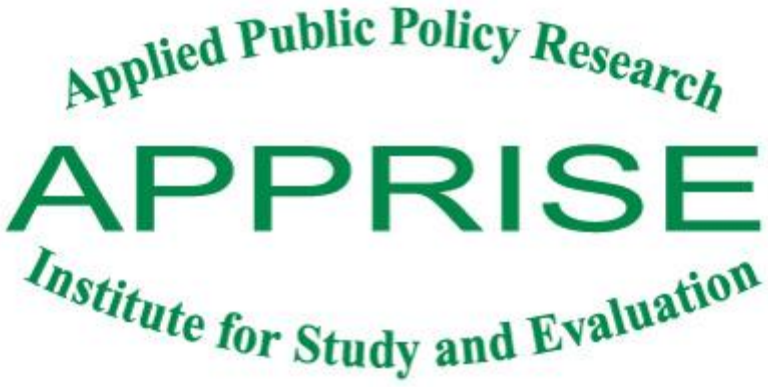

Maryland Low-Income Market Characterization Report

Prepared for the Maryland Office of People's Counsel

October 2018

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Executive Summary

The Maryland Office of People's Counsel (OPC) is an independent state agency that advocates for the interests of residential utility customers. The purpose of the Maryland Low-Income Market Characterization Study is to furnish data that can be used to understand the energy affordability issues faced by Maryland's low-income population and to inform the design of existing and future programs. By providing baseline data to OPC, state agencies, utilities, and other interested parties, the study seeks to inform the discussion of how to best meet the energy needs of low-income households.

A. Research Objectives

The research objectives for the Maryland Low-Income Market Characterization Study were as follows:

1. Document the composition and energy needs of households who are income-eligible for low-income energy programs.
2. Document how energy needs are being met by existing state programs for distinct segments of the low-income population.
3. Identify gaps in services and recommend how to build on existing program strengths to target unmet energy needs.

B. Data Sources

The study used two types of information to characterize the low-income market and the programs that serve them; public use data sets from surveys conducted by the U.S. Bureau of the Census and other Federal Statistical Agencies, and summary program data furnished by the Maryland Department of Housing & Community Development (DHCD) and the Maryland Department of Human Services, Office of Home Energy Programs (OHEP).

The study used the following public use data sets to develop customized statistics for Maryland's low-income population.

- The 2014-2016 American Community Survey (ACS)
- The 2009 Residential Energy Consumption Survey (RECS)

Program data provided by OHEP and DHCD were used to document how existing state energy programs are serving low-income households. OHEP provided fiscal year 2017 data on households served through its two main energy assistance benefits, the Maryland Energy Assistance Program (MEAP) and Electric Universal Service Program (EUSP). DHCD provided fiscal years 2010 – 2017 data on households served through the Weatherization Assistance Program. Funding sources for this program included the U.S. Department of Energy, Regional Greenhouse Gas Initiative, the Customer Investment Fund, and the Low

Income Home Energy Assistance Program (LIHEAP). DHCD also provided data on households served through the EmPOWER Limited Income Energy Efficiency Program, but for this program only households served between 2012 and 2017 are included instead of 2010 through 2017 because DHCD assumed administration of EmPOWER only in 2012.

OHEP and DHCD program participation data were compared to statistics on the income-eligible population to understand energy needs, how different segments of the low-income population are utilizing existing programs, and opportunities for targeting high-need households.

C. Key Results

This section highlights key analysis results.

Maryland Low-Income Households

The study defines households at or below 200% of the federal poverty level (FPL) as low-income. These households are income-eligible for DHCD's single-family weatherization program. A subset of this population is income-eligible for energy assistance benefits provided by OHEP.

- There are nearly 450,000 low-income households in Maryland, or 21 percent of the population.
- Over 380,000 households are income-eligible for OHEP benefits.
- At least 25 percent of households in the Eastern Shore and Western regions of Maryland are low-income.
- The largest number of low-income households resides in the Washington D.C./Baltimore metropolitan corridor (Capital and Central regions). Half of the Maryland low-income population is concentrated in the Central region of the state, and an additional 25% reside in the Capital region.

Eligibility and Participation

- A total of 64,870 households, or 14% of the low-income population, have income between 176% and 200% of the FPL and is income-eligible for DHCD's weatherization program, but do not qualify for OHEP benefits.
- Approximately one-quarter of income-eligible households in Maryland receives energy assistance. Households with lower income participate in OHEP at a higher rate than households at the program's upper-income limits.
- Nine percent of low-income households received weatherization services from fiscal years 2010 through 2017. Participation in weatherization services is highest among low-income households between 76% and 125% of the FPL and lowest among households above 150% of the FPL.

Low-Income Market Segmentation

- Elderly households represent 41% the low-income market, older households aged 40 – 59 comprise 32%, and younger households comprise 26% of the population.

- Home ownership status is one of the most important factors that influence how weatherization services are delivered. While 60% of the low-income market rents, only 29% of the participants are renters.

- Housing unit type is another important factor to consider for assessing market potential and targeting program services. While 34% of low-income households live in large multifamily buildings, 5% of single-family weatherization participants live in large multifamily buildings. Other large multifamily building residents are served through DHCD's multifamily energy efficiency programs.

Energy Burden and Program Impact

- Home energy expenditures differ by main heating fuel type. Households with electric main heat have the lowest average energy expenditures of $2,060 while households that heat with propane have the highest energy expenditures of $4,030. The percentage of heating bills paid by OHEP varies by heating fuel, averaging 87% of heating expenditures for fuel oil/kerosene heaters, 61% for electric heaters, 59% for propane heaters, and 42% for natural gas heaters.

- Income-eligible households pay 15% of their income towards home energy costs prior to receipt of OHEP benefits and 9% after accounting for average combined MEAP and EUSP benefits.

- Low-income households pay 66% of income towards shelter costs. Households in the Capital and Southern regions of the state pay the largest share of income towards shelter.

D. Summary of Findings and Recommendations

The following are some of the most important findings for the low-income market and the energy programs that serve them.

- **Diversity in the Low-Income Market** – Differences in income, demographics, housing, energy use, and energy affordability must be considered to most effectively target energy programs. These differences require macro-level state policies that promote equity in benefit distribution and micro-level targeting to address the localized needs of individual low-income market segments.

- **Program Participation by Home Ownership Rates** – Program participation differs substantially by county, demonstrating the importance of local subgrantee outreach and application assistance. Although renters comprise 60% of the low-income population, only 29% of weatherization participants were renters from fiscal years 2010 through 2017. However, renters are more likely to receive energy assistance.

- **Program Participation by Heating Fuel** – Households that heat with more expensive bulk fuels participate in energy assistance at a higher rate than households that heat with electric and gas; however, most counties where bulk fuels are used have lower participation in weatherization.

- **Program Participation by Demographic Factors** – Elderly households participate in energy assistance at a lower rate than the total low-income population, and data provided by DHCD indicate low participation in energy efficiency services among all vulnerable household types.

- **Housing and Energy Burden of Low-Income Households** – Although energy and shelter burden vary by income and demographics, the research shows, on average, low-income households have unaffordable energy bills and housing costs (i.e. they have energy burdens over 6% and shelter burdens over 30% of income). These high burdens are driven by income in some cases and by high energy and housing costs for other populations. Current programs appear to target energy burden reduction differently by market segment. For example, households that heat with more expensive propane have a smaller percentage of their bill paid than households that heat with fuel oil/kerosene.

- **Barriers to Accessing Energy Programs** –Agencies should account for their territory's specific needs to ensure that all households have access to program services. For example, language barriers are particularly high in Montgomery, Prince George's and Howard counties, indicating the need for language access services and community partners to support non-English speaking populations. Carroll County and the Upper/Mid Eastern Shore have a high percentage of elderly households who usually do not have access to the internet; agencies in these areas should prioritize traditional outreach and application services.

The following recommendations are made to target unmet energy needs within Maryland's low-income market.

- **Define Program Goals and Outcomes** – The study finds that Maryland's current energy assistance and energy efficiency programs play a critical role in making home energy more affordable for low-income households, but that more work is needed to bring household energy burden to an affordable level. As advocates, implementers, and policymakers discuss policies to better meet the energy needs of Maryland's low-income population, it is important to define what success looks like for the low-income market as a whole, and how outcomes should be distributed across the population.

- **Target Outreach to Populations Underutilizing Existing Programs** – Existing energy programs should evaluate factors that may influence differences in participation and target outreach to populations with unaffordable energy costs who underutilize current programs. Stakeholders serving the energy needs of Maryland's low-income population should consider best practices used by some local agencies and build on those strengths.

- **Address Differences in Home Energy Costs by Fuel Type** – OHEP benefits cover a larger share of home heating costs for households heating with fuel oil/kerosene and electricity than households heating with propane and natural gas. As a result, propane and gas-heated homes have higher net heating burdens. OHEP should review its allocation of benefits to improve equity across fuel types. DHCD's single family weatherization program serves a smaller share of the low-income population in counties where more households heat with expensive bulk fuels. Although DHCD cannot use EmPOWER funds in some parts of these counties, it can use DOE funds in these counties to maximize energy savings and target households with high energy costs.

- **Develop Strategies for Localized Issues** – We recommend that subgrantees be given the data, guidance, and resources needed to customize strategies to the needs and composition of the population they serve. Both DHCD and OHEP mandate that subgrantees develop annual plans that detail how they will perform their work. State agencies can leverage these plans to incorporate performance measurement. As part of this effort, states and subgrantees should consider the financial and staffing resources needed to achieve desired outcomes.

Agencies can build on existing program strengths to incrementally improve energy outcomes for low-income households in Maryland. Parallel to these efforts, we believe stakeholders should discuss the broader energy affordability challenges facing the low-income market to identify the appropriate resources and programming that are needed. Additional research and analysis should be conducted to specify desired outcomes and assess how policy approaches can facilitate these outcomes for the many segments of the low-income market.

I. Introduction

The Maryland Office of People's Counsel (OPC) is an independent state agency that advocates for the interests of residential utility customers. OPC participates in Public Service Commission and federal agency proceedings and legislative bill hearings, and provides information and assistance to customers and the public. The purpose of the Maryland Low-Income Market Characterization Study is to furnish data that can be used to understand the energy affordability issues faced by Maryland's low-income population and to inform the design of existing and future programs. By providing baseline data to OPC, state agencies, utilities, and other interested parties, the study seeks to inform the discussion of how to best meet the energy needs of low-income households.

A. Research Objectives

The research objectives for the Maryland Low-Income Market Characterization Study were as follows:

1. Document the composition and energy needs of households who are income-eligible for low-income energy programs.
2. Document how energy needs are being met by existing state programs for distinct segments of the low-income population.
3. Identify gaps in services and recommend how to build on existing program strengths to target unmet energy needs.

B. Data Sources

The study used two types of information to characterize the low-income market and the programs that serve them; public use data sets from surveys conducted by the U.S. Bureau of the Census and other Federal Statistical Agencies, and summary program data furnished by the Maryland Department of Housing & Community Development (DHCD) and the Maryland Department of Human Services, Office of Home Energy Programs (OHEP).

The public use data sets in the study include the following:

- The 2014-2016 American Community Survey (ACS)
- The 2009 Residential Energy Consumption Survey (RECS)

The study team used the public use data sets to develop customized statistics for Maryland's low-income population. Detailed methodologies of how the study team used these data sets are included in Appendices A and B.

Program data provided by OHEP and DHCD were used to document how existing state energy programs are serving low-income households. OHEP provided fiscal year 2017 data

on households served through its two main energy assistance benefits, the Maryland Energy Assistance Program (MEAP) and Electric Universal Service Program (EUSP). DHCD provided fiscal years 2010 – 2017 data on households served through the Weatherization Assistance Program. Funding sources for this program include the U.S. Department of Energy, Regional Greenhouse Gas Initiative, the Customer Investment Fund, and the Low Income Home Energy Assistance Program (LIHEAP). DHCD also provided data on households served through the EmPOWER Limited Income Energy Efficiency Program, but for this program only households served between 2012 and 2017 are included instead of 2010 through 2017 because DHCD assumed administration of EmPOWER only in 2012.

A single year file was used to assess energy assistance recipient characteristics because eligible households can receive benefits on an annual, recurring basis. An eight-year file was used to assess energy efficiency recipient characteristics because eligible households must wait a set number of years before they can receive additional services.[1]

OHEP and DHCD program participation data were compared to statistics on the income-eligible population to understand energy needs, how different segments of the low-income population are utilizing existing programs, and opportunities for targeting high-need households.

C. Market Segmentation Strategy

This section describes the segmentation strategy used to analyze the Maryland low-income population.

Population Segmentation

The study segments Maryland's low-income population by five main characteristics; income, demographics, housing, energy and utilities, and energy and shelter burden. Each characteristic is analyzed in detail and compared across income levels and geography. In addition, the study combines program data from OHEP and DHCD with data on the low-income population to understand how segments of the low-income market utilize existing energy assistance and energy efficiency programs. Table I-1 summarizes the research goals for the five main population characteristics analyzed.

[1] Homes receiving assistance through the Department of Energy Weatherization Assistance Program after September 30, 1994 are ineligible for re-weatherization. Homes receiving assistance through the EmPOWER Limited Income Energy Efficiency Program may not have been weatherized in the previous five years.

Table I-1
Population Characteristics Used in Survey Data Analysis

Characteristic	Research Goal
Income	What are the number and distribution of low-income households and how does participation in energy programs differ by income?
Demographics	Who is low-income and how are their energy needs being met based on differences in household composition?
Housing	What type of housing do low-income households live in and how does participation in energy programs differ by type of housing?
Energy and Utilities	What are the energy usage patterns and non-energy utility costs for low-income households?
Energy and Shelter Burden	How do energy and shelter burden differ among segments of the low-income population and how are energy programs targeting households with high energy burden?

Income Segmentation

Households with income at or below 200% of the federal poverty level (FPL) are defined as low-income for this study.[2] This income level reflects the maximum income eligibility to qualify for federal- and ratepayer-funded low-income energy efficiency programs in the state. A subset of the low-income population with income below 175% of the FPL qualifies for federal and ratepayer-funded energy assistance programs. Within that subpopulation, households receive different benefit amounts based upon their household income. Statistics that analyze energy assistance data only include households at or below 175% of the FPL and are distinguished as reporting on the OHEP-eligible or OHEP-recipient population.

When analyzing differences in characteristics by income, the study segments low-income households into five income ranges that correspond to households' eligibility and benefit levels for energy efficiency and assistance programs.

- 175% - 200% FPL – Income limit for ratepayer and federally funded low-income energy efficiency programs. Households at this income level do not qualify for state energy assistance programs.
- 151% - 175% FPL – Income limit for ratepayer and federally funded low-income energy assistance programs; households in this tier receive the lowest percentage of their energy bills paid by energy assistance benefits.[3]
- 111% - 150% FPL – Households in this tier receive the second lowest percentage of their energy bills paid by energy assistance benefits.
- 76% - 110% FPL – Households in this tier receive the second highest percentage of their energy bills paid by energy assistance benefits.

[2] Counts of the low-income population using publicly available survey sources are based on 2016 poverty guidelines established by the U.S. Department of Health & Human Services. Income data from 2014 and 2015 are adjusted to 2016 dollars.
[3]The Maryland Office of Home Energy Program allocates heating and electric benefits based off a percentage of estimated household energy costs. While benefit levels are primarily based on household income level, special categories exist for households with heat included in rent, subsidized housing, roomers/boarders, submetered, and subsidized submetered households. These households are excluded from the summary of benefit tiers.

- 0% - 75% FPL – Households in this tier receive the highest percentage of their energy bill paid by energy assistance benefits.

In addition to analyzing households by FPL, the study analyzed households by annual income.

Geographic Segmentation

The study segments Maryland's low-income population at the sub-state level into five state regions and 16 county and county groups to understand geographic differences in population characteristics. Table I-2 documents the counties included each of the five state regions and Table I-3 documents the county areas. The five state regions are intended to approximate the service territories of the largest regulated utilities in the state. However, it is important to note that utility service areas cut across county borders and do not align exactly with the regions used in the study.

Table I-2
State Regions Used in Survey Data Analysis

State Region	Counties Included in State Region	Approximated Utility Service Territory
Western	Garrett, Allegany, Washington, Frederick	Potomac Edison
Capital	Montgomery, Prince George's	PEPCO, Washington Gas
Central	Baltimore City, Baltimore County, Howard, Anne Arundel, Carroll, Harford	Baltimore Gas & Electric
Southern	Calvert, Charles, St. Mary's	Southern Maryland Electric Cooperative, Washington Gas
Eastern Shore	Cecil, Kent, Queen Anne's, Talbot, Caroline, Dorchester, Wicomico, Somerset, Worcester	Delmarva, Choptank, Easton

Table I-3
County and County Groups Used in Survey Data Analysis

State Region	Counties and County Groups
Western	Allegany & Garrett
	Washington
	Frederick
Capital	Montgomery
	Prince George's
Central	Baltimore City
	Baltimore County
	Anne Arundel
	Howard
	Harford
	Carroll
Southern	Charles
	St. Mary's & Calvert
Eastern Shore	Cecil
	Queen Anne's, Talbot, Caroline, Dorchester & Kent
	Wicomico, Worcester & Somerset

Profiles of Low-Income Market Segments

To provide additional context for how energy affordability needs vary by household type, the study developed five client profile groups. The client profiles show how household demographics, shelter costs, and energy costs for each group compare to the total low-income population. The five client profiles included in the study are:

- **Elderly One-Person Households on a Fixed Income of Social Security or Supplemental Security Income** – Low-income households age 60 years or older whose only source of income is Social Security and/or Supplemental Security Income (SSI).
- **Baltimore City Renters** – All low-income households in Baltimore City that do not own their homes.
- **Capital Region Working Poor** – All low-income households in the Capital Region (Montgomery and Prince George's County) where at least one household member earns income from wages, salaries, or self-employment.
- **Eastern Shore Households that Heat with Delivered Fuels** – All low-income households in the Eastern Region whose main heating source is fuel oil, kerosene, or propane.

- **Western Region Owners of Single-Family Homes** – All low-income households in the Western Region (Garrett, Allegany, Washington, and Frederick County) that live-in and own single-family homes.

D. Report Organization

The study consists of eight sections.

- Introduction
- Income Characteristics
- Demographic Characteristics
- Housing Characteristics
- Energy and Utilities
- Energy and Shelter Burden
- Profiles of Low-Income Market Segments
- Findings and Recommendations

II. Income Characteristics

This section analyzes the share of households that are low-income, differences in poverty by geographic area, participation in energy assistance and energy efficiency programs, and the sources of income for low-income households.

A. Poverty

Table II-1 shows there are 447,863 households in Maryland that are low-income (below 200% of the FPL), representing more than one in every five households (21%) in the state. These households are income-eligible for grant-based energy efficiency programs administered by DHCD[4]. A subset of this population, 382,993 households, are within income limits for energy assistance benefits administered by OHEP, set at 175% of the FPL.

In the Eastern Shore and Western regions of Maryland at least one in four households are low-income. However, the largest number of low-income households reside in the Washington D.C./Baltimore metropolitan corridor (Capital and Central regions). Half of the Maryland low-income population is concentrated in the Central region of the state, with an additional 25% residing in the Capital region.

Table II-1
Household Count and Average Income by Income Level
State Regions

State Region	Low-Income (0 – 200% FPL)			OHEP-Eligible (0 – 175% FPL)			All Households	
	#	%	Average Income	#	%	Average Income	#	Average Income
Capital	113,699	17%	$22,507	96,274	14%	$19,614	676,345	$116,181
Central	223,546	22%	$18,573	192,846	19%	$16,219	1,020,411	$96,491
Eastern Shore	45,546	27%	$20,185	39,258	23%	$17,975	171,111	$77,015
Southern	19,673	16%	$21,094	16,519	13%	$18,097	126,588	$106,909
Western	45,400	25%	$19,938	38,096	21%	$17,482	184,889	$84,612
State Total	447,863	21%	$19,985	382,993	18%	$17,459	2,179,344	$100,670

Source: ACS (2014 – 2016)

Tables II-2 and II-3 show the distribution of low-income households by income and FPL. One-quarter of the low-income population, or over 110,000 households, have an average income under $10,000 and over 90% of low-income households have income under $40,000. A total of 64,870 households, or 14% of the low-income population, has income

[4] The EmPOWER Maryland Low Income Energy Efficiency Program, Weatherization Assistance Program, and Enhanced Weatherization Program are administered by DHCD and each have income limits of 200% of the FPL. The Multifamily Energy Efficiency Improvement Program, also administered by DHCD, promotes energy efficiency in low-to-moderate multifamily housing and can serve buildings with an occupancy restriction up to 85% of Area Median Income.

between 176% and 200% of the FPL. These households are income-eligible for DHCD energy efficiency programs, but do not qualify for OHEP benefits. Many households have income well below the poverty line with limited financial means to pay their energy bills.

Table II-2
Distribution of Income for Low-Income Households

Annual Income	Low-Income Households		Average Income
	#	%	
Less than $10,000	111,918	25%	$4,662
$10,000 - <$20,000	134,636	30%	$14,917
$20,000 - <$30,000	108,554	24%	$24,165
$30,000 - <$40,000	54,479	12%	$34,009
$40,000 - <$50,000	21,754	5%	$44,379
$50,000 or More	16,522	4%	$59,234
All Low-Income Households	447,863	100%	$19,985

Source: ACS (2014 – 2016) / Totals may not sum to 100% due to rounding.

Table II-3
Households by Federal Poverty Level

Federal Poverty Level (FPL)	Number of Households	Percentage of Low-Income Households
0 – 75% FPL	123,960	28%
76 - 110% FPL	87,623	20%
111 - 150% FPL	102,141	23%
151 - 175% FPL	69,269	15%
176 - 200% FPL	64,870	14%
All Low-Income Households	447,863	100%

Source: ACS (2014 – 2016)

OHEP and DHCD partner with subgrantees to provide direct energy assistance and efficiency services in county areas.[5] The study examined how differences in population characteristics by county areas may impact the need for and targeting of energy programs at the county-level. Table II-4 demonstrates that there are significant differences in the concentration of low-income households at the county level. Whereas statewide, 21% of the population is low-income, this number is as high as 39% in Allegany and Garrett counties, and as low as 11% in Howard County. Although most counties with higher rates of low-income households are in rural parts of the state, Baltimore City stands out as an urban area

[5] Although DHCD uses subgrantees to support program delivery in 20 of Maryland's 24 counties, subgrantee work is supplemented by state weatherization contractors that perform under the EmPower Limited Income Energy Efficiency Program.

that also has a high share of households that are low-income (38%). Of the entire low-income population in Maryland, more than one in five reside in Baltimore City.

Table II-4
Households by Income Level
County Areas

County Area	Low-Income (0 – 200% FPL)		Non-Low-Income (200% + FPL)	
	#	%	#	%
Allegany & Garrett	15,339	39%	24,442	61%
Anne Arundel	28,808	14%	176,764	86%
Baltimore City	91,995	38%	147,357	62%
Baltimore County	63,699	20%	248,299	80%
Carroll	9,066	15%	51,326	85%
Cecil	8,352	22%	29,114	78%
Charles	8,503	15%	46,625	85%
Frederick	13,648	15%	75,962	85%
Harford	18,186	20%	74,074	80%
Howard	11,791	11%	99,046	89%
Montgomery	57,706	16%	312,180	84%
Prince George's	55,993	18%	250,466	82%
Queen Anne's, Talbot, Caroline, Dorchester, & Kent	17,012	25%	50,593	75%
St. Mary's & Calvert	11,170	16%	60,290	84%
Washington	16,412	30%	39,085	70%
Wicomico, Worcester, & Somerset	20,182	31%	45,858	69%
State Total	447,863	21%	1,731,481	79%

Source: ACS (2014 – 2016) / Totals may not sum to 100% due to rounding.

Table II-5 shows that the distribution of income among low-income households varies by county. In Baltimore City, a large share of low-income households (35%) are below 75% of the FPL. These households may be at a greater risk for energy crises such as utility disconnections. Counties such as Prince George's, Frederick, and Baltimore County have a higher than average share of households between 176% and 200% of the FPL. Households at this income-level are ineligible for OHEP energy assistance benefits but still may qualify for DHCD energy efficiency services. Because households over the income eligibility limit for OHEP must apply directly for DHCD energy efficiency services (OHEP-eligible households apply with their energy assistance application), DHCD may consider investing in more targeted outreach and application assistance in these counties to provide greater

assurance that higher income households with high energy usage are informed of energy efficiency opportunities.[6]

Table II-5
Number and Percentage of Households by Federal Poverty Level
County Areas

County Area	Number and Percentage of Households by Federal Poverty Level (FPL)											
	0 – 75% FPL		76 – 110% FPL		111 – 150% FPL		151 - 175% FPL		176 – 200% FPL		Total	
	#	%	#	%	#	%	#	%	#	%	#	%
Allegany & Garrett	3,904	25%	2,988	19%	3,695	24%	2,463	16%	2,289	15%	15,339	100%
Anne Arundel	8,160	28%	4,446	15%	7,034	24%	4,640	16%	4,529	16%	28,809	100%
Baltimore City	32,387	35%	19,891	22%	18,267	20%	11,791	13%	9,658	11%	91,994	100%
Baltimore County	16,877	26%	11,790	19%	14,117	22%	10,329	16%	10,586	17%	63,699	100%
Carroll	1,770	20%	2,019	22%	2,263	25%	1,457	16%	1,558	17%	9,067	100%
Cecil	1,833	22%	1,900	23%	1,984	24%	1,379	17%	1,256	15%	8,352	100%
Charles	2,233	26%	1,839	22%	1,822	21%	1,201	14%	1,408	17%	8,503	100%
Frederick	3,196	23%	3,053	22%	2,960	22%	1,968	14%	2,472	18%	13,649	100%
Harford	5,037	28%	3,660	20%	3,604	20%	3,149	17%	2,737	15%	18,187	100%
Howard	3,074	26%	2,660	23%	2,800	24%	1,626	14%	1,632	14%	11,792	100%
Montgomery	14,708	25%	10,653	18%	15,444	27%	9,326	16%	7,574	13%	57,705	100%
Prince George's	14,017	25%	9,606	17%	13,040	23%	9,480	17%	9,851	18%	55,994	100%
Queen Anne's, Talbot, Caroline, Dorchester, & Kent	4,370	26%	3,249	19%	4,260	25%	3,177	19%	1,956	12%	17,012	100%
St. Mary's & Calvert	3,203	29%	2,070	19%	2,558	23%	1,593	14%	1,745	16%	11,169	100%
Washington	3,912	24%	3,205	20%	4,182	25%	2,572	16%	2,542	15%	16,413	100%
Wicomico, Worcester, & Somerset	5,281	26%	4,596	23%	4,112	20%	3,117	15%	3,076	15%	20,182	100%
State Total	123,960	28%	87,623	20%	102,141	23%	69,269	15%	64,870	14%	447,863	100%

Source: ACS (2014 – 2016) / Totals may not sum to 100% due to rounding.

Through a single application, the OHEP office administers two benefits that target home heating and electric bills. While both benefits are available to households up to 175% of the FPL, non-income eligibility requirements differ. Heating benefits, referred to as the

[6] Maryland Department of Housing and Community Development DHCD) policies permit agencies to use proof of OHEP participation to qualify households for limited income energy efficiency services; since households between 176% and 200% of the FPL do not quality for OHEP, they must provide a separate application to participate in DHCD energy efficiency services.

Maryland Energy Assistance Program (MEAP), do not require households pay their heating bill directly to receive a benefit; however, households in subsidized housing with heat included in rent are ineligible. Electric benefits, referred to as the Electric Universal Service Program (EUSP), are only available to households that have an electric bill in the name of the OHEP applicant.

Table II-6 shows what percentage of households that are income-eligible for OHEP receive MEAP and EUSP benefits. While differences in participation between MEAP and EUSP benefits are minimal, participation by county differs significantly. Statewide, approximately one-quarter of income-eligible households in Maryland receive energy assistance. Participation ranges from as high as 46% in Allegany and Garrett counties to as low as 15% in Montgomery County. Agency-by-agency differences in participation suggest the need to target OHEP outreach in areas such as Montgomery and Prince George's County, where there are large numbers of income-eligible households but low participation compared to other counties. However, as is discussed later in the report, it is important to note that not all income-eligible households qualify for OHEP due to program eligibility criteria and the need for energy assistance may differ by county.

Table II-6
OHEP Participation Rates[7]
County Areas

County Areas	OHEP Income-Eligible Households	MEAP Recipients	EUSP Recipients	MEAP Participation	EUSP Participation
Allegany & Garrett	13,050	5,943	5,970	46%	46%
Anne Arundel	24,279	4,679	4,354	19%	18%
Baltimore City	82,337	22,893	21,497	28%	26%
Baltimore County	53,113	12,103	11,812	23%	22%
Carroll	7,509	2,148	2,098	29%	28%
Cecil	7,096	2,768	2,692	39%	38%
Charles	7,095	2,298	2,248	32%	32%
Frederick	11,176	2,907	2,877	26%	26%
Harford	15,449	4,247	4,134	27%	27%
Howard	10,159	3,283	3,203	32%	32%
Montgomery	50,132	7,303	6,955	15%	14%
Prince George's	46,142	8,389	8,823	18%	19%
Queen Anne's, Talbot, Caroline, Dorchester, & Kent	15,057	6,628	6,504	44%	43%
St. Mary's & Calvert	9,425	3,092	3,002	33%	32%

[7] Participation rates based on FY 2017 OHEP data.

County Areas	OHEP Income-Eligible Households	MEAP Recipients	EUSP Recipients	MEAP Participation	EUSP Participation
Washington	13,870	3,147	3,170	23%	23%
Wicomico, Worcester, & Somerset	17,105	7,108	7,097	42%	41%
State Total	382,993	98,936	96,436	26%	25%

Source: ACS (2014 – 2016) / FY 2017 OHEP Data File

Table II-7 shows that households with lower income participate in OHEP at a higher rate than households at the program's upper-income limits. The data indicate the program is effectively targeting households with less income to pay energy bills. Low-income households close to the income limits for the program may be less likely to know they qualify for assistance or have a less urgent need to obtain energy assistance.

Table II-7
OHEP Participation Rates by Federal Poverty Level
County Areas

County Area	Federal Poverty Level (FPL)									
	0 - 75% FPL		76 - 110% FPL		111 - 150% FPL		151 - 175% FPL		All Low-Income Households	
	EUSP	MEAP	EUSP	MEAP	EUSP	MEAP	EUSP	MEAP	EUSP	MEAP
Allegany & Garrett	48%	48%	59%	58%	45%	45%	27%	27%	46%	46%
Anne Arundel	20%	21%	25%	27%	16%	17%	11%	12%	18%	19%
Baltimore City	30%	32%	28%	30%	24%	26%	15%	16%	26%	28%
Baltimore County	26%	27%	27%	28%	21%	22%	12%	13%	22%	23%
Carroll	34%	34%	30%	30%	28%	29%	18%	19%	28%	29%
Cecil	55%	56%	39%	40%	36%	37%	18%	18%	38%	39%
Charles	32%	33%	34%	35%	33%	34%	25%	25%	32%	32%
Frederick	25%	26%	26%	26%	29%	29%	21%	22%	26%	26%
Harford	27%	26%	31%	32%	32%	34%	15%	17%	27%	27%
Howard	44%	45%	30%	31%	25%	26%	21%	22%	32%	32%
Montgomery	18%	19%	19%	21%	10%	11%	8%	8%	14%	15%
Prince George's	24%	23%	22%	21%	17%	16%	12%	11%	19%	18%
Queen Anne's, Talbot, Caroline, Dorchester, & Kent	44%	45%	63%	64%	44%	45%	21%	21%	43%	44%
St. Mary's & Calvert	30%	31%	43%	44%	34%	35%	18%	19%	32%	33%
Washington	23%	22%	32%	32%	22%	23%	12%	12%	23%	23%

County Area	Federal Poverty Level (FPL)									
	0 - 75% FPL		76 - 110% FPL		111 - 150% FPL		151 - 175% FPL		All Low-Income Households	
	EUSP	MEAP	EUSP	MEAP	EUSP	MEAP	EUSP	MEAP	EUSP	MEAP
Wicomico, Worcester, & Somerset	45%	45%	48%	48%	46%	46%	20%	20%	41%	42%
State Total	29%	29%	31%	31%	24%	24%	14%	15%	25%	26%

Source: ACS (2014 – 2016) / FY 2017 OHEP Data File

DHCD's Housing and Building Energy Programs office administers limited-income single-family and multifamily weatherization programs. DHCD's single-family weatherization program serves low-income households up to 200% of the FPL and its multifamily program serves households up to 85% Area Median Income. This study analyzed DHCD's single-family weatherization program to understand what share of the low-income population is served.

Although DHCD's single-family weatherization program primarily targets single-family housing, the program also serves multi-unit dwellings that can be modeled with a single-family audit procedure and do not have common areas or shared HVAC systems.[8] Only a small number of large multifamily residents have been served through DHCD's single-family program. These units represent only 5% of households served (However, multifamily buildings are also served through DHCD's multifamily energy efficiency programs). When analyzing households eligible for single-family weatherization, the study prepared statistics that both excluded and included low-income households in large multifamily buildings.

Tables II-8 and II-9 shows how many households are eligible for and participate in DHCD's single family weatherization program when excluding and including large multifamily housing.[9] The analyses include households served by DHCD's single family weatherization program from fiscal years 2010 to 2017. In both analyses, program participation is higher in Howard, Baltimore City, Allegany and Garrett counties and lower in Washington, Carroll and Baltimore counties. Excluding multifamily housing, DHCD served 9% of income-eligible households from 2010 to 2017 and served 6% of income-eligible households when including multifamily housing.

[8] These households may qualify for assistance through DHCD's multifamily weatherization program.

[9] Low-income households in small multifamily housing (2-4 units) are included in the count of eligible households. However, some small multifamily housing units may not meet DHCD single family weatherization audit requirements. In other cases, DHCD policy permits weatherization of buildings with households over-income for weatherization, as long as at least 50% of the units are occupied by income-eligible persons.

Table II-8
Single-Family Weatherization Participation Rates – Excluding Large Multifamily Housing[10]
FY 2010 – FY 2017

County Areas	Single-Family Weatherization		
	Eligible Households	Recipients	Participation
Allegany & Garrett	12,397	1,581	13%
Anne Arundel	21,166	1,692	8%
Baltimore City	64,638	8,247	13%
Baltimore County	39,979	2,728	7%
Carroll	7,346	479	7%
Cecil	6,531	533	8%
Charles	6,885	478	7%
Frederick	9,832	908	9%
Harford	12,918	1,000	8%
Howard	6,255	910	15%
Montgomery	26,112	2,226	9%
Prince George's	29,802	3,062	10%
Queen Anne's, Talbot, Caroline, Dorchester, & Kent	14,127	1,038	7%
St. Mary's & Calvert	8,697	717	8%
Washington	13,286	688	5%
Wicomico, Worcester, & Somerset	16,147	1,200	7%
State Total	296,119	27,486	9%

Source: ACS (2014 – 2016) / FY 2010 – FY 2017 DHCD Data File

[10] Counts of households served by housing unit type provided by DHCD differed from separately reported counts of total households served. The study calculated the percentage of households served in large multifamily housing for each county and multiplied this factor by the count of households served by county. This amount was subtracted from the total count of recipients for each county to calculate the number of recipients excluding large multifamily housing.

Table II-9
Single-Family Weatherization Participation Rates – Including Large Multifamily Housing
FY 2010 – FY 2017

County Areas	Single-Family Weatherization		
	Eligible Households	Recipients	Participation
Allegany & Garrett	15,339	1,863	12%
Anne Arundel	28,808	1,696	6%
Baltimore City	91,995	8,431	9%
Baltimore County	63,699	3,058	5%
Carroll	9,066	479	5%
Cecil	8,352	533	6%
Charles	8,503	483	6%
Frederick	13,648	943	7%
Harford	18,186	1,002	6%
Howard	11,791	912	8%
Montgomery	57,706	2,395	4%
Prince George's	55,993	3,075	5%
Queen Anne's, Talbot, Caroline, Dorchester, & Kent	17,012	1,139	7%
St. Mary's & Calvert	11,170	894	8%
Washington	16,412	690	4%
Wicomico, Worcester, & Somerset	20,182	1,210	6%
State Total	447,863	28,803	6%

Source: ACS (2014 – 2016) / FY 2010 – FY 2017 DHCD Data File

Table II-10 shows how participation in weatherization differs by income. Participation is highest among low-income households between 76% and 125% of the FPL. Households between 150% and 200% of the FPL have the lowest participation in weatherization. Because a portion of this market segment has income above 175% of the FPL, they cannot be qualified for weatherization through an OHEP application and may be less likely to be aware of and apply for weatherization services.[11] As will be discussed in ensuing analysis, households between 0% and 75% of the FPL may participate at a lower rate than households with slightly more income because these households are more likely to rent their homes and have deferred maintenance issues that disqualify them from weatherization.

[11] Data provided by DHCD grouped weatherization recipients by poverty ranges and did not permit the study to separately analyze recipients between 175% and 200% of the FPL.

Table II-10
Single-Family Weatherization Participation by Federal Poverty Level – Excluding Large Multifamily Housing
FY 2010 – FY 2017

State Region	Federal Poverty Level (FPL)					
	0 - 75% FPL	76 - 100% FPL	101 - 125% FPL	126 - 150% FPL	151 - 200% FPL	All Low-Income Households
Allegany & Garrett	13%	22%	15%	16%	7%	13%
Anne Arundel	6%	11%	8%	7%	10%	8%
Baltimore City	10%	13%	17%	14%	14%	13%
Baltimore County	7%	11%	8%	8%	5%	7%
Carroll	8%	8%	9%	7%	4%	7%
Cecil	8%	12%	9%	12%	5%	8%
Charles	7%	8%	10%	8%	5%	7%
Frederick	8%	13%	7%	14%	8%	9%
Harford	7%	12%	12%	10%	4%	8%
Howard	17%	17%	17%	15%	9%	15%
Montgomery	13%	12%	14%	4%	5%	9%
Prince George's	10%	11%	11%	10%	10%	10%
Queen Anne's, Talbot, Caroline, Dorchester, & Kent	5%	14%	12%	8%	5%	7%
St. Mary's & Calvert	12%	12%	7%	7%	4%	8%
Washington	5%	8%	6%	5%	4%	5%
Wicomico, Worcester, & Somerset	9%	10%	11%	9%	3%	7%
State Total	9%	12%	11%	9%	7%	9%

Source: ACS (2014 – 2016) / FY 2010 – FY 2017 DHCD Data File

B. Sources of Income

The study assessed how differences in income sources for low-income households may impact participation in energy assistance and energy efficiency programs. Table II-11 examines what type of income households have at different income levels. Income sources are grouped into four categories as defined below:

- Wages – salaries, wages, and self-employment income

- Retirement Benefits – Social Security income and retirement, survivor, or disability pensions
- Public Assistance Benefits – public assistance, welfare payments, or Supplemental Security Income
- Other Sources of Income – income from any other income source, such as Veterans payments, unemployment insurance, child support, and alimony

Nearly half (46%) of low-income households receive retirement benefits compared to 33% of non-low-income households. Households that rely on fixed income from retirement benefits are likely to need ongoing energy assistance. Over half (56%) of low-income households receive wages, with households at higher income ranges more likely to earn wages than those with lower income. These households have greater potential to increase their income.

Table II-11
Sources of Income by Income Level[12]

Federal Poverty Level (FPL)	Wages	Retirement Benefits	Public Assistance Benefits	Other Sources of Income
Low-Income Households	56%	46%	6%	11%
0 – 75% FPL	41%	36%	10%	10%
76% - 110% FPL	53%	56%	7%	11%
111% - 150% FPL	63%	50%	5%	11%
151% - 175% FPL	65%	49%	4%	10%
176% - 200% FPL	70%	46%	3%	13%
Non-Low-Income Households	88%	33%	1%	11%
All Households	81%	36%	2%	11%

Source: ACS (2014 – 2016)

In Fiscal Year 2019, the Maryland Office of Home Energy Programs (OHEP) is implementing a streamlined recertification process for seniors and disabled households with fixed incomes. Households will be mailed a letter with prior year OHEP application information and, if they certify that no information has changed, they can sign a form to have their benefit eligibility assessed. Table II-12 analyzes the share of the population income-eligible for OHEP that receive retirement benefits as their only source of income. The data shows that close to one-third of households income-eligible for OHEP only receive fixed income from retirement benefits and could benefit from this streamlined recertification process.

[12] Because households may have multiple forms of income, totals can exceed 100%.

Table II-12
Households Income-Eligible for OHEP Only Receiving Retirement Benefits by Income-Level

Federal Poverty Level	Elderly Households	Non-Elderly Households	Total Households	% OHEP Income-Eligible Population
0 – 75% FPL	23,208	10,149	33,357	27%
76% - 110% FPL	27,053	8,125	35,178	40%
111% - 150% FPL	29,375	3,662	33,037	32%
151% -175% FPL	19,251	1,708	20,959	30%
All Households Income-Eligible for OHEP	98,887	23,644	122,531	32%

Source: ACS (2014 – 2016)

Table II-13 examines the number of weeks worked per year by households with wages[13]. The household member with the greatest number of weeks of employment is analyzed for each household. The data show that whereas 95% of non-low-income households with wages work at least 40 weeks per year, only 76% of low-income households do so. Because income-eligibility for energy assistance and weatherization programs are determined based on the past 30 days of income, household eligibility for energy programs may change throughout the year based on the number of weeks worked by wage-earners in the 30 days prior to application.

Table II-13
Weeks Worked Per Year by Income Level

Weeks Worked	Federal Poverty Level (FPL)		
	Low-Income (0 – 200% FPL)	Non-Low-Income (200% + FPL)	All Households
50 to 52 Weeks	67%	89%	86%
40 to 49 Weeks	9%	6%	6%
27 to 39 Weeks	8%	2%	3%
14 to 26 Weeks	6%	1%	2%
13 Weeks or Less	9%	1%	2%
All Households	100%	100%	100%

Source: ACS (2014 – 2016)

C. *Key Findings and Recommendations*

More than one-in-five households in Maryland are low-income. Within the low-income population, different income groups have very different capacities to pay their energy bills. Key findings and recommendations include:

[13]Households where the individual with the highest earnings is a student are excluded from the analysis.

- One-quarter of low-income households have an annual income under $10,000. These households are likely to face significant challenges managing their energy costs and require assistance from public programs.
- 64,870 households, or 14% of the low-income population, have income between 176% and 200% of the FPL. These households are over-income for energy assistance benefits and need to directly apply for weatherization services.
- Over half of low-income households earn wages, and households at higher income levels are more likely to work. Nearly one-third of low-income households only receive retirement income. These households are likely to need assistance with their energy costs on an on-going basis.

The analysis shows important differences in income and participation in energy programs by geography. Key findings include:

- In rural parts of the state and Baltimore City, a higher share of the population is low-income. However, most low-income households live in the Capital and Central regions of the state. One-in-five low-income households are located in Baltimore City.
- One-quarter of income-eligible households receive energy assistance. Participation varies from as high as 46% of the income-eligible population in Allegany and Garrett counties to as low as 15% in Montgomery County. Where the varying participation rates are not predominately a result of program-eligibility issues and need, OHEP should develop strategies to improve outreach and increase awareness of the program in areas with low participation.
- Weatherization participation differs by county and income level. Households between 150% and 200% of the FPL have the lowest participation in weatherization. Households with income above 175% of the FPL must directly apply to DHCD for assistance, whereas other households are categorically eligible based on receipt of OHEP benefits. DHCD should work with subgrantees to increase participation in weatherization services in areas with low participation, including Washington, Carroll, and Baltimore counties.

III. Demographic Characteristics

This section of the report furnishes information on demographic characteristics that influence need for and participation in low-income energy programs, including household composition, vulnerable populations, language barriers, and internet access.

A. Household Composition

Table III-1 shows the distribution of low-income households by age and the presence of children. Elderly households represent the largest share of the low-income population (41%).[14] Older households aged 40 to 59 comprise 32% of the population and younger households comprise 26% of the population.

Household income differs significantly based on household composition. Elderly couples have nearly twice as much income as elderly individuals. Similarly, both older and younger households with children have approximately twice as much income as such households without children. Elderly individuals comprise the largest share of the low-income population and have the lowest average income; highlighting the need to provide targeted outreach to this vulnerable population to ensure that energy-challenged households within this population have access to programs that improve energy affordability.

Table III-1
Head of Household Type in Low-Income Households

Head of Household Type	Number of Households	Percentage of Low-Income Households	Average Income
Elderly Individual	109,911	25%	$12,828
Elderly Couple	74,010	17%	$24,461
Older without Children (40-59)	71,252	16%	$14,417
Older with Children (40-59)	72,238	16%	$29,723
Younger without Children (<40)	42,247	9%	$13,386
Younger with Children (<40)	78,205	17%	$25,448
All Low-Income Households	447,863	100%	$19,985

Source: ACS (2014 – 2016) / Totals may not sum to 100% due to rounding.

Table III-2 shows there are significant differences in low-income household composition at the county level. Elderly households represent a large share of the low-income population in Carroll County (59%) and the Mid/Upper Shore area (51%).[15] A larger share of low-income households have children in Cecil (42%), Prince George's (41%), Howard (40%), Charles (40%), and Montgomery (39%). Agencies serving different parts of the state should

[14] A household is considered elderly if the head of household is 60 or older.
[15] Due to limitations in ACS data, Queen Anne's, Talbot, Caroline, Dorchester and Kent counties are combined into a single county area of analysis. This area is referred to as the "Mid/Upper Shore area" in this and ensuing analyses.

adapt their customer engagement strategies according to the specific composition of the households they serve. For example, elderly households may have difficulty with transportation to apply at a local agency whereas working households with children may need agencies to have staff available outside of typical working hours.

Table III-2
Head of Household Type in Low-Income Households
County Areas

County Area	Elderly		Non-Elderly, No Children		Non-Elderly Children	
	#	%	#	%	#	%
Allegany & Garrett	6,542	43%	4,608	30%	4,188	27%
Anne Arundel	13,216	46%	7,132	25%	8,460	29%
Baltimore City	34,145	37%	30,835	34%	27,015	29%
Baltimore County	28,971	45%	14,905	23%	19,823	31%
Carroll	5,348	59%	1,618	18%	2,100	23%
Cecil	3,199	38%	1,648	20%	3,504	42%
Charles	3,578	42%	1,508	18%	3,418	40%
Frederick	5,583	41%	3,757	28%	4,308	32%
Harford	8,910	49%	3,749	21%	5,527	30%
Howard	4,721	40%	2,353	20%	4,717	40%
Montgomery	22,129	38%	12,870	22%	22,706	39%
Prince George's	18,473	33%	14,318	26%	23,203	41%
Queen Anne's, Talbot, Caroline, Dorchester, & Kent	8,689	51%	3,308	19%	5,015	29%
St. Mary's & Calvert	4,702	42%	2,392	21%	4,076	36%
Washington	7,686	47%	3,660	22%	5,066	31%
Wicomico, Worcester, & Somerset	8,027	40%	4,837	24%	7,317	36%
State Total	183,921	41%	113,498	25%	150,444	34%

Source: ACS (2014 – 2016) / Totals may not sum to 100% due to rounding.

Table III-3 displays household size by income level for low-income and non-low-income households. The data shows that low-income households are more likely to live alone than non-low-income households (40% compared to 24%), and one-person households are more likely to experience severe poverty. Whereas 48% of the population that is between 0% and 75% of the FPL lives alone, 30% of the population between 176% and 200% does so. Although individuals living alone may live in smaller housing and potentially use less

energy on average than larger households, they may have as great a need for energy assistance and energy efficiency services because they tend to have lower income.

Table III-3
Household Size by Income Level

Federal Poverty Level (FPL)	Number of Household Members						
	1	2	3	4	5	6 or More	Total
All Low-Income Households	40%	23%	14%	11%	7%	6%	100%
0 – 75% FPL	48%	20%	13%	8%	6%	5%	100%
76 - 110% FPL	44%	20%	12%	10%	8%	6%	100%
111 - 150% FPL	36%	22%	15%	13%	7%	7%	100%
151 - 175% FPL	37%	26%	13%	10%	6%	7%	100%
176 - 200% FPL	30%	28%	15%	12%	8%	6%	100%
Non-Low-Income Households	24%	35%	18%	14%	6%	3%	100%
All Households	27%	32%	17%	14%	6%	4%	100%

Source: ACS (2014 – 2016) / Totals may not sum to 100% due to rounding.

B. *Vulnerable Populations*

State energy assistance and energy efficiency programs provide guidance to local agencies to prioritize vulnerable populations, defined as households with a child under six, a disabled individual, or an elderly individual 60 years or older. These households are more sensitive to temperature extremes, may be more susceptible to health and safety concerns from a loss of energy service, and therefore are prioritized in program outreach.

Table III-4 shows that 72% of low-income households have at least one vulnerable member. Nearly 170,000 households, or 38% of the low-income market, have an individual with a disability. A portion of this population may qualify for additional utility service disconnection protections if they have a serious illness or rely on utilities for life-supporting equipment.[16] In recent years, OPC has partnered with Baltimore Gas & Electric, the Cancer Support Foundation, and OHEP to identify individuals with critical medial illnesses and provide expedited assistance to continue or restore utility service. Utility companies should work with local energy assistance agencies and community partners to document the status of these households, develop data sharing and referral processes, and provide expedited assistance.

[16] Per the Code of Maryland Regulations, Section 20.31.03.01, electric or gas service may not be terminated for an initial period of 30 days beyond the scheduled date of service termination when the termination will aggravate an existing serious illness or prevent the use of life-support equipment of any occupants of the premise.

Table III-4
Low-Income Households with a Vulnerable Member

Vulnerable Population Type	Number of Households	Percentage of Low-Income Households
Child Under Six	82,727	18%
Disabled Individual[17]	168,107	38%
Elderly Individual (60+)	183,921	41%
Any Vulnerable Member	321,681	72%

Source: ACS (2014 – 2016)

Table III-5 shows how vulnerable population composition differs by county. Counties surrounding Washington D.C. (Prince George's, Howard, Montgomery, and Charles) have the largest share of households with a child under six, whereas Western Maryland (Allegany, Garrett, and Washington) have the largest share of disabled households. Carroll County and the Upper/Mid Eastern Shore have particularly large shares of elderly households. In every county in the state, at least two-thirds of low-income households have a vulnerable member. The data show that at the state level, energy programs do not need to target specific geographic areas to reach vulnerable households; however, subgrantees should tailor local outreach based on the composition of their county's vulnerable population.

Table III-5
Low-Income Households with a Vulnerable Household Member
County Areas

County Area	Vulnerable Population Type							
	Child Under Six		Disabled Individual		Elderly Individual (60+)		Any Vulnerable Member	
	#	%	#	%	#	%	#	%
Allegany & Garrett	1,947	13%	7,609	50%	6,542	43%	11,878	77%
Anne Arundel	4,926	17%	10,312	36%	13,216	46%	21,232	74%
Baltimore City	14,687	16%	42,148	46%	34,145	37%	66,307	72%
Baltimore County	10,641	17%	23,737	37%	28,971	45%	46,838	74%
Carroll	1,055	12%	3,556	39%	5,348	59%	7,105	78%
Cecil	1,494	18%	3,146	38%	3,199	38%	5,861	70%
Charles	1,821	21%	2,043	24%	3,578	42%	5,851	69%
Frederick	1,971	14%	4,855	36%	5,583	41%	9,253	68%
Harford	3,266	18%	6,878	38%	8,910	49%	14,382	79%

[17] ACS classifies disability status based on answers to questions related to hearing and visual impairments, and questions related to difficulties with certain mental, emotional, and physical activities. This definition was supplemented using information on the receipt of Supplemental Security Income only available to disabled individuals.

County Area	Vulnerable Population Type							
	Child Under Six		Disabled Individual		Elderly Individual (60+)		Any Vulnerable Member	
	#	%	#	%	#	%	#	%
Howard	2,551	22%	3,389	29%	4,721	40%	7,821	66%
Montgomery	12,240	21%	16,113	28%	22,129	38%	38,293	66%
Prince George's	14,556	26%	17,353	31%	18,473	33%	38,090	68%
Queen Anne's, Talbot, Caroline, Dorchester, & Kent	2,507	15%	6,885	40%	8,689	51%	13,152	77%
St. Mary's & Calvert	2,255	20%	4,646	42%	4,702	42%	8,043	72%
Washington	2,869	17%	8,054	49%	7,686	47%	13,175	80%
Wicomico, Worcester, & Somerset	3,941	20%	7,383	37%	8,027	40%	14,401	71%
State Total	82,727	18%	168,107	38%	183,921	41%	321,681	72%

Source: ACS (2014 – 2016)

Table III-6 shows the participation rate of vulnerable households for OHEP's heating assistance benefit, MEAP. A slightly higher share of vulnerable households participate in OHEP than the total income-eligible population. However, elderly households participate at a lower rate (23%) than households with a child under six (33%). OHEP can improve participation among vulnerable households by investing in outreach efforts targeted towards senior citizens. Furthermore, the data reinforces the potential value of OHEP's streamlined recertification pilot for repeat elderly and disabled applicants on fixed incomes.

Table III-6
MEAP Participation for Households with a Vulnerable Member

Vulnerable Population Type	OHEP Income-Eligible Households	MEAP Recipients	MEAP Participation Rate
Child Under Six	71,163	23,167	33%
Disabled Individual[18]	146,596	37,876	26%
Elderly Individual (60+)	155,877	35,897	23%
Any Vulnerable Member	276,971	75,676	27%
All OHEP Income-Eligible Households	382,993	98,936	26%

Source: ACS (2014 – 2016) / FY 2017 OHEP Data File

Tables III-7a and III-7b document the participation rate of vulnerable households for DHCD's weatherization program, excluding large multifamily housing. Data for all DHCD weatherization units served show that whereas 9% of low-income households participate in

[18] ACS classifies disability status based on answers to questions related to hearing and visual impairments, and questions related to difficulties with certain mental, emotional, and physical activities. This definition was supplemented using information on the receipt of Supplemental Security Income only available to disabled individuals.

weatherization, only 5% of low-income households with a vulnerable member participate. DHCD expressed concern about the comprehensiveness of reporting on vulnerable households and recommended use of DOE-funded project data as a proxy for all households served. When applying the percentage of households served who are vulnerable for DOE-funded units to all DHCD weatherization units, participation of households with a vulnerable population increased from 5% to 7%, as compared to 9% for the overall low-income population. The data suggest that DHCD should increase efforts to correctly categorize household vulnerability characteristics and to reach vulnerable households.

Table III-7a
Weatherization Participation for Households with a Vulnerable Member – All DHCD Data
Excluding Large Multifamily Housing
FY 2010 – FY 2017

Vulnerable Population Type	Income-Eligible Households	Weatherization Recipients	Weatherization Participation Rate
Child Under Six	56,620	2,883	5%
Disabled Individual[19]	112,190	3,174	3%
Elderly Individual (60+)	124,582	6,533	5%
Any Vulnerable Member	216,091	10,169	5%
All Low-Income Households	296,119	27,486	9%

Source: ACS (2014 – 2016) / FY 2010 - 2017 DHCD Data File

Table III-7b
Weatherization Participation for Households with a Vulnerable Member – DOE Data
Excluding Large Multifamily Housing
FY 2010 – FY 2017

Vulnerable Population Type	% of DOE Recipients	Weatherization Recipients	Income-Eligible Households	Weatherization Participation Rates
Child Under Six	10%	2,742	56,620	5%
Disabled Individual	18%	5,058	112,190	5%
Elderly Individual	38%	10,507	124,582	8%
Any Vulnerable Member	54%	14,731	216,091	7%
All Low-Income Households	100%	27,486	296,119	9%

Source: ACS (2014 – 2016) / FY 2010 - 2017 DHCD Data File

Table III-8 provides information on the number of veterans in Maryland, how many are disabled, and how many receive health care through Veterans Affairs.[20] Of the 374,577

[19] ACS classifies disability status based on answers to questions related to hearing and visual impairments, and questions related to difficulties with certain mental, emotional, and physical activities. This definition was supplemented using information on the receipt of Supplemental Security Income only available to disabled individuals.
[20] All individuals with a Veteran Period of Service recorded in the American Community Survey, or a VA disability rating greater than zero percent are marked as veterans. All veterans with a VA disability rating greater than zero percent are coded as disabled veterans.

veterans living in Maryland, 47,862 are low-income. Over 90% of disabled veterans are not low-income and do not qualify for energy assistance or energy efficiency grants.

Table III-8
Number of Veterans by Income Level

Federal Poverty Level (FPL)	Number of Veterans	Number of Disabled Veterans	Number Receiving VA Health Care
All Low-Income Households	47,862	5,376	18,748
0 – 75% FPL	10,525	1,243	4,321
76% - 110% FPL	6,778	850	3,104
111% - 150% FPL	11,739	841	3,980
151% - 175% FPL	9,631	1,373	3,628
176% - 200% FPL	9,190	1,068	3,714
Non-Low-Income Households	326,715	57,579	84,785
All Maryland Households	374,577	62,955	103,533

Source: ACS (2014 – 2016)

C. *Race/Ethnicity and Language Barriers*

Programs serving low-income households may need to adapt application, intake, and outreach procedures based on the race/ethnicity and language spoken in the communities served. Table III-9 shows the race/ethnicity of households in Maryland. While White non-Hispanic households represent almost one-half of the low-income households, Black households represent a significant share of these households as well. Hispanic and Asian households comprise a smaller share of the low-income population.

Table III-9
Race/Ethnicity of Households by Income Level

Race and Ethnicity	Federal Poverty Level (FPL)		
	Low-Income (0 – 200% FPL)	Non-Low-Income (200% + FPL)	All Households
White Non-Hispanic	45%	61%	57%
Black Non-Hispanic	39%	26%	29%
Hispanic	9%	6%	6%
Asian	5%	5%	5%
Other	2%	2%	2%
All Low-Income Households	100%	100%	100%

Source: ACS (2014 – 2016) / Totals may not sum to 100% due to rounding.

County-level analysis shows that race and ethnicity concentrations vary across the state. Table III-10 shows the vast majority of the low-income population in Allegany, Garrett, and

Carroll counties is White non-Hispanic, whereas the majority of low-income households in Baltimore City, Prince George's, and Charles counties are Black. Prince George's and Montgomery counties have particularly large Hispanic populations, and Howard and Montgomery counties have sizeable low-income Asian communities.

Table III-10
Race/Ethnicity of Low-Income Households
County Areas

County Area	Race and Ethnicity					
	White Non-Hispanic	Black Non-Hispanic	Hispanic	Asian	Other	All Households
Allegany & Garrett	96%	2%	0%	1%	2%	100%
Anne Arundel	66%	21%	8%	3%	3%	100%
Baltimore City	18%	74%	3%	2%	2%	100%
Baltimore County	57%	29%	6%	5%	2%	100%
Carroll	92%	3%	3%	1%	0%	100%
Cecil	78%	12%	5%	3%	3%	100%
Charles	38%	51%	4%	1%	6%	100%
Frederick	69%	14%	9%	5%	3%	100%
Harford	71%	21%	4%	3%	2%	100%
Howard	41%	34%	7%	15%	3%	100%
Montgomery	30%	26%	26%	15%	2%	100%
Prince George's	12%	62%	19%	4%	3%	100%
Queen Anne's, Talbot, Caroline, Dorchester, & Kent	64%	26%	7%	1%	2%	100%
St. Mary's & Calvert	66%	24%	5%	2%	2%	100%
Washington	84%	11%	2%	1%	1%	100%
Wicomico, Worcester, & Somerset	61%	33%	3%	1%	2%	100%
State Total	45%	39%	9%	5%	2%	100%

Source: ACS (2014 – 2016) / Totals may not sum to 100% due to rounding.

Table III-11 shows the distribution of low-income households by linguistic isolation for each county. The term "linguistic isolation" means that there are no household members aged 16 years or older who report that they speak English "well" or "very well". These households are likely to have limited English proficiency and require translation services for program outreach and application materials. In Montgomery, Prince George's, and Howard counties, more than 10% of the low-income population is linguistically isolated. The

majority of the linguistically isolated population in Montgomery and Howard counties are non-Hispanic. Subgrantees in these areas should ensure that staff are trained on limited English proficiency procedures so that non-English speaking households can access services.

Table III-11
Linguistic Isolation of Low-Income Households
County Areas

County Area	Linguistically Isolated		Not Linguistically Isolated
	Non-Hispanic	Hispanic	
Allegany & Garrett	1%	0%	99%
Anne Arundel	2%	2%	96%
Baltimore City	3%	1%	96%
Baltimore County	4%	2%	94%
Carroll	1%	0%	99%
Cecil	1%	1%	97%
Charles	3%	1%	97%
Frederick	3%	3%	93%
Harford	1%	0%	99%
Howard	10%	1%	89%
Montgomery	11%	8%	82%
Prince George's	4%	8%	89%
Queen Anne's, Talbot, Caroline, Dorchester, & Kent	1%	3%	96%
St. Mary's & Calvert	0%	1%	99%
Washington	1%	1%	98%
Wicomico, Worcester, & Somerset	1%	0%	99%
State Total	4%	3%	93%

Source: ACS (2014 – 2016) / Totals may not sum to 100% due to rounding.

Table III-12 analyzes language access further by documenting the five most commonly spoken languages at home in low-income households in each county area in Maryland. While English and Spanish comprise the two most common languages in each county, the remaining languages spoken at home in each county vary dramatically. Some of the most common of these are Korean, French, and Chinese. Montgomery County has particularly high diversity in languages spoken, with the top five languages only comprising 81% of the County's low-income population. Local agencies should consider translating application and outreach materials in the most common languages spoken in their service areas and

ensure that staff are trained in using translation and language services for non-English speaking customers. Furthermore, agencies should develop partnerships with community organizations to improve participation among minority populations with language barriers that may be unaware of available energy programs.

Table III-12
Low-Income Households by Language Spoken at Home
County Areas

County Area	Language					
	Language #1	Language #2	Language #3	Language #4	Language #5	Top 5 Total
Allegany & Garrett	English 97%	Spanish 1%	Polish 1%	Korean <1%	Penn. German <1%	>99%
Anne Arundel	English 87%	Spanish 7%	German 1%	Korean 1%	French 1%	97%
Baltimore City	English 92%	Spanish 3%	Arabic 1%	Chinese 1%	Korean 1%	96%
Baltimore County	English 83%	Spanish 5%	Russian 1%	Arabic 1%	Chinese 1%	91%
Carroll	English 93%	Spanish 3%	Haitian 1%	German 1%	Nepali 1%	99%
Cecil	English 90%	Spanish 5%	Gujarati 1%	Russian 1%	Vietnamese 1%	98%
Charles	English 93%	Spanish 3%	African Lang. 1%	Arabic 1%	Haitian 1%	99%
Frederick	English 82%	Spanish 9%	Urdu 1%	French 1%	Burmese 1%	95%
Harford	English 93%	Spanish 3%	Punjabi 1%	Vietnamese 1%	Farsi <1%	98%
Howard	English 64%	Spanish 11%	Korean 7%	Urdu 3%	Yoruba, Ibo & Kru 2%	87%
Montgomery	English 45%	Spanish 25%	Amharic 4%	Chinese 4%	French 3%	81%
Prince George's	English 72%	Spanish 17%	Yoruba, Ibo & Kru 2%	Chinese 2%	French 1%	94%
Queen Anne's, Talbot, Caroline, Dorchester, & Kent	English 91%	Spanish 6%	Haitian 1%	Thai 1%	Vietnamese <1%	99%
St. Mary's & Calvert	English 93%	Spanish 4%	Nepali 2%	Tagalog 1%	French <1%	>99%
Washington	English 96%	Spanish 1%	German 1%	French <1%	Swahili <1%	99%
Wicomico, Worcester, & Somerset	English 92%	Spanish 3%	Haitian 2%	Arabic 1%	German 1%	98%
State Total	English 81%	Spanish 9%	Korean 1%	French 1%	Chinese 1%	92%

Source: ACS (2014 – 2016)

D. Internet Access

Both OHEP and DHCD conduct internet-based outreach activities, posting information online on utility, agency, and partner websites to increase program awareness. Additionally, OHEP allows customers to apply for benefits online through myDHR. In fiscal year 2017, 25% of OHEP applications were received through myDHR.[21] The study examined how low-income households use the internet to understand the opportunities and limitations of internet-based customer service tools.

Table III-13 examines low-income access to the internet by household type.[22] Two-thirds of Maryland's low-income population has access to the internet, but this varies by household characteristics. As expected, the elderly are less likely to have access. While only 41% of elderly individuals living alone have access to the internet, at least 80% of households with children and younger adults without children have access. Even if households have internet access, they may still have difficulty using OHEP's online application portal to apply for assistance and upload required documents. OHEP should leverage its Call Center to assist customers that require help completing their application and ensure that the myDHR portal provides clear instructions for applicants to complete online applications and submit required documents. For example, this may include instructing clients how they can use a camera on a smart phone to provide their income documentation.

Table III-13
Low-Income Households with Access to the Internet by Household Type

Head of Household Type	Internet Access	
	Does Not Have Access to the Internet	Has Access to the Internet
Elderly Individual	59%	41%
Elderly Couple	32%	68%
Older without Children (40-59)	35%	65%
Older with Children (40-59)	16%	84%
Younger without Children (<40)	17%	83%
Younger with Children (<40)	20%	80%
All Low-Income Households	33%	67%

Source: ACS (2014 – 2016)

Table III-14 shows the types of internet subscription for households with internet access.[23] The vast majority of low-income households access the internet through a Hi-Speed connection. Over half of households access the internet through a mobile broadband device.

[21] FY 2017 Electric Universal Services Program Annual Report, Maryland Public Service Commission Case Number 8903
[22] Internet access includes all households that report having internet in their home, regardless of whether they pay for an internet subscription.
[23] Only individuals who pay for an internet subscription were asked about type of internet subscription.

Table III-14
Type of Internet Connection for Households with Internet Subscription by Income Level[24]

Type of Internet Subscription	Federal Poverty Level		
	Low-Income (0 – 200% FPL)	Non-Low-Income (200% + FPL)	All Households
Dial Up	3%	2%	2%
Hi-Speed (DSL/Cable/Fiber-Optic)	82%	91%	89%
Mobile Broadband Plan	56%	63%	62%
Other	7%	8%	6%

Source: ACS (2014 – 2016)

E. Key Findings and Recommendations

The analysis documents differences in household composition that may impact the need for and utilization of energy assistance and energy efficiency programs. Key findings and recommendations include:

- On average, elderly individuals living alone are the poorest household type and comprise one-quarter of the low-income population.
- At least two-thirds of low-income households in every county area have a child under six, disabled individual, and/or elderly individual. However, targeting of vulnerable households should be performed locally, as the composition of vulnerable populations differs significantly by county.
- Households with a disability may qualify for additional service disconnection protections if they have a serious illness or rely on utilities for life-supporting equipment. It is important that utilities document the medical status of these households and develop data sharing and referral processes with local agencies to help them obtain OHEP benefits.
- While OHEP appears to be effectively targeting vulnerable households overall, participation among elderly households is low. OHEP should invest in strategies, such as its pilot recertification program, to reduce barriers for elderly households to receive benefits.
- Data provided by DHCD indicates the agency is serving vulnerable households at a lower rate than the overall low-income population. DHCD should explore how much of this difference is due to data collection issues and how much is due to a need to conduct more targeted outreach.

[24] Totals exceed 100% because households can have multiple forms of internet subscriptions.

Different segments of the low-income population have barriers to accessing services that agencies should account for in their program operations. Key findings and recommendations include:

- Linguistic isolation is highest in Montgomery, Prince George's and Howard counties. These agencies should ensure staff are trained in the use of language translation services, critical program materials are translated, and strategic partnerships are made with community organizations that serve populations with language barriers.
- One in three low-income households does not have access to the internet and the majority of elderly individuals living alone does not have internet access. Agencies should prioritize paper applications in senior centers and similar outreach locations serving older adults that are less likely to see online applications and marketing materials. For households with internet access, OHEP should ensure its application portal provides clear instructions and leverage its Call Center to assist customers who require help completing their online application.

IV. Housing Characteristics

This section of the report furnishes information on home ownership and housing unit type of low-income households and assesses how these characteristics impact the need for and utilization of energy assistance and efficiency programs.

A. *Owner/Renter Status*

Home ownership status is one of the most important factors that influences how energy efficiency services are delivered. For example, renters must obtain signed permission from their landlord to qualify for DHCD services. Table IV-1 identifies the share of households that own and rent their homes.[25] Low-income households are significantly less likely to own their homes (40%) than non-low-income households (73%).

Table IV-1
Low-Income Households by Owner/Renter Status

Ownership Status	Low-Income Households	Non-Low-Income Households	All Households
Own	40%	73%	66%
Rent	60%	27%	34%
All Ownership Types	100%	100%	100%

Source: ACS (2014 – 2016)

Table IV-2 shows that households with lower income are less likely to own their homes. Only 32% of Maryland households between 0% and 75% of the FPL are homeowners, whereas half of households between 176% and 200% of the FPL own their homes.

Table IV-2
Owner/Renter Status of Low-Income Households by Income Level

Ownership Status	Federal Poverty Level (FPL)				
	0 – 75% FPL	76% - 110% FPL	111% - 150% FPL	151% - 175% FPL	176% - 200% FPL
Own	32%	33%	43%	46%	50%
Rent	68%	67%	57%	54%	50%
All Low-Income Households	100%	100%	100%	100%	100%

Source: ACS (2014 – 2016) / Totals may not sum to 100% due to rounding.

Table IV-3 displays homeownership status by head of household type. Elderly households are the only household type where at least half of the low-income population owns their home. Younger households, and particularly those without children, are least likely to own

[25] Households who do not own their housing unit but occupy it without payment of rent are classified as renters.

their home. While elderly households may be more easily served by weatherization programs because they are more likely to own their homes, they also are likely to have lower energy usage, and additional efforts should be made to provide energy efficiency services to renters.

Table IV-3
Low-Income Owner/Renter Status by Head of Household Type

Head of Household Type	Own	Rent
Elderly Individual	50%	50%
Elderly Couple	68%	32%
Older without Children (40-59)	35%	65%
Older with Children (40-59)	39%	61%
Younger without Children (<40)	13%	87%
Younger with Children (<40)	17%	83%
All Low-Income Households	40%	60%

Source: ACS (2014 – 2016) / Totals may not sum to 100% due to rounding.

Table IV-4 shows that home ownership rates among low-income households vary significantly by county. Baltimore City has the lowest home ownership rate in the state at 28%. Despite its low home ownership rate, Baltimore City has one of the highest weatherization participation rates in the state, as identified in Table II-8. Conversely, counties such as Carroll, Anne Arundel, and Harford have below average weatherization participation despite high rates of homeownership. Counties with higher rates of home ownership should have fewer barriers to providing weatherization services because homeowners are less mobile, do not require consent from landlords, and generally do not live in large multifamily housing. However, the data show home ownership does not correlate with weatherization participation at the county level, and other factors such as housing concentration, may influence program participation.

Table IV-4
Low-Income Households by Owner/Renter Status
County Areas

County Area	Ownership Status	
	Own	Rent
Allegany & Garrett	51%	49%
Anne Arundel	55%	45%
Baltimore City	28%	72%
Baltimore County	41%	59%
Carroll	55%	45%

County Area	Ownership Status	
	Own	Rent
Cecil	44%	56%
Charles	49%	51%
Frederick	46%	54%
Harford	54%	46%
Howard	36%	64%
Montgomery	34%	66%
Prince George's	37%	63%
Queen Anne's, Talbot, Caroline, Dorchester, & Kent	50%	50%
St. Mary's & Calvert	42%	58%
Washington	40%	60%
Wicomico, Worcester, & Somerset	41%	59%
State Total	40%	60%

Source: ACS (2014 – 2016) / Totals may not sum to 100% due to rounding.

Table IV-5 assesses how participation in weatherization differs by home ownership status, excluding large multifamily housing. Whereas 13% of low-income homeowners received weatherization, only 5% of renters did. The data confirms that renters face barriers to weatherization and that DHCD should make concerted efforts to increase participation among renters with high energy usage.

Table IV-5
Weatherization Participation by Ownership Status – Excluding Large Multifamily Housing
FY 2010 – FY 2017

State Region	Ownership Status	
	Own	Rent
Allegany & Garrett	20%	4%
Anne Arundel	10%	4%
Baltimore City	15%	11%
Baltimore County	11%	2%
Carroll	9%	3%
Cecil	13%	2%
Charles	12%	2%
Frederick	14%	2%

State Region	Ownership Status	
	Own	Rent
Harford	11%	3%
Howard	18%	10%
Montgomery	9%	8%
Prince George's	16%	1%
Queen Anne's, Talbot, Caroline, Dorchester, & Kent	11%	3%
St. Mary's & Calvert	15%	2%
Washington	10%	1%
Wicomico, Worcester, & Somerset	14%	2%
State Total	13%	5%

Source: ACS (2014 – 2016) / FY 2010 - 2017 DHCD Data File

Table IV-6 shows differences in OHEP participation by owners and renters. Whereas homeowners are more likely to receive weatherization services, renters are more likely to receive energy assistance benefits. The table shows that 29% of OHEP income-eligible renters receive MEAP benefits compared to 20% of income-eligible homeowners. Higher participation among renters is consistent across all counties, with the exception of Allegany & Garrett counties. While renters have lower income, they also are less likely to receive energy efficiency services and may have a greater need for energy assistance as a result.

Table IV-6
OHEP Participation by Ownership Status
County Areas

County Area	MEAP		EUSP	
	Owners	Renters	Owners	Renters
Allegany & Garrett	47%	44%	47%	45%
Anne Arundel	11%	29%	10%	27%
Baltimore City	25%	29%	23%	27%
Baltimore County	14%	29%	13%	28%
Carroll	17%	42%	16%	42%
Cecil	28%	48%	27%	46%
Charles	20%	45%	20%	44%
Frederick	18%	32%	18%	32%
Harford	17%	39%	16%	39%
Howard	20%	39%	19%	38%

County Area	MEAP		EUSP	
	Owners	Renters	Owners	Renters
Montgomery	11%	16%	11%	15%
Prince George's	17%	19%	17%	20%
Queen Anne's, Talbot, Caroline, Dorchester, & Kent	31%	55%	31%	55%
St. Mary's & Calvert	30%	34%	30%	33%
Washington	17%	26%	17%	27%
Wicomico, Worcester, & Somerset	36%	45%	35%	45%
State Total	20%	29%	19%	29%

Source: ACS (2014 – 2016) / FY 2017 OHEP Data File

B. *Housing Unit Type*

Housing unit type is another important factor in designing and implementing energy efficiency programs. For example, DHCD administers a separate energy efficiency program for large multifamily buildings, which requires building managers to directly apply to DHCD for a whole-building retrofit.

Table IV-7 shows the share of low-income households that live in each type of housing unit compared to non-low-income households. Low-income households are much more likely to live in multifamily buildings than non-low-income households. However, over half of low-income households live in either attached or detached single family homes.

Table IV-7
Households by Housing Unit Type

Housing Unit Type	Low-Income (0 – 200% FPL)	Non-Low-Income (200% + FPL)	All Households
Single Family Attached	23%	20%	21%
Single Family Detached	33%	58%	53%
Small Multifamily[26]	7%	3%	4%
Large Multifamily	34%	18%	22%
Mobile Home[27]	3%	1%	1%
All Housing Units	100%	100%	100%

Source: ACS (2014 – 2016) / Totals may not sum to 100% due to rounding.

Table IV-8 shows that as income rises, households are more likely to live in single-family detached housing and less likely to live in large multifamily buildings.

[26] Small Multifamily is defined as a building with 2 – 4 apartment units
[27] The mobile home category includes a small number of building types classified as "Other" in ACS data, which encompasses housing types such as boats, RVs, and vans.

Table IV-8
Low-Income Households by Housing Unit Type and Income Level

Housing Unit Type	Federal Poverty Level (FPL)				
	0 – 75% FPL	76 - 110% FPL	111 - 150% FPL	151 - 175% FPL	176 - 200% FPL
Single Family Attached	25%	21%	22%	23%	22%
Single Family Detached	28%	30%	35%	37%	41%
Small Multifamily	8%	7%	8%	6%	6%
Large Multifamily	36%	40%	31%	32%	29%
Mobile Home	3%	2%	3%	2%	3%
All Housing Units	100%	100%	100%	100%	100%

Source: ACS (2014 – 2016) / Totals may not sum to 100% due to rounding.

Table IV-9 breaks down housing unit type at the county level. Less densely populated rural areas of the state generally have a larger share of households living in single-family detached units, whereas suburban counties such as Montgomery, Prince George's and Howard have a larger share of households living in multifamily buildings. Nearly half of low-income households in Baltimore City live in single-family attached housing. Mobile homes comprise a small portion of the total low-income housing in Maryland, with the highest concentrations of this housing in counties located on the Eastern Shore and Western Maryland.

Table IV-9
Low-Income Households by Housing Unit Type
County Areas

County Area	Housing Unit Type					
	Single Family Attached	Single Family Detached	Small Multifamily	Large Multifamily	Mobile Home	All Housing Unit Types
Allegany & Garrett	9%	57%	8%	19%	8%	100%
Anne Arundel	19%	46%	3%	27%	5%	100%
Baltimore City	49%	8%	13%	30%	0%	100%
Baltimore County	24%	33%	5%	37%	1%	100%
Carroll	13%	59%	7%	19%	3%	100%
Cecil	12%	46%	11%	22%	10%	100%
Charles	18%	57%	3%	19%	3%	100%
Frederick	19%	47%	5%	28%	1%	100%

County Area	Housing Unit Type					
	Single Family Attached	Single Family Detached	Small Multifamily	Large Multifamily	Mobile Home	All Housing Unit Types
Harford	16%	44%	5%	29%	6%	100%
Howard	23%	25%	4%	47%	1%	100%
Montgomery	17%	23%	5%	55%	0%	100%
Prince George's	14%	35%	4%	47%	1%	100%
Queen Anne's, Talbot, Caroline, Dorchester, & Kent	4%	61%	10%	17%	7%	100%
St. Mary's & Calvert	9%	60%	4%	22%	5%	100%
Washington	21%	41%	13%	19%	5%	100%
Wicomico, Worcester, & Somerset	5%	58%	9%	20%	9%	100%
State Total	23%	33%	7%	34%	3%	100%

Source: ACS (2014 – 2016) / Totals may not sum to 100% due to rounding.

Table IV-10 shows the age of housing occupied by low-income and non-low-income households in Maryland. Older housing may have greater opportunities for energy efficiency, but also may be more prone to deferred maintenance issues that can be a barrier to weatherization services. Furthermore, homes built prior to 1978, and in particular those built before 1950, are likely to contain lead-based paint and require lead-safe work practices when installing energy efficiency measures[28]. The data show that low-income households are more likely to live in housing built before 1950 (23%) than non-low-income households (15%).

[28] Lead paint was banned by the City of Baltimore in 1950 and was banned nationally in 1978

Table IV-10
Housing Age of Low-Income Households by Income Level

Age of Housing Stock	Housing Built in Time Period		
	Low-Income (0 – 200% FPL)	Non-Low-Income (200% + FPL)	All Households
2000 or Later	11%	16%	15%
1990 to 1999	11%	16%	15%
1980 to 1989	13%	16%	16%
1970 to 1979	15%	14%	14%
1960 to 1969	13%	12%	12%
1950 to 1959	14%	11%	12%
1940 to 1949	7%	5%	5%
1939 or earlier	16%	10%	11%
All Housing Units	100%	100%	100%

Source: ACS (2014 – 2016) / Totals may not sum to 100% due to rounding.

Table IV-11 shows the distribution of housing age for low-income households by region. In Western and Central Maryland, a larger share of low-income housing was built pre-1950 compared to other parts of the state.

Table IV-11
Housing Age of Low-Income Households
State Regions

Age of Housing Stock	State Region				
	Capital	Central	Eastern Shore	Southern	Western
2000 or Later	11%	9%	16%	18%	11%
1990 to 1999	11%	10%	14%	16%	12%
1980 to 1989	17%	11%	16%	15%	11%
1970 to 1979	19%	13%	15%	21%	17%
1960 to 1969	18%	11%	9%	11%	11%
1950 to 1959	15%	15%	11%	7%	10%
1940 to 1949	5%	9%	6%	4%	6%
1939 or earlier	4%	21%	13%	7%	23%
All Housing Units	100%	100%	100%	100%	100%

Source: ACS (2014 – 2016) / Totals may not sum to 100% due to rounding.

C. Housing Market Segments

Tables IV-12 and IV-13 segment the home ownership rate for each housing unit type by income level and region. These tables help to identify important segments of the low-income market. The tables show that the majority of households living in single-family detached and mobile homes[29] own their home, whereas low-income households living in multifamily buildings are renters. Households with very low income are more likely to rent single-family attached homes, whereas households with more income are likely to own. Ownership rates are highest in the Eastern Shore, Southern, and Western Maryland, likely related to the higher share of mobile homes and single family detached housing.

Table IV-12
Ownership Rate of Low-Income Households by Housing Unit Type and Income Level

Housing Unit Type	Federal Poverty Level (FPL)									
	0 – 75% FPL		76% - 110% FPL		111% - 150% FPL		151% - 175% FPL		176% - 200% FPL	
	Own	Rent	Own	Rent	Own	Rent	Own	Rent	Own	Rent
Single Family Attached	35%	65%	39%	62%	48%	52%	55%	45%	55%	45%
Single Family Detached	70%	30%	68%	32%	75%	25%	76%	24%	81%	19%
Small Multifamily	4%	96%	5%	95%	6%	94%	9%	91%	4%	96%
Large Multifamily	6%	94%	6%	94%	8%	92%	10%	90%	10%	90%
Mobile Homes	56%	44%	66%	34%	72%	28%	77%	23%	75%	25%
All Housing Units	32%	68%	33%	67%	43%	57%	46%	54%	50%	50%

Source: ACS (2014 – 2016)

[29] Survey data used does not distinguish between mobile homes where the building is owned, but the land is rented.

Table IV-13
Ownership Rate of Low-Income Households by Housing Unit Type
State Regions

Housing Unit Type	State Region									
	Capital		Central		Eastern Shore		Southern		Western	
	Own	Rent	Own	Rent	Own	Rent	Own	Rent	Own	Rent
Single Family Attached	55%	45%	44%	56%	31%	69%	32%	68%	32%	68%
Single Family Detached	77%	23%	79%	21%	64%	36%	63%	37%	74%	26%
Small Multifamily	12%	88%	5%	95%	3%	97%	6%	94%	3%	97%
Large Multifamily	8%	92%	9%	91%	4%	96%	4%	96%	4%	96%
Mobile Homes	49%	51%	69%	31%	66%	34%	73%	27%	75%	25%
All Housing Units	35%	65%	39%	61%	45%	55%	45%	55%	46%	54%

Source: ACS (2014 – 2016)

Tables IV-14 and IV-15 show how many low-income owners and renters live in each housing type. This information can be used to assess the market segments with the greatest opportunities for outreach and enrollment. For example, 34% of low-income households live in large multifamily buildings, with the vast majority of these households living in the Capital and Central regions. Most of these households cannot directly receive services through DHCD's single-family weatherization program, but may benefit if their landlord applies through DHCD's multifamily energy efficiency improvement programs. In another example, over 150,000 low-income owners live in single-family attached or detached housing, 35% of the low-income market. While most of these households live in the Capital and Central region, a significant number also live in the Eastern Shore, Southern, and Western Maryland.

Table IV-14
Percentage of Low-Income Households by Housing Unit Type and Ownership Status

Housing Unit Type	Own	Rent	All Households
Single Family Attached	10%	13%	23%
Single Family Detached	25%	9%	33%
Small Multifamily	0%	7%	7%
Large Multifamily	3%	31%	34%
Mobile Homes	2%	1%	3%
All Housing Units	40%	60%	100%

Source: ACS (2014 – 2016) / Totals may not sum to 100% due to rounding.

Table IV-15
Number of Low-Income Households by Housing Unit Type and Ownership Status
State Regions

Housing Unit Type	State Region											
	Capital		Central		Eastern Shore		Southern		Western		All State Regions	
	Own	Rent	Own	Rent	Own	Rent	Own	Rent	Own	Rent	Own	Rent
Single Family Attached	9,599	7,733	31,619	40,651	806	1,833	814	1,717	2,409	5,077	45,247	57,011
Single Family Detached	25,314	7,715	45,201	12,106	16,592	9,367	7,299	4,260	16,139	5,664	110,545	39,112
Small Multifamily	575	4,309	910	17,824	127	4,234	43	616	124	3,869	1,779	30,852
Large Multifamily	4,360	53,425	6,305	64,937	383	8,357	153	3,938	378	9,507	11,579	140,164
Mobile Homes	327	341	2,735	1,257	2,524	1,323	613	222	1,671	561	7,870	3,704
All Housing Units	40,175	73,524	86,770	136,775	20,433	25,113	8,920	10,753	20,721	24,679	177,019	270,844

Source: ACS (2014 – 2016)

D. Key Findings and Recommendations

The study identifies important trends in home ownership among low-income households. Key findings and recommendations include:

- Low-income households are much more likely to rent their homes than non-low-income households. Ownership is higher in less densely populated parts of the state which also have higher penetration of single-family detached housing. Rental rates are high in urban and suburban parts of the state which also have high rates of multifamily and/or single family attached housing. In Baltimore City, 72% of low-income households rent their homes.

- DHCD's weatherization program serves homeowners at a significantly higher rate than renters. However, several counties with high rates of home ownership have low participation in weatherization. The data show an opportunity to increase participation in these counties, in addition to the need to address barriers for renters to access weatherization services.

- OHEP serves a larger share of renters than homeowners. Renters are lower income, but they also may rely on financial assistance to keep energy costs affordable because they are less likely to receive weatherization.

The study also furnishes important information about low-income housing types. Key findings include:

- Low-income households are more likely to live in older housing than non-low-income households. In the Western and Central regions, over 20% of the low-income population lives in housing built before 1940. This housing may provide greater opportunities for energy efficiency, but also greater barriers due to health and safety issues that may be more prevalent.

- Over one-third of low-income households live in large multifamily housing. Most of these households may not be eligible to apply for DHCD's single family weatherization program. Over 150,000 households, or 35% of the low-income population, live in single-family housing. These households are most readily served through DHCD's single-family weatherization program.

V. Energy and Utilities

This study analyzed the energy characteristics of low-income households to understand how they may impact the need for and use of energy programs. These energy characteristics should be understood when assessing, designing, or implementating energy efficiency and assistance programs. Due to limitations in available data, one part of the analysis on heating and cooling sources and energy usage reflects characteristics of the low-income population in the Mid-Atlantic region as opposed to only MD's population.[30] This level of analysis does not account for differences between Maryland and other states within the region which should be considered when interpreting the data.

A. *Heating and Cooling Sources*

Table V-1 shows the main heating fuel of low-income households in Maryland. Most households heat their homes with either electricity (45%) or gas (42%). While 9% of low-income households use fuel oil or kerosene, 5% heat with propane or other fuel types.

Table V-1
Main Heating Fuel of Low-Income Households

Main Heating Fuel	Low-Income (0 – 200% FPL)
Electric	45%
Natural Gas	42%
Fuel Oil/Kerosene	9%
Propane	3%
Other[31]	2%
All Low-Income Households	100%

Source: ACS (2014 – 2016) / Totals may not sum to 100% due to rounding.

Table V-2 shows how participation in OHEP's heating assistance program, MEAP, differs by main heating fuel. Households that heat with propane, fuel oil, and kerosene participate in OHEP at a higher rate than households that heat with natural gas and electric. This is likely due to the fact that bulk fuels are more expensive than electric and gas heat, and that these households have greater need for energy assistance.

[30] The Mid-Atlantic region includes Maryland, Washington D.C., Delaware, and West Virginia
[31] Households reporting coal/coke, wood, and solar are consolidated as "Other".

Table V-2
MEAP Participation by Fuel Type

Main Heating Fuel	OHEP Income-Eligible Households	MEAP-Recipient Households	MEAP Participation Rate
Electric	169,913	46,655	27%
Natural Gas	157,422	38,696	25%
Fuel Oil/Kerosene	33,825	9,718	29%
Propane	10,891	3,421	31%
All Households[32]	372,051	98,490	26%

Source: ACS (2014 – 2016) \ FY 2017 OHEP Data File

Table V-3 shows how the main heating fuel differs by region. In the Central and Capital region, half of the households heat their homes with gas, compared to only a small portion of households in the Eastern Shore, Southern, and Western Maryland. In these areas, fuel oil/kerosene is more commonly used in home heating. In all regions of the state, a significant share of households heat their homes with electricity.

Table V-3
Main Heating Fuel of Low-Income Households
State Regions

Main Heating Fuel	State Region				
	Capital	Central	Eastern Shore	Southern	Western
Electric	45%	40%	56%	61%	46%
Natural Gas	51%	49%	12%	9%	28%
Fuel Oil/Kerosene	3%	8%	17%	21%	17%
Propane	1%	2%	11%	6%	3%
Other	0%	1%	3%	4%	6%
All Low-Income Households	100%	100%	100%	100%	100%

Source: ACS (2014 – 2016) / Totals may not sum to 100% due to rounding.

Table V-4 shows that the main heating fuel differs significantly at the county level. In Allegany and Garrett counties, 10% of the population uses a heating fuel other than electric, natural gas, fuel oil/kerosene, or propane. Based on analysis of OHEP client data, most of these customers appear to heat their homes with wood pellets or coal.

[32] Unlike the totals in the "All Households" row of other tables, the totals in this row exclude households heating with a fuel type other than the ones listed in the table, and households without a main heating fuel type.

Table V-4
Main Heating Fuel of Low-Income Households
County Areas

County Area	Main Heating Fuel					
	Electric	Natural Gas	Fuel Oil/ Kerosene	Propane	Other	All Low-Income
Allegany & Garrett	29%	41%	17%	3%	10%	100%
Anne Arundel	48%	34%	13%	3%	1%	100%
Baltimore City	31%	63%	5%	1%	1%	100%
Baltimore County	40%	50%	8%	1%	1%	100%
Carroll	59%	11%	22%	3%	4%	100%
Cecil	51%	12%	26%	7%	3%	100%
Charles	61%	13%	18%	6%	3%	100%
Frederick	57%	23%	14%	2%	4%	100%
Harford	48%	29%	15%	5%	4%	100%
Howard	65%	26%	4%	1%	3%	100%
Montgomery	50%	45%	2%	1%	1%	100%
Prince George's	39%	56%	4%	1%	0%	100%
Queen Anne's, Talbot, Caroline, Dorchester, & Kent	59%	7%	18%	12%	3%	100%
St. Mary's & Calvert	61%	6%	23%	5%	4%	100%
Washington	54%	19%	20%	4%	4%	100%
Wicomico, Worcester, & Somerset Counties	55%	17%	12%	13%	3%	100%
State Total	44%	42%	9%	3%	2%	100%

Source: ACS (2014 – 2016) / Totals may not sum to 100% due to rounding.

Table V-5 provides information on supplemental heat use among low-income households. The data shows that 17% of low-income households use electric space heaters as supplemental heat for their homes, and 5% supplement with a heating stove. Due to limitations in these data, the analysis is only available for the Mid-Atlantic region.[33]

[33] The Mid-Atlantic region includes Maryland, Washington D.C., Delaware, and West Virginia

Table V-5
Use of Supplemental Heat among Low-Income Households
Mid-Atlantic Region

Supplemental Equipment Used	Percentage of Households
Electric Space Heaters	17%
Heating Stove[34]	5%

Source: 2009 RECS

Table V-6 provides information on main cooling equipment by income level. The data show that low-income households are less likely to use central air conditioning and more likely to use window/wall air conditioning than non-low-income households.

Table V-6
Main Cooling Equipment of Low-Income Households by Income Level
Mid-Atlantic Region

Cooling Equipment	Low-Income (0 – 200% FPL)	Non-Low-Income (200% + FPL)	All Households
Central Air Conditioning	46%	75%	67%
Window/Wall Air Conditioning	52%	22%	31%
No Air Conditioning	2%	2%	2%

Source: 2009 RECS

B. Energy Usage

Tables V-7 and V-8 show average annual electricity usage by housing type for households that heat with electricity and other fuel sources. Electric usage for low-income households is significantly higher in electric-heated single-family homes than in non-electric heated homes and multifamily housing. This suggests that DHCD's single-family weatherization program can achieve the greatest electric savings in single-family electric-heated housing. Low-income households use less electricity than non-low-income households. The only subpopulation where low-income households use more electricity than non-low-income households is in multifamily buildings that heat with natural gas, fuel oil/kerosene, or propane.

[34] Statistic based on small sample size of 10 or less survey respondents

Table V-7
Average Annual Electricity Usage (kWh) by Housing Type and Income Level for Households that Heat with Natural Gas, Fuel Oil/Kerosene or Propane
Mid-Atlantic Region

Housing Unit Type	Low-Income (0 – 200% FPL)	Non-Low-Income (200% + FPL)	All Households
Single Family Homes (1-4)	8,894 kWh	11,979 kWh	11,115 kWh
Multifamily Home (5+)	6,136 kWh[35]	5,029 kWh[36]	5,304 kWh
All Housing Units	8,392 kWh	10,573 kWh	9,973 kWh

Source: 2009 RECS

Table V-8
Average Annual Electricity Usage (kWh) by Housing Type and Income Level for Households that Heat with Electricity
Mid-Atlantic Region

Housing Unit Type	Low-Income (0 – 200% FPL)	Non-Low-Income (200% + FPL)	All Households
Single Family Homes (1-4)	17,730 kWh	20,704 kWh	20,075 kWh
Multifamily Home (5+)	8,989 kWh[37]	10,601 kWh[38]	9,884 kWh
All Housing Units	14,580 kWh	19,100 kWh	17,920 kWh

Source: 2009 RECS / Totals may not sum to 100% due to rounding.

Tables V-9 and V-10 show the distribution of electricity usage for households that heat with electricity and other fuel sources. 31 percent of low-income, single-family households that do not heat with electricity use more than 10,000 kwh per year and 44 percent that heat with electricity use more than 18,000 kWh annually, indicating significant opportunity within the low-income market for both baseload electric and whole house energy efficiency services.

[35] Statistic based on small sample size of 11 to 30 respondents
[36] Statistic based on small sample size of 11 to 30 respondents
[37] Statistic based on small sample size of 11 to 30 respondents
[38] Statistic based on small sample size of 10 or less respondents

Table V-9
Annual Electricity Usage Distribution for Households in Single Family Homes that Heat with Natural Gas, Fuel Oil/Kerosene or Propane, by Income Level
Mid-Atlantic Region

kWh	Low-Income (0 – 200% FPL)[39]	Non-Low-Income (200% + FPL)	All Households
Less than 5,000	13%	11%	12%
5,000 - <7,500	21%	17%	18%
7,500 - <10,000	34%	13%	19%
10,000 or More	31%	59%	51%
All kWh Usage	100%	100%	100%

Source: 2009 RECS / Totals may not sum to 100% due to rounding.

Table V-10
Annual Electricity Usage Distribution for Households in Single Family Homes that Heat with Electricity, by Income Level
Mid-Atlantic Region

Thousand kWh	Low-Income (0 – 200% FPL)[40]	Non-Low-Income (200% + FPL)	All Households
Less than 6,000	4%	3%	3%
6,000 - 12,000	18%	12%	13%
12,000 - <18,000	34%	31%	32%
18,000 - <24,000	29%	25%	26%
24,000 or More	15%	29%	26%
All kWh Usage	100%	100%	100%

Source: 2009 RECS / Totals may not sum to 100% due to rounding.

Table V-11 compares electric usage of households that are income-eligible for OHEP to households receiving EUSP electric benefits. It is important to note that the distribution of electric usage for income-eligible households includes survey respondents from the Mid-Atlantic region, which includes Maryland, Washington D.C. Delaware, and West Virginia. Whereas 33% of income-eligible households use over 14,000 kWh of electricity, 27% of EUSP recipients use this much electricity.

[39] Statistic based on small sample size of 11 to 30 respondents
[40] Statistic based on small sample size of 11 to 30 respondents

Table V-11
Distribution of Electric Usage for Income-Eligible and EUSP-Recipient Households

Kilowatt Hours	OHEP Income-Eligible	EUSP-Recipients
0 - 6,000	19%	25%
6,001 – 10,000	29%	28%
10,001 – 14,000	19%	20%
14,001 or More	33%	27%

Source: 2009 RECS / FY 2017 OHEP Data File

C. *Heat Included in Rent*

Households that directly pay their heating bills receive an OHEP benefit paid directly to their energy supplier. Households with heat included in rent can qualify for MEAP benefits if they do not live in subsidized housing. Benefits are paid directly to landlords, who must sign a Landlord Agreement consenting to reduce the rent by the amount of the benefit. If a landlord refuses to sign the Agreement, benefits may be paid to a secondary heat source or directly to the applicant.

Tables V-12 and V-13 show the majority of low-income households (88%) pay directly for their main heating fuel, although a significant share (12%) have their heating fuel included in their rent. The counties where the largest share of households have heat included in their rent are Montgomery, Prince George's, Baltimore City, Allegany and Garrett.

Table V-12
Low-Income Households with Heat Included in Rent by Income Level[41]

Method of Payment	All Low-Income Households
Heat Included in the Rent	12%
Tenant Directly Pays Vendor	88%

Source: ACS (2014 – 2016)

Table V-13
Low-Income Households with Heat Included in Rent
County Areas

County Area	Method of Payment	
	Heat Included in the Rent	Tenant Directly Pays Vendor
Allegany & Garrett	11%	89%
Anne Arundel	8%	92%

[41] Households with no heating fuel charges that did not specify charges included in rent are classified as paying heating bill directly to vendor and assumed to have been shut-off or surveyed in a month with no heating charges.

County Area	Method of Payment	
	Heat Included in the Rent	Tenant Directly Pays Vendor
Baltimore City	14%	86%
Baltimore County	8%	92%
Carroll	3%	97%
Cecil	4%	96%
Charles	2%	98%
Frederick	5%	95%
Harford	7%	93%
Howard	5%	95%
Montgomery	23%	77%
Prince George's	22%	78%
Queen Anne's, Talbot, Caroline, Dorchester, & Kent	3%	97%
St. Mary's & Calvert	6%	94%
Washington	10%	90%
Wicomico, Worcester, & Somerset Counties	6%	94%
State Total	12%	88%

Source: ACS (2014 – 2016)

Table V-14 segments heat included in rent by fuel type. As expected, households that heat with electricity or natural gas are more likely to have heat included in rent, whereas less than 6% of low-income households that heat with fuel oil/kerosene, propane, or other fuel sources have heat included in rent.

Table V-14
Heating Bill Payment Method of Low-Income Households, by Fuel Type

Main Heating Fuel	Included in Rent or Fee		Pay Directly		TOTAL	
	Number	Percentage	Number	Percentage	Number	Percentage
Electric	23,921	12%	173,543	88%	197,464	100%
Natural Gas	26,881	15%	157,819	85%	184,700	100%
Fuel Oil/Kerosene	1,896	5%	38,680	95%	40,576	100%
Propane	741	6%	11,856	94%	12,598	100%
Other	325	4%	8,304	96%	8,629	100%
All Low-Income Households	53,765	12%	390,201	88%	443,966[42]	100%

Source: ACS (2014 – 2016)

Table V-15 assesses the percentage of low-income households with heat included in rent by housing unit type. Most low-income households that do not pay for their heat live in multifamily buildings.

Table V-15
Heating Bill Payment Method of Low-Income Households, by Housing Unit Type

Housing Type	Included in Rent or Fee		Pay Directly		TOTAL	
	Number	Percentage	Number	Percentage	Number	Percentage
Single Family Attached	5,895	6%	96,362	94%	102,257	100%
Single Family Detached	3,181	2%	146,476	98%	149,657	100%
Small Multifamily	5,039	15%	27,592	85%	32,631	100%
Large Multifamily	40,026	26%	111,718	74%	151,744	100%
Mobile Homes	237	2%	11,337	98%	11,574	100%
All Housing Units	54,378	12%	393,485	88%	447,863	100%

Source: ACS (2014 – 2016)

D. Water and Sewer Utilities

Tables V-16 and V-17 examine utility costs for water and sewer. These costs have become a significant affordability challenge for low-income households. In Baltimore City, water and wastewater rates have increased by 127% from 2006 to 2016 and are expected to rise an additional 33% over the following three years.[43] Increased fixed fees result in many

[42] The total low-income household count for tables analyzing fuel usage omit households that reported no fuel used, and therefore are slightly less than other counts of total low-income households.
[43] Jacobson, Joan (2016). *Keeping the Water On: Strategies for Addressing High Increases in Water and Sewer Rates for Baltimore's Most Vulnerable Customers.* Prepared for the Abell Foundation. November 2016.

households having higher costs even if they reduce water consumption. For example, from 2016 to 2018, Infrastructure Fees have increased by 20% in Baltimore City.

The average cost of water and sewage for low-income households in Maryland is $555, though average costs range from $235 in Baltimore County to $795 in St. Mary's and Calvert counties. A 33% increase in water and sewage costs would increase the average cost of water and sewage in the state to $738 annually. Costs are highest in single-family housing and lowest in large multifamily buildings. Agencies may be able to help offset rising costs of water and sewage by improving coordination of energy and water assistance programs. For example, the Washington Suburban Sanitary Commission (WSSC) operates a Customer Assistance Program in the Capital region that automatically qualifies households for water bill discounts if they are receiving OHEP benefits. In other areas such as Baltimore City, households may apply for water assistance benefits which have different application and eligibility requirements.

Table V-16
Average Annual Cost of Water and Sewage for Low-Income Households
County Areas

County Area	Annual Water/Sewage Cost	33% Estimated Increase in Annual Water/Sewage Cost
Allegany & Garrett	$650	$865
Anne Arundel	$524	$697
Baltimore City	$655	$871
Baltimore County	$235	$313
Carroll	$617	$821
Cecil	$740	$984
Charles	$640	$851
Frederick	$636	$846
Harford	$432	$575
Howard	$450	$599
Montgomery	$573	$762
Prince George's	$643	$855
Queen Anne's, Talbot, Caroline, Dorchester, & Kent	$607	$807
St. Mary's & Calvert	$795	$1,057
Washington	$726	$966
Wicomico, Worcester, & Somerset Counties	$673	$895
State Average	$555	$738

Source: ACS (2014 – 2016)

Table V-17
Average Annual Cost of Water and Sewage for Low-Income Households, by Housing Unit Type

Housing Type	Annual Water/ Sewer Cost	33% Estimated Increase in Annual Water/Sewage Cost
Single Family Attached	$596	$793
Single Family Detached	$600	$798
Small Multifamily	$438	$583
Large Multifamily	$371	$493
Mobile Homes	$487	$648
All Housing Units	$555	$738

Source: ACS (2014 – 2016)

E. Key Findings and Recommendations

The study identifies important trends in the energy characteristics of low-income households. Key findings include:

- Although 90% of low-income households heat with electricity or natural gas, main heating fuel type differs by geography. Households are more likely to heat with bulk fuels in Southern and Western Maryland and the Eastern Shore than in the Capital and Central regions. Households that heat with more expensive bulk fuels participate in OHEP at a slightly higher rate than households that heat with electricity and natural gas.

- A large part of the low-income market has high electric usage and may be strong candidates for DHCD's weatherization funding sources that target electric reduction. A total of 31% of low-income single-family households that do not heat with electricity use more than 10,000 kWh per year and 44% of low-income single-family households that heat with electricity use more than 18,000 kWh per year.

- While most households pay their heat directly, 12% of the population pays for heat through their rent. This is most common in the Capital region where there are also high rates of multifamily housing.

- The cost of water and sewage for low-income households varies dramatically by county, with rates averaging as high as $795 in St. Mary's and Calvert counties and as low as $235 in Baltimore County. Agencies should consider opportunities to coordinate energy and water assistance programs when possible to help low-income households manage these costs.

VI. Energy and Shelter Burden

Energy Burden, the percentage of income a household pays towards energy costs, is an important consideration when designing and implementing energy assistance and efficiency programs. Both OHEP and DHCD target households with high energy costs. Additionally, low-income households must manage their energy costs within the context of their larger shelter costs. This section of the study assesses home energy expenditures and energy and shelter burden to understand how these costs impact different segments of the low-income market and how low-income energy programs can improve affordability.

A. *Heating and Cooling Expenditures*

Table VI-1 describes home heating and electric expenditures by county for low-income households.[44] The largest average expenditures occur in the Eastern Shore and Southern Maryland, whereas the smallest average expenditures occur primarily in Western Maryland. This data may appear counterintuitive, as the lowest temperatures and highest snow fall occur in Western Maryland.[45] However, the analysis shows that non-heating electric expenditures account for 62% of average home energy bills in Maryland. These expenditures are highest in households that heat with fuel oil/kerosene, propane, and other fuel sources, which comprise the largest share of the population in the Eastern Shore and Southern regions. Counties located in Western Maryland have the four lowest average non-heating electric expenditures in the state.

Table VI-1
Heating and Non-Heating Electric Expenditures of Low-Income Households
County Areas

County Area	Main Heating Expenditures	Non-Heating Electric Expenditures	Heating and Electric Expenditures
Allegany & Garrett	$1,010	$1,303	$2,313
Anne Arundel	$889	$1,750	$2,640
Baltimore City	$957	$1,589	$2,546
Baltimore County	$841	$1,488	$2,330
Carroll	$1,046	$1,694	$2,740
Cecil	$1,106	$1,757	$2,862
Charles	$1,037	$1,811	$2,849
Frederick	$817	$1,478	$2,296
Harford	$898	$1,662	$2,559

[44] Heating expenditures only reflect fuel costs for the primary fuel type indicated by respondents, since fuel expenditures for other fuel types could be for supplemental heat or for non-heating purposes such as cooking.
[45] Maryland State Climatologist Office. *Maryland's Climate*.

County Area	Main Heating Expenditures	Non-Heating Electric Expenditures	Heating and Electric Expenditures
Howard	$782	$1,504	$2,286
Montgomery	$856	$1,500	$2,356
Prince George's	$988	$1,625	$2,613
Queen Anne's, Talbot, Caroline, Dorchester, & Kent	$1,036	$1,678	$2,714
St. Mary's & Calvert	$929	$1,871	$2,800
Washington	$832	$1,230	$2,062
Wicomico, Worcester, & Somerset Counties	$1,064	$1,795	$2,859
State Average	$949	$1,582	$2,532

Source: ACS (2014 – 2016)

Table VI-2 shows that home energy expenditures for low-income households vary significantly by main heating fuel. The average low-income household pays $2,532 per year for energy costs. Households with electric main heat have the lowest average energy expenditures of $2,060 while households that heat with propane have the highest energy expenditures of $4,030. The data show homes that heat with bulk fuels have both high heating and electric expenditures, demonstrating the need for both baseload and home performance energy efficiency measures. The study did not assess what share of electric expenditures are from supplemental electric space heating. More frequent use of electric space heating for households that heat with bulk fuels may partially explain higher electric expenditures. Main heating expenditures for electric main heat homes do not include water heating costs. When counted as a main heating expenditure, combined space heating and water heating costs are nearly half of total electricity expenditures in electric main heat homes.[46]

[46] For non-electric main heating fuel households, if a household's water heating is from their main heating fuel type, the cost is included in main heating expenditures. For non-electric main heating fuel households whose water heating is electric, the cost is included in non-heating electric expenditures.

Table VI-2
Heating and Non-Heating Electric Expenditures of Low-Income Households by Main Heating Fuel

Main Heating Fuel	Main Heating Expenditures	Non-Heating Electric Expenditures	Main Heating and Other Electric Expenditures
Electric[47]	$608	$1,452	$2,060
Natural Gas	$1,192	$1,608	$2,800
Fuel Oil/Kerosene	$1,491	$1,887	$3,378
Propane	$2,147	$1,883	$4,030
Other	$938	$2,060	$2,998
All Low-Income Households	$949	$1,582	$2,532

Source: ACS (2014 – 2016)

Table VI-3 shows the percentage of main heating fuel costs paid by fuel type through OHEP's MEAP benefit. MEAP benefits on average pay 59% of households heating bills; however this differs significantly by fuel type. OHEP is appropriately paying a higher share of energy bills for households that heat with more expensive fuel oil and kerosene; however, households heating with propane, which is the most expensive heating fuel type in the state, only have 59% of their bill paid on average through MEAP. OHEP should review its benefit allocation formula to ensure an equitable share of energy costs are covered for households that heat with propane. Similarly, OHEP should review its distribution of heating benefits between electric and gas heated homes. Although gas is more expensive than electric heating, OHEP currently pays a larger of electric heating costs than gas.

Average energy bill data used in the analysis are estimated based on responses to the ACS from households who are income-eligible for OHEP benefits. To meet new federal reporting requirements, OHEP has started collecting actual bill data of program participants. As multiple years of actual bill data are collected, the data should be compared with ACS estimates. However, it is important to analyze the estimated costs of all low-income households as well as only those who receive MEAP benefits. More refined energy cost data from recipients' energy bills is needed to assess the distribution of costs, burden, and benefits of OHEP recipients.

[47] ACS does not separate heating electric expenditures from non-heating electric expenditures. The 2009 RECS data uses a regression model to allocate electric costs across space heating, air conditioning, water heating, refrigeration, and other uses. Based on this model, it was estimated that 30 percent of the electric bill for electric heat households was due to space heating costs with the remaining 70 percent classified as other electric expenditures.

Table VI-3
Percentage of Heating Bill Paid by MEAP Benefits by Fuel Type

Main Heating Fuel	Main Heating Expenditures	Average MEAP Benefit	Percent of Bill Paid
Electric[48]	$600	$367	61%
Natural Gas	$1,174	$492	42%
Fuel Oil/Kerosene	$1,491	$1,298	87%
Propane	$2,124	$1,244	59%
All OHEP Income-Eligible Households	$916	$538	59%

Source: ACS (2014 – 2016) / FY 2017 OHEP Data File

B. Energy Burden

Table VI-4 displays household energy burden by income level[49]. It shows the average annual energy burden for low-income households is 13%, compared to 2% for non-low-income households. Within the low-income market, households that have very low-income have an average energy burden of 42%, whereas households, at the upper low-income range have an average energy burden of 8%.

Table VI-4
Energy Burden by Income Level

Federal Poverty Level (FPL)	Average Annual Energy Bill	Average Annual Income	Average Energy Burden
Low-Income Households	$2,658	$20,038	13%
0 - 75% FPL	$2,541	$6,120	42%
76 - 110% FPL	$2,642	$16,386	16%
111 - 150% FPL	$2,706	$24,144	11%
151 - 175% FPL	$2,663	$29,341	9%
176 - 200% FPL	$2,805	$34,928	8%
Non-Low-Income Households	$3,032	$121,614	2%
All Households	$2,961	$100,821	3%

Source: ACS (2014 – 2016)

Table VI-5 shows how household energy burden differs by housing unit type. Households living in large multifamily buildings have the lowest energy burden on average, despite

[48] ACS does not separate heating electric expenditures from non-heating electric expenditures. The 2009 RECS data for electric heat households of similar geographic and income characteristics was used to estimate the average percentage of the total electric bill resulting from electric heat. Based on these estimates it was assumed that 26 percent of the electric bill for electric heat households was due to heating costs with the remaining 74 percent classified as other electric expenditures.

[49] Average Annual Energy Bill includes energy costs for secondary fuel types, and therefore is greater than Main Heating and Other Electric expenditures described in Table II-47.

having the lowest average income. This is because their energy bills are 66% lower than the average low-income household, likely due to a smaller home size and more efficient shared heating systems.

Table VI-5
Energy Burden of Low-Income Households by Housing Unit Type

Housing Unit Type	Average Energy Bill	Average Income	Average Energy Burden
Single Family Attahed	$2,918	$21,423	14%
Single Family Detached	$3,367	$22,492	15%
Small Mulitfamily	$2,029	$17,450	12%
Large Multifamily	$1,606	$17,233	9%
Mobile Home	$3,140	$19,847	16%
All Low-Income Households	$2,658	$20,038	13%

Source: ACS (2014 – 2016)

Table VI-6 shows how energy burden differs by household type. Despite having lower energy bills, energy burden is highest among older households without children and elderly individual households. These households have significantly lower annual incomes on average. Conversely, households with children have higher energy bills but lower energy burdens due to larger annual incomes. These data suggest that more elderly and older households without children need to rely on energy assistance to keep energy costs affordable, whereas households with children may be able to reduce their energy usage and significantly increase energy affordability with energy efficiency services.

Table VI-6
Energy Burden by Household Type

Head of Household Type	Average Annual Energy Bill	Average Annual Income	Average Energy Burden
Elderly Individual	$2,161	$12,828	17%
Elderly Couple	$3,190	$24,461	13%
Older without Children (40-59)	$2,535	$14,417	18%
Older with Children (40-59)	$3,261	$29,723	11%
Younger without Children (<40)	$1,808	$13,386	14%
Younger with Children (<40)	$2,733	$25,448	11%
All Low-Income Households	$2,657	$19,985	13%

Source: ACS (2014 – 2016) / Totals may not sum to 100% due to rounding.

Table VI-7 segments home energy burden by main heating fuel. The data shows that household energy burden is 75% higher for homes that heat with propane and 50% higher for homes that heat with fuel oil/kerosene than those that heat with electric. While these

households represent a small share of the total low-income population, it is important to consider how DHCD and OHEP target energy efficiency and bill assistance programs to these populations.

Table VI-7
Energy Burden of Low-Income Households by Fuel Type

Main Heating Fuel	Average Energy Bill	Average Income	Average Energy Burden
Electric	$2,259	$18,991	12%
Natural Gas	$2,852	$21,078	14%
Fuel Oil/Kerosene	$3,661	$20,051	18%
Propane	$4,202	$20,155	21%
Other	$3,328	$21,519	15%
All Low-Income Households	$2,658	$20,038	13%

Source: ACS (2014 – 2016) / Totals may not sum to 100% due to rounding.

Table VI-8 analyzes the impact of the MEAP benefit on home heating burden by fuel type. Overall, households that are income-eligible for OHEP have a gross heating burden of 5% prior to receiving energy assistance. Using fiscal year 2017 average MEAP benefits, the study calculated the average group net heating burden by fuel type for households after receiving MEAP. The data show MEAP benefits reduce heating burden to 1% on average for households that heat with electric and oil. Households that heat with propane have a 5% group net heating burden and households that heat with gas have a 4% group net heating burden after receiving MEAP. Although electric costs should be considered when calculating program impact on total energy burden, the data reinforce previous analysis that OHEP should review its distribution of heating benefits across fuel types.

Table VI-8
Gross and Net Heating Burden by Fuel Type for MEAP Recipients[50]

Main Heating Fuel	Average Main Heating Bill[51]	Average Income	Average Gross Heating Burden	Average MEAP Benefit	Average Net Heating Burden
Electric	$600	$16,560	4%	$367	1%
Natural Gas	$1,174	$18,447	6%	$492	4%
Fuel Oil/Kerosene[52]	$1,491	$17,489	9%	$1,298	1%
Propane	$2,124	$17,462	12%	$1,244	5%
All OHEP Income-Eligible Households[53]	$916	$17,469	5%	$538	2%

Source: ACS (2014 – 2016) / FY 2017 OHEP Data File

Table VI-9 analyzes the impact of MEAP and EUSP benefits on home energy burden by county. Statewide, income-eligible households pay 15% of their income towards home energy costs prior to receipt of OHEP. The average energy burden of households who are income-eligible for OHEP is higher than the average energy burden of all low-income households (up to 200% of the FPL) because OHEP only serves households up to 175% FPL. When accounting for average combined MEAP and EUSP benefits in each county, net energy burden is reduced to 9% statewide. Energy burden is higher in Baltimore City (11%), primarily due to low average income, and in the Mid/Upper Shore, Anne Arundel, and Carroll counties (10%), due to a combination of higher average energy bills and lower incomes.

While this study does not advocate for a specific energy affordability target, OPC has advocated for adoption of an energy affordability standard proposed by Fisher, Sheehan, and Colton of 6% based on the idea that a household can afford to spend 30% of income on shelter costs, and that 20% of shelter costs are used for energy bills.[54] This is consistent with the standard used in OHEP's proposed Supplemental Targeted Energy Program (STEP) and bill assistance programs in other states such as New Jersey and New York. Using this standard, the data suggest that on average, current OHEP funding is insufficient to bring households to an affordable energy burden.

[50] Average Gross Energy Burden is based off self-reported responses to the ACS of household energy bills and may differ from actual energy bills.
[51] Average main heating bill is calculated by group average of each main heating fuel type. Heating expenditures only reflect fuel costs for the primary fuel type indicated by respondents, since fuel expenditures for other fuel types could be for supplemental heat or for non-heating purposes such as cooking
[52] ACS statistics report average energy bill of fuel oil and kerosene together. However, OHEP provides separate benefit amounts for households that heat with oil and kerosene. This data has been combined to determine average benefit of Fuel Oil/Kerosene; however, it is important to note that MEAP benefits for oil were $65 higher on average than kerosene in FY 2017.
[53] Statistics exclude households heating with other fuels or without a main heating fuel.
[54] For more information, see http://www.homeenergyaffordabilitygap.com/

Table VI-9
Gross and Net Energy Burden for OHEP Recipients Receiving MEAP and EUSP Benefits
County Areas

County Areas	Average Annual Energy Bill	Average Annual Income	Average Gross Energy Burden	Average Combined MEAP and EUSP Benefit	Average Net Energy Burden
Allegany & Garrett	$2,483	$16,837	15%	$1,185	8%
Anne Arundel	$2,734	$17,181	16%	$1,056	10%
Baltimore City	$2,677	$15,026	18%	$988	11%
Baltimore County	$2,478	$17,319	14%	$873	9%
Carroll	$2,798	$17,093	16%	$1,078	10%
Cecil	$2,974	$19,702	15%	$1,284	9%
Charles	$2,928	$18,396	16%	$1,266	9%
Frederick	$2,415	$18,004	13%	$918	8%
Harford	$2,558	$16,400	16%	$1,075	9%
Howard	$2,432	$17,722	14%	$891	9%
Montgomery	$2,450	$19,435	13%	$814	8%
Prince George's	$2,760	$19,937	14%	$1,111	8%
Queen Anne's, Talbot, Caroline, Dorchester, & Kent	$2,863	$17,312	17%	$1,208	10%
St. Mary's & Calvert	$2,941	$17,940	16%	$1,376	9%
Washington	$2,146	$17,806	12%	$966	7%
Wicomico, Worcester, & Somerset	$2,953	$17,941	16%	$1,255	9%
State Total	$2,632	$17,508	15%	$1,047	9%

Source: ACS (2014 – 2016) / FY 2017 OHEP Data File

C. *Shelter Burden*

Shelter burden is a statistic that can provide insight into housing affordability, and is used by the Department of Housing and Urban Development to establish guidelines for affordable housing. Shelter burden is calculated by determining the percentage of income a household pays towards shelter costs. For renters, shelter costs include rent, utilities, and fuels. For homeowners, shelter costs include mortgages, real estate taxes, insurance, utilities, fuels, mobile home costs, and condominium fees. Housing experts generally state that households should spend no more than 30% of their income on the cost of housing.

Table VI-10 shows average annual shelter costs, income, and shelter burden for Maryland households. The average shelter burden for low-income households is 66%, compared to 17% for non-low-income households. Within the low-income market, shelter burden is 208% for the lowest income households, while low-income households with higher incomes

have a shelter burden that is closer to, but still above the affordability target of 30%. It is important to note that shelter burden compares annual income to annual shelter expenditures; income does not include non-cash assistance benefits, assistance from others, or withdrawals from assets.[55] The data indicate that across all poverty levels, low-income households in Maryland do not have affordable shelter costs.

Table VI-10
Shelter Burden by Income Level

Federal Poverty Level (FPL)	Average Annual Shelter Expenditures	Average Annual Income	Average Shelter Burden[56]
All Low-Income Households	$13,154	$19,985	66%
0 – 75% FPL	$12,705	$6,103	208%
76% - 110% FPL	$12,122	$16,359	74%
111% - 150% FPL	$13,458	$24,124	56%
151% - 175% FPL	$13,650	$29,346	47%
176% - 200% FPL	$14,374	$34,895	41%
Non-Low-Income Households	$20,928	$121,540	17%
All Households	$19,357	$100,670	19%

Source: ACS (2014 – 2016)

Table VI-11 shows that although shelter burden is consistent across regions for non-low-income households, low-income household shelter burden varies significantly by geography. Shelter burden for low-income households is highest in the Capital and Southern regions, whereas shelter burden is lower in the Eastern Shore and Western Maryland.

[55] Households that do not own the housing unit but do not pay rent are excluded from the analysis.
[56] Shelter burden estimates shown are group estimates.

Table VI-11
Shelter Burden by Income Level
State Regions

Federal Poverty Level (FPL)	State Region				
	Capital	Central	Eastern Shore	Southern	Western
Low-Income Households	75%	65%	54%	70%	51%
0% - 75% FPL	278%	197%	157%	238%	144%
76% - 110% FPL	58%	70%	69%	74%	59%
111% - 150% FPL	63%	54%	44%	66%	46%
151% - 175% FPL	54%	46%	36%	47%	38%
176% - 200% FPL	48%	40%	36%	39%	33%
Non-Low-Income Households	18%	17%	17%	18%	17%
All Households	19%	19%	20%	20%	19%

Source: ACS (2014 – 2016)

Table VI-12 shows how shelter burden differs by head of household type. While households with children have higher shelter expenditures, their energy burden is lower than other household types as a result of higher average income. Conversely, younger households without children and older households without children have the highest shelter burdens, primarily due to significantly lower annual income.

Table VI-12
Shelter Burden Distribution by Head of Household Type

Head of Household Type	Average Annual Shelter Expenditures	Average Annual Income	Average Shelter Burden
Elderly Individual	$9,439	$12,828	74%
Elderly Couple	$12,964	$24,461	53%
Older without Children (40-59)	$12,364	$14,417	86%
Older with Children (40-59)	$17,492	$29,723	59%
Younger without Children (<40)	$14,080	$13,386	105%
Younger with Children (<40)	$14,762	$25,448	58%
All Low-Income Households	$13,154	$19,985	66%

Source: ACS (2014 – 2016) / Totals may not sum to 100% due to rounding.

D. Key Findings and Recommendations

The statistics presented in this section of the report show that low-income households have unaffordable energy and shelter costs, although there are differences within segments of the low-income market. Key findings include:

- Home heating and electric expenditures are highest on average for households that heat with propane, kerosene, and fuel oil. This is consistent with findings that energy costs are highest on the Eastern Shore and in Southern Maryland, where more households heat with these fuels.

- Despite higher energy expenditures on the Eastern Shore and in Southern Maryland, participation in weatherization is low in these areas. DHCD should target energy efficiency services to households in these areas that heat with bulk fuels. EmPOWER funds can be used for households that receive their electricity through Delmarva Power and Southern Maryland Energy Cooperative. Households served by other electric utilities can be targeted using Department of Energy (DOE) weatherization funds. Although limited DOE funding may restrict targeting opportunities, DHCD should work with local agencies in these service areas to ensure that households across the state have access to the program.

- OHEP recipients that heat with fuel oil/kerosene and electric have lower net heating burdens on average after receipt of MEAP benefits than households that heat with propane and electricity. This is because MEAP pays a larger share of heating bills for these fuel types. OHEP should review its benefit allocation formula to account for differences in energy burden outcomes by fuel type. More refined energy cost data from recipients' energy bills is needed to assess the distribution of costs, burden, and benefits and to conduct this analysis.

- While average gross energy burden of low-income households is 13%, this number varies from as high as 42% for households between 0% and 75% of the FPL and 8% for households between 176% and 200% of the FPL. Analysis of OHEP data shows that, when accounting for receipt of MEAP and EUSP benefits, net average energy burden for households income-eligible for OHEP is 9%. The data confirm that additional resources are needed to achieve a 6% energy burden outcome for all low-income households.

- Based on a 30% shelter burden target, shelter costs are unaffordable on average for low-income households at all income levels. Shelter burden is highest in the Capital and Southern regions of Maryland, and the highest average energy burdens are faced by adults without children and elderly individuals. Whereas energy burden for low-income households is highest in Baltimore City and the Upper/Mid-Shore area, shelter burden is highest in the Capital region of the state. Higher cost of living in the Washington D.C. suburban area may be a contributing factor towards higher shelter burdens.

VII. Profiles of Low-Income Market Segments

The study used ACS data to quantify the size, demographics, and shelter and energy costs for five segments of the low-income population in Maryland. These five segments provide a diverse representation of various segments of the low-income market. For each segment, we present group average statistics and provide an analysis of the findings. A description of each selected segment analyzed is listed below:

- **Elderly One-Person Households on Fixed Income of Social Security or Supplemental Security Income** – Low-income households age 60 years or older whose only source of income is Social Security and/or Supplemental Security Income (SSI).
- **Baltimore City Renters** – Low-income households in Baltimore City that do not own their homes.
- **Capital Region Working Poor** – Low-income households in the Capital Region (Montgomery and Prince George's County) where at least one household member earns income from wages, salaries, or self-employment.
- **Eastern Shore Households that Heat with Delivered Fuels** – Low-income households on the Eastern Shore whose main heating source is fuel oil, kerosene, or propane.
- **Western Region Owners of Single-Family Homes** – Low-income households in the Western Region (Garrett, Allegany, Washington, and Frederick County) that live-in and own single-family homes.

A. Client Profiles

Table VII-1 shows the characteristics of each population segment in comparison to statistics for the entire low-income population. Analysis of each population segment is included below.

Table VII-1
Home Energy and Housing Costs of Segments of the Low-Income Population

Characteristic	Elderly One-Person Households on Fixed Income	Baltimore City Renters	Capital Region Working Poor	Eastern Shore Heat with Delivered Fuels	Western Region Single-Family Homeowners	All Low-Income Households
Size of Segment						
Number of Households	57,321	66,366	74,649	12,742	18,548	447,863
Percent of Low-Income Households	13%	15%	17%	3%	4%	100%
Demographics						
Average Household Size	1.0	2.2	3.4	2.4	2.3	2.4
Average Income	$12,607	$15,618	$28,050	$20,306	$22,197	$19,985
Percent of Segment < 100% FPL	45%	58%	28%	37%	26%	41%
Percent Received SNAP Last Year	30%	58%	29%	32%	19%	36%
Percent that Own Home	48%	0%	32%	67%	100%	40%
Shelter and Energy						
Average Annual Shelter Costs (Housing and Energy)	$8,898	$10,032	$18,418	$10,932	$10,655	$13,154
Average Group Shelter Burden (Housing and Energy)	71%	64%	66%	54%	48%	66%
Average Annual Energy Costs	$2,141	$2,441	$2,727	$3,884	$2,774	$2,657
Average Group Energy Burden[57]	17%	16%	10%	19%	12%	13%
Percent of Shelter Costs Related to Energy Costs	24%	24%	15%	36%	26%	20%

Source: ACS (2014 – 2016) /

Elderly One-Person Households on a Fixed-Income of Social Security or Supplemental Security Income (SSI)

Thirteen percent of Maryland's low-income households are elderly one-person households that only receive income from Social Security or Supplemental Security Income (SSI). While average energy expenses for these households are more than $500 lower than the average for all low-income households ($2,141 per year), these households have a higher than average energy burden due to their limited, fixed income. Average income is $12,607 for these households compared to $19,985 for the overall low-income population. Although seniors generally have lower expenses because they are not working and live in smaller homes, the estimated shelter burden for these households is substantial; over 70% based on average reported income and housing expenses. Additionally, they are likely to have greater

[57] Energy burden is a subset of shelter burden.

medical expenses than the average household.[58] These results show that elderly single-person households on a fixed income should be considered for energy assistance program prioritization, despite their low energy costs.

Baltimore City Renters

Of all Maryland counties, Baltimore City has the highest percentage of low-income households that rent (72%). Baltimore City renters represent approximately 15 percent of the low-income households in Maryland, or more than 66,000 households. These households have average annual incomes of $15,618, more than 20 percent below the average for all low-income households. Of the five population segments analyzed, Baltimore City renters have the highest share of households that live below poverty (58%) and receive assistance from the Supplemental Nutrition Assistance Program (58%). Although average annual energy costs are lower for Baltimore City renter households than for all Maryland low-income households, the lower annual income for this segment results in a high average energy burden of nearly 16%. This is higher than the average energy burden of 13% for all low-income households. Energy costs represent almost one quarter of all shelter costs faced by these households.

Capital Region Working Poor

The "Working Poor" are low-income households where at least a portion of the household's income is from employment earnings (wages, salaries, or self-employment). In the Capital region surrounding Washington, D.C., nearly 75,000 low-income households earned income from employment, representing 17% of Maryland's low-income households. While the "Working Poor" in the Capital region earn more income than the average low-income household in Maryland, these households have shelter costs that are significantly greater than the average shelter costs. As a result, housing expenses consume a high portion of these household's income (66%), with energy expenses representing a modest share of those expenses (15%). Their energy burden, at 10%, is lower than that of the overall low-income population.

Eastern Shore Households that Heat with Delivered Fuels

Low-income households who live on the Eastern Shore are the most likely to heat their homes with fuel oil, kerosene, or propane. For these households, average energy costs are nearly $3,900 a year, more than 46% greater than the average energy costs for all low-income households in Maryland. With an average energy burden of 19% and energy costs consisting of 36% of shelter expenses, energy costs are a more significant financial consideration for these low-income households. Given the high rate of homeownership (67%), energy efficiency programs may have success identifying eligible housing and achieving energy savings among this population.

[58] Machlin, S. and Carper, K. "Out-of-Pocket Health Care Expenses by Age and Insurance Coverage". Statistical Brief #411. June 2014. Agency for Healthcare Research and Quality.

Western Region Owners of Single-Family Homes

The Western region of Maryland borders West Virginia and Pennsylvania and has the highest rate of poverty of all Maryland regions, as well as the highest proportion of households living in older housing. The average income is about $22,200 a year and about one quarter live below poverty. While the average shelter burden (48%) and energy burden (12%) are below the average for all low-income households in Maryland, this population has higher than average energy expenses and has potential to benefit from energy efficiency programs.

VIII. Findings and Recommendations

The purpose of the Maryland Low-Income Market Characterization Study is to document the energy needs of low-income households, determine how those needs are being met by existing programs, and recommend how programs can target unmet energy needs to better serve the low-income market.

A. Key Findings

The following are some of the most important findings for the low-income market and the energy programs that serve them.

- **Diversity in the Low-Income Market** – Differences in income, demographics, housing, energy use, and energy affordability must be considered to most effectively target energy programs. These differences require macro-level state policies that promote equity in the distribution of benefits, as well as micro-level targeting that addresses the needs of individual segments of the low-income market.
- **Program Participation Varies by Population** – The study assesses how segments of the low-income market utilize current energy programs.
    - Program participation differs substantially by county for both OHEP and weatherization, demonstrating that some local subgrantees may improve participation with improved outreach and reduced barriers to obtaining services.
    - Households between 150% and 200% of the FPL have the lowest participation in weatherization. Households with income above 175% of the FPL must directly apply to DHCD for assistance, whereas other households are categorically eligible based on receipt of OHEP benefits.
    - Although renters comprise 60% of the low-income population, only 5% of tenants living in single-family and small multifamily housing received weatherization from fiscal years 2010 through 2017. These households face particularly high barriers to obtaining energy efficiency services. However, renters are more likely to receive energy assistance.
    - Households that heat with more expensive bulk fuels participate in energy assistance at a higher rate than households that heat with electric and gas; however, most counties where bulk fuels are used have lower participation in weatherization.
    - Elderly households participate in energy assistance at a lower rate than the total low-income population, and data provided by DHCD indicate low participation in energy efficiency services among all vulnerable household types.
- **Variation in Income of Low-Income Households** – More than one-in-five households in Maryland are low-income. Within this market, income varies significantly:

- One-quarter of low-income households have an annual income under $10,000. These households are likely to face significant challenges managing their energy costs and require assistance from public programs.
- 64,870 households, or 14% of the low-income population, have income between 176% and 200% of the FPL. These households are over-income for energy assistance benefits and need to directly apply for weatherization services.
- Over half of low-income households earn wages, and households at higher income levels are more likely to work. Nearly one-third of low-income households only receive retirement income. These households are likely to need assistance with their energy costs on an on-going basis.
- In rural parts of the state and Baltimore City, a higher share of the population is low-income. However, most low-income households live in the Capital and Central regions of the state. One-in-five low-income households are located in Baltimore City.
- On average, elderly individuals living alone are the poorest household type and comprise one-quarter of the low-income population.

- **Housing and Energy Costs for Low-Income Households** – Although energy and shelter costs vary by income and demographics, the research shows that energy and housing are unaffordable on average (i.e. they have energy burdens over 6% and shelter burdens over 30% of income).
  - Average gross energy burden ranges from 42% for households between 0% and 75% FPL to 8% for households between 176% and 200% FPL.
  - For some populations, high energy and shelter burdens are driven by very low incomes, and for others they are driven by high energy and housing costs. For example, elderly individuals on fixed income have low energy bills but high energy burdens because they have very low incomes. Households that heat with bulk fuels on the Eastern Shore have more income but have high energy burdens because they have high energy bills.
  - OHEP benefits on average reduce household energy burden from 15% to 9%. However, burden reduction differs by fuel type. Households that heat with electricity and fuel oil/kerosene have lower net heating burden than households that heat with gas or propane.
  - A large part of the low-income market has high electric usage and may be strong candidates for DHCD's weatherization funding sources that target electric reduction. A total of 31% of low-income single-family households that do not heat with electricity use more than 10,000 kWh per year and 44% of low-income single-family households that heat with electricity use more than 18,000 kWh per year.

- Whereas energy burden for low-income households is highest in Baltimore City and the Upper/Mid Eastern Shore, shelter burden is highest in the Capital region of the state. Higher cost of living in the Washington D.C. suburban area may be a contributing factor towards higher shelter burdens.
- Water and sewer reflect a growing cost for low-income households, although costs vary significantly by county. Water assistance programs are available for low-income households in certain parts of the state, although most are not coordinated with energy assistance programs.

- **Barriers to Accessing Energy Programs** – The research shows specialized issues agencies should account for to ensure all households have access to program services.
  - Language barriers are particularly high in Montgomery, Prince George's and Howard counties, indicating the need for language access services and community partners to support non-English speaking populations.
  - OHEP is serving elderly households at a lower rate than the overall income-eligible population. Elderly individuals are less likely to have access to the internet and may rely on traditional outreach and application processes to access benefits.
  - DHCD is serving vulnerable households at a much lower rate than the overall low-income population. DHCD should explore whether this is due to data collection issues or a need to conduct more targeted outreach.
  - Over one-third of the low-income market lives in large multifamily housing, with the vast majority of these households living in the Capital and Central regions. Most of these households cannot directly receive services through DHCD's single-family weatherization program, but may benefit if their landlord applies through DHCD's multifamily energy efficiency improvement programs.
  - Low-income households are more likely to live in older housing than non-low-income households. In the Western and Central regions, over 20% of the low-income population lives in housing built before 1940. This housing may provide greater opportunities for energy efficiency, but also greater barriers due to health and safety issues that may be more prevalent.
  - It is challenging to engage owners of rental housing to participate in energy efficiency programs and low-income households are much more likely to rent their homes than non-low-income households. Rental rates are highest in urban and suburban parts of the state which also have high rates of multifamily and/or single family attached housing. In Baltimore City, 72% of low-income households rent their homes.
  - While most households pay their heat directly, 12% of the population pays for heat through their rent. This is most common in the Capital region where there are also high rates of multifamily housing.

While findings for specific subpopulations within the low-income market provide important insight into opportunities to improve program performance, each should be considered within the larger context of Maryland's low-income market.

B. Key Recommendations

The following recommendations were made to better meet the energy needs of Maryland's low-income market.

- **Define Program Goals and Outcomes** – The study finds that Maryland's current energy assistance and energy efficiency programs play a critical role in making home energy more affordable for low-income households, but that more work is needed to bring household energy burden to an affordable level. As advocates, implementers, and policymakers discuss policies to better meet the energy needs of Maryland's low-income population, it is important to define what success looks like for the low-income market as a whole, and how outcomes should be distributed across the population.

- **Target Outreach to Populations Underutilizing Existing Programs** – Existing energy programs should evaluate factors that may influence differences in participation and target outreach to populations with unaffordable energy costs who underutilize current programs. Stakeholders serving the energy needs of Maryland's low-income population should consider best practices used by some local agencies and build on those strengths.

- **Address Differences in Home Energy Costs by Fuel Type** – OHEP benefits cover a larger share of home heating costs for households heating with fuel oil/kerosene and electricity than households heating with propane and natural gas. As a result, propane and gas-heated homes have higher net heating burdens. OHEP should conduct further research to assess its allocation of benefits to ensure equity across fuel types. DHCD's single family weatherization program serves a smaller share of the low-income population in counties where more households heat with expensive bulk fuels. Although DHCD cannot use EmPOWER funds in some parts of these counties, it can use DOE funds in these counties to maximize energy savings and target households with high energy costs.

- **Develop Strategies for Localized Issues** –We recommend that subgrantees be given the data, guidance, and resources needed to customize strategies to the needs and composition of the population they serve. Both DHCD and OHEP mandate that subgrantees develop annual plans that detail how they will perform their work. State agencies can leverage these plans to incorporate performance measurement. As part of this effort, states and subgrantees should consider the financial and staffing resources needed to achieve desired outcomes.

Agencies can build on existing program strengths to incrementally improve energy outcomes for low-income households in Maryland. Parallel to these efforts, we believe stakeholders should discuss the broader energy affordability challenges facing the low-income market to identify the appropriate resources and programming that are needed. Additional research and analysis should be conducted to specify desired outcomes and

assess how policy approaches can facilitate these outcomes for the many segments of the low-income market.

IX. Appendix

This appendix contains a glossary of acronyms and methodology reports for the public use data sets used in the analysis.

Appendix A – Acronyms

ACS	American Community Survey
DHCD	Maryland Department of Housing & Community Development
EIA	Energy Information Administration
EUSP	Electric Universal Service Program
FPL	Federal Poverty Level
kWh	Kilowatt Hour
LIHEAP	Low Income Home Energy Assistance Program
MEAP	Maryland Energy Assistance Program
OHEP	Maryland Department of Human Services, Office of Home Energy Programs
OPC	Maryland Office of People's Counsel
PUMA	Public Use Microdata Area
PUMS	Public Use Microdata Sample
RECS	Residential Energy Consumption Survey
SNAP	Supplemental Nutrition Assistance Program
SSI	Supplemental Security Income
WSSC	Washington Suburban Sanitary Commission

Appendix B – Methodology Report – American Community Survey

Introduction to American Community Survey

The American Community Survey (ACS) is an ongoing survey conducted annually by the U.S. Census Bureau. The ACS provides vital information on a yearly basis about our nation and its people. This includes information on income, demographic characteristics, housing characteristics, and energy and housing costs. Each year, approximately 38,000 households in Maryland participate in the ACS. The ACS collects information from individuals, households, and housing units, which allows for a variety of analysis options.[59] Currently, the Census Bureau releases ACS statistics and data that represent a single year period and estimates that represent a five-year period.

Maryland PUMS Data

The Census Bureau publishes summary statistics and summary-level data products derived from the ACS. In addition, the Bureau publishes ACS Public Use Microdata Sample (PUMS) files that include a sample of untabulated records for individual persons and housing units that completed the survey. Unlike the summary-level data products, the PUMS files allow researchers to develop customized statistics that are not published by the Census Bureau.

For the Maryland OPC Market Characterization Study, APPRISE used the 1-year ACS PUMS data for 2014, 2015, and 2016. Estimates produced from the PUMS files are available for each Census Region, Census Division, State, and Public Use Microdata Area (PUMA). The PUMA is the lowest geographic identifier and they are constructed to maintain approximately equal populations of at least 100,000 people. PUMAs are related to counties in three ways. First, a PUMA can identify the same geographic border as a single county. Second, a single county can be divided into multiple PUMAs. For example, the highly-populated Baltimore County is divided into seven PUMAs. Third, a single PUMA can be split among multiple counties such as the single PUMA which spans Wicomico, Worcester and Somerset counties. PUMAs are re-defined each decennial Census.

The 1-year ACS PUMS files can be used to furnish state-level statistics. However, to develop statistics for sub-state areas, the Census Bureau advises data users to use multiyear files. To produce estimates for sub-state geographic regions, the project team used the 1-year ACS PUMS files to develop a three-year file to produce estimates that represent the average for the 2014-2016 period. These three-year estimates have the advantages of greater precision than estimates from individual 1-year ACS PUMS files and greater currency than those derived from 5-year ACS PUMS files.

Table APP B-1 below presents the number of households in Maryland that were included in the ACS PUMS files for each year used for this analysis.

[59] https://www.census.gov/programs-surveys/acs/about.html

Table APP B-1 – Number of Maryland Households Included in the ACS PUMS Files (2014-2016)

Survey Year	Maryland Sample Size
2014	22,594
2015	22,706
2016	22,847
TOTAL	68,147

Analysis Data

The Maryland OPC Market Characterization Study used variables that were taken directly from the ACS data files as well as some computed variables. Computed variables used throughout the report include the following.

- Annual Household Income – Used data on annual income, year of survey participation, and inflation adjustment factors to compute the annual income for each household in 2016 dollars.
- Cost Variables – All cost variables used inflation adjustment factors to convert all amounts to 2016 dollars.
- Poverty Group – Used data on the annual income and household size to compute the ratio of household income to the HHS poverty guideline for each household size. Households were then categorized into poverty groups by the ratio of household income to HHS poverty guidelines. As income from all years was adjusted to 2016 dollars, 2016 HHS poverty guidelines were used for all households.
- Geographic Regions – Developed matching between Maryland counties and PUMAs defined by the 2010 Census to create County Areas as well as State Regions that approximate utility service areas.
- Head of Household Type – Used data on age of head of household, age of other household members, and marital status of head of household to define mutually exclusive categories for head of household type based on age, marital status, and the presence of children.

The following sections outline the variables used and the methodologies for the computed variables for variables specific to each section of the report.

Income Characteristics

The section on income and poverty statistics used variables taken directly from the ACS file, the computed variables described above, as well as the following computed variables.

- Disabled Individual – ACS classifies disability status based on answers to questions related to hearing and visual impairments, and questions related to difficulties with certain mental, emotional, and physical activities. This definition was supplemented using information on

the receipt of supplementary security and social security income only available to disabled individuals.

- Veteran – All individuals with a Veteran Period of Service recorded in the ACS survey, or a VA veteran disability rating greater than zero percent were marked as veterans.[60] All veterans with a VA disability rating greater than zero percent were coded as disabled veterans.

Demographic Characteristics

The household demographics section used variables directly from the ACS file, computed variables already described, and the following additional computed variables.

- Race and Ethnicity Groups – ACS data on race and ethnicity were combined to create mutually exclusive categories.

- Language – The ACS provides a blank row where respondents can write in what language they speak at home. The language category "Chinese" includes households where any of the following answers were given: "Chinese", "Mandarin", "Cantonese" and "Min Nan Chinese".

  Beginning in 2016, the Census Bureau changed the way the responses to the detailed language question were coded, to allow for a more precise linguistic categorization of respondents. Languages that did not have an individual code prior to 2016 were combined into the language group under which they were reported prior to 2016. Two such groups are commonly spoken in certain areas of Maryland, "Persian" and "Yoruba, Ibo and Kru". According to the 2016 ACS, the only Persian language spoken in Maryland is Farsi, so all households that were coded under Persian in the 2014 and 2015 ACS were recoded as Farsi. A similar assumption cannot be made for the "Yoruba, Ibo and Kru" language group, however.

  The full name in the ACS for "African Lang.", the third most widely spoken language group in Charles County, is "Other Languages of Africa". ACS does not provide specific information on what these languages are.

- Internet Subscription – Respondents who use a satellite internet service subscription were combined with the other category. The Mobile Broadband Plan includes individuals who use mobile broadband to access the internet either via their mobile phone or with a computer. Only individuals who pay for internet subscriptions were asked about the type of subscription. It does not include information on types of internet connections for households who may have access to the internet but do not pay for an internet subscription.

Housing Characteristics

The section on housing characteristics included variables directly from the ACS file, computed variables described above, and the following additional computed variables.

[60] This excludes individuals who were only on active duty for training purposes and were not injured or killed during training, pursuant to the definition available at http://veterans.maryland.gov/military-service-recognition.

- Housing type – Used data on building type. Apartment buildings with two to four apartments were classified as small multifamily. Buildings with five or more units were classified as large multifamily. The mobile home category included a small number of building types classified as other in the ACS data, which encompassed housing types such as boats, RVs, and vans.

- Owner/Renter Status – Households who did not own the housing unit but occupied it without payment of rent were classified as renters.

Energy and Utilities

The section on energy characteristics included variables directly from the ACS file, computed variables described above, and the following additional computed variables.[61]

- Main Heating Fuel – Households listing coal/coke, wood, and solar were consolidated with the Other category. When reporting on main heating expenditures, only fuel expenditures for the primary fuel type reported by households are included. Households reporting no fuel used are excluded from analysis of main heating fuel.

- Method of Payment – Only households that specified heat included in rent were classified as such. Households with no heating fuel charges that did not specify charged included in rent were classified as paying heating bill direct to vendor and assumed to have been shut-off or surveyed in a month with no heating charges.

Energy Burden

The section on energy burden included variables directly from the ACS file, computed variables described above, and the following additional computed variables.[62]

- Main Heating Expenditures – ACS does not separate heating electric expenditures from non-heating electric expenditures. The 2009 RECS data for electric heat households of similar geographic and income characteristics was used to estimate the average percentage of the total electric bill resulting from electric heat. Based on these estimates it was assumed that 26 percent of the electric bill for electric heat households was due to heating costs with the remaining 74 percent classified as other electric expenditures. Statistics for non-electric heating households used data direct from ACS. Households whose main heating bill payment is included in their rent were excluded from this calculation.

- Other Electric Expenditures – ACS does not separate heating electric expenditures from non-heating electric expenditures. The 2009 RECS data for electric heat households of similar geographic and income characteristics was used to estimate the average percentage of the total electric bill resulting from electric heat. Based on these estimates it was assumed that 26 percent of the electric bill for electric heat households was due to heating costs with the remaining 74 percent classified as other electric expenditures. Statistics for non-electric heating households used data direct from ACS. Households whose electricity bill is included in their rent were excluded from this calculation

[61] This section also included data from the 2009 RECS survey as described in the RECS data methodology summary.
[62] This section also included data from the 2009 RECS survey as described in the RECS data methodology summary.

- Annual Energy Bill – ACS data includes data on electric and gas expenditures for the most recent month, and yearly expenditures for other fuels. Annual gas and electricity costs were estimated by multiplying the monthly cost by 12. Yearly data on electric, gas and other fuel costs was summed to find the total annual energy bill. Since energy usage varies by month (e.g., gas bills are much higher in winter months than in summer months), the annualized energy bill is likely to be much higher than the respondent's actual energy bill for some households and much lower than actual for others. Households whose main heating or electricity bill payments are included in the rent were excluded from this calculation.

- Average Energy Burden – Since annual energy bills are likely to over or understate true energy costs at the individual household level, average energy burden using ACS data used mean group burdens. Average annual energy costs for the group were divided by the average annual income for the group.[63]

Shelter Burden

The section on energy and shelter burden included variables directly from the ACS file, computed variables described above, and the following additional computed variables.

- Shelter Expenditures – For households who rent their homes, shelter expenditures were annualized from the ACS variable on monthly rent costs, which includes utility and fuel costs if they are paid by the renter or by someone else on behalf of the renter. For households who own their homes, shelter expenditures were annualized from the ACS variable on monthly owner costs, which includes mortgage payments, real estate taxes, various insurances, utilities, fuels, mobile home costs, and condominium fees.

- Shelter Burden – Estimates of shelter burden were calculated using the group mean shelter costs of the population divided by the group mean income.

[63] Energy burdens reported at the individual household level, including distribution of energy burdens, use 2009 RECS data due to the higher level of accuracy regarding annual energy costs.

Appendix C – Methodology Report – Residential Energy Consumption Survey

Introduction to Residential Energy Consumption Survey

The Residential Energy Consumption Survey (RECS) is a nationally representative survey of housing units administered by the U.S. Energy Information Administration (EIA). The RECS is conducted every four-to-six years and collects information on energy characteristics of the housing unit, usage patterns, and household demographics. The data collected from households that respond to the survey is combined with data from the households' energy suppliers (i.e., electric and gas utilities, and delivered fuel vendors) to estimate energy costs and usage for heating, cooling, appliances, and other uses.[64]

2009 RECS Data

EIA publishes summary statistics and summary-level data products derived from the RECS. In addition, EIA publishes public use microdata files for researchers to produce customized statistics for analysis.

For the Maryland OPC Market Characterization Study, APPRISE used the 2009 RECS, which was the most recent iteration of the survey with published final microdata files available. The 2009 RECS collected data from more than 12,000 households. The 2009 RECS data can be used to produce estimates for Census Regions, Census Divisions, and for groups of states or larger individual states. For this analysis, APPRISE produced estimates for the Mid-Atlantic Region, which includes Maryland, Washington D.C., Delaware, and West Virginia. A total of 228 households were included in the 2009 RECS Mid-Atlantic Region data used for this analysis.

Variables Used for Analysis

The Maryland OPC Market Characterization Study used variables that were taken directly from the 2009 RECS data file, as well as some computed variables. RECS variables used for this analysis included the following:

- Annual Income
- Household Income At or Below 150 percent of Poverty
- Number of Household Members
- Main Space Heating Fuel
- Housing Type
- Use of Electric Space Heater
- Use of Heating Stove
- Use of Air Conditioning
- Air Conditioning Type

[64] https://www.eia.gov/consumption/residential/about.php

- Electricity Usage (2009)