ENERGY STAR® PortfolioManager®

Technical Reference

ENERGY STAR Score for K-12 Schools in the United States

OVERVIEW

The ENERGY STAR Score for K-12 Schools applies to buildings or campuses used as a school for kindergarten through 12th grade students. The objective of the ENERGY STAR score is to provide a fair assessment of the energy performance of a property relative to its peers, taking into account 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 K-12 schools applies to a property used as a school for kindergarten through 12th grade students. The score applies to an entire school whether it is a single building or a campus of buildings.
- **Reference Data.** The analysis for K-12 schools is based on data from the Department of Energy, Energy Information Administration's 2003 Commercial Building Energy Consumption Survey (CBECS).
- **Adjustments for Weather and Business Activity.** The analysis includes adjustments for:
  - Building Size
  - Number of Personal Computers
  - Number of Walk-in Refrigerators
  - Whether or not the School is Open on Weekends
  - Whether or not there is Energy Used for Cooking
  - Whether or not the school is a High School
  - 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 K-12 schools is updated periodically as more recent data becomes available:
  - Most Recent Update: February 2009
  - Previous Update: January 2004
  - Original Release: April 2000

This document presents details on the development of the 1 - 100 ENERGY STAR score for K-12 school properties. 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 K-12 schools:

REFERENCE DATA & FILTERS

For the ENERGY STAR score for K-12 schools, the reference data used to establish the peer building population in the United States is based on data from the Department of Energy, Energy Information Administration's (EIA) 2003 Commercial Building Energy Consumption Survey (CBECS). Detailed information on this survey, including complete data files, is available at: http://www.eia.doe.gov/emeu/cbecs/contents.html.

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 K-12 schools, 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 353 properties.

Figure 1 – Summary of Filters for the ENERGY STAR Score for K-12 Schools

Condition for Including an Observation in the Analysis	Rationale	Number Remaining
PBAPLUS8= 28 or 29	Building Filter – CBECS defines building types according to the variable "PBAPLUS8." Elementary/middle schools are coded as PBAPLUS8 = 28 and High Schools are coded as PBAPLUS8 = 29.	456
Must operate for at least 30 hours per week	EPA Program Filter – Baseline condition for being a full time K-12 school.	448
Must have energy consumption data	EPA Program Filter – Baseline condition for being a full time K-12 school.	447
Must operate for at least 8 months per year	EPA Program Filter – Baseline condition for being a full time K-12 school.	434
A single activity must characterize greater than 50% of the floor space[1]	EPA Program Filter – In order to be considered part of the K-12 school peer group, more than 50% of the building must be defined by one of those activities.	432
Must have square foot less than or equal to 1,000,000	Data Limitation Filter – CBECS masks actual values above 1,000,000 using regional averages.	431
If propane is used, the amount category (PRAMTC8) must equal 1, 2, or 3	Data Limitation Filter – Cannot estimate propane use if the quantity is "greater than 1000" or unknown.	408

[1] This filter is applied by a set of screens. If the variable ONEACT8=1, this indicates that one activity occupies 75% or more of the building. If the variable ONEACT8=2, then the building can specify up to 3 activities (ACT18, ACT28, ACT38). One of these activities must be Education (PBAX8=16) and must account for more than 50% of the floor area.

Condition for Including an Observation in the Analysis	Rationale	Number Remaining
If propane is used, the maximum estimated propane amount must be 10% or less of the total source energy	Data Limitation Filter – Because propane values are estimated from a range, propane is restricted to 10% of the total source energy.	408
Must not use chilled water	Data Limitation Filter – CBECS does not collect quantities of chilled water	400
Must have square foot >= 5,000	Analytical Filter – Analysis could not model behavior for buildings smaller than 5,000 ft^2.	361
Must have Source EUI less than 450 kBtu/ft^2	Analytical Filter – Values determined to be statistical outliers.	353

The reasons for applying filters on the use and quantity of propane are worthy of additional discussion. In CBECS, major fuel use is reported in exact quantities. However, if a building uses propane, the amount of propane is reported according to the variable PRAMT8, which uses ranges rather than exact quantities (e.g., less than 100 gallons, 100 to 500 gallons, etc.). Therefore, the quantity must be estimated within the range. To limit error associated with this estimation, EPA applies two filters related to propane.

1. The quantity of propane expressed by PRAMT8 must be 1000 gallons or smaller.
2. The value of propane cannot account for more than 10% of the total source energy use. Because the exact quantity of propane is not reported, this cap ensures that the quantity of propane entered will not introduce undue error into the calculation of total energy consumption. In order to determine if the 10% cap is exceeded, the value at the high end of the propane category is employed (e.g., for the category of less than 100, a value of 99 is used). If the 10% cap is not exceeded, then EPA will use the value at the middle of the range to calculate total energy use for the regression analysis (e.g., for the category of less than 100, a value of 50 is used).

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., K-12 school properties smaller than 5,000 ft^2 do not behave the same way as larger properties), 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 K-12 schools, the score is based on a campus of buildings, because each building on the campus is necessary to make the complete function of the property. For example, the school gym

may be in a separate building, but it is inherently part of the school. For property types that earn a campus score, the entire campus will receive a 1 - 100 score and no individual buildings on the campus can earn a separate score. When there is a single building property of this type (e.g., entire school in one building), it is also eligible for a score.

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., number of computers, number of refrigerators, and 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 K-12 schools.

Dependent Variable

The dependent variable in the K-12 school analysis is source energy use intensity (source EUI). Source EUI is equal to the total source energy use of the facility divided by the gross floor area. By setting source EUI as the dependent variable, the regressions analyze the key drivers of source EUI – those factors that explain the variation in source energy per square foot in K-12 schools.

Independent Variables

The reference survey collects numerous property operating characteristics that were identified as potentially important for offices. Based on a review of the available variables in the data, in accordance with the criteria for inclusion in Portfolio Manager[2], the following variables were analyzed:[3]

- SQFT8 – Square footage
- WKHRS8 – Weekly hours of operation
- EDSEAT8 – Student seating capacity
- PCNUM8 – Number of personal computers
- SRVNUM8 – Number of servers
- PRNTRN8 – Number of printers
- COPRN8 – Number of photocopiers
- RFGWIN8 – Number of walk-in refrigeration units
- RFGOPN8 – Number of open refrigerated cases
- RFGRSN8 – Number of residential refrigerators
- RFGCLN8 – Number of closed refrigerated cases
- RFGVNN8 – Number of refrigerated vending machines
- COOK8 – Energy used for cooking (yes/no)
- FDRM8 – Commercial food preparation area (yes/no)
- CAF8 – Cafeteria or large restaurant (yes/no)

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

[3] Note that the number 8 at the end of all variables indicates that the 2003 CBECS survey is the eighth survey conducted by the Energy Information Administration.

- ELEVTR8 – Elevators (yes/no)
- NELVTR8 – Number of elevators
- NFLOOR8 – Number of floors
- MONUSE8 – Months of year in use
- OPNWE8 – Open weekends (yes/no)
- POOL8 – Indoor pool (yes/no)
- HTPOOL8 – Heated pool (yes/no)
- YRCON – Year of construction
- RENOV8 – Renovations since 1980 (yes/no)
- HEATP8 – Percent heated
- COOLP8 – Percent cooled
- HDD658 – Heating degree days
- CDD658 – Cooling degree days

We perform extensive review on all of these operational characteristics. In addition to reviewing each characteristic individually, characteristics are reviewed in combination with each other (e.g., Heating Degree Days times Percent Heated). As part of the analysis, some variables are reformatted to reflect the physical relationships of building components. For example, the number of personal computers is typically evaluated in a density format. The number of computers *per square foot* (not the gross number of computers) is expected to be correlated with the energy use per square foot. In addition, based on analytical results and residual plots, variables were examined using different transformations (such as the natural logarithm, abbreviated as Ln). The analysis consisted of multiple regression formulations. These analyses were structured to find the combination of statistically significant operating characteristics that explained the greatest amount of variance in the dependent variable: source EUI.

The final regression equation includes the following variables:

- Natural log of gross square feet
- Whether the school is open on weekends (1 = yes, 0 = no)
- Number of walk-in refrigerators per 1,000 square feet
- Whether there is energy used for cooking (1 = yes, 0 = no)
- Number of personal computers (PCs) per 1,000 square feet
- (Natural log of heating degree days) times Percent of the building that is heated
- (Natural log of cooling degree days) times Percent of the building that is cooled

These variables are used together to compute the predicted source EUI for K-12 schools. 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.

High School Analysis

Analysis revealed that high school buildings have different responses to gross square feet and cooling degrees than elementary/middle schools. Due to this unique response, the final regression includes a dummy variable to account for the different average energy use at High Schools, in addition to two interactive terms to account for the different impact that size and cooling degree days have on high schools. These variables are as follows:

- Yes/No variable indicating whether the building is a high school
- Additional floor area adjustment

- Additional climate adjustments
  - Cooling degree days times Percent of the building that is cooled
  - (Natural log of cooling degree days) times percent of the building that is cooled

The determination of these adjustments was based on a substantial analysis of the data and the differences among types of K-12 schools. EPA investigated a wide variety of regression formulations. The adjustments for high schools described above were determined to be statistically significant when added to the K-12 schools regression equation. These adjustments improved the overall significance of the K-12 schools regression equation, and resulted in more equitable ENERGY STAR scores for both elementary/middle schools and high schools.

Testing

Finally, we test the regression equation using actual K-12 school buildings that have been entered in Portfolio Manager. This provides another set of buildings to examine in addition to the CBECS 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 building size, computer density, and heating 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 353 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), with the exception of the high school yes/no variable, which has a lower level of significance (42%). The high school variable is unique given the significant interaction terms for high school with cooling degree days and floor area. Because these interaction terms are highly significant, it is standard practice in statistical analysis to retain the base dummy variable (high school yes/no) in the regression equation. This practice provides a more appropriate intercept for the high school population, distinguishing it from the other schools.

The regression equation has a coefficient of determination (R^2) value of 0.2680, indicating that this equation explains 26.8% of the variance in source EUI for K-12 schools. 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[4], demonstrates that the equation actually explains 83.9% of the variation of source energy of offices. 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.

[4] 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

Variable	Mean	Minimum	Maximum
Source EUI (kBtu/ft²)	151.6	11.22	400.0
High School (yes/no)	0.2298	0.000	1.000
Ln (Gross Square Feet)	10.20	8.517	13.10
Square Feet	47310	5000	490000
Open Weekends (yes/no)	0.2730	0.000	1.000
Number of Walk-in Refrigerators per 1000 ft²	0.0109	0.000	0.1928
Presence of Cooking (yes/no)	0.5358	0.000	1.000
Number of Computers per 1000 ft²	1.742	0.000	9.537
Cooling Degree Days x Percent Cooled	1316	0.000	5064
Ln (Heating Degree Days) x Percent Heated	7.716	0.2821	9.139
Ln (Cooling Degree Days) x Percent Cooled	5.045	0.000	8.530

Figure 3 - Final Regression Results

Summary				
Dependent Variable	Source Energy Intensity (kBtu/ft²)			
Number of Observations in Analysis	353			
R^2 value	0.2680			
Adjusted R^2 value	0.2444			
F Statistic	11.35			
Significance (p-level)	0.000			
	Unstandardized Coefficients	**Standard Error**	**T value**	**Significance (p-level)**
Constant	131.9	6.668	19.78	0.0000
High School (yes/no)	4.377	7.922	0.5526	0.5809
C_ Ln (HDD) x Percent Heated	8.974	2.582	3.476	0.0005
C_ Ln (CDD) x Percent Cooled	6.389	1.230	5.193	0.0000
C_ Ln (Gross Square Feet)	-19.26	4.295	-4.484	0.0000
Open Weekends (yes/no)	18.43	7.488	2.461	0.0143
C_ Number of Walk-in Refrigerators per 1000 ft²	574.7	150.1	3.830	0.0002
Presence of Cooking (yes/no)	24.20	9.416	2.570	0.0106
C_ Number of Computers per 1000 ft²	9.568	2.336	4.096	0.0001
High School x C_Square Feet	0.00021	0.0001	2.490	0.0133
High School x C_CDD x Percent Cooled	0.0285	0.0093	3.071	0.0023
High School x C_Ln (CDD) x Percent Cooled	-11.75	3.781	-3.107	0.0020

Note:

- *The regression is a weighted ordinary least squares regression, weighted by the CBECS variable "ADJWT8".*
- *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****.*
- *Unlike other variables, the yes/no variables (Cooking and Open on Weekends) are not centered. The coefficient adjustments represent the adjustment for K-12 schools that have these characteristics.*

The High School terms are not centered because they represent a multiplier on the already centered variables C_Square feet, C_CDD x Percent Cooled, and C_Ln (CDD) x Percent Cooled, hence the variable is computed as high school times square foot for high school.

ENERGY STAR SCORE LOOKUP TABLE

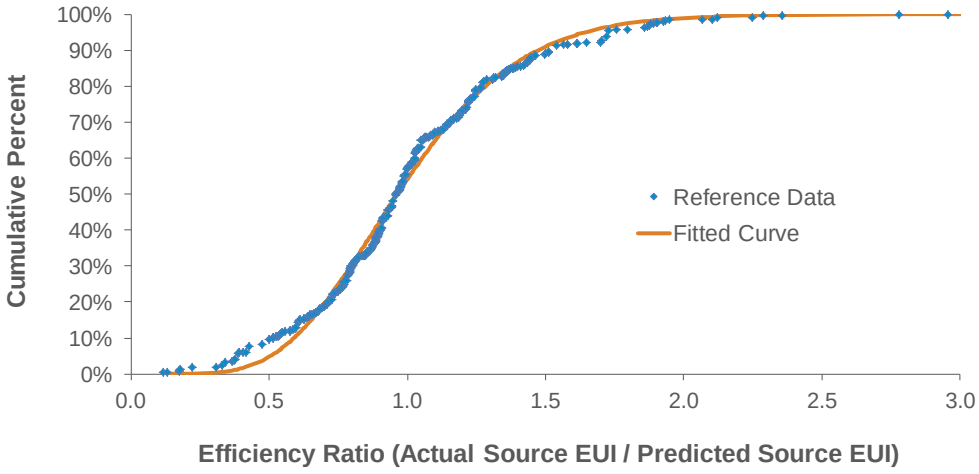
The final regression equation (presented in ***Figure 3***) yields a prediction of source EUI based on a building's operating characteristics. Some buildings in the reference data sample use more energy than predicted by the regression equation, while others use less. The *actual* source EUI of each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

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

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 8.229 and a scale parameter (beta) of 0.1220. For this fit, the sum of the squared error is 0.1752.

Figure 4 – K-12 School Distribution



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 K-12 Schools

ENERGY STAR Score	Cumulative Percent	Energy Efficiency Ratio > =	Energy Efficiency Ratio <
100	0%	0.0000	0.3499
99	1%	0.3499	0.3972
98	2%	0.3972	0.4295
97	3%	0.4295	0.4550
96	4%	0.4550	0.4766
95	5%	0.4766	0.4955
94	6%	0.4955	0.5124
93	7%	0.5124	0.5280
92	8%	0.5280	0.5424
91	9%	0.5424	0.5559
90	10%	0.5559	0.5686
89	11%	0.5686	0.5808
88	12%	0.5808	0.5925
87	13%	0.5925	0.6036
86	14%	0.6036	0.6144
85	15%	0.6144	0.6248
84	16%	0.6248	0.6349
83	17%	0.6349	0.6447
82	18%	0.6447	0.6543
81	19%	0.6543	0.6638
80	20%	0.6638	0.6730
79	21%	0.6730	0.6820
78	22%	0.6820	0.6909
77	23%	0.6909	0.6996
76	24%	0.6996	0.7083
75	25%	0.7083	0.7168
74	26%	0.7168	0.7252
73	27%	0.7252	0.7336
72	28%	0.7336	0.7418
71	29%	0.7418	0.7500
70	30%	0.7500	0.7581
69	31%	0.7581	0.7661
68	32%	0.7661	0.7741
67	33%	0.7741	0.7820
66	34%	0.7820	0.7900
65	35%	0.7900	0.7979
64	36%	0.7979	0.8058
63	37%	0.8058	0.8136
62	38%	0.8136	0.8215
61	39%	0.8215	0.8294
60	40%	0.8294	0.8372
59	41%	0.8372	0.8450
58	42%	0.8450	0.8528
57	43%	0.8528	0.8608
56	44%	0.8608	0.8686
55	45%	0.8686	0.8765
54	46%	0.8765	0.8845
53	47%	0.8845	0.8925
52	48%	0.8925	0.9005
51	49%	0.9005	0.9085
50	50%	0.9085	0.9166
49	51%	0.9166	0.9248
48	52%	0.9248	0.9330
47	53%	0.9330	0.9413
46	54%	0.9413	0.9496
45	55%	0.9496	0.9580
44	56%	0.9580	0.9666
43	57%	0.9666	0.9752
42	58%	0.9752	0.9838
41	59%	0.9838	0.9926
40	60%	0.9926	1.0015
39	61%	1.0015	1.0105
38	62%	1.0105	1.0197
37	63%	1.0197	1.0289
36	64%	1.0289	1.0383
35	65%	1.0383	1.0480
34	66%	1.0480	1.0578
33	67%	1.0578	1.0677
32	68%	1.0677	1.0778
31	69%	1.0778	1.0881
30	70%	1.0881	1.0987
29	71%	1.0987	1.1094
28	72%	1.1094	1.1206
27	73%	1.1206	1.1319
26	74%	1.1319	1.1435
25	75%	1.1435	1.1555
24	76%	1.1555	1.1678
23	77%	1.1678	1.1805
22	78%	1.1805	1.1937
21	79%	1.1937	1.2073
20	80%	1.2073	1.2215
19	81%	1.2215	1.2363
18	82%	1.2363	1.2516
17	83%	1.2516	1.2678
16	84%	1.2678	1.2846
15	85%	1.2846	1.3025
14	86%	1.3025	1.3214
13	87%	1.3214	1.3415
12	88%	1.3415	1.3631
11	89%	1.3631	1.3864
10	90%	1.3864	1.4117
9	91%	1.4117	1.4396
8	92%	1.4396	1.4706
7	93%	1.4706	1.5057
6	94%	1.5057	1.5465
5	95%	1.5465	1.5953
4	96%	1.5953	1.6566
3	97%	1.6566	1.7403
2	98%	1.7403	1.8776
1	99%	1.8776	>1.8776

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 K-12 schools:

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 (hours, etc.)

Energy Data	Value
Electricity	700,000 kWh
Natural gas	20,000 therms

Property Use Details	Value
Gross floor area (ft²)	100,000
High School	1 (Yes)
Open weekends	1 (Yes)
Walk in refrigerators	0
Presence of cooking	0 (No)
Number of personal computers	200
Percent heated	100%
Percent cooled	100%
HDD (provided by Portfolio Manager, based on Zip code)	4,937
CDD (provided by Portfolio Manager, based on Zip code)	1,046

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	700,000 kWh	3.412	2,388,400	3.14	7,499,576
Natural gas	20,000 therms	100	2,000,000	1.05	2,100,000
				Total Source Energy (kBtu)	9,599,576
				Actual Source EUI (kBtu/ft²)	96.0

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 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	--	--	--	131.9	131.9
High School	1.000	--	1.000	4.377	4.377
C_ Ln (HDD) x Percent Heated	8.505	7.716	0.7890	8.974	7.080
C_ Ln (CDD) x Percent Cooled	6.953	5.045	1.908	6.389	12.19
C_ Ln (Square Feet)	11.51	10.20	1.310	-19.26	-25.23
Open Weekends (yes/no)	1.000	--	1.000	18.43	18.43
C_ Number of Walk-in Refrigerators per 1000 ft^2	0.000	0.0109	-0.0109	574.7	-6.264
Presence of Cooking (yes/no)	0.000	--	0.000	24.20	0.000
C_ Number of Computers per 1000 ft^2	2.000	1.742	0.2580	9.568	2.469
C_Square Feet	100,000	47,310	52,690	--	--
C_CDD x Percent Cooled	1046	1316	-270.0	--	--
High School x C_Square Feet	52,690	--	52,690	0.00021	11.06
High School x C_CDD x Percent Cooled	-270.0	--	-270.0	0.0285	-7.695
High School x C_Ln (CDD) x Percent Cooled	1.908	--	1.908	-11.75	-22.42
			Predicted Source EUI (kBtu/ft^2)		**125.9**

4 Portfolio Manager computes the energy efficiency ratio

- The ratio equals the actual source EUI (Step 2) divided by predicted source EUI (Step 3)
- Ratio = 96.0 / 125.9 = 0.7625

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

- The ratio from Step 4 is used to identify the score from the lookup table
- A ratio of 0.7625 is greater than 0.7581 and less than 0.7661
- ***The ENERGY STAR score is 69***