

	<p style="text-align: center;">State of Ohio Weatherization Program Standards</p>	Section	ADMINISTRATION
		Subject	Energy Density Analysis

ENERGY DENSITY ANALYSIS 115

Energy density analysis means using actual metered energy consumption data from a large pool of metered, low-income, utility customers to determine how much energy a customer uses in relation to other metered, low-income, utility customers. The purpose of this analysis is to allow providers to prioritize high-use, high-payment arrearage homes for the installation of cost-effective energy efficiency measures and intensive customer energy management education.

definition
115

UNIVERSAL SERVICE FUND (USF) AND PUBLIC HOUSING AUTHORITY (PHA) PROGRAMS 115-1

Actual metered energy consumption data may be used to normalize the annual energy consumption of large samples of low income customers in order to target customers for services or to help determine a theoretical level of the energy efficiency measures (EEMs) investment.

Actual metered consumption
115-1

The energy density analysis must include all customers in the sample. Only buildings with metered energy sources may use energy density analysis in place of 100% on-site auditing. Extrapolation of results to units with no metered consumption data is not allowed.

all customers
115-1.1

Energy density analysis must be determined from actual metered energy consumption data provided by the utility, or from check metering, for a minimum of 1 full heating season and 1 calendar year which includes 1 full cooling season (expressed in energy units and cost per energy unit).

actual consumption data
115-1.1a

At least 12 months metered energy consumption data with data points for each month must be used in the energy density analysis.

12 months data
115-1.1b

actual building size 115-1.1c	Actual building size in consistent units, such as square feet of conditioned living area, must be used across all buildings sampled in the energy density analysis to determine energy use per square foot.
actual local weather information 115-1.1d	Actual local weather information (heating and cooling degree-days), corresponding to fuel metering dates (not yearly averages), must be used in the energy density analysis. Long term heating and cooling degree-day data will be used to normalize the energy use to factor out abnormally warm or cold weather conditions that occur in a particular year.
PRISM-consistent 115-1.2a	The analysis must be consistent with data requirements of the Princeton Scorekeeping Method (PRISM). The metered energy consumption data analysis must cover all units in the sample population.
space conditioning/ base load energy use disaggregation 115-1.2b	Energy density analysis must consider space conditioning (heating and cooling) energy use separately from base load energy use. The following data requirements in 115-1.2c apply to each customer data set.
energy intensity index (EEI) 115-1.2c	<p>The energy intensity index is a number used to compare a sample of buildings for their energy use in a manner that normalizes buildings by energy usage, building size (such as conditioned floor area) and local long term weather conditions. To calculate the EEI, divide Btu by square feet of conditioned area, and then divide that number by the heating degree-days. The resulting number is the EEI. The following assumptions apply:</p> <ol style="list-style-type: none">i. All energy must be converted to British thermal units (Btu),ii. Energy consumption must be disaggregated into heating load, cooling load and base load to account for customer versus building energy usage,iii. Square feet of conditioned living area must be used for evaluation (others, such as volume or shell area may also be used at the analyst's discretion),iv. Heating (rather than cooling) energy intensity must be used for all benchmarking,v. Base load energy intensity (all non-heating, non-cooling energy consumption) will be analyzed separately.vi. Actual local heating and cooling degree-day data that corresponds to the energy consumption period shall be appended to historical temperature data for the analysis.

PRIORITIZATION 115-2

After all of the metered energy consumption data has been collected and normalized, the authorize provider will perform on-site inspections of a sub-set of each range of units (based on EEI). The sample may be sorted into several workable ranges for further analysis.

on-site inspections
115-2.1

For the range of high energy users, all units (100%) must have on-site inspections and full energy audits to determine energy efficiency measures that have an SIR of 1 or greater.

high energy users
115-2.1a

If the object of the energy density analysis is to determine a group of customers that will not receive any, or all, benefits due to low energy consumption and low potential for cost-effective energy savings, then the authorized provider must inspect no less than 5% of the low energy user population on-site to verify the results of the analysis.

low energy users
115-2.1b

If the object of the sampling is to determine a group of customers that will receive reduced benefits because of moderate energy consumption, then any authorized provider planning to serve the moderate-use range(s) must perform at least 20% on-site verification and auditing of the 20% of the sample population.

moderate energy users
115-2.1c

COST-EFFECTIVENESS 115-3

As cost-effectiveness applies to Section 115-2, the cost-effectiveness of the EEMs that could be performed and decisions of which buildings will be cost-effective on a large scale, based on the energy density analysis, is dependant on many variables. These variables include: the cost of fuel, the cost of the retrofits, the heating and cooling degree-days, the amount and type of existing EEMs, and the effectiveness of the work that is performed. For these reasons, prioritizing units or setting threshold criteria is the responsibility of the authorized providers. The cost-effectiveness will, however, be based upon an SIR of 1 or greater.

cost-effectiveness testing
115-3.1