

Calculated Results on EUIs from CBECS 2012 Screened Data Set

Version 2

July 2016



The DOE Energy Information Administration (EIA) completed the release of the 2012 CBECS consumption and expenditures microdata in May 2016.

*** This revision of the initial short document, originally released in June 2016, makes some minor changes and adds some clarifications. The electric source energy adjustment factor was changed from 3.11 to 3.01, a correction based on newer SEDS data. Some other minor clarifications are also included.

The results presented show calculated, weighted energy use intensities (EUIs) derived from a screened data set, similar to what EPMI has provided previously for the 2003 CBECS data. EUIs are provided based on both delivered energy (site energy) and primary energy, where energy production and transmission losses are estimated and included (see notes at bottom of source EUI table).

The screening is done to ameliorate and adjust for buildings used less than nine months per year and some perturbations that EIA applies to the data, as well as estimate propane energy use, which is very small for the sector but does lead to some impact on EUI statistics if not estimated.

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Introduction

Energy use in commercial buildings is complicated to understand, due to the wide range of building uses and ownership, variations in the size and complexity of energy systems, differences in energy system operation and maintenance, and other factors. Commercial buildings use energy in many different ways, as a result of this wide range.

The process of assessing building energy use and identifying potential efficiency improvements is complicated and has several steps. Different levels of assessment can be undertaken, with varying requirements and activities. Energy use intensities (EUIs) combine building characteristics with energy data to provide a simple benchmark for initial assessment of the energy performance of buildings. In addition to targeting energy-saving opportunities, EUIs may help identify problems that exist in specific buildings, such as unnecessary after-hours use of lights or mechanical systems, inefficiencies with lighting and other building systems, or excessive infiltration of outdoor air into conditioned spaces.

This report provides EUI distribution statistics calculated for the more detailed building activity categories in the 2012 CBECS data, using CBECS floor area data (SQFT) as the normalizing building characteristic.

CBECS 2012

The Commercial Buildings Energy Consumption Survey (CBECS) is a national-level sample survey of commercial buildings and their energy suppliers conducted nominally every four years (although the previous successful survey was in 2003) by the Energy Information Administration (EIA). The target population for CBECS is all commercial buildings in the United States with more than 1,000 square feet of floor space.

CBECS 2012 data began to be released in 2015, and the final microdata set, with energy consumption and expenditures data included, was released in May 2016.

Building “types” in CBECS are based on primary building activity, and CBECS has two sets of these, where one set is like older CBECS data and another set is more detailed. The set that is like older data is actually more confusing, due to the way different types of buildings are combined together in larger groups, and only the more detailed categories will be presented here.

The CBECS sample is designed so that survey responses can be used to estimate characteristics of the entire stock of commercial buildings larger than 1,000 square feet in the United States. The method of estimation involves calculation of sample weights that best allow the sample to represent the overall population.

By not including the smallest buildings (< 1,000 sq ft), CBECS underestimates total commercial sector floor area and energy use by about 2% and the total number of buildings by about 15% (based on examination of the 1979 NBECS survey and detailed commercial sector data from California). However, the calculation of representative EUI statistics should not be affected much, if at all, by this condition.

Since the survey unit of interest is individual buildings, CBECS also has some issues related to large campuses or reservations, including military, health care, research and development, and university or college campuses. Representation of large campuses is not really handled by CBECS, and there appears to be some underestimation of total sectoral energy use due to large campus issues. However, statistics on individual building EUIs should not be affected to any important degree by these issues, since the EUI results are focused on the building level.

CBECS results and data can be obtained from: <http://www.eia.gov/consumption/commercial/>

Primary and Site Energy

Commercial buildings use different combinations of fuels, including electricity, natural gas, fuel oil, district steam, and others. Site energy is the amount of fuel consumed by a building at its local site. Site energy, also called delivered energy, does not include any energy used to transport or generate the energy used by the building. Electricity generation using fossil fuels requires more energy to generate the electricity than the electricity provides directly. Energy is also required to transport oil, natural gas, district heat, and electricity to buildings to be used.

Primary energy, also called source energy, is calculated by making adjustments to the site energy to account for energy used to generate the fuel source and transport it to the building for use. Electricity requires a large adjustment, and sometimes primary energy only includes the electricity adjustment. The Energy Star program uses primary, or source, energy for building energy performance ratings, and Energy Star has developed adjustment factors for most fuels used in commercial buildings.

This document provides CBECS-derived statistics for both site and source EUIs. Source energy adjustments are based on Energy Star factors for fuels other than electricity (<https://portfoliomanager.energystar.gov/pdf/reference/Source%20Energy.pdf>). The adjustment factor for electricity is based on EIA's State Energy Data System (SEDS) data for the US commercial sector in 2012.

Building Types

The extended building use or activity categories (PBAPLUS) for CBECS 2012 are shown in the table below. These categories are much the same as for the 2003 CBECS, except two new categories have been added for “Bar / pub / lounge” and “Courthouse / probation office.” The courthouse category is changed from the 2003 CBECS to also include probation offices, and a new category under “Public Order and Safety” is added as “Other public order and safety.” The “College / University” category is for educational buildings, which can also be fairly diverse.

Building Use Description	2012 CBECS PBAPLUS ID	Building Use Description	2012 CBECS PBAPLUS ID
Education		Office	
College/University (educational buildings)	27	Administrative/Professional Office	2
Elementary/Middle School	28	Bank / Financial Institution	3
High School	29	Government Office	4
Other Classroom Education	31	Mixed-Use Office	6
Preschool/Daycare	30	Other Office	7
Food Sales		Other (all other types, which is a very wide range)	
Grocery Store/Food Market	14	Public Assembly	
Convenience store (without Gas Station)	12	Entertainment/Culture	22
Convenience store (with Gas Station)	13	Library	23
Other Food Sales	15	Recreation	24
Food Service		Social/Meeting	
Fast Food	32	25	
Restaurant/Cafeteria	33	Other Public Assembly	
Bar/pub/lounge	53	26	
Other Food Service	34	Public Order and Safety	
Health Care		Fire Station/Police Station	
Hospital/Inpatient Health	35	16	
Nursing Home, Assisted Living	36	Courthouse/probation office	
Clinic/Other Outpatient Health	19	52	
Medical Office (non-diagnostic)	5	Other public order and safety	
Medical Office (diagnostic)	18	17	
Laboratory		Religious Worship	
8		21	
Lodging		Retail	
Hotel	38	Retail Stores (non-mall stores)	
Motel or Inn	39	42	
Dormitory/Fraternity/Sorority	37	Other Retail	
Other Lodging	40	43	
Mall (Different categories may be needed for malls, based on ownership and tenant arrangements)		Vehicle Dealerships/Showrooms	
Strip Mall	50	41	
Enclosed Mall	51	Service	
		Vehicle Repair/Service Shop	
		46	
		Vehicle storage/maintenance	
		47	
		Post Office/Postal Center	
		44	
		Repair Shop	
		45	
		Other Service	
		48	
		Storage / Shipping / Warehouse	
		Self-storage	
		11	
		Non-Refrigerated Warehouse	
		10	
		Distribution/Shipping Center	
		9	
		Refrigerated Warehouse	
		20	
		Vacant	
		1	

Basic Sample and Estimated Populations

The CBECS 2012 sample consists of 6,720 data records on individual buildings. The final weighting parameter for the sample is FINALWT, which is used for weighted calculations, including calculating national, regional, or other totals or statistical values. Additional weights are also included for the jackknife replicated half-sample method for estimation of relative standard errors (RSEs) of weighted, calculated population estimates. RSEs are not presented here. The tables on this page and the next show the population estimates for each building type.

2012 CBECS Basic Sample and Weighted Building Populations				
Building Use Description, PBPLUS	# of Buildings in CBECS Sample	US Total, calculated, weighted result		
		# of Buildings (thousands)	Total Floor Area, Billions sq ft	Total Floor Area, Billions sq m
Education				
College/University (educational bldgs)	104	27.2	1.883	0.175
Elementary/Middle School	397	189.0	6.122	0.569
High School	142	42.7	3.053	0.284
Other Classroom Education	62	62.0	0.751	0.070
Preschool/Daycare	50	67.7	0.599	0.056
Food Sales				
Grocery Store/Food Market	48	44.7	0.763	0.071
Convenience store (without Gas Station)	47	79.1	0.282	0.026
Convenience store (with Gas Station)	32	51.7	0.188	0.017
Other Food Sales	2	1.2	0.018	0.002
Food Service				
Fast Food	94	92.3	0.410	0.038
Restaurant/Cafeteria	180	178.6	1.040	0.097
Bar/pub/lounge	60	71.4	0.350	0.033
Other Food Service	27	37.4	0.128	0.012
Health Care				
Hospital/Inpatient Health	409	9.6	2.352	0.219
Nursing Home, Assisted Living	94	29.5	1.275	0.118
Clinic/Other Outpatient Health	135	86.9	1.271	0.118
Medical Office (non-diagnostic)	42	50.4	0.301	0.028
Medical Office (diagnostic)	62	60.3	0.510	0.047
Laboratory	41	15.5	0.729	0.068
Lodging				
Hotel	159	30.0	2.613	0.243
Motel or Inn	61	60.9	0.603	0.056
Dormitory/Fraternity/Sorority	48	24.6	0.804	0.075
Other Lodging	27	12.8	0.426	0.040
Mall (may need ownership and tenant arrangement categories instead)				
Strip Mall	296	162.7	5.085	0.472
Enclosed Mall	34	1.4	0.869	0.081

Source: calculated based on DOE/EIA 2012 CBECS micro-data released May 2016

<http://epminst.us>

Building Use Description, PBAPLUS	# of Buildings in CBECS Sample	US Total, calculated, weighted result		
		# of Buildings (thousands)	Total Floor Area, Billions sq ft	Total Floor Area, Billions sq m
Office				
Administrative / Professional Office	766	558.1	9.103	0.846
Bank / Financial Institution	79	91.1	0.903	0.084
Government Office	205	113.3	2.656	0.247
Mixed-Use Office	212	125.1	2.669	0.248
Other Office	52	74.5	0.482	0.045
Other (all other, a very wide range)	87	109.3	1.543	0.143
Public Assembly				
Entertainment/Culture	89	51.2	1.267	0.118
Library	37	23.8	0.762	0.071
Recreation	127	100.4	1.898	0.176
Social/Meeting	98	135.4	0.967	0.090
Other Public Assembly	63	41.3	0.635	0.059
Public Order and Safety				
Fire Station/Police Station	53	68.9	0.673	0.062
Courthouse/probation office	26	6.3	0.430	0.040
Other public order and safety	22	8.7	0.432	0.040
Religious Worship	352	411.8	4.760	0.442
Retail				
Retail Stores (non-mall stores)	294	336.3	4.503	0.418
Other Retail	41	58.8	0.375	0.035
Vehicle Dealerships/Showrooms	34	43.2	0.559	0.052
Service				
Vehicle Repair/Service Shop	149	214.0	1.809	0.168
Vehicle storage/maintenance	113	176.1	1.312	0.122
Post Office/Postal Center	26	30.3	0.402	0.037
Repair Shop	53	84.5	0.535	0.050
Other Service	83	113.6	0.685	0.064
Storage / Shipping / Warehouse				
Self-storage	81	208.8	1.572	0.146
Non-Refrigerated Warehouse	350	427.0	5.376	0.499
Distribution/Shipping Center	307	151.4	5.741	0.533
Refrigerated Warehouse	21	8.5	0.441	0.041
Vacant	247	296.0	3.257	0.303
Entire Sample or Weighting	6,720	5,557.1	88.175	8.191

Source: calculated based on DOE/EIA 2012 CBECS micro-data released May 2016

<http://epminst.us>

Adjusting for EUI Calculation

The EUIs presented here are based on a screened set of CBECS 2012 data. The first adjustment in the screened data set is to estimate propane use based on CBECS parameters. Propane quantities for annual consumption are reported as ranges, and the quantities could be gallons or pounds. Propane use is estimated for those buildings with reported quantities by assuming the middle of the range is used.

Secondly, source energy use is calculated based on adjustment factors. The Energy Star factors currently reported on the energystar.gov website that are used here are: natural gas, 1.05; oil / propane, 1.01; and district heat, 1.20. The electricity factor is calculated from the EIA State Energy Data System commercial sector electricity data for the whole country, as reported for the year 2012 in the 2013 *State Energy Consumption Estimates* report [DOE/EIA-0214(2013), July 2015, Table CT5, p 26], and is 3.01. Following the calculation of primary energy, if the estimated propane primary energy is more than 10% of total primary energy, that observation is deleted from the screened set.

If propane is used, but estimated quantities are not included in the data, that building is deleted also. EIA follows certain rules in trying to assure the identity of buildings cannot be readily determined, as they explain in the user guide for the microdata. One rule or method that causes difficulties for calculation of EUIs is to make large changes to floor area for most, if not all, buildings that are larger than 999,999 gross square feet. Thus, for floor-area-based EUI calculations here, all buildings larger than 999,999 sq ft are deleted.

Finally, CBECS has a parameter on the months per year the building is used. For the calculations here, for all buildings except Vacant buildings, if the months of use are less than nine, the building is deleted. In the following tables on EUIs, the number of buildings in the CBECS data sample and the number of buildings in the screened data set are listed.

There are only two buildings in the category of “Other food sales,” and no EUI information is reported for this category. All other building types have at least 20 buildings in the screened set, except “Other Food Service” has 16, “Enclosed Mall” has 19, and “Other public order and safety” has 19. Users can consider whether the reported values for each type are based on an acceptable sample size.

Total US sectoral floor area for the CBECS sample estimated using the weights is 88.175 billion square feet. Total US floor area estimated for the screened sample is 79.276 billion square feet.

Site Energy EUI Values

Distributional values estimated for site-energy-based EUIs are presented in two tables on this page and the next. EUIs are for site or delivered energy, as thousands of Btu (kBtu) per gross square foot of building floor area, as reported by CBECS (floor area parameter = SQFT).

Commercial Sector Samples and SITE EUI Percentiles based on May 2016 CBECS Data for 2012									
Building Use Description	# bldgs in CBECS N	Screened # of buildings N	Energy Use Index (EUI) Values, Calculated, Weighted						
			SITE Energy kBtu/yr per gross square foot						
			Percentiles					Mean	
			10th	25th	50th	75th	90th		
Education									
College/University (educational bldgs)	104	100	26	58	88	128	162	109	
Elementary/Middle School	397	377	21	30	47	70	104	57	
High School	142	134	23	42	64	94	126	74	
Other Classroom Education	62	55	20	30	40	99	117	60	
Preschool/Daycare	50	49	27	35	57	83	133	72	
Food Sales									
Grocery Store/Food Market	48	42	104	134	196	234	301	196	
Convenience store (without Gas Station)	47	39	65	121	224	350	423	243	
Convenience store (with Gas Station)	32	28	123	219	258	351	466	302	
Other Food Sales	2	2	-- --	-- --	-- --	-- --	-- --	-- --	
Food Service									
Fast Food	94	88	133	245	470	717	844	475	
Restaurant/Cafeteria	180	149	89	182	336	515	668	370	
Bar/pub/lounge	60	55	43	77	131	236	358	178	
Other Food Service	27	16	27	60	201	320	351	195	
Health Care									
Hospital/Inpatient Health	409	317	95	161	212	274	319	216	
Nursing Home, Assisted Living	94	82	67	82	130	165	241	139	
Clinic/Other Outpatient Health	135	124	29	52	68	104	162	87	
Medical Office (non-diagnostic)	42	36	24	30	49	69	90	54	
Medical Office (diagnostic)	62	61	22	34	57	75	103	64	
Laboratory	41	40	12	32	156	258	627	194	
Lodging									
Hotel	159	141	43	58	66	108	165	90	
Motel or Inn	61	49	45	51	57	121	137	83	
Dormitory/Fraternity/Sorority	48	44	17	40	64	89	121	65	
Other Lodging	27	27	38	56	71	127	159	86	
Mall (may need ownership / tenant arrangement categories instead)									
Strip Mall	296	278	36	56	104	176	265	141	
Enclosed Mall	34	19	27	27	62	70	95	57	

Source: calculated based on DOE/EIA 2012 CBECS micro-data released May 2016, with some adjustments, as below <http://epminst.us>

Notes: Propane calculations based on methodology similar to EPA Energy Star, with some deletions based on propane use.

Buildings of 1 Million square feet or larger have inappropriate data and were deleted.

EXCEPT for VACANT buildings, any building used less than nine months/yr was deleted.

Commercial Sector Samples and SITE EUI Percentiles based on May 2016 CBECS Data for 2012									
Building Use Description	# bldgs in CBECS N	Screened # of buildings N	Energy Use Index (EUI) Values, Calculated, Weighted						
			SITE Energy kBtu/yr per gross square foot						Mean
			Percentiles						
			10th	25th	50th	75th	90th		
Office									
Administrative / Professional Office	766	730	19	32	52	73	131	65	
Bank / Financial Institution	79	77	45	59	88	114	152	93	
Government Office	205	177	25	42	59	88	131	71	
Mixed-Use Office	212	198	16	30	48	71	122	59	
Other Office	52	48	12	23	41	79	125	59	
Other (all other, a very wide range)	87	73	0.9	16	39	79	174	77	
Public Assembly									
Entertainment/Culture	89	74	20	35	52	76	102	70	
Library	37	35	28	45	72	86	99	71	
Recreation	127	106	21	28	56	101	174	75	
Social/Meeting	98	69	18	25	56	96	111	66	
Other Public Assembly	63	46	21	38	58	78	205	79	
Public Order and Safety									
Fire Station/Police Station	53	46	17	34	63	86	148	70	
Courthouse/probation office	26	25	61	74	101	105	129	94	
Other public order and safety	22	19	65	112	118	143	143	119	
Religious Worship	352	308	9.1	18	30	54	92	47	
Retail									
Retail Stores (non-mall stores)	294	269	16	27	53	86	128	65	
Other Retail	41	32	21	47	71	147	168	88	
Vehicle Dealerships/Showrooms	34	32	25	36	61	101	142	81	
Service									
Vehicle Repair/Service Shop	149	134	14	26	45	95	171	76	
Vehicle storage/maintenance	113	102	5.6	17	34	76	161	65	
Post Office/Postal Center	26	25	30	45	63	77	89	62	
Repair Shop	53	46	10	18	40	86	138	54	
Other Service	83	76	16	32	53	116	486	143	
Storage / Shipping / Warehouse									
Self-storage	81	80	2.0	3.6	13	35	70	30	
Non-Refrigerated Warehouse	350	330	2.3	6.4	17	39	76	27	
Distribution/Shipping Center	307	266	7.0	16	30	47	76	36	
Refrigerated Warehouse	21	20	25	35	84	231	304	128	
Vacant	247	242	0.7	4.0	10	32	58	21	
Entire Sample or Weighting	6720	6037	10.8	25.6	52	98	200	91	

Source: calculated based on DOE/EIA 2012 CBECS micro-data released May 2016, with some adjustments, as below <http://epminst.us>

Notes: Propane calculations based on methodology similar to EPA Energy Star, with some deletions based on propane use.

Buildings of 1 Million square feet or larger have inappropriate data and were deleted.

EXCEPT for VACANT buildings, any building used less than nine months/yr was deleted.

Source Energy EUI Values

Distributional values estimated for source-energy-based EUIs are presented in the same two-table format. EUIs in these tables are for source or primary energy, as thousands of Btu (kBtu) per gross square foot of building floor area. The source energy values are calculated as explained previously under “Primary and Site Energy” and “Adjusting for EUI Calculation,” and the normalizing floor areas are based on those reported by CBECS (floor area parameter = SQFT).

Commercial Sector SOURCE EUI Percentiles based on May 2016 CBECS Data for 2012								
Building Use Description	# bldgs in CBECS N	Screened # of buildings N	Energy Use Index (EUI) Values, Calculated, Weighted					
			SOURCE Energy kBtu/yr per gross square foot					
			Percentiles					Mean
			10th	25th	50th	75th	90th	
Education								
College/University (educational bldgs)	104	100	75	129	199	244	365	234
Elementary/Middle School	397	377	52	77	106	148	225	128
High School	142	134	70	95	145	197	274	161
Other Classroom Education	62	55	38	64	87	149	219	116
Preschool/Daycare	50	49	58	94	136	201	276	172
Food Sales								
Grocery Store/Food Market	48	42	271	400	473	615	727	502
Convenience store (without Gas Station)	47	39	183	358	629	1054	1242	679
Convenience store (with Gas Station)	32	28	316	627	739	1056	1356	824
Other Food Sales	2	2	---	---	---	---	---	---
Food Service								
Fast Food	94	88	331	554	1070	1517	1824	1066
Restaurant/Cafeteria	180	149	206	357	632	1014	1305	724
Bar/pub/lounge	60	55	112	173	312	525	666	378
Other Food Service	27	16	61	130	439	765	968	532
Health Care								
Hospital/Inpatient Health	409	317	219	333	466	566	662	456
Nursing Home, Assisted Living	94	82	116	179	249	366	465	282
Clinic/Other Outpatient Health	135	124	70	130	170	244	417	207
Medical Office (non-diagnostic)	42	36	60	83	128	151	191	129
Medical Office (diagnostic)	62	61	49	84	133	194	242	158
Laboratory	41	40	34	96	320	493	1101	437
Lodging								
Hotel	159	141	102	124	173	222	368	208
Motel or Inn	61	49	85	129	158	255	365	198
Dormitory/Fraternity/Sorority	48	44	50	93	131	189	200	137
Other Lodging	27	27	78	84	148	257	333	169
Mall (may need ownership and tenant arrangement categories instead)								
Strip Mall	296	278	97	154	246	387	506	307
Enclosed Mall	34	19	34	60	179	205	224	148

Source: calculated based on DOE/EIA 2012 CBECS micro-data released May 2016, with some adjustments, as below

<http://epminst.us>

Notes: Propane calculations based on methodology similar to EPA Energy Star, with some deletions based on propane use.

SOURCE EUI calculations based on EPA Energy Star national average conversion factors in 2016 for district heat, oil / propane, and natural gas.

*** SOURCE EUI conversion for electricity based on DOE/EIA SEDS 2012 commercial sector national average source/site ratio = 3.01.

Buildings of 1 Million square feet or larger have inappropriate data and were deleted.

EXCEPT for VACANT buildings, any building used less than nine months/yr was deleted.

Commercial Sector SOURCE EUI Percentiles based on May 2016 CBECS Data for 2012								
Building Use Description	# bldgs in CBECS N	Screened # of buildings N	Energy Use Index (EUI) Values, Calculated, Weighted					
			SOURCE Energy kBtu/yr per gross square foot					
			Percentiles					Mean
			10th	25th	50th	75th	90th	
Office								
Administrative/Professional Office	766	730	46	75	119	175	298	153
Bank / Financial Institution	79	77	108	140	224	283	353	228
Government Office	205	177	55	100	150	228	299	171
Mixed-Use Office	212	198	42	74	120	173	241	135
Other Office	52	48	36	64	93	180	244	128
Other (all other, a very wide range)	87	73	2.8	39	84	168	520	174
Public Assembly								
Entertainment/Culture	89	74	34	64	104	173	242	158
Library	37	35	85	135	152	205	216	164
Recreation	127	106	38	64	120	211	354	168
Social/Meeting	98	69	39	54	111	164	265	134
Other Public Assembly	63	46	58	78	109	152	377	162
Public Order and Safety								
Fire Station/Police Station	53	46	42	62	126	194	240	146
Courthouse/probation office	26	25	118	158	220	232	305	207
Other public order and safety	22	19	137	247	352	352	403	301
Religious Worship	352	308	20	38	61	100	178	86
Retail								
Retail Stores (non-mall stores)	294	269	42	66	129	213	320	156
Other Retail	41	32	36	73	193	383	447	217
Vehicle Dealerships/Showrooms	34	32	65	91	128	250	336	184
Service								
Vehicle Repair/Service Shop	149	134	33	61	107	184	285	142
Vehicle storage/maintenance	113	102	15	40	73	119	285	130
Post Office/Postal Center	26	25	61	108	139	155	188	133
Repair Shop	53	46	32	42	90	151	230	102
Other Service	83	76	35	63	125	220	706	248
Storage / Shipping / Warehouse								
Self-storage	81	80	6.0	11	38	105	209	85
Non-Refrigerated Warehouse	350	330	6.9	18	45	86	146	62
Distribution/Shipping Center	307	266	20	37	67	113	154	80
Refrigerated Warehouse	21	20	46	106	253	471	914	370
Vacant	247	242	2.2	10	23	60	106	45
Entire Sample or Weighting	6720	6037	27.7	59.0	118	218	448	202

Source: calculated based on DOE/EIA 2012 CBECS micro-data released May 2016, with some adjustments, as below

<http://epminst.us>

Notes: Propane calculations based on methodology similar to EPA Energy Star, with some deletions based on propane use.

SOURCE EUI calculations based on EPA Energy Star national average conversion factors in 2016 for district heat, oil / propane, and natural gas.

*** SOURCE EUI conversion for electricity based on DOE/EIA SEDS 2012 commercial sector national average source/site ratio = 3.01.

Buildings of 1 Million square feet or larger have inappropriate data and were deleted.

EXCEPT for VACANT buildings, any building used less than nine months/yr was deleted.

Changes from 2003

With almost a decade between commercial sector survey results, changes that have occurred may be of interest. The following tables are the final part of this document and show the differences in median and mean of SOURCE EUI, calculated based on the EPMI screened CBECS data sets for 2012 and 2003. Electricity supply is more efficient on a source basis in 2012 compared to 2003, so that has a small effect. Due to changes in categories from 2003 to 2012, and some data limitations, values are only shown where considered feasible. Negative values mean EUI decreased from 2003 to 2012.

Change in Source EUI from 2003 to 2012, based on differences in screened CBECS sets, kBtu/ft²		
Building Use Description	Median	Mean
Education		
College/University (educational buildings)	-84	-77
Elementary/Middle School	-40	-40
High School	-4.3	-8.5
Other Classroom Education	-8.0	-1.4
Preschool/Daycare	-19	-12
Food Sales		
Grocery Store/Food Market	-30	-59
Convenience store (without Gas Station)	-145	-176
Convenience store (with Gas Station)	-23	66
Other Food Sales		
Food Service		
Fast Food	-136	-273
Restaurant/Cafeteria	88	45
Bar/pub/lounge		
Other Food Service		
Health Care		
Hospital/Inpatient Health	52	-15
Nursing Home, Assisted Living	0.3	8.1
Clinic/Other Outpatient Health	-23	-19
Medical Office (non-diagnostic)	-5.0	-4.1
Medical Office (diagnostic)	4.4	18
Laboratory	-290	-309
Lodging		
Hotel	-18	-23
Motel or Inn	-10.5	-6.9
Dormitory/Fraternity/Sorority	14	-13
Other Lodging	-29	-7.6
Mall (may need ownership and tenant arrangement categories instead)		
Strip Mall	-0.7	36
Enclosed Mall	-70	-149

Based on differences in EPMI screened data sets for 2012 and 2003

Keep in mind that any decreases are partly due to the increase in efficiency of electricity supply, which led to a reduction of about 10% from 2003 to 2012 in source energy required to deliver the same amount of site energy for the calculations here.

Change in Source EUI from 2003 to 2012, based on differences in screened CBECS sets, kBtu/ft²		
Building Use Description	Median	Mean
Office		
Administrative / Professional Office	-34	-29
Bank / Financial Institution	-49	-66
Government Office	-34	-38
Mixed-Use Office	-47	-76
Other Office	-65	-34
Other (all other, a very wide range)	-46	20
Public Assembly		
Entertainment/Culture	49	18
Library	-94	-100
Recreation	9.4	6.9
Social/Meeting	24	13
Other Public Assembly	23	26
Public Order and Safety		
Fire Station/Police Station	-35	-42
Courthouse/probation office		
Other public order and safety		
Religious Worship	-15	-3.7
Retail		
Retail Stores (non-mall stores)	1.5	-29
Other Retail	-81	-68
Vehicle Dealerships/Showrooms	-30	-57
Service		
Vehicle Repair/Service Shop	12	7.7
Vehicle storage/maintenance	17	26
Post Office/Postal Center	-24	-38
Repair Shop	-16	-4.6
Other Service	-68	-57
Storage / Shipping / Warehouse		
Self-storage	14	58
Non-Refrigerated Warehouse	1.3	-16
Distribution/Shipping Center	-14	-15
Refrigerated Warehouse	-28	42
Vacant	-2.3	-7.3
Entire Sample or Weighting	-26.5	-31.2

Based on differences in EPMI screened data sets for 2012 and 2003