104	99	87	86	95	101
35	New Mexico	73	70	74	72	72	66	63	66	63
36	New York	101	90	93	94	87	80	84	94	93
37	North Carolina	116	98	101	109	104	86	95	109	98
38	North Dakota	134	102	107	129	105	80	79	107	105
39	Ohio	98	82	86	94	88	77	80	87	85
40	Oklahoma	82	72	81	86	76	68	71	80	80
41	Oregon	77	76	72	71	66	62	68	61	61
42	Pennsylvania	106	97	103	109	105	92	95	108	105
44	Rhode Island	126	95	106	117	116	92	108	109	114
45	South Carolina	102	90	93	99	94	87	78	94	90
46	South Dakota	95	84	98	112	90	88	98	100	101
47	Tennessee	89	78	84	87	79	70	69	79	78
48	Texas	57	52	54	61	57	51	53	59	56
49	Utah	72	66	73	70	66	65	65	65	63
50	Vermont	114	112	102	149	100	108	121	123	125
51	Virginia	111	94	95	103	104	86	91	95	95
53	Washington	92	86	84	87	74	78	80	79	74
54	West Virginia	96	83	92	98	88	82	72	91	86
55	Wisconsin	92	88	95	109	95	80	84	93	90
56	Wyoming	94	81	88	95	94	86	82	81	81
	U.S. Average	85	77	80	86	81	72	74	81	80

APPENDIX TABLE F-3: AVERAGE *ANNUAL* HOUSEHOLD COSTS FOR OTHER FUELS FOR ALL END-USES

FIPS	STATE	2011	2012	2013	2014	2015	2016	2017	2018	2019
1	Alabama	653	670	517	581	651	548	586	636	532
2	Alaska	2,223	2,415	2,434	2,048	2,158	1,765	1,817	1,898	1,447
4	Arizona	533	568	537	527	534	600	477	524	515
5	Arkansas	633	497	577	549	592	443	452	581	496
6	California	588	516	487	537	491	505	516	492	554
8	Colorado	682	575	535	589	589	541	543	491	577
9	Connecticut	1,795	1,715	1,870	1,893	1,798	1,408	1,423	1,452	1,637
10	Delaware	1,044	1,035	1,370	1,430	1,140	780	914	1,028	1,145
11	District of Columbia	791	1,027	1,088	849	2,774	1,200	3,030	436	60
12	Florida	587	533	444	568	570	645	581	461	627
13	Georgia	609	568	533	521	529	457	476	435	483
15	Hawaii	557	763	473	247	495	257	440	611	344
16	Idaho	677	668	629	598	613	578	623	603	710
17	Illinois	762	837	723	762	840	857	745	780	848
18	Indiana	825	893	722	831	994	728	708	724	894
19	Iowa	877	944	923	1,105	773	840	975	874	972
20	Kansas	746	695	651	710	756	681	561	675	876
21	Kentucky	683	681	594	588	636	572	532	636	545
22	Louisiana	496	670	507	419	418	519	434	427	512
23	Maine	1,528	1,592	1,625	1,542	1,555	1,161	1,121	1,394	1,416
24	Maryland	1,212	1,343	1,225	1,369	1,303	992	996	1,208	1,039
25	Massachusetts	1,751	1,670	1,666	1,858	1,775	1,352	1,285	1,415	1,532
26	Michigan	978	1,011	922	1,072	1,035	863	894	947	973
27	Minnesota	1,176	1,082	1,054	1,198	1,118	946	829	891	1,084
28	Mississippi	686	512	540	701	732	654	501	586	670
29	Missouri	625	628	621	704	645	589	587	604	680
30	Montana	747	613	653	717	629	644	778	645	732

31	Nebraska	1,239	700	860	944	907	776	839	714	1,024
32	Nevada	578	794	597	704	533	605	490	569	579
33	New Hampshire	1,671	1,465	1,710	1,630	1,711	1,292	1,151	1,415	1,284
34	New Jersey	1,580	1,536	1,491	1,613	1,530	1,307	1,118	1,319	1,328
35	New Mexico	591	550	530	590	576	593	595	574	652
36	New York	1,791	1,689	1,799	1,865	1,824	1,403	1,299	1,481	1,482
37	North Carolina	817	796	755	830	875	680	644	636	761
38	North Dakota	1,298	1,147	926	1,327	1,025	1,065	979	1,128	878
39	Ohio	1,038	975	1,022	1,049	938	838	824	887	837
40	Oklahoma	671	604	533	543	566	471	482	621	492
41	Oregon	618	652	599	565	533	577	586	561	623
42	Pennsylvania	1,473	1,399	1,428	1,514	1,376	1,053	1,036	1,171	1,215
44	Rhode Island	1,587	1,743	1,556	1,785	1,460	1,143	1,155	1,391	1,459
45	South Carolina	743	683	649	650	607	544	510	562	541
46	South Dakota	1,122	1,250	1,021	1,342	888	1,034	827	1,006	896
47	Tennessee	683	664	568	623	587	578	538	592	495
48	Texas	522	528	438	532	549	542	571	463	464
49	Utah	607	558	597	542	488	457	494	462	466
50	Vermont	1,606	1,565	1,432	1,784	1,559	1,356	1,062	1,335	1,379
51	Virginia	954	871	866	946	878	699	677	780	835
53	Washington	790	838	661	646	671	588	625	639	643
54	West Virginia	728	786	759	798	717	724	703	775	749
55	Wisconsin	1,039	1,075	980	1,137	1,013	807	807	920	917
56	Wyoming	970	873	433	502	735	488	714	425	634
	U.S. Average	1,054	1,034	1,030	1,092	1,049	862	837	916	953

APPENDIX TABLE F-4: AVERAGE *ANNUAL* ENERGY (ALL FUELS COMBINED) COSTS PER HOUSEHOLD FOR ALL END-USES[27]

FIPS	STATE	2011	2012	2013	2014	2015	2016	2017	2018	2019
1	Alabama	2,725	2,478	2,437	2,603	2,539	2,420	2,338	2,588	2,622
2	Alaska	2,509	3,346	2,814	2,635	2,723	2,732	2,785	2,452	2,626
4	Arizona	1,945	1,975	1,935	1,881	1,939	1,950	1,945	1,989	1,979
5	Arkansas	2,225	2,085	2,228	2,300	2,337	2,066	2,073	2,265	2,162
6	California	1,402	1,416	1,431	1,418	1,455	1,530	1,638	1,631	1,692
8	Colorado	1,660	1,718	1,763	1,756	1,729	1,660	1,705	1,676	1,739
9	Connecticut	2,709	2,525	2,496	2,650	2,790	2,426	2,426	2,626	2,793
10	Delaware	3,001	2,861	2,725	2,810	2,746	2,359	2,389	2,397	2,460
11	District of Columbia	2,191	2,027	1,742	2,255	2,156	1,883	2,009	2,166	1,861
12	Florida	1,938	1,797	1,739	1,823	1,838	1,802	1,763	1,792	1,811
13	Georgia	2,575	2,382	2,353	2,459	2,464	2,325	2,284	2,404	2,382
15	Hawaii	2,055	2,236	2,118	2,286	1,913	1,927	1,908	1,756	2,047
16	Idaho	1,692	1,672	1,761	1,823	1,715	1,605	1,773	1,721	1,744
17	Illinois	2,180	1,956	1,954	2,093	2,039	1,969	2,032	2,087	2,097
18	Indiana	2,160	2,103	2,169	2,401	2,313	2,093	2,187	2,345	2,348
19	Iowa	1,995	1,796	1,976	2,150	1,953	1,901	1,937	2,021	2,071
20	Kansas	2,275	2,164	2,325	2,582	2,299	2,182	2,282	2,542	2,515
21	Kentucky	2,105	1,954	2,070	2,212	2,228	2,074	2,092	2,347	2,189
22	Louisiana	2,240	2,012	2,045	2,253	2,114	2,020	2,011	2,203	2,079
23	Maine	2,354	2,306	2,351	2,210	2,494	1,937	2,050	2,217	2,403
24	Maryland	2,557	2,433	2,401	2,554	2,529	2,347	2,403	2,366	2,368
25	Massachusetts	2,116	2,001	1,998	2,214	2,349	2,043	2,035	2,357	2,281

[27] Note that the estimates in Appendix Tables F-1 and F-2 are published on a monthly basis, whereas the estimates in Appendix Table F-3 are published on an annual basis. It is not possible to convert the data in Appendix Tables F-1 and F-2 to an annual basis and then add them to the data in Table F-3 to produce the numbers reported in this table. For example, the figures in Appendix Table F-3 reflect average expenditures by those households who utilize fuels other than or in addition to natural gas and electricity. Relatively few households, however, fall into this category so simply summing the numbers in the tables would over-estimate average household expenditures for total energy.

26	Michigan	2,389	2,306	2,328	2,382	2,310	2,199	2,223	2,321	2,307
27	Minnesota	1,920	1,829	1,860	1,982	1,928	1,854	1,855	1,999	2,035
28	Mississippi	2,515	2,313	2,346	2,642	2,575	2,273	2,196	2,426	2,455
29	Missouri	2,360	2,248	2,312	2,486	2,388	2,266	2,274	2,469	2,399
30	Montana	1,863	1,778	1,766	1,829	1,705	1,653	1,944	1,913	1,918
31	Nebraska	2,165	2,048	2,220	2,361	2,243	2,286	2,215	2,383	2,331
32	Nevada	2,054	2,043	1,945	1,951	2,001	1,886	1,903	1,952	1,918
33	New Hampshire	2,186	2,288	2,215	2,361	2,268	2,146	2,121	2,276	2,297
34	New Jersey	2,520	2,332	2,365	2,350	2,324	2,183	2,124	2,188	2,245
35	New Mexico	1,869	1,926	1,942	1,916	1,930	1,906	1,935	1,907	1,924
36	New York	2,340	2,220	2,252	2,341	2,235	2,042	2,004	2,168	2,070
37	North Carolina	2,304	2,167	2,177	2,294	2,323	2,135	2,106	2,313	2,242
38	North Dakota	1,811	1,815	1,647	1,921	1,758	1,745	1,608	1,820	1,795
39	Ohio	2,162	1,964	1,988	2,124	2,094	1,981	1,931	2,106	2,039
40	Oklahoma	2,319	2,192	2,182	2,312	2,250	2,099	2,095	2,303	2,250
41	Oregon	1,683	1,709	1,685	1,657	1,609	1,594	1,789	1,663	1,671
42	Pennsylvania	2,385	2,250	2,277	2,385	2,379	2,220	2,150	2,354	2,336
44	Rhode Island	2,377	2,174	2,121	2,383	2,313	2,004	2,193	2,340	2,458
45	South Carolina	2,434	2,270	2,276	2,419	2,443	2,376	2,270	2,503	2,365
46	South Dakota	1,963	1,880	2,104	2,162	2,013	2,186	2,197	2,274	2,319
47	Tennessee	2,349	2,126	2,160	2,339	2,235	2,141	2,098	2,324	2,277
48	Texas	2,165	1,996	1,973	2,122	2,103	1,921	1,929	2,101	2,101
49	Utah	1,829	1,763	1,905	1,843	1,823	1,792	1,776	1,801	1,746
50	Vermont	2,746	2,580	2,320	2,826	2,560	2,375	2,287	2,591	2,483
51	Virginia	2,327	2,154	2,133	2,292	2,351	2,098	2,135	2,236	2,225
53	Washington	1,653	1,685	1,625	1,651	1,567	1,619	1,747	1,668	1,618
54	West Virginia	2,119	1,980	2,214	2,185	2,122	2,216	2,139	2,386	2,256
55	Wisconsin	2,036	1,930	1,966	2,079	1,970	1,825	1,858	2,005	1,931
56	Wyoming	2,042	1,929	1,925	2,141	2,162	1,939	2,025	1,994	1,829
	U.S. Average	2,126	2,010	2,019	2,120	2,095	1,987	1,999	2,120	2,105

APPENDIX TABLE F-5: AVERAGE *ANNUAL* WATER/SEWAGE COSTS PER HOUSEHOLD

FIPS	STATE	2011	2012	2013	2014	2015	2016	2017	2018	2019
1	Alabama	413	416	397	427	418	439	437	427	449
2	Alaska	317	436	353	377	340	390	439	351	385
4	Arizona	552	579	557	561	576	559	554	552	545
5	Arkansas	376	391	394	424	450	448	429	443	451
6	California	485	513	509	525	530	508	537	565	556
8	Colorado	432	455	440	453	450	438	453	462	476
9	Connecticut	238	223	225	242	264	233	275	281	324
10	Delaware	289	296	295	338	283	306	434	387	343
11	District of Columbia	406	294	295	328	288	227	319	326	276
12	Florida	438	440	434	439	444	443	443	441	441
13	Georgia	381	383	383	382	388	401	399	386	395
15	Hawaii	501	584	562	694	565	554	510	625	575
16	Idaho	336	341	396	367	404	353	370	405	436
17	Illinois	338	360	364	367	388	406	412	414	409
18	Indiana	394	415	418	419	415	420	435	444	454
19	Iowa	423	422	430	456	466	467	488	465	516
20	Kansas	441	473	453	461	446	453	431	457	462
21	Kentucky	381	394	416	422	429	425	445	455	453
22	Louisiana	379	405	400	419	424	436	444	454	449
23	Maine	136	170	154	162	135	120	176	168	191
24	Maryland	318	356	357	385	387	372	420	400	410
25	Massachusetts	298	323	319	315	334	312	304	315	299
26	Michigan	350	380	402	396	440	448	447	455	443
27	Minnesota	294	299	302	286	274	294	309	318	314
28	Mississippi	361	358	353	368	406	394	387	400	412
29	Missouri	339	370	363	376	372	397	390	394	388
30	Montana	262	261	261	263	303	350	315	292	337
31	Nebraska	348	303	308	293	333	371	366	375	350

32	Nevada	382	429	414	422	434	451	476	460	452
33	New Hampshire	173	134	203	163	160	186	157	205	172
34	New Jersey	337	357	355	350	343	336	338	347	330
35	New Mexico	377	394	393	389	421	443	472	411	425
36	New York	206	197	204	205	197	206	211	224	211
37	North Carolina	322	320	320	330	346	345	346	358	363
38	North Dakota	293	367	352	351	369	452	410	367	400
39	Ohio	396	414	429	429	438	458	477	459	473
40	Oklahoma	427	447	421	433	445	467	487	497	518
41	Oregon	442	472	461	464	461	456	493	515	488
42	Pennsylvania	413	442	462	452	474	495	486	486	493
44	Rhode Island	300	277	285	231	261	192	301	303	259
45	South Carolina	346	338	353	360	363	361	392	366	376
46	South Dakota	307	393	342	342	365	347	387	406	393
47	Tennessee	343	368	346	369	365	364	353	370	386
48	Texas	521	532	532	539	549	557	570	561	569
49	Utah	439	446	457	458	474	445	472	457	467
50	Vermont	143	204	145	201	186	141	157	181	173
51	Virginia	337	361	361	397	396	413	380	395	432
53	Washington	506	537	539	560	561	573	575	576	594
54	West Virginia	420	443	504	455	462	524	529	546	508
55	Wisconsin	282	290	301	295	319	317	337	355	330
56	Wyoming	350	420	345	401	363	358	428	386	403
U.S. Average		393	408	408	416	423	428	436	439	442

Appendix G: Use of The ACS To Develop the HCSUA Energy Component

The ACS does not differentiate between heating/cooling end-use expenditures and other energy expenditures - information that is needed in order to develop the HCSUAs. As mentioned previously there is also evidence that respondents tend to overestimate self-reported utility expenditures. Therefore, it is necessary to develop adjustment parameters to (1) ensure that heating and cooling expenses are included in the development of the HCSUAs and (2) account for upward bias in the ACS self-reported utility expenditure estimates. RECS is the best source for this purpose since it provides expenditure detail on end-uses and its data are validated against utility company records. Shown in Appendix Table G-1, the parameter is defined as the ratio between total energy expenditures of low-income households that have heating and cooling expenses—tabulated using 2015 RECS data—and total average energy expenditures of all low-income households—tabulated using 2015 ACS data.

Appendix Table G-1: RECS Adjustment Parameters for ACS-Based HCSUAs[28]

Census Division	FIPS	STATE	2015 RECS[†]	2015 ACS[‡]	Ratio
1: New England	9	Connecticut	198	206	96%
	23	Maine			
	25	Massachusetts			
	33	New Hampshire			
	44	Rhode Island			
	50	Vermont			
2: Middle Atlantic	34	New Jersey	159	192	83%
	36	New York			
	42	Pennsylvania			
3: East North Central	17	Illinois	139	179	78%
	18	Indiana			
	26	Michigan			
	39	Ohio			
	55	Wisconsin			
4: West North Central	19	Iowa	120	180	67%
	20	Kansas			
	27	Minnesota			
	29	Missouri			
	31	Nebraska			

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[28] Slight differences in the computations may exist due to rounding.

			‡	†	
	38	North Dakota			
	46	South Dakota			
5: South Atlantic	10	Delaware	155	184	84%
	11	District of Columbia			
	12	Florida			
	13	Georgia			
	24	Maryland			
	37	North Carolina			
	45	South Carolina			
	51	Virginia			
	54	West Virginia			
6: East South Central	1	Alabama	150	198	76%
	21	Kentucky			
	28	Mississippi			
	47	Tennessee			
7: West South Central	5	Arkansas	148	179	83%
	22	Louisiana			
	40	Oklahoma			
	48	Texas			
8: Mountain	4	Arizona	132	156	84%
	8	Colorado			
	16	Idaho			
	30	Montana			
	32	Nevada			
	35	New Mexico			
	49	Utah			
	56	Wyoming			
9: Pacific	2	Alaska	105	125	84%
	6	California			
	15	Hawaii			
	41	Oregon			
	53	Washington			

‡Average Monthly Energy Expenditures (All Fuels Combined) of Low-Income Households
†Average Monthly Energy Expenditures (All Fuels Combined) Paid Directly by Low-Income Households Who Have Heating/Cooling Expenses

Appendix Table G-2: Development of the Energy Component of the ACS-Based HCSUAs

			A	B	C = A x B	D	E	F = (C x D) / E
FIPS	STATE	Census Division	2019 Total Monthly Energy Expend-itures by Low-Income Households (ACS)[a]	RECS Adjustment Parameter[b]	2019 Total Monthly Energy Expenditures by Low-Income Households with Out-of-Pocket Heating/Cooling Expenses	FY 2022 Total Energy Expenditure Growth Rate[c]	FY 2022 House-hold Growth Rate[d]	FY 2022 Total Monthly Energy Expenditures by Low-Income Households with Out-of-Pocket Heating/Cooling Expenses
1	Alabama	East South Central	$218.53	76%	$165.82	1.06	1.05	$166.86
2	Alaska	Pacific	$218.83	84%	$184.31	1.16	1.04	$205.53
4	Arizona	Mountain	$164.94	84%	$139.14	1.06	1.04	$140.62
5	Arkansas	West South Central	$180.17	83%	$149.55	1.03	1.03	$149.78
6	California	Pacific	$141.03	84%	$118.78	1.17	1.08	$128.66
8	Colorado	Mountain	$144.89	84%	$122.23	1.05	1.06	$121.47
9	Connecticut	New England	$232.73	96%	$224.00	1.09	0.98	$248.94
10	Delaware	South Atlantic	$204.97	84%	$172.40	1.01	1.08	$161.15
11	District of Columbia	South Atlantic	$155.10	84%	$130.45	1.02	1.09	$122.30
12	Florida	South Atlantic	$150.90	84%	$126.92	1.02	1.07	$121.24
13	Georgia	South Atlantic	$198.51	84%	$166.97	1.02	1.05	$163.05
15	Hawaii	Pacific	$170.58	84%	$143.67	1.18	1.03	$165.69
16	Idaho	Mountain	$145.31	84%	$122.58	1.05	1.10	$117.86
17	Illinois	East North Central	$174.71	78%	$135.52	1.05	1.07	$132.11
18	Indiana	East North Central	$195.70	78%	$151.81	1.04	1.07	$148.74
19	Iowa	West North Central	$172.62	67%	$115.18	1.03	1.03	$114.90
20	Kansas	West North Central	$209.62	67%	$139.86	1.04	1.07	$135.94
21	Kentucky	East South Central	$182.38	76%	$138.39	1.06	1.05	$140.47
22	Louisiana	West South Central	$173.28	83%	$143.83	1.02	1.05	$139.62
23	Maine	New England	$200.24	96%	$192.73	1.12	1.05	$205.56
24	Maryland	South Atlantic	$197.35	84%	$165.99	1.03	1.02	$167.69
25	Massachusetts	New England	$190.05	96%	$182.92	1.09	1.08	$184.28

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26	Michigan	East North Central	$192.22	78%	$149.11	1.04	1.07	$145.13
27	Minnesota	West North Central	$169.55	67%	$113.13	1.03	1.07	$109.08
28	Mississippi	East South Central	$204.58	76%	$155.24	1.06	1.05	$156.13
29	Missouri	West North Central	$199.92	67%	$133.40	1.05	1.02	$137.15
30	Montana	Mountain	$159.84	84%	$134.84	1.05	1.02	$139.55
31	Nebraska	West North Central	$194.21	67%	$129.58	1.04	1.06	$127.49
32	Nevada	Mountain	$159.82	84%	$134.82	1.05	1.02	$139.01
33	New Hampshire	New England	$191.41	96%	$184.23	1.12	1.04	$198.69
34	New Jersey	Middle Atlantic	$187.08	83%	$155.14	1.04	1.05	$152.87
35	New Mexico	Mountain	$160.33	84%	$135.26	1.05	1.08	$131.00
36	New York	Middle Atlantic	$172.47	83%	$143.02	1.04	1.07	$139.65
37	North Carolina	South Atlantic	$186.86	84%	$157.17	1.03	1.04	$155.93
38	North Dakota	West North Central	$149.55	67%	$99.78	1.04	1.00	$104.04
39	Ohio	East North Central	$169.92	78%	$131.81	1.05	1.05	$131.44
40	Oklahoma	West South Central	$187.52	83%	$155.66	1.03	1.05	$152.75
41	Oregon	Pacific	$139.26	84%	$117.29	1.18	1.08	$127.22
42	Pennsylvania	Middle Atlantic	$194.63	83%	$161.40	1.04	1.06	$159.18
44	Rhode Island	New England	$204.79	96%	$197.11	1.07	1.15	$183.21
45	South Carolina	South Atlantic	$197.08	84%	$165.76	1.03	1.07	$159.49
46	South Dakota	West North Central	$193.21	67%	$128.92	1.04	1.11	$120.92
47	Tennessee	East South Central	$189.76	76%	$143.99	1.07	1.09	$141.52
48	Texas	West South Central	$175.07	83%	$145.32	1.03	1.05	$142.74
49	Utah	Mountain	$145.49	84%	$122.73	1.05	1.03	$125.68
50	Vermont	New England	$206.91	96%	$199.15	1.13	1.10	$204.83
51	Virginia	South Atlantic	$185.44	84%	$155.98	1.02	1.06	$149.98
53	Washington	Pacific	$134.83	84%	$113.56	1.18	1.07	$125.45
54	West Virginia	South Atlantic	$187.97	84%	$158.10	1.03	1.07	$152.80
55	Wisconsin	East North Central	$160.92	78%	$124.83	1.04	1.08	$120.98
56	Wyoming	Mountain	$152.43	84%	$128.59	1.05	1.02	$131.36

[a] Tabulated from the 2019 ACS and shown in Appendix Table F-4.

[b] From Appendix Table G-1.

[c] From Appendix Table E-1

[d] From Appendix Table D-1

Appendix H: Use of the ACS to Compute Water/Sewage/Trash Expenditures by Low-Income Households

APPENDIX TABLE H-1: AVERAGE MONTHLY EXPENDITURES FOR WATER/SEWAGE/TRASH[29]

		A	B	C				D = (A x B x C)
		2019 ACS Water / Sewage Expenditures by Low-Income Households[a]	Escalation Adjustment for Trash Expenditures[b]	Historical ACS Growth Rates for Water and Sewage Expenditures by Low-Income Households[c]				Average Monthly Water / Sewage / Trash Expenditures by Low-Income House-holds
FIPS	STATE	Monthly	2019	FY 2017	FY 2018	FY 2019	AVERAGE	FY 2022
				CY 2014	CY 2015	CY 2016		
1	Alabama	37.44	1.37	1.03	1.03	1.01	1.02	52.47
2	Alaska	32.10	1.37	1.13	1.10	0.97	1.06	46.90
4	Arizona	45.44	1.37	0.99	0.96	0.98	0.98	60.90
5	Arkansas	37.58	1.37	1.02	0.98	1.00	1.00	51.61
6	California	46.37	1.37	1.01	1.05	1.10	1.05	67.07
8	Colorado	39.68	1.37	0.99	1.02	1.08	1.03	56.17
9	Connecticut	27.03	1.37	1.09	1.06	1.35	1.17	43.29
10	Delaware	28.56	1.37	1.19	1.41	1.15	1.25	49.05
11	District of Columbia	23.00	1.37	0.90	1.12	1.27	1.10	34.70
12	Florida	36.75	1.37	1.01	0.99	1.00	1.00	50.41
13	Georgia	32.92	1.37	1.05	1.00	0.98	1.01	45.61
15	Hawaii	47.94	1.37	0.75	1.05	1.06	0.96	62.85
16	Idaho	36.33	1.37	1.00	0.98	1.21	1.06	53.06
17	Illinois	34.12	1.37	1.12	1.07	1.01	1.07	49.90

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[29] Slight differences may exist due to rounding.

18	Indiana	37.81	1.37	1.03	1.06	1.07	1.06	54.80
19	Iowa	42.99	1.37	1.06	1.01	1.08	1.05	61.85
20	Kansas	38.47	1.37	0.95	1.01	1.02	0.99	52.30
21	Kentucky	37.73	1.37	1.04	1.06	1.07	1.06	54.64
22	Louisiana	37.39	1.37	1.06	1.06	1.03	1.05	53.93
23	Maine	15.92	1.37	1.00	1.26	1.54	1.27	27.67
24	Maryland	34.16	1.37	1.06	1.05	1.10	1.07	50.07
25	Massachusetts	24.91	1.37	0.97	0.94	0.97	0.96	32.79
26	Michigan	36.94	1.37	1.13	1.03	1.00	1.05	53.33
27	Minnesota	26.20	1.37	1.07	1.15	1.07	1.10	39.48
28	Mississippi	34.37	1.37	1.06	0.98	1.04	1.02	48.32
29	Missouri	32.33	1.37	1.04	1.06	0.98	1.03	45.57
30	Montana	28.07	1.37	1.23	0.98	0.93	1.05	40.38
31	Nebraska	29.20	1.37	1.25	1.12	0.96	1.11	44.53
32	Nevada	37.65	1.37	1.11	1.07	1.01	1.06	54.90
33	New Hampshire	14.31	1.37	1.01	1.21	0.97	1.06	20.86
34	New Jersey	27.47	1.37	0.96	1.01	0.99	0.99	37.28
35	New Mexico	35.45	1.37	1.20	1.01	0.95	1.05	51.26
36	New York	17.59	1.37	1.03	1.12	1.04	1.06	25.64
37	North Carolina	30.21	1.37	1.05	1.03	1.05	1.04	43.17
38	North Dakota	33.36	1.37	1.20	1.02	0.87	1.03	47.13
39	Ohio	39.38	1.37	1.10	1.06	1.02	1.06	57.35
40	Oklahoma	43.17	1.37	1.11	1.11	1.10	1.11	65.65
41	Oregon	40.64	1.37	1.04	1.11	1.09	1.08	60.12
42	Pennsylvania	41.12	1.37	1.08	1.02	0.99	1.03	58.27
44	Rhode Island	21.56	1.37	1.19	1.16	1.40	1.25	36.97
45	South Carolina	31.35	1.37	1.07	1.02	1.03	1.04	44.83
46	South Dakota	32.78	1.37	1.10	1.10	1.14	1.12	50.18
47	Tennessee	32.16	1.37	0.97	1.00	1.05	1.01	44.37
48	Texas	47.38	1.37	1.05	1.03	1.02	1.03	67.11
49	Utah	38.94	1.37	1.02	0.97	1.04	1.01	54.00
50	Vermont	14.43	1.37	0.76	0.94	1.24	0.98	19.42

51	Virginia	36.00	1.37	0.98	0.99	1.02	1.00	49.28
53	Washington	49.54	1.37	1.03	1.03	1.03	1.03	69.87
54	West Virginia	42.36	1.37	1.16	1.17	0.99	1.11	64.30
55	Wisconsin	27.53	1.37	1.13	1.10	1.06	1.10	41.38
56	Wyoming	33.61	1.37	1.02	1.09	1.12	1.08	49.71

[a] Tabulated from the 2019 ACS and shown in Appendix Table F-5.

[b] Calculated at the national level as total 2019 expenditures for water/sewage/trash from the CEX divided by total 2019 expenditures for water/sewage from the ACS.

[c] Tabulated from the ACS, various years.

Appendix I: Computation of Broadband Utility Allowance

APPENDIX TABLE I-1: BASE DATA FROM ALLCONNECT.COM

State	Internet Service Provider	Cost per Month	Speed (mbps)	Technology	Coverage
Alabama	AT&T	$ 19.99	5	DSL	73%
Alabama	Xfinity	$ 29.99	15	Cable	24%
Alabama	HughesNet	$ 49.99	25	Satellite	100%
Alaska	Borealis Broadband	$ 40.00	3	DSL	26%
Alaska	HughesNet	$ 49.99	25	Satellite	99%
Alaska	Matanuska Telephone Association	$ 59.99	15	DSL	17%
Alaska	GCI	$ 74.99	100	Cable	77%
Alaska	Alaska Communications	$ 89.99	50	DSL	45%
Arizona	Mediacom	$ 19.99	60	Cable	87%
Arizona	Frontier	$ 27.99	6	DSL	91%
Arizona	Xfinity	$ 29.99	15	Cable	87%
Arizona	Cox	$ 29.99	10	Cable	76%
Arizona	HughesNet	$ 49.99	25	Satellite	99%
Arkansas	Windstream	$ 19.99	25	DSL	22%
Arkansas	Xfinity	$ 29.99	15	Cable	20%

State	Internet Service Provider	Cost per Month	Speed (mbps)	Technology	Coverage
Arkansas	Cox	$ 29.99	10	Cable	24%
Arkansas	suddenlink	$ 34.99	100	Cable	19%
Arkansas	centurylink	$ 49.00	100	DSL	15%
Arkansas	AT&T	$ 49.99	1000	DSL/Fiber	70%
Arkansas	HughesNet	$ 39.99	25	Satellite	99%
California	Cox	$ 29.99	10	Cable	9%
California	Frontier	$ 27.99	6	DSL	35%
California	Xfinity	$ 29.99	60	Cable	32%
California	HughnesNet	$ 59.99	N/A	Satellite	98%
Colorado	Xfinity	$ 29.99	15	Cable	84%
Colorado	Rise Broadband	$ 29.99	5	Fixed Wireless	63%
Colorado	PCI Broadband	$ 39.95	10	Fixed Wireless	8%
Colorado	HughnesNet	$ 59.99	25	Satellite	99%
Connecticut	Frontier	$ 20.00	12	DSL	91%
Connecticut	Xfinity	$ 29.99	15	Cable	54%
Connecticut	Cox	$ 29.99	10	Cable	10%
Connecticut	HughnesNet	$ 59.99	25	Satellite	100%
Delaware	Mediacom	$ 19.99	60	Cable	8%
Delaware	Xfinity	$ 29.99	15	Cable	87%

State	Internet Service Provider	Cost per Month	Speed (mbps)	Technology	Coverage
Delaware	Verizon	$ 39.99	200	DSL	97%
Delaware	Atlantic Broadband	$ 39.99	50	Cable	5%
Delaware	HughnesNet	$ 59.99	25	Satellite	99%
District of Columbia	Verizon DSL	$ 25.00	0.5-15	DSL	96%
District of Columbia	Xfinity	$ 29.99	15	Cable	95%
District of Columbia	RCN	$ 29.99	50	Cable	66%
Florida	Frontier	$ 27.99	6	DSL	30%
Florida	Xfinity	$ 29.99	60	Cable	55%
Florida	HughnesNet	$ 59.99	25	Satellite	98%
Georgia	Xfinity	$ 29.99	15	Cable	59%
Georgia	Windstream	$ 37.00	15	DSL	10%
Georgia	HughnesNet	$ 49.99	25	Satellite	100%
Hawaii	Hawaiian Telcom	$ 44.99	300	Fiber	94%
Hawaii	Spectrum	$ 49.99	30	Cable	97%
Hawaii	HughnesNet	$ 59.99	25	Satellite	99%
Idaho	Ziply	$ 40.00	100	DSL	35%
Idaho	Xfinity	$ 24.99	25	Cable	0.06%
Idaho	Cox	$ 39.99	50	Cable	50%
Idaho	CenturyLink	$ 49.00	100	DSL	70%

State	Internet Service Provider	Cost per Month	Speed (mbps)	Technology	Coverage
Idaho	HughnesNet	$ 59.99	25	Satellite	100%
Illinois	Mediacom	$ 19.99	60	Cable	30%
Illinois	HughnesNet	$ 59.99	25	Satellite	99%
Indiana	AT&T	$ 19.99	5	DSL	79%
Indiana	Xfinity	$ 34.99	15	Cable	69%
Indiana	Spectrum	$ 44.99	30	Cable	72%
Indiana	HughnesNet	$ 59.99	25	Satellite	97%
Iowa	Cox	$ 39.99	50	Cable	74%
Iowa	MediaCom	$ 39.99	60	Cable	56%
Iowa	HughnesNet	$ 49.99	25	Satellite	97%
Kansas	AT&T	$ 39.99	100	DSL	72%
Kansas	Spectrum	$ 44.99	30	Cable	96%
Kansas	Cox	$ 29.99	50	Cable	63%
Kentucky	HughnesNet	$ 59.99	25	Satellite	95%
Kentucky	Spectrum	$ 49.99	200	Cable	76%
Louisiana	Cox	$ 29.99	10	Cable	69%
Louisiana	Xfinity	$ 34.99	25	Cable	49%
Louisiana	HughnesNet	$ 69.99	25	Satellite	99%
Maine	Spectrum	$ 44.99	100	Cable	76%

State	Internet Service Provider	Cost per Month	Speed (mbps)	Technology	Coverage
Maine	Xfinity	$ 39.99	200	Cable	95%
Maine	Visasat	$ 70.00	12	Satellite	100%
Maryland	RCN	$ 19.99	25	Cable	4%
Maryland	Port Networks	$ 30.00	25	Fixed Wireless	9%
Maryland	Verizon	$ 39.99	200	DSL	97%
Maryland	Xfinity	$ 39.99	200	Cable	92%
Maryland	Shentel	$ 40.00	50	Cable, DSL	94%
Maryland	HughesNet	$ 59.99	25	Satellite	100%
Massachusetts	RCN	$ 29.99	100	Cable	19%
Massachusetts	Xfinity	$ 29.99	15	Cable	90%
Massachusetts	HughesNet	$ 59.99	25	Satellite	99%
Michigan	Frontier	$ 27.99	6	DSL	9%
Michigan	Xfinity	$ 29.99	15	Cable	72%
Michigan	WOW!	$ 34.99	100	Cable	24%
Michigan	HughesNet	$ 59.99	25	Satellite	99%
Minnesota	Mediacom	$ 19.99	60	Cable	55%
Minnesota	Frontier	$ 27.99	6	DSL	8%
Minnesota	Xfinity	$ 29.99	15	Cable	55%
Minnesota	HughesNet	$ 59.99	25	Satellite	99%

State	Internet Service Provider	Cost per Month	Speed (mbps)	Technology	Coverage
Mississippi	Xfinity	$ 20.00	10	Cable	70%
Mississippi	Frontier	$ 27.99	6	DSL	20%
Missouri	Mediacom	$ 19.99	60	Cable	12%
Missouri	Windstream	$ 27.00	15	DSL	1%
Missouri	Spectrum	$ 29.99	400	Cable	63%
Missouri	Xfinity	$ 39.99	200	Cable	7%
Missouri	HughesNet	$ 59.99	10	Satellite	100%
Montana	CenturyLink	$ 49.99	15	DSL	79%
Montana	Spectrum	$ 49.99	100	Cable	71%
Montana	Blackfoot Telephone Cooperative	$ 50.00	115	DSL	6%
Montana	HughesNet	$ 59.99	10	Satellite	100%
Nebraska	Cox	$ 29.99	10	Cable	25%
Nebraska	Windstream	$ 19.99	200	DSL	15%
Nevada	Cox	$ 29.99	10	Cable	"4 cities
Nevada	Centurylink	$ 49.99	100	DSL	"3 cities"
Nevada	HughesNet	$ 59.99	25	Satellite	"20 cities"
New Hampshire	xfinity	$ 39.99	60	Cable	85%
New Hampshire	Spectrum	$ 49.99	200	Cable	82%
New Hampshire	Consolidated communications	$ 28.69	7	DSL	92%

State	Internet Service Provider	Cost per Month	Speed (mbps)	Technology	Coverage
New Hampshire	HughesNet	$ 59.99	25	Satellite	100%
New Jersey	Optimum	$ 29.99	20	Cable	44%
New Jersey	xfinity	$ 29.99	15	Cable	53%
New Jersey	Verizon	$ 39.99	200	DSL	97%
New Jersey	HughesNet	$ 59.99	25	Satellite	100%
New Mexico	Xfinity	$ 29.99	15	DSL	72%
New Mexico	HughesNet	$ 59.99	25	Satellite	100%
New York	Windstream	$ 25.00	15	DSL	72%
New York	frontier	$ 27.99	6	DSL	8%
New York	xfinity	$ 29.99	60	Cable	76%
New York	optimum	$ 29.99	20	Cable	41%
New York	HughesNet	$ 59.99	25	Satellite	100%
North Carolina	Windstream	$ 25.00	15	DSL	13%
North Carolina	frontier	$ 27.99	6	DSL	7%
North Carolina	xfinity	$ 29.99	60	Cable	58%
North Carolina	Mediacom	$ 29.99	60	Cable	81%
North Carolina	cox	$ 29.99	10	Cable	83%
North Carolina	HughesNet	$ 59.99	25	Satellite	96%
North Dakota	Northern Skies	$ 29.95	30	Wireless	7.60%

State	Internet Service Provider	Cost per Month	Speed (mbps)	Technology	Coverage
North Dakota	Visasat	$ 50.00	100	Satellite	100%
Ohio	Buckeye Broadband	$ 19.99	25	Cable	5%
Ohio	Windstream	$ 25.00	15	DSL	4%
Ohio	frontier	$ 27.99	6	DSL	10%
Ohio	armstrong	$ 29.95	12	Cable	2%
Ohio	wow!	$ 34.99	100	Cable	17%
Ohio	bright.net	$ 39.95	5	DSL	10%
Ohio	HughesNet	$ 59.99	25	Satellite	100%
Oklahoma	Cox	$ 29.99	10	Cable	55%
Oklahoma	Visasat	$ 50.00	100	Satellite	100%
Oregon	Whiz to coho	$ 24.95	15	Fixed Wireless	3%
Oregon	HughesNet	$ 49.99	25	Satellite	100%
Pennsylvania	Windstream	$ 19.99	25	DSL	39%
Pennsylvania	rcn	$ 19.99	10	Cable	7%
Pennsylvania	frontier	$ 27.99	6	DSL	33%
Pennsylvania	optimum	$ 29.99	20	Cable	10%
Pennsylvania	xfinity	$ 29.99	15	Cable	77%
Pennsylvania	HughesNet	$ 59.99	25	Satellite	100%
Rhode Island	Cox	$ 29.99	N/A	Cable	98%

State	Internet Service Provider	Cost per Month	Speed (mbps)	Technology	Coverage
Rhode Island	HughesNet	$ 59.99	25	Satellite	100%
South Carolina	Frontier	$ 27.99	6	DSL	52%
South Carolina	Windstream	$ 25.00	15	DSL	66%
South Carolina	xfinity	$ 24.99	25	Cable	72%
South Carolina	HughesNet	$ 49.99	25	Satellite	98%
South Dakota	Vast broadband	$ 39.99	100	N/A	N/A
South Dakota	HughesNet	$ 49.00	25	Satellite	100%
Tennessee	AT&T	$ 39.99	10	DSL	66%
Tennessee	Xfinity	$ 25.00	25	Cable	23%
Tennessee	Cox	$ 29.99	10	Cable	15%
Texas	Windstream	$ 19.99	25	DSL	38%
Texas	frontier	$ 27.99	6	DSL	45%
Texas	xfinity	$ 29.99	15	Cable	52%
Texas	suddenlink	$ 39.99	300	Cable	11%
Texas	HughesNet	$ 59.99	25	Satellite	99%
Utah	connext	$ 30.00	N/A	N/A	N/A
Utah	xfinity	$ 39.99	N/A	Cable	80%
Utah	viasat	$ 50.00	100	Satellite	100%
Vermont	xfinity	$ 39.99	60	Cable	97%

State	Internet Service Provider	Cost per Month	Speed (mbps)	Technology	Coverage
Vermont	spectrum	$ 49.99	200	Cable	39%
Vermont	viasat	$ 50.00	12	Satellite	99%
Virginia	cox	$ 29.99	10	Cable	44%
Virginia	verizon fios	$ 39.99	200	DSL	74%
Virginia	xfinity	$ 20.00	25	Cable	58%
Virginia	HughesNet	$ 39.99	25	Satellite	99%
Washington	xfinity	$ 29.99	15	Cable	81%
Washington	wired or wireless, inc.	$ 39.95	30	Fixed Wireless	7%
Washington	HughesNet	$ 59.99	25	Satellite	99%
West Virginia	Frontier DSL	$ 27.99	90	DSL	93%
West Virginia	viasat	$ 50.00	12	Satellite	100%
Wisconsin	frontier	$ 27.99	6	DSL	11%
Wisconsin	tds telecom	$ 35.00	15	DSL	40%
Wisconsin	bertram communications	$ 39.95	5	Fixed Wireless	24%
Wisconsin	HughesNet	$ 59.99	25	Satellite	99%
Wyoming	verizon	$ 40.00	50	DSL	81%
Wyoming	centurylink	$ 49.00	940	DSL	83%
Wyoming	HughesNet	$ 59.99	25	Satellite	100%

APPENDIX TABLE I-2: STATE AVERAGES OF ALLCONNECT LOW-COST INTERNET PLANS

FIPS	STATE	Average Monthly Cost of Inexpensive Plans
1	Alabama	$24.99
2	Alaska	$45.00
4	Arizona	$26.99
5	Arkansas	$35.66
6	California	$29.32
8	Colorado	$33.31
9	Connecticut	$26.66
10	Delaware	$32.49
11	District of Columbia	$28.33
12	Florida	$28.99
13	Georgia	$33.50
15	Hawaii	$47.49
16	Idaho	$38.50
17	Illinois	$19.99
18	Indiana	$33.32
19	Iowa	$39.99
20	Kansas	$38.32
21	Kentucky	$49.99
22	Louisiana	$32.49
23	Maine	$42.49
24	Maryland	$33.99
25	Massachusetts	$29.99
26	Michigan	$30.99
27	Minnesota	$25.99
28	Mississippi	$24.00
29	Missouri	$29.24
30	Montana	$49.99
31	Nebraska	$24.99
32	Nevada	$39.99
33	New Hampshire	$39.56
34	New Jersey	$33.32
35	New Mexico	$29.99
36	New York	$28.24
37	North Carolina	$28.59
38	North Dakota	$29.95
39	Ohio	$29.65
40	Oklahoma	$29.99
41	Oregon	$24.95
42	Pennsylvania	$25.59

44	Rhode Island	$29.99
45	South Carolina	$25.99
46	South Dakota	$39.99
47	Tennessee	$31.66
48	Texas	$29.49
49	Utah	$35.00
50	Vermont	$44.99
51	Virginia	$29.99
53	Washington	$34.97
54	West Virginia	$27.99
55	Wisconsin	$34.31
56	Wyoming	$44.50

APPENDIX TABLE I-3: AVERAGE LOW-COST BROADBAND ESTIMATES FROM BROADBANDSEARCH.NET

FIPS	STATE	Average Cost per Mpbs	Average Cost of 25 Mpbs
1	Alabama	$0.55	$13.75
2	Alaska	Not Listed	Not Available
4	Arizona	$0.55	$13.75
5	Arkansas	$0.55	$13.75
6	California	$0.27	$6.75
8	Colorado	$0.83	$20.75
9	Connecticut	$0.67	$16.75
10	Delaware	$0.85	$21.25
11	District of Columbia	Not Listed	Not Available
12	Florida	$0.83	$20.75
13	Georgia	$0.83	$20.75
15	Hawaii	Not Listed	Not Available
16	Idaho	$0.55	$13.75
17	Illinois	$0.55	$13.75
18	Indiana	$0.55	$13.75
19	Iowa	$0.50	$12.50
20	Kansas	$0.55	$13.75
21	Kentucky	$0.83	$20.75
22	Louisiana	$0.55	$13.75
23	Maine	$0.83	$20.75
24	Maryland	$0.83	$20.75
25	Massachusetts	$0.40	$10.00
26	Michigan	$0.44	$11.00
27	Minnesota	$0.55	$13.75
28	Mississippi	$0.55	$13.75
29	Missouri	$0.55	$13.75
30	Montana	Not listed	Not Available
31	Nebraska	$0.65	$16.25
32	Nevada	Nost listed	Not Available
33	New Hampshire	$0.65	$16.25
34	New Jersey	$0.65	$16.25
35	New Mexico	$0.55	$13.75
36	New York	$0.83	$20.75
37	North Carolina	$0.83	$20.75
38	North Dakota	$0.55	$13.75
39	Ohio	$0.65	$16.25
40	Oklahoma	$0.55	$13.75
41	Oregon	$0.55	$13.75
42	Pennsylvania	$0.83	$20.75
44	Rhode Island	Not Listed	Not Available
45	South Carolina	$0.83	$20.75
46	South Dakota	$0.55	$13.75
47	Tennessee	$0.55	$13.75

48	Texas	$0.12	$3.00
49	Utah	$0.75	$18.75
50	Vermont	$0.83	$20.75
51	Virginia	$0.83	$20.75
53	Washington	$0.55	$13.75
54	West Virginia	$0.70	$17.50
55	Wisconsin	$0.83	$20.75
56	Wyoming	$1.00	$25.00

APPENDIX TABLE I-4: CALCULATION OF AVERAGE MONTHLY COST OF INEXPENSIVE INTERNET PLANS

FIPS	STATE	BroadbandSearch Average	Allconnect Average	Overall Average	Lifeline Participation Rate	Weighted Average Estimate Accounting for Lifeline Participation	FY 2022 Estimate
1	Alabama	$13.75	$24.99	$19.37	17%	$17.80	$18.33
2	Alaska	N/A	$45.00	$45.00	37%	$41.57	$42.82
4	Arizona	$13.75	$26.99	$20.37	26%	$17.97	$18.50
5	Arkansas	$13.75	$35.66	$24.70	24%	$22.48	$23.16
6	California	$6.75	$29.32	$18.04	51%	$13.32	$13.72
8	Colorado	$20.75	$33.31	$27.03	16%	$25.55	$26.32
9	Connecticut	$16.75	$26.66	$21.71	24%	$19.49	$20.07
10	Delaware	$21.25	$32.49	$26.87	18%	$25.21	$25.96
11	District of Columbia	N/A	$28.33	$28.33	29%	$25.64	$26.41
12	Florida	$20.75	$28.99	$24.87	20%	$23.02	$23.71
13	Georgia	$20.75	$33.50	$27.12	29%	$24.44	$25.17
15	Hawaii	N/A	$47.49	$47.49	8%	$46.75	$48.15
16	Idaho	$13.75	$38.50	$26.12	9%	$25.29	$26.05
17	Illinois	$13.75	$19.99	$16.87	19%	$15.11	$15.57
18	Indiana	$13.75	$33.32	$23.54	23%	$21.41	$22.05
19	Iowa	$12.50	$39.99	$26.25	17%	$24.67	$25.41
20	Kansas	$13.75	$38.32	$26.04	16%	$24.56	$25.29
21	Kentucky	$20.75	$49.99	$35.37	30%	$32.60	$33.57
22	Louisiana	$13.75	$32.49	$23.12	36%	$19.79	$20.38
23	Maine	$20.75	$42.49	$31.62	14%	$30.33	$31.23
24	Maryland	$20.75	$33.99	$27.37	30%	$24.60	$25.33
25	Massachusetts	$10.00	$29.99	$20.00	17%	$18.42	$18.98
26	Michigan	$11.00	$30.99	$21.00	26%	$18.59	$19.15
27	Minnesota	$13.75	$25.99	$19.87	16%	$18.39	$18.94
28	Mississippi	$13.75	$24.00	$18.87	22%	$16.84	$17.34
29	Missouri	$13.75	$29.24	$21.50	17%	$19.92	$20.52
30	Montana	N/A	$49.99	$49.99	2%	$49.81	$51.30
31	Nebraska	$16.25	$24.99	$20.62	3%	$20.34	$20.95
32	Nevada	N/A	$39.99	$39.99	26%	$37.59	$38.71
33	New Hampshire	$16.25	$39.56	$27.90	8%	$27.16	$27.98
34	New Jersey	$16.25	$33.32	$24.79	21%	$22.84	$23.53
35	New Mexico	$13.75	$29.99	$21.87	30%	$19.10	$19.67
36	New York	$20.75	$28.24	$24.50	25%	$22.18	$22.85
37	North Carolina	$20.75	$28.59	$24.67	15%	$23.28	$23.98
38	North Dakota	$13.75	$29.95	$21.85	7%	$21.20	$21.84

39	Ohio	$16.25	$29.65	$22.95	30%	$20.17	$20.78
40	Oklahoma	$13.75	$29.99	$21.87	45%	$17.71	$18.24
41	Oregon	$13.75	$24.95	$19.35	15%	$17.96	$18.50
42	Pennsylvania	$20.75	$25.59	$23.17	26%	$20.77	$21.39
44	Rhode Island	N/A	$29.99	$29.99	23%	$27.86	$28.70
45	South Carolina	$20.75	$25.99	$23.37	23%	$21.24	$21.88
46	South Dakota	$13.75	$39.99	$26.87	8%	$26.13	$26.91
47	Tennessee	$13.75	$31.66	$22.71	18%	$21.04	$21.67
48	Texas	$3.00	$29.49	$16.25	16%	$14.77	$15.21
49	Utah	$18.75	$35.00	$26.87	13%	$25.67	$26.44
50	Vermont	$20.75	$44.99	$32.87	14%	$31.58	$32.52
51	Virginia	$20.75	$29.99	$25.37	19%	$23.61	$24.32
53	Washington	$13.75	$34.97	$24.36	22%	$22.33	$22.99
54	West Virginia	$17.50	$27.99	$22.75	29%	$20.06	$20.66
55	Wisconsin	$20.75	$34.31	$27.53	25%	$25.22	$25.98
56	Wyoming	$25.00	$44.50	$34.75	1%	$34.66	$35.70

Appendix J: Use of the ACS to Compute HCSUA

APPENDIX TABLE J-1: TOTAL MONTHLY UTILITY EXPENDITURES BY LOW-INCOME HOUSEHOLDS WITH OUT-OF-POCKET EXPENSES FOR HEATING AND/OR COOLING[30]

FIPS	STATE	FY 2022 Monthly Energy Expenditures[a]	FY 2022 Monthly Water / Sewage / Trash Expenditures[b]	FY 2022 Monthly Broadband Expenditures[c]	FY 2022 Total Monthly Utility Expenditures
1	Alabama	$166.86	$52.47	$18.33	$237.67
2	Alaska	$205.53	$46.90	$42.82	$295.25
4	Arizona	$140.62	$60.90	$18.50	$220.02
5	Arkansas	$149.78	$51.61	$23.16	$224.56
6	California	$128.66	$67.07	$13.72	$209.45
8	Colorado	$121.47	$56.17	$26.32	$203.96
9	Connecticut	$248.94	$43.29	$20.07	$312.29
10	Delaware	$161.15	$49.05	$25.96	$236.17
11	District of Columbia	$122.30	$34.70	$26.41	$183.40
12	Florida	$121.24	$50.41	$23.71	$195.36
13	Georgia	$163.05	$45.61	$25.17	$233.84
15	Hawaii	$165.69	$62.85	$48.15	$276.69
16	Idaho	$117.86	$53.06	$26.05	$196.97
17	Illinois	$132.11	$49.90	$15.57	$197.58
18	Indiana	$148.74	$54.80	$22.05	$225.59
19	Iowa	$114.90	$61.85	$25.41	$202.17
20	Kansas	$135.94	$52.30	$25.29	$213.54
21	Kentucky	$140.47	$54.64	$33.57	$228.68
22	Louisiana	$139.62	$53.93	$20.38	$213.93
23	Maine	$205.56	$27.67	$31.23	$264.46
24	Maryland	$167.69	$50.07	$25.33	$243.09
25	Massachusetts	$184.28	$32.79	$18.98	$236.05
26	Michigan	$145.13	$53.33	$19.15	$217.61
27	Minnesota	$109.08	$39.48	$18.94	$167.50
28	Mississippi	$156.13	$48.32	$17.34	$221.79
29	Missouri	$137.15	$45.57	$20.52	$203.24
30	Montana	$139.55	$40.38	$51.30	$231.23
31	Nebraska	$127.49	$44.53	$20.95	$192.97
32	Nevada	$139.01	$54.90	$38.71	$232.62

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[30] Slight differences in the computations may exist due to rounding.

33	New Hampshire	$198.69	$20.86	$27.98	$247.52
34	New Jersey	$152.87	$37.28	$23.53	$213.68
35	New Mexico	$131.00	$51.26	$19.67	$201.93
36	New York	$139.65	$25.64	$22.85	$188.14
37	North Carolina	$155.93	$43.17	$23.98	$223.08
38	North Dakota	$104.04	$47.13	$21.84	$173.01
39	Ohio	$131.44	$57.35	$20.78	$209.56
40	Oklahoma	$152.75	$65.65	$18.24	$236.64
41	Oregon	$127.22	$60.12	$18.50	$205.85
42	Pennsylvania	$159.18	$58.27	$21.39	$238.84
44	Rhode Island	$183.21	$36.97	$28.70	$248.88
45	South Carolina	$159.49	$44.83	$21.88	$226.20
46	South Dakota	$120.92	$50.18	$26.91	$198.02
47	Tennessee	$141.52	$44.37	$21.67	$207.56
48	Texas	$142.74	$67.11	$15.21	$225.05
49	Utah	$125.68	$54.00	$26.44	$206.11
50	Vermont	$204.83	$19.42	$32.52	$256.77
51	Virginia	$149.98	$49.28	$24.32	$223.59
53	Washington	$125.45	$69.87	$22.99	$218.31
54	West Virginia	$152.80	$64.30	$20.66	$237.76
55	Wisconsin	$120.98	$41.38	$25.98	$188.34
56	Wyoming	$131.36	$49.71	$35.70	$216.77

[a] From Appendix Table G-2.
[b] From Appendix Table H-1.
[c] From Appendix Table I-4.

APPENDIX TABLE J-2: FACTORS TO CONVERT AVERAGE UTILITY EXPENDITURES TO HCSUAS

FIPS	State	2019 Total Monthly Utility Costs of Low-Income Households (ACS)						HCSUA Conversion Ratios				
				Percentile								
		Mean	Median	80th	85th	90th	95th	Median / Mean	80th Pct / Mean	85th Pct / Mean	90th Pct / Mean	95th Pct / Mean
1	Alabama	$248	$223	$343	$385	$430	$510	0.90	1.38	1.55	1.73	2.05
2	Alaska	$228	$207	$383	$405	$450	$513	0.91	1.68	1.78	1.97	2.25
4	Arizona	$196	$170	$283	$313	$363	$442	0.87	1.45	1.60	1.86	2.26
5	Arkansas	$210	$190	$300	$328	$365	$427	0.90	1.43	1.56	1.74	2.03
6	California	$169	$132	$250	$288	$340	$440	0.78	1.48	1.71	2.01	2.60
8	Colorado	$169	$146	$245	$280	$320	$400	0.86	1.45	1.66	1.89	2.37
9	Connecticut	$239	$200	$375	$427	$492	$583	0.84	1.57	1.79	2.06	2.44
10	Delaware	$223	$200	$330	$363	$400	$470	0.90	1.48	1.63	1.80	2.11
11	District of Columbia	$155	$120	$240	$269	$340	$399	0.77	1.55	1.73	2.19	2.57
12	Florida	$176	$152	$250	$280	$313	$380	0.86	1.42	1.59	1.78	2.16
13	Georgia	$223	$200	$310	$348	$390	$467	0.90	1.39	1.56	1.75	2.09
15	Hawaii	$194	$150	$300	$353	$413	$500	0.77	1.54	1.82	2.12	2.57
16	Idaho	$169	$140	$246	$278	$315	$373	0.83	1.45	1.65	1.86	2.21
17	Illinois	$194	$170	$290	$321	$375	$450	0.87	1.49	1.65	1.93	2.32
18	Indiana	$221	$195	$320	$358	$403	$500	0.88	1.45	1.62	1.82	2.26
19	Iowa	$201	$180	$293	$330	$380	$457	0.90	1.46	1.64	1.89	2.27
20	Kansas	$237	$213	$340	$371	$420	$508	0.90	1.44	1.57	1.77	2.14
21	Kentucky	$211	$192	$293	$323	$375	$440	0.91	1.39	1.53	1.78	2.09
22	Louisiana	$203	$185	$280	$306	$342	$415	0.91	1.38	1.51	1.68	2.05
23	Maine	$206	$180	$307	$348	$408	$517	0.88	1.49	1.69	1.99	2.51
24	Maryland	$216	$188	$318	$365	$420	$512	0.87	1.47	1.69	1.94	2.37
25	Massachusetts	$192	$150	$310	$350	$400	$500	0.78	1.61	1.82	2.08	2.60
26	Michigan	$217	$190	$320	$360	$415	$520	0.87	1.47	1.66	1.91	2.39
27	Minnesota	$182	$150	$288	$320	$365	$480	0.82	1.58	1.76	2.00	2.63

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28	Mississippi	$232	$210	$311	$350	$392	$492	0.90	1.34	1.51	1.69	2.12
29	Missouri	$223	$200	$320	$355	$403	$490	0.90	1.43	1.59	1.81	2.20
30	Montana	$176	$150	$260	$281	$325	$400	0.85	1.47	1.59	1.84	2.27
31	Nebraska	$214	$192	$300	$327	$385	$450	0.90	1.41	1.53	1.80	2.11
32	Nevada	$181	$155	$266	$300	$343	$407	0.86	1.47	1.66	1.89	2.24
33	New Hampshire	$191	$170	$308	$357	$395	$497	0.89	1.62	1.87	2.07	2.60
34	New Jersey	$195	$150	$307	$350	$420	$513	0.77	1.57	1.79	2.15	2.63
35	New Mexico	$185	$160	$262	$300	$343	$423	0.87	1.42	1.62	1.86	2.29
36	New York	$170	$130	$263	$304	$370	$470	0.77	1.55	1.79	2.18	2.77
37	North Carolina	$210	$183	$293	$325	$370	$453	0.87	1.40	1.55	1.76	2.16
38	North Dakota	$165	$120	$250	$299	$368	$465	0.73	1.52	1.82	2.24	2.82
39	Ohio	$194	$170	$280	$312	$360	$440	0.88	1.44	1.61	1.85	2.27
40	Oklahoma	$220	$200	$304	$337	$375	$450	0.91	1.38	1.53	1.70	2.04
41	Oregon	$164	$140	$240	$261	$300	$387	0.86	1.47	1.59	1.83	2.36
42	Pennsylvania	$221	$196	$325	$362	$414	$509	0.89	1.47	1.64	1.88	2.31
44	Rhode Island	$196	$167	$302	$340	$370	$512	0.85	1.54	1.73	1.88	2.61
45	South Carolina	$222	$200	$300	$338	$380	$474	0.90	1.35	1.52	1.71	2.14
46	South Dakota	$213	$182	$340	$380	$430	$493	0.85	1.60	1.79	2.02	2.32
47	Tennessee	$215	$193	$300	$325	$373	$450	0.90	1.40	1.51	1.74	2.10
48	Texas	$211	$190	$300	$330	$370	$440	0.90	1.42	1.56	1.75	2.08
49	Utah	$171	$157	$240	$270	$305	$380	0.92	1.41	1.58	1.79	2.23
50	Vermont	$209	$170	$345	$375	$448	$553	0.81	1.65	1.79	2.14	2.64
51	Virginia	$210	$180	$300	$336	$383	$473	0.86	1.43	1.60	1.83	2.25
53	Washington	$164	$133	$252	$283	$327	$410	0.81	1.53	1.72	1.99	2.49
54	West Virginia	$223	$205	$315	$333	$391	$483	0.92	1.41	1.49	1.75	2.16
55	Wisconsin	$177	$150	$257	$290	$330	$400	0.85	1.45	1.64	1.87	2.26
56	Wyoming	$175	$150	$250	$275	$330	$371	0.86	1.43	1.58	1.89	2.12

APPENDIX TABLE J-3: PROPOSED HCSUAS

FIPS	State	Meanª	Percentage of Low-Income Households with the Same or Lower Utility Expenditures			
			80%	85%	90%	95%
1	Alabama	$238	$329	$369	$412	$488
2	Alaska	$295	$497	$525	$583	$665
4	Arizona	$220	$319	$352	$409	$497
5	Arkansas	$225	$320	$351	$390	$456
6	California	$209	$310	$357	$421	$545
8	Colorado	$204	$296	$338	$386	$483
9	Connecticut	$312	$490	$558	$643	$762
10	Delaware	$236	$350	$385	$424	$498
11	District of Columbia	$183	$284	$318	$402	$472
12	Florida	$195	$277	$311	$348	$422
13	Georgia	$234	$325	$365	$409	$489
15	Hawaii	$277	$427	$503	$587	$711
16	Idaho	$197	$287	$324	$367	$435
17	Illinois	$198	$295	$326	$381	$457
18	Indiana	$226	$326	$365	$411	$510
19	Iowa	$202	$295	$332	$383	$460
20	Kansas	$214	$307	$334	$379	$458
21	Kentucky	$229	$318	$350	$407	$478
22	Louisiana	$214	$295	$323	$360	$438
23	Maine	$264	$394	$448	$525	$664
24	Maryland	$243	$358	$411	$473	$576
25	Massachusetts	$236	$381	$430	$492	$615
26	Michigan	$218	$320	$360	$415	$520
27	Minnesota	$168	$265	$294	$335	$441
28	Mississippi	$222	$297	$334	$374	$469
29	Missouri	$203	$292	$324	$368	$447
30	Montana	$231	$341	$368	$426	$524
31	Nebraska	$193	$271	$295	$348	$407
32	Nevada	$233	$341	$385	$441	$522
33	New Hampshire	$248	$400	$463	$513	$645

34	New Jersey	$214	$335	$383	$459	$562
35	New Mexico	$202	$286	$328	$375	$463
36	New York	$188	$292	$337	$410	$521
37	North Carolina	$223	$312	$346	$394	$482
38	North Dakota	$173	$262	$314	$387	$488
39	Ohio	$210	$302	$336	$389	$475
40	Oklahoma	$237	$327	$362	$403	$483
41	Oregon	$206	$302	$328	$378	$487
42	Pennsylvania	$239	$352	$391	$448	$551
44	Rhode Island	$249	$382	$431	$469	$648
45	South Carolina	$226	$306	$345	$387	$483
46	South Dakota	$198	$317	$354	$401	$459
47	Tennessee	$208	$290	$314	$361	$435
48	Texas	$225	$319	$351	$394	$468
49	Utah	$206	$290	$326	$369	$459
50	Vermont	$257	$423	$460	$550	$679
51	Virginia	$224	$319	$358	$408	$504
53	Washington	$218	$335	$376	$434	$545
54	West Virginia	$238	$336	$355	$417	$515
55	Wisconsin	$188	$274	$309	$352	$427
56	Wyoming	$217	$310	$341	$410	$460

[a]From Appendix Table J-1