

## **NYSERDA LOW- TO MODERATE-INCOME MARKET CHARACTERIZATION STUDY METHODOLOGY REPORT - AMERICAN COMMUNITY SURVEY**

### **1.0 Introduction to American Community Survey**

The American Community Survey (ACS) is an ongoing survey conducted annually by the U.S. Bureau of the Census. It provides vital information on a yearly basis about our nation and its people. This includes information on income, program participation, and housing costs. The ACS collects information on individuals, households, and housing units, which allows for a variety of analysis options.<sup>1</sup>

### **2.0 New York State PUMS Data**

The ACS Public Use Microdata Sample (PUMS) files are a set of untabulated records about individual people or housing units. This analysis makes use of the American Community Survey public use data files for 2013, 2014, and 2015. Unlike the summary products available online, the PUMS files allow for the development of customized statistics that are not published by the Census Bureau.

Information is available at the 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 in each PUMA. PUMAs are related to counties in three ways. 1) A PUMA can identify the same geographic border as a single county. 2) A single county can be divided into multiple PUMAs. For example, the highly-populated Onondaga County (where Syracuse is located) is divided into four PUMAs. 3) A single PUMA can be split among multiple counties such as the single PUMA which spans Madison and Cortland counties. PUMAs are re-defined each decennial Census.

The annual American Community Survey can be used to furnish state-level statistics. However, to develop statistics for sub-state areas, the Census Bureau advises data users to use a three-year data file. For this study, the project team developed the recommended three-year file because the study includes analysis of sub-state geographic areas.

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<sup>1</sup> <https://www.census.gov/programs-surveys/acs/about.html>

**Table 2.1 - Sample Size of New York State ACS PUMS File**

Survey Year	NYS Sample Size
2013	74,183
2014	74,547
2015	74,355
TOTAL	223,085

### 3.0 Demographic, Income, and Housing Data

The LMI Market Characterization Study used variables that were taken directly from the ACS data files as well as some computed variables. The following are a list of the main computed variables.

- 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.
- Program Eligibility Groups – Used data on the annual income and household size to compute the income-eligibility of households for several national-level assistance programs (SNAP, LIHEAP, and HUD).
- Household Type – Used data on the household size and the ages of individuals in each household to develop household composition categories.
- Annual Household Income Group – Used data on annual income, year of survey participation, and inflation adjustment factors to compute the annual income for each household in 2015 dollars.
- Geographic Regions – Developed matching between New York counties and PUMAs defined by the 2010 Census to be able to produce statistics for sub-state geographic regions.
- Heating Fuel Bill Payment Method – Used data on the household’s main heating fuel and electric, gas, and delivered fuel bills to determine whether households pay their heating fuel bill direct to the vendor, whether it’s included in rent, or whether they only pay their electric non-heat bill direct-to-vendor.

The following table shows the complete set of variables used in the analysis, including a brief description of the variable and information on whether the variable was developed by the project team or was used directly from the PUMS data file.

**Table 3.1 - LMI Market Characterization Study ACS Data - Demographic, Income, Housing**

Variable Name	Variable Description	PUMS or Computed
year	ACS participation year	Computed
hincp	Annual household income; non-adjusted dollars	PUMS
adjinc	Income adjustment factor	PUMS
adj_factor_2013	Adjustment factor to convert 2013 dollars to 2015 dollars	Computed
adj_factor_2014	Adjustment factor to convert 2014 dollars to 2015 dollars	Computed
hincp_adj	Annual household income; 2015 dollars	Computed
np	Number of persons in the household (with value label for single member household)	PUMS
hh_num	Number of persons in the household (numeric)	Computed
Region	NYSERDA Economic Development Regions	Computed
PUMA10	PUMA region defined by 2010 Census	PUMS
PUMA10_AMI	PUMA 100% Area Median Income (AMI) based on household size	Computed
povh	100% HHSPG based on household size	Computed
povh130	130% HHSPG based on household size	Computed
povh150	150% HHSPG based on household size	Computed
stmed_4	State Median Income (SMI) for a 4-person household in New York State (NYS)	Computed
smi100	100% SMI for NYS based on household size	Computed
smi80	80% SMI for NYS based on household size	Computed
smi60	60% SMI for NYS based on household size	Computed
ami80_PUMA	80% of PUMA-based AMI based on household size	Computed
liheaph60	Federal maximum LIHEAP eligibility based on household size (greater of 60% SMI and 150% HHSPG)	Computed
hud_elig_ami	HUD eligibility based on household size (greater of 80% SMI and 80% AMI)	Computed
povratio	Percent of poverty level	Computed
povcategory	Percent of poverty level groups	Computed
hincp_adj_grp	Annual Household Income Groups; 2015 dollars	Computed
pov_seg	Program income-eligibility group	Computed
agep	Age of each member of the household	PUMS
min_age	Age of youngest household member	Computed
max_age	Age of oldest household member	Computed
over60_hh	Identifies households with at least one member over the age of 60	Computed

Variable Name	Variable Description	PUMS or Computed
under18_hh	Identifies households with at least one member under the age of 18	Computed
dis	Disability status of each member of the household	PUMS
dis_noneld	Identifies households with at least one disabled, non-elderly member	Computed
hh_type	Household Composition Type	Computed
rac1p	Race; detailed	PUMS
hispanic	Hispanic origin; detailed	PUMS
hispanic_recode	Hispanic origin; consolidated	Computed
race_ethn	Race/Ethnicity; consolidated	Computed
lngi	Linguistic Isolation	PUMS
lang_grp	Linguistic Isolation; separates Hispanic	Computed
bld	Housing unit type; detailed	PUMS
bld_type	Housing unit type; consolidated	Computed
ten	Owner/Renter status; detailed	PUMS
rent_own	Owner/Renter status; consolidated	Computed
hfl	Type of main heating fuel; detailed	PUMS
fuel_short	Type of main heating fuel; consolidated	Computed
elep	Monthly electricity bill; non-adjusted dollars	PUMS
gasp	Monthly gas bill; non-adjusted dollars	PUMS
fulp	Monthly delivered bill; non-adjusted dollars	PUMS
elec_bill_pay	Electric bill payment method	Computed
gas_bill_pay	Gas bill payment method	Computed
fuel_bill_pay	Delivered fuel bill payment method	Computed
heat_to_vendor	How the household pays their heating fuel bill	Computed
ybl	Housing vintage; detailed	PUMS
vintage	Housing vintage; consolidated	Computed
new_york	New York City boroughs based on PUMAs	Computed
con_region	Consolidated New York Geographic Regions	Computed
lmi_segment	Specific LMI population segment; numeric identifiers	Computed
lmi_segment_detailed	Specific LMI population segment; detailed descriptions	Computed
wgtp	Household weight	PUMS

### 4.0 Energy Burden Data

The project team developed a summary variable for energy burden using the self-reported data elements from ACS respondents. The summary variable was developed using the following steps.

- Electric Expenditures – Adjusted value of most recent electric bill for inflation to 2015 dollars. Annualized to create an estimate for a household’s annual electric bill.
- Gas Expenditures – Adjusted value of most recent gas bill for inflation to 2015 dollars. Annualized to create an estimate for a household’s annual gas bill.
- Delivered Expenditures – Adjusted value of most recent delivered fuel bill for inflation to 2015 dollars. Annualized to create an estimate for a household’s annual delivered fuel bill.
- Annual Household Income – Adjusted income for inflation to produce a household’s annual income in 2015 dollars.
- Individual Household Energy Burden - Energy burden is computed by dividing a household's total energy cost by their annual income.

In the ACS, respondents are asked to report on their most recent electric bill and on their most recent gas 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.

Table 4.1 shows the distribution of Natural Gas Expenditures from the ACS compared to those from the Residential Energy Consumption Survey (RECS). The ACS expenditure distribution is more variable than the RECS distribution; the RECS data furnish more accurate information on the distribution of expenditures and therefore the distribution of energy burden.

**Table 4.1 - Distribution of Natural Gas Expenditures - ACS vs. RECS**

Survey	10%	25%	Median	75%	90%
ACS Survey	240	366	977	1,802	2,931
RECS Survey	669	893	1,205	1,602	2,051

Table 4.2 shows the distribution of Electric Expenditures from the ACS compared to those from the RECS. As with natural gas, the ACS electric expenditure distribution is more variable than the RECS distribution.

**Table 4.2 - Distribution of Electric Expenditures - ACS vs. RECS**

Survey	10%	25%	Median	75%	90%
ACS Survey	600	855	1,440	2,320	3,484
RECS Survey	497	660	957	1,467	2,117

Because of this measurement issue, the ACS energy burden data is used to furnish statistics on the average group energy burden, but it not used to furnish statistics on the distribution of energy burden.

The following table shows the complete set of variables used in the energy burden analysis, including a brief description of the variable and information on whether the variable was developed by the project team or was used directly from the PUMS data file.

**Table 4.3 - LMI Market Characterization Study ACS Data - Energy Burden Analysis**

Variable Name	Variable Description	PUMS or Computed
elep	Monthly electricity bill; non-adjusted dollars	PUMS
gasp	Monthly gas bill; non-adjusted dollars	PUMS
fulp	Monthly delivered fuel bill; non-adjusted dollars	PUMS
year	ACS participation year	Computed
adj_factor_2013	Adjustment factor to convert 2013 dollars to 2015 dollars	Computed
adj_factor_2014	Adjustment factor to convert 2014 dollars to 2015 dollars	Computed
elep_adj	Monthly electricity bill; 2015 dollars	Computed
gasp_adj	Monthly gas bill; 2015 dollars	Computed
fulp_adj	Monthly delivered fuel bill; 2015 dollars	Computed
annual_elep_bill	Annual electricity bill; 2015 dollars	Computed
annual_gasp_bill	Annual gas bill; 2015 dollars	Computed
annual_fulp_bill	Annual delivered fuel bill; 2015 dollars	Computed
annual_total_bill	Annual total energy bill; 2015 dollars	Computed
hfl	Main heating fuel; detailed	PUMS
fuel_short	Main heating fuel; consolidated	Computed
hfl_con	Main heating fuel; consolidated	Computed
hincp	Annual household income, non-adjusted dollars	PUMS
adjinc	Household income adjustment factor	PUMS
hincp_adj	Annual household income, 2015 dollars	Computed

Variable Name	Variable Description	PUMS or Computed
bld_type	Housing unit type; consolidated	Computed
bld_type_con	Housing unit type; consolidated further	Computed
hincp_adj_grp	Annual household income groups; 2015 dollars	Computed
povcategory	Percent of poverty level groups	Computed
pov_seg	Program Group categories based on income	Computed
Region	NYSERDA Economic Development Region	Computed
new_york	New York City boroughs based on PUMAs	Computed
con_region	Consolidated New York geographic regions	Computed
wgtp	Household weight	PUMS

### 5.0 Shelter Burden Data

The project team developed a summary variable for shelter burden using the self-reported data elements from ACS respondents. The summary variable was developed using the following steps.

- Rental Housing Expenditures – Adjusted value of monthly costs associated with renting a home for inflation to 2015 dollars. These costs include rent and the estimated monthly costs for utilities and fuels. Annualized to create an estimate for a rental household’s annual shelter cost.
- Homeowner Housing Expenditures – Adjusted value of monthly costs associated with owning a home for inflation to 2015 dollars. These costs include mortgage payments or similar debts on the property; real estate taxes; fire, hazard, and flood insurance; utilities; fuels; and condominium fees and/or mobile home costs when applicable. Annualized to create an estimate for a homeowner’s annual shelter cost.
- Annual Household Income – Adjusted income for inflation to produce a household’s annual income in 2015 dollars. Shelter burden was produced by dividing a household’s shelter cost by their annual income.

The following table shows the complete set of variables used in the shelter burden analysis, including a brief description of the variable and information on whether the variable was developed by the project team or was used directly from the PUMS data file.

**Table 5.1 - LMI Market Characterization Study ACS Data - Shelter Burden Analysis**

Variable Name	Variable Description	PUMS or Computed
grntp	Gross monthly rent; non-adjusted dollars	PUMS
annual_rent	Gross annual rent; non-adjusted dollars	Computed
smocp	Monthly homeowner costs; non-adjusted dollars	PUMS
annual_owner_cost	Annual homeowner costs; non-adjusted dollars	Computed
ten	Owner/Renter status (tenure); detailed	PUMS
housing_cost	Annual housing cost for owners and renters; non-adjusted dollars	Computed
adj_factor_2013	Adjustment factor to convert 2013 dollars to 2015 dollars	Computed
adj_factor_2014	Adjustment factor to convert 2014 dollars to 2015 dollars	Computed
housing_cost_adj	Annual housing cost for owners and renters; 2015 dollars	Computed
hincp	Annual household income, non-adjusted dollars	PUMS
adjinc	Household income adjustment factor	PUMS
hincp_adj	Annual household income, 2015 dollars	Computed
shelter_burden	Annual individual shelter burden (annual housing costs / annual income); percentage	Computed
shelter_burden_grp	Annual shelter burden percentage groups	Computed
wgtp	Household weight	PUMS
bld_type	Housing unit type; consolidated	Computed
bld_type_con	Housing unit type; consolidated further	Computed
hincp_adj_grp	Annual household income groups; 2015 dollars	Computed
rent_own	Owner-Renter status; consolidated	Computed
Region	NYSERDA Economic Development Region	Computed
povcategory	Percent of poverty level group	Computed
pov_seg	Program Group based on annual income	Computed
hh_type	Household composition type	Computed
con_region	Consolidated New York geographic regions	Computed