ENERGY STAR® PortfolioManager® Technical Reference

ENERGY STAR Score for Convenience Stores in the United States

OVERVIEW

The ENERGY STAR Score for Convenience Stores applies to buildings used for the sale of a limited range of items such as groceries, toiletries, newspapers, soft drinks, tobacco products, and other everyday items. Some of these buildings will also sell cooked-to-order foods as well as fuel. The objective of the ENERGY STAR score is to provide a fair assessment of the energy performance of a property relative to its peers, considering the climate, weather, and business activities at the property. To identify the aspects of building activity that are significant drivers of energy use and then normalize for those factors, a statistical analysis of the peer building population is performed. The result of this analysis is an equation that will predict the energy use of a property, based on its experienced business activities. The energy use prediction for a building is compared to its actual energy use to yield a 1 to 100 percentile ranking of performance, relative to the national population.

- **Property Types.** The ENERGY STAR Score for Convenience Stores applies to buildings used for the sale of a limited range of items such as groceries, toiletries, newspapers, soft drinks, tobacco products, and other everyday items. Some of these buildings will also sell cooked-to-order foods as well as fuel.
- **Reference Data.** The analysis for convenience stores is based on data from an industry survey conducted by the National Association of Convenience Stores (NACS) for the 2019 calendar year.
- **Adjustments for Weather and Business Activity.** The analysis includes adjustments for:
    - Number of Full-Time Equivalent Workers
    - Number of Cooking Equipment Units
    - Number of Heating and Warming Equipment Units
    - Length of Open or Closed Refrigeration/Freezer Units
    - Percent of Gross Floor Area which is Walk-in Refrigeration
    - Weather and Climate (using Heating and Cooling Degree Days, retrieved based on ZIP Code)
    - Percent of the Building that is Heated and Cooled
- **Release Date.** The ENERGY STAR score for convenience stores is updated periodically as more recent data becomes available:
    - Most Recent Update: March 2023.

This document presents details on the development of the 1 – 100 ENERGY STAR score for convenience stores. More information on the overall approach to develop ENERGY STAR scores is covered in our Technical Reference for the ENERGY STAR Score, available at www.energystar.gov/ENERGYSTARScore. The subsequent sections of this document offer specific details on the development of the ENERGY STAR score for convenience stores:

REFERENCE DATA & FILTERS

For the ENERGY STAR score for convenience stores, the reference data used to establish the peer building population in the United States is based on data from a United States industry survey conducted by the National Association of Convenience Stores (NACS). EPA relies on publicly available external data sets to develop ENERGY STAR scores where feasible, but a sufficiently robust set of such convenience store energy consumption information was not available. The NACS energy usage survey accounts for the 2019 calendar year and was created for the purpose of creating holistic and robust industry data upon which to base an ENERGY STAR scoring model.

To analyze the building energy and operating characteristics in this survey data, four types of filters are applied to define the peer group for comparison and to overcome any technical limitations in the data: Building Type Filters, Program Filters, Data Limitation Filters, and Analytical Filters. A complete description of each of these categories is provided in our Technical Reference for the ENERGY STAR Score, at www.energystar.gov/ENERGYSTARScore. ***Figure 1*** presents a summary of each filter applied in the development of the ENERGY STAR score for Convenience stores, the rationale behind the filter, and the resulting number of properties in the data set after the filter is applied. After all filters are applied, the remaining data set has 152 properties.

Figure 1: Summary of Filters for the ENERGY STAR Score for Convenience Stores

Condition for Including an Observation in the Analysis	Rationale	Number Remaining
Must be a convenience store with fuel service or a convenience store without fuel service	EPA Program Filter – Criteria to define the peer group to be analyzed	161
Must have at least 1 full time employee	EPA Program Filter – Baseline condition for being a full-time convenience store.	161
Must have Source EUI between 0 and 2,000 kBtu/ft^2	Analytical Filter – Values determined to be data entry errors or statistical outliers.	159
Must have fewer than 10 full time employees per 1,000 ft^2	Analytical Filter – Values determined to be data entry errors or statistical outliers.	158
Must have 8 or fewer closed reach-in cases	Analytical Filter – Values determined to be data entry errors or statistical outliers.	157
Must have 10 or fewer countertop display/buffet refrigerators	Analytical Filter – Values determined to be data entry errors or statistical outliers.	156
Area of walk-in beer caves must be less than or equal to 35% of total floor area	Analytical Filter – Values determined to be data entry errors or statistical outliers.	154
Area of walk-in coolers must be less than or equal to 40% of total floor area	Analytical Filter – Values determined to be data entry errors or statistical outliers.	153
Must have 2 or fewer grills, conventional ovens, impinger ovens, fryers, and/or heat and hold re-therms per 1,000 ft^2	Analytical Filter – Values determined to be data entry errors or statistical outliers.	152

Of the filters applied to the reference data, some result in constraints on calculating a score in Portfolio Manager and others do not. Building Type and Program Filters are used to limit the reference data to include only properties that are eligible to receive a score in Portfolio Manager and are therefore related to eligibility requirements. In contrast, Data Limitation Filters account for limitations in the data availability, but do not apply in Portfolio Manager. Analytical Filters are used to eliminate outlier data points or different subsets of data and may or may not affect eligibility. In some cases, a subset of the data will have different behavior from the rest of the properties (e.g., hotels smaller than 5,000 ft^2 do not behave the same way as larger buildings), in which case an Analytical Filter will be used to determine eligibility in Portfolio Manager. In other cases, Analytical Filters exclude a small number of outliers with extreme values that skew the analysis, but do not affect eligibility requirements. A full description of the criteria you must meet to get a score in Portfolio Manager is available at www.energystar.gov/EligibilityCriteria.

Related to the filters and eligibility criteria described above, another consideration is how Portfolio Manager treats properties that are situated on a campus. The main unit for benchmarking in Portfolio Manager is the property, which may be used to describe either a single building or a campus of buildings. The applicability of the ENERGY STAR score depends on the type of property. For convenience stores, the score is based on individual establishments. Eligible store configurations include free standing stores and stores located in open air or strip centers (a collection of attached stores with common areas that are not enclosed). Convenience store configurations not eligible to receive an ENERGY STAR score include individual stores located within enclosed malls; and individual stores that are part of a larger non-mall building (i.e., office or hotel). To receive an ENERGY STAR score, a convenience store must be a single store that is at least 1,000 square feet and has an exterior entrance to the public.

Survey Weights

Analysis of the convenience store survey data showed that the distribution of facilities across certain size ranges did not reflect the national population. Therefore, rather than being a complete random sample of the population, the survey can be viewed as a stratified random sample, with multiple categories of respondents. In order to properly account for this stratification, survey sample weights were constructed to reflect the probability of being selected within each group. Observations were weighted by convenience store gross floor area groups. Within each group, the weight of an individual observation was computed as:

$$Observation\ Weight = \frac{Total\ Size\ of\ Population\ in\ Group}{Number\ of\ Responses\ in\ Group}$$

The Total Size of Population in Group was obtained through store size data from the Commercial Building Energy Consumption Survey (CBECS) convenience store data. The Number of Responses in Group was counted from the complete set of 161 convenience stores in the survey.

VARIABLES ANALYZED

To normalize for differences in business activity, we perform a statistical analysis to understand what aspects of building activity are significant with respect to energy use. The filtered reference data set described in the previous section is analyzed using a weighted ordinary least squares regression, which evaluates energy use relative to business activity (e.g., employee density, cooking equipment, climate). This linear regression yields an equation that is used to compute energy use (also called the dependent variable) based on a series of characteristics that describe the business activities (also called independent variables). This section details the variables used in the statistical analysis for convenience stores.

Dependent Variable

The dependent variable is what we try to predict with the regression equation. For the convenience store analysis, the dependent variable is energy consumption expressed in source energy use intensity (source EUI). This is equal to the total source energy use of the property divided by the gross floor area. The regressions analyze the key drivers of source EUI – those factors that explain the variation in source energy use per square foot in convenience stores.

Independent Variables

The reference survey collects numerous property operating characteristics that were identified as potentially important for convenience stores. Based on a review of the available variables in the data, in accordance with the criteria for inclusion in Portfolio Manager[1], the following variables were analyzed:

- Gross Floor Area
- Weekly Hours with Customer Occupancy
- Full-Time Equivalent Employees
- Food Service
- Seating Area
- Heating Degree Days
- Cooling Degree Days
- Percent which can be Heated
- Percent which can be Cooled
- Ice Dispensers
- Display/Buffet Cases
- Number of Customers
- Fuel Gallons Sold
- Counts of Cold Merchandising and Display Equipment by type, including Open Refrigeration/Reach-in Cases, Closed Refrigeration/Reach-in Cases, Closed Refrigeration/Reach-in Doors, Closed Refrigeration Cooler Cases, Closed Refrigeration Cooler Doors, Countertop Display/Buffet Refrigerators, Refrigerated Countertop Display Cases, and Reach-in Chest Freezers
- Walk-In Refrigeration Area, including Walk-In Refrigeration and Walk-In Beer Caves
- Counts of Cooking Equipment by type, including Griddles or Grills, Conventional/Convection/Dual Ovens, Rapid Cook/Speed Ovens, Impinger Ovens, and Fryers
- Counts of Heating and Warming Equipment by type, including Heated Merchandiser Cases, Heat and Hold Re-therms, Warmer Drawers, Nacho Cheese and Chili Dispensers, Soup Warmers, Electric Kettles, Toasters, and Microwaves
- Counts of Beverage Dispensers by type, including Water-only Dispensers, Cold Soft Drink Dispensers, Bowl Refrigerated Dispensers, Iced Tea Brewers and Dispensers, Frozen Beverage Dispensers, Coffee and Tea Brewers and Makers, Coffee and Tea Warmers, Cappuccino Dispensers, Espresso Makers, and Hot Water Dispensers

We perform extensive review of all these operational characteristics. In addition to reviewing each characteristic individually, characteristics are reviewed in combination with each other (e.g., Heating Degree Days multiplied by Percent which can be Heated). As part of the analysis, some variables are reformatted to reflect the physical relationships of building components. For example, the number of workers is typically evaluated in a density format.

[1] For a complete explanation of these criteria, refer to our Technical Reference for the ENERGY STAR Score, at www.energystar.gov/ENERGYSTARScore.

The number of workers *per square foot* (not the gross number of workers) is expected to be correlated with the energy use per square foot. The analysis consists of multiple regression formulations. These analyses are structured to find the combination of statistically significant operating characteristics that explain the greatest amount of variance in the dependent variable: source EUI.

The final regression equation includes the following variables:

- Number of Full-Time Equivalent Workers per 1,000 Square Feet
- Number of Cooking Equipment Units[2] per 1,000 Square Feet
- Number of Warming and Heating Equipment Units[3] per 1,000 Square Feet
- Length of Open or Closed Refrigeration/Freezer Units[4] per 1,000 Square Feet
- Percent of Gross Floor Area which is Walk-in Refrigeration
- Cooling Degree Days times Percent of the Building that is Cooled
- Heating Degree Days times Percent of the Building that is Heated

These variables are used together to compute the predicted source EUI for convenience stores. The predicted source EUI is the mean EUI for a hypothetical population of buildings that share the same values for each of these variables. That is, the mean energy use for a building that operates just like your building.

Climate Variables

Climate is one characteristic that was examined closely. EPA analyzed the relationship between EUI and both Cooling Degree Days (CDD) and Heating Degree Days (HDD). A combination of methods was used, which included running regression equations with survey data using various forms and combinations of CDD and HDD. Due to the high correlation between CDD and HDD, EPA determined it was necessary to introduce an engineering adjustment for CDD and HDD into the scoring process. EPA employed an alternative method to account for cooling and heating energy that uses the Department of Energy's commercial reference buildings. These reference buildings use energy modeling to provide complete descriptions of whole building energy use. EPA adjusted the size and loads of the commercial reference buildings to model convenience stores and used models across a range of climate zones to identify the relationships between heating energy and HDD, and cooling energy and CDD in the modeled data.

Cooking, and Heating and Warming Equipment Variables

NACS survey data provided extensive detail regarding several types of cooking, heating, and warming equipment. Each type of equipment was analyzed against source EUI for statistical significance based on total units as well as density (units per 1,000 square feet). Equipment types were analyzed individually and in combination with other similar types of equipment. It was determined that there was a statistically significant relationship between source EUI and the number of cooking equipment units per 1,000 square feet, with cooking equipment defined to include conventional ovens, convection ovens, impinger ovens, retherm ovens, fryers, and grills. Additionally, it was determined that there was a statistically significant relationship between source EUI and the number of heating and warming equipment units per 1,000 square feet, with heating and warming equipment defined to include heated merchandiser cases, warming drawers, and hot dog rollers.

[2] This count should include all conventional, convection, impinger, and retherm ovens, as well as fryers and grills. Smaller pieces of equipment such as toasters, microwaves, and rapid cook ovens should not be included in this count.

[3] This includes heated merchandiser cases, warming drawers, and hot dog rollers. This equipment should be operational and warming food for a majority of the time the store is open to the public.

[4] This includes open reach-in case, reach-in chest freezer, closed refrigeration/reach-in cases, and closed refrigeration coolers.

Refrigeration and Freezer Equipment Variables

NACS survey data provided extensive detail regarding several types of refrigeration and freezer equipment. Each type of refrigeration/freezer case was analyzed against source EUI for statistical significance based on total units (cases and/or doors) as well as density (units per 1,000 square feet). It was determined that there is a statistically significant relationship between source EUI and the Length of Open and Closed Refrigeration/Freezer Units per 1,000 Square Feet; this included Open Refrigeration Reach-In Cases, Closed Refrigeration Reach-In Cases, Closed Refrigeration Cooler Doors, and Reach-in Chest Freezers. The lengths of each equipment type were assumed based on industry averages of 6 feet per open reach-in case, 4 feet per reach-in chest freezer, 2.5 feet for closed refrigeration/reach-in cases, and 2.5 feet for closed refrigeration coolers. In addition to refrigeration/freezer cases, walk-In refrigeration was analyzed. It was determined that there was a statistically significant relationship between source EUI and the percent of gross floor area which is walk-in refrigeration; this included Walk-in Coolers and Walk-in Beer Caves.

Testing

Finally, we test the regression equation using actual convenience stores that have been entered in Portfolio Manager. This provides another set of buildings to examine in addition to the NACS survey data, to see the average ENERGY STAR scores and distributions, and to assess the impacts and adjustments. This analysis provides a second level of confirmation that the final regression equation produces robust results that are unbiased with respect to the key operational characteristics such as refrigeration case density, cooking and warming equipment densities, walk-in refrigerator floor area, heating degree days and cooling degree days

It is important to reiterate that the final regression equation is based on the nationally representative reference data, not data previously entered into Portfolio Manager.

REGRESSION EQUATION RESULTS

The final regression is a weighted ordinary least squares regression across the filtered data set of 152 observations. The dependent variable is source EUI. Each independent variable is centered relative to the mean value, presented in ***Figure 2***. The final equation is presented in ***Figure 3***. All variables in the regression equation are significant at the 95% confidence level or better, as shown by the significance levels (a p-level of less than 0.05 indicates 95% confidence).

The regression equation has a coefficient of determination (R^2) value of 0.6923, indicating that this equation explains 69.23% of the variance in source EUI for convenience stores. Because the final equation is structured with energy per square foot as the dependent variable, the explanatory power of square foot is not included in the R^2 value, thus this value appears artificially low. Re-computing the R^2 value in units of source energy[5] demonstrates that the equation actually explains 72.05% of the variation of source energy of convenience stores. This is an excellent result for a statistically based energy model.

Detailed information on the ordinary least squares regression approach is available in our Technical Reference for the ENERGY STAR Score, at www.energystar.gov/ENERGYSTARScore.

[5] The R^2 value in Source Energy is calculated as: 1 – (Residual Variation of Y) / (Total Variation of Y). The residual variation is sum of $(\text{Actual Source Energy}_i - \text{Predicted Source Energy}_i)^2$ across all observations. The Total variation of Y is the sum of $(\text{Actual Source Energy}_i - \text{Mean Source Energy})^2$ across all observations.

Figure 2 - Descriptive Statistics for Variables in Final Regression Equation

Variable	Mean	Minimum	Maximum
Source EUI (kBtu/ft^2)	938.5	175.1	1,819
Number of Full-Time Equivalent Workers per 1,000 ft^2	2.843	1.055	7.273
Number of Cooking Equipment Units Per 1,000 ft^2	0.6083	0	1.818
Number of Heating and Warming Equipment Units per 1,000 ft^2	0.8391	0	1.548
Length of Open or Closed Refrigeration/Freezer Units per 1,000 ft^2	14.04	5.000	21.00
Percent of Gross Floor Area which is Walk-in Refrigeration	0.1214	0	0.3567
Percent Heated x Heating Degree Days	5,765	204.4	11,199
Percent Cooled x Cooling Degree Days	1,177	0	4,051

Figure 3 - Final Regression Result

Summary				
Dependent Variable		Source Energy Use Intensity (kBtu/ft^2)		
Number of Observations in Analysis		152		
R^2 value		0.6923		
Adjusted R^2 value		0.6818		
F Statistic		65.71		
Significance (p-level)		< 0.0001		
	Unstandardized Coefficients	**Standard Error**	**T value**	**Significance (p-level)**
Constant	938.5	16.47	56.99	< 0.0001
C_Number of Full-Time Equivalent Workers per 1000 ft^2	66.65	15.98	4.170	< 0.0001
C_Number of Cooking Equipment Units per 1,000 ft^2	243.6	40.40	6.030	< 0.0001
C_Number of Heating and Warming Equipment Units per 1,000 ft^2	300.4	42.33	7.096	< 0.0001
C_Length of Open or Closed Refrigeration/Freezer Units per 1,000 ft^2 (*min value of 5)*	19.14	3.793	5.045	< 0.0001
C_Percent of Gross Floor Area which is Walk-in Refrigeration	1,002	371.5	2.698	0.0078
C_Percent Heated x Heating Degree Days	0.02592	0	Infty	< 0.0001
C_Percent Cooled x Cooling Degree Days	0.05873	0	Infty	< 0.0001

Notes:

- *The regression is a weighted ordinary least squares regression, weighted by the Survey Weights (refer to Survey Weights Section)*
- *The prefix C_ on each variable indicates that it is centered. The centered variable is equal to difference between the actual value and the observed mean. The observed mean values are presented in **Figure 2**.*
- *The CDD and HDD coefficients were restricted to the average kBtu/ft^2 for CDD and HDD identified through the analysis of the Department of Energy's Commercial Building Reference Data (refer to the Climate Variables Section)*
- *The adjustment for Length of Open or Closed Refrigeration/Freezer Units has a floor value of 5 feet per 1,000 ft^2.*

ENERGY STAR SCORE LOOKUP TABLE

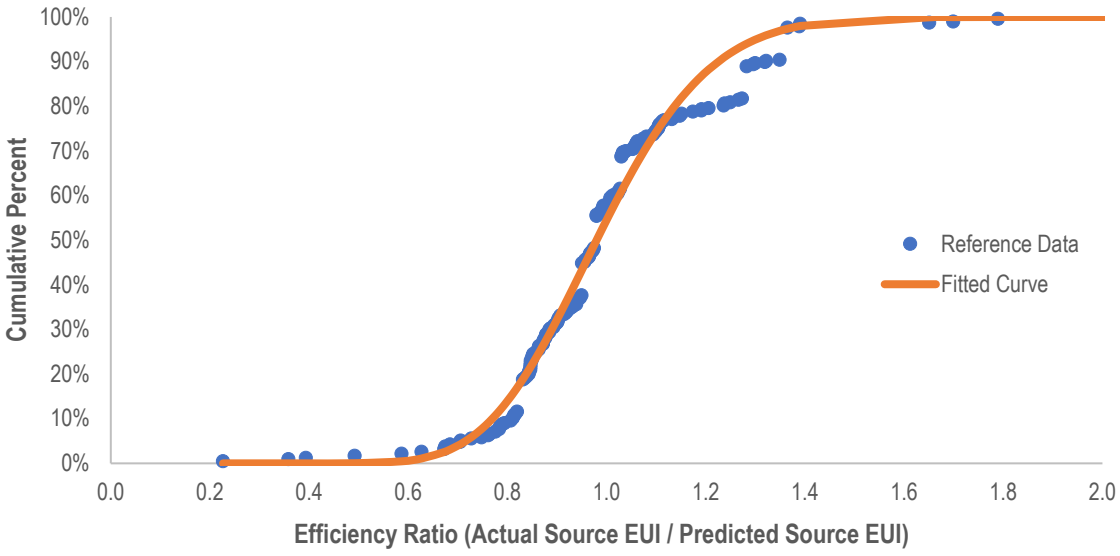
Some buildings in the reference data sample use more energy than predicted by the regression equation, while others use less. The *actual* source EUI of each reference data observation is divided by its *predicted* source EUI to calculate an energy efficiency ratio. The final regression equation (presented in ***Figure 3***) yields a prediction of source EUI based on a building's operating characteristics.

$$Energy\ Efficiency\ Ratio = \frac{Actual\ Source\ EUI}{Predicted\ Source\ EUI}$$

A lower efficiency ratio indicates that a building uses less energy than predicted, and consequently is more efficient. A higher efficiency ratio indicates the opposite.

The efficiency ratios are sorted from smallest to largest and the cumulative percent of the population at each ratio is computed using the individual observation weights from the reference data set. ***Figure 4*** presents a plot of this cumulative distribution. A smooth curve (shown in orange) is fitted to the data using a two-parameter gamma distribution. The fit is performed in order to minimize the sum of squared differences between each building's actual percent rank in the population and each building's percent rank with the gamma solution. The final fit for the gamma curve yielded a shape parameter (alpha) of 30.71 and a scale parameter (beta) of 0.03225. For this fit, the sum of the squared error is 0.2266.

Figure 4 – Distribution for Convenience Stores



The final gamma shape and scale parameters are used to calculate the efficiency ratio at each percentile (1 to 100) along the curve. For example, the ratio on the gamma curve at 1% corresponds to a score of 99; only 1% of the population has a ratio this small or smaller. The ratio on the gamma curve at the value of 25% will correspond to the ratio for a score of 75; only 25% of the population has ratios this small or smaller. The complete score lookup table is presented in ***Figure 5***.

Figure 5 – ENERGY STAR Score Lookup Table for Convenience Stores

ENERGY STAR Score	Cumulative Percent	Energy Efficiency Ratio ≥	Energy Efficiency Ratio <
100	0%	0.0000	0.6225
99	1%	0.6225	0.6588
98	2%	0.6588	0.6826
97	3%	0.6826	0.7008
96	4%	0.7008	0.7159
95	5%	0.7159	0.7289
94	6%	0.7289	0.7405
93	7%	0.7405	0.7509
92	8%	0.7509	0.7605
91	9%	0.7605	0.7694
90	10%	0.7694	0.7778
89	11%	0.7778	0.7856
88	12%	0.7856	0.7931
87	13%	0.7931	0.8002
86	14%	0.8002	0.8070
85	15%	0.8070	0.8136
84	16%	0.8136	0.8199
83	17%	0.8199	0.8260
82	18%	0.8260	0.8320
81	19%	0.8320	0.8378
80	20%	0.8378	0.8434
79	21%	0.8434	0.8489
78	22%	0.8489	0.8543
77	23%	0.8543	0.8596
76	24%	0.8596	0.8648
75	25%	0.8648	0.8699
74	26%	0.8699	0.8749
73	27%	0.8749	0.8798
72	28%	0.8798	0.8847
71	29%	0.8847	0.8895
70	30%	0.8895	0.8943
69	31%	0.8943	0.8990
68	32%	0.8990	0.9037
67	33%	0.9037	0.9083
66	34%	0.9083	0.9129
65	35%	0.9129	0.9174
64	36%	0.9174	0.9220
63	37%	0.9220	0.9265
62	38%	0.9265	0.9310
61	39%	0.9310	0.9354
60	40%	0.9354	0.9399
59	41%	0.9399	0.9443
58	42%	0.9443	0.9487
57	43%	0.9487	0.9532
56	44%	0.9532	0.9576
55	45%	0.9576	0.9620
54	46%	0.9620	0.9664
53	47%	0.9664	0.9709
52	48%	0.9709	0.9753
51	49%	0.9753	0.9797
50	50%	0.9797	0.9842
49	51%	0.9842	0.9887
48	52%	0.9887	0.9932
47	53%	0.9932	0.9977
46	54%	0.9977	1.0022
45	55%	1.0022	1.0068
44	56%	1.0068	1.0114
43	57%	1.0114	1.0160
42	58%	1.0160	1.0207
41	59%	1.0207	1.0254
40	60%	1.0254	1.0302
39	61%	1.0302	1.0350
38	62%	1.0350	1.0399
37	63%	1.0399	1.0448
36	64%	1.0448	1.0498
35	65%	1.0498	1.0548
34	66%	1.0548	1.0600
33	67%	1.0600	1.0652
32	68%	1.0652	1.0705
31	69%	1.0705	1.0758
30	70%	1.0758	1.0813
29	71%	1.0813	1.0869
28	72%	1.0869	1.0926
27	73%	1.0926	1.0985
26	74%	1.0985	1.1045
25	75%	1.1045	1.1106
24	76%	1.1106	1.1169
23	77%	1.1169	1.1233
22	78%	1.1233	1.1300
21	79%	1.1300	1.1369
20	80%	1.1369	1.1440
19	81%	1.1440	1.1514
18	82%	1.1514	1.1591
17	83%	1.1591	1.1671
16	84%	1.1671	1.1755
15	85%	1.1755	1.1843
14	86%	1.1843	1.1936
13	87%	1.1936	1.2035
12	88%	1.2035	1.2140
11	89%	1.2140	1.2253
10	90%	1.2253	1.2375
9	91%	1.2375	1.2509
8	92%	1.2509	1.2657
7	93%	1.2657	1.2824
6	94%	1.2824	1.3016
5	95%	1.3016	1.3244
4	96%	1.3244	1.3528
3	97%	1.3528	1.3911
2	98%	1.3911	1.4529
1	99%	1.4529	>1.4529

EXAMPLE CALCULATION

As detailed in our Technical Reference for the ENERGY STAR Score, at www.energystar.gov/ENERGYSTARScore, there are five steps to compute a score. The following is a specific example for the score for convenience stores:

1 User enters building data into Portfolio Manager

- 12 months of energy use information for all energy types (annual values, entered in monthly meter entries)
- Physical building information (size, location, etc.) and use details describing building activity (number of workers, etc.)

Energy Data	Value
Electricity	490,000 kWh
Natural gas	5,446 therms

Property Use Details	Value
Gross Floor Area	8,847
Number of Full-Time Equivalent Workers	15
Number of Cooking Equipment Units	6
Number of Heating and Warming Equipment Units	5
Length of Open or Closed Refrigeration/Freezer Units	87
Area of Walk-in Refrigeration/Freezer Units	405
Heating Degree Days	9285
Cooling Degree Days	480
Percent of the Building that is Heated	100
Percent of the Building that is Cooled	100

2 Portfolio Manager computes the actual source EUI

- Total energy consumption for each fuel is converted from billing units into site energy and source energy.
- Source energy values are added across all fuel types.
- Source energy is divided by gross floor area to determine actual source EUI.

Computing Actual Source EUI

Fuel	Billing Units	Site kBtu Multiplier	Site kBtu	Source kBtu Multiplier	Source kBtu
Electricity	490,000 kWh	3.412	1,671,880	2.80	4,681,264
Natural gas	5,446 therms	100	544,600	1.05	571,830
				Total Source Energy (kBtu)	5,253,094
				Actual Source EUI (kBtu/ft²)	**593.77**

3 Portfolio Manager computes the predicted source EUI

- Using the property use details from Step 1, Portfolio Manager computes each building variable value in the regression equation (determining the natural log or density or applying any minimum or maximum values used in the regression model, as necessary).
- The centering values are subtracted to compute the centered variable for each operating parameter.
- The centered variables are multiplied by the coefficients from the regression equation to obtain a predicted source EUI.

Computing Predicted Source EUI

Variable	Actual Building Value	Reference Centering Value	Building Centered Variable	Coefficient	Coefficient * Centered Variable
Constant	-	-	-	938.5	938.5
Number of Full-Time Equivalent Workers per 1,000 ft²	1.70	2.843	-1.143	66.65	-76.1810
Number of Cooking Equipment Units per 1,000 ft²	0.34	0.6083	-0.2683	243.6	-65.35788
Number of Heating and Warming Equipment Units per 1,000 ft²	0.57	0.8391	-0.2691	300.4	-80.8376
Length of Open or Closed Refrigeration/Freezer Units per 1,000 ft²	9.83	14.04	-4.210	19.14	-80.5794
Percent of Gross Floor Area which is Walk-in Refrigeration	0.05	0.1214	-0.0714	1,002	-71.5428
Percent Heated x Heating Degree Days	9285	5,765	3,520	0.02592	91.2384
Percent Cooled x Cooling Degree Days	480	1,177	-697	0.05873	-40.9348
				Predicted Source EUI (kBtu/ft²)	**614.3**

4 Portfolio Manager computes the energy efficiency ratio

- The energy efficiency ratio equals the actual source EUI (Step 2) divided by predicted source EUI (Step 3)
- Energy Efficiency Ratio = 593.77 / 614.3 = 0.9666

5 Portfolio Manager uses the efficiency ratio to assign a score via a lookup table

- The energy efficiency ratio from Step 4 is used to identify the score from the lookup table
- An energy efficiency ratio of 0.9666 is greater than or equal to 0.9664 and less than 0.9709.
- ***The ENERGY STAR score is 53.***