ADDENDA

ANSI/ASHRAE/IES Addendum b to
ANSI/ASHRAE/IES Standard 100-2015

Energy Efficiency in Existing Buildings

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FOREWORD

This addendum provides normative primary energy EUI target tables in Sections 7 and 10 and Normative Appendix A, in addition to a primary energy EUI calculation option in Appendix A, to add an alternative compliance path for the qualified person seeking compliance with the standard. Primary energy EUI target tables are to be selected by the authority having jurisdiction using the same procedures that are currently used for selecting the site EUI target tables in Standard 100-2015. A primary EUI calculation option and associated EUI target tables for electricity and fossil fuel use are included in Appendix A for authorities having jurisdiction who prefer to use locally derived primary energy conversion factors.The qualified person is permitted to demonstrate compliance using either the site energy target or primary energy target selected by the authority having jurisdiction.

Note: In this addendum, changes to the current standard are indicated in the text by underlining (for additions) and ~~strikethrough~~ (for deletions) unless the instructions specifically mention some other means of indicating the changes.

Addendum b to Standard 100-2015

Revise Section 3 as shown. The remainder of Section 3 is unchanged.

3. DEFINITIONS

3.1 General

primary energy: See *source energy*.

site energy: energy consumed by a building as measured at the boundaries of the building site.

source energy: energy consumed by a building as measured at the building converted using source (primary) energy conversion factors to account for the energy consumed in the extraction, processing, and transport of primary fuels such as coal, oil, and natural gas; energy losses in thermal combustion in power-generation plants; and energy losses in transmission and distribution to the building. See also *primary energy*.

~~***time switch:*** a device that controls lighting, equipment, or systems based on the time of day.~~

~~***vacancy sensor:*** a sensor that automatically turns lighting, equipment, or appliances off within a specified time period after an area is vacated, which requires the lighting, equipment, or appliances to be manually turned on.~~

Revise Section 4.4.2 as shown.

4.4.2 Alternative Energy Targets (EUI_t). The qualified person determining compliance shall demonstrate to the AHJ that they have met the required energy targets on either a site energy or source energy basis in accordance with Section 7 or Section 10, or have met the requirements in Section 4.3.3 for buildings without energy targets. Alternative performance requirements, such as those in Normative Annex A, ~~Table A-1,~~ are permitted to be specified by the AHJ.

Revise Section 5.2.3 and Table 5-2 as shown.

5.2.3 Energy Conversion Factors. The site energy content of different ~~types~~ forms of purchased energy shall be converted from the purchased unit to the standard site energy unit. If site energy conversion factors are not provided by the utility or fuel supplier, ~~then~~ the conversion factors in Table 5-2a shall be used. (See also Informative Annex K.)

TABLE 5-2a Site Energy Conversion Factors

Fuel Oils	**kJ/L**	**Btu/U.S. gal**
#1	37,600	135,000
#2	38,700	139,000
#4	40,700	146,000
#5L	41,300	148,000
#5H	41,800	150,000
#6	42,900	154,000
Gas	**kJ/m^3**	**Btu/ft^3**
Natural Gas	38,400	1030
	kJ/L	**Btu/U.S. gal**
Propane	25,500	91,600
Electricity	**kJ/kWh**	**Btu/kWh**
	3600	3412

Note: Energy accounting and conversion factors shown in Table 5-2a are based on site energy~~—i.e., the available energy delivered to the building~~.

TABLE 5-2b Primary Energy Conversion Factors

Energy Form		**Conversion Factor**
Electricity		3.15
Natural gas		1.09
Fuel oil		1.19
LPG or propane		1.15
Other		1.10
Purchased district energy	Hot water	1.35
	Steam	1.45
	Chilled water	1.04

Note: Energy accounting and conversion factors shown in Table 5-2b are based on site energy using conversion factors in Table 5-2a converted to primary or source energy. Section 4.4.2 of the standard allows alternative energy targets established by the adopting AHJ. The AHJ may choose to use site energy to source energy conversion factors shown in Table 5-2b or may use other conversion factors following the processes and procedures incorporated within ANSI/ASHRAE Standard 105-2014, *Standard Methods of Determining, Expressing, and Comparing Building Energy Performance and Greenhouse Gas Emissions*. The AHJ may also choose to use locally appropriate factors for source (primary) energy.

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Revise Section 7.1 as shown.

7.1 Building Type and Energy Targets. [. . .]

7.1.1 Building Type. Buildings are divided into 53 types with activities as shown in Table 7-1. Buildings with one or more activities listed in Table 7-1 have energy targets as shown in Table 7-2a or 7-2b.

7.1.2 Energy Targets. Site-based energy targets are shown in Tables 7-2a in both I-P and SI units, while source-based energy targets are shown in Tables 7-2b in both I-P and SI units. Site energy electricity use and fossil fuel use targets listed in Tables 7-2c and 7-2d are for use in target calculations by authorities having jurisdiction.

All energy targets were derived from Commercial Building Energy Consumption Survey (CBECS) 2003 and Residential Energy Consumption Survey (RECS) 2005 data by Oak Ridge National Laboratory (ORNL) and the U.S. Department of Energy (DOE) and represent the 25th bottom (low energy) percentile of energy use by each building category.

The median numbers for each building category from CBECS and RECS data representing all buildings in the building type/activity across all climatic conditions were extrapolated to 17 DOE climate zones using multipliers generated through simulation of a representative building for each group of building categories. Informative Annex J gives a detailed explanation of target table derivation.

Informative Note: Tables 7-2c and 7-2d should not be applied separately for individual energy sources. The tables are used in accordance with Normative Annex A, Equation A-1, to determine the appropriate source energy target.

Revise Section 7.2.2 and 7.2.3 as shown.

7.2.2 Energy targets for buildings with a single activity shall be calculated as follows:

$$(\mathrm{EUI}_t) = S \times (\mathrm{EUI}_{t1})$$

where (EUI_{t1}) is the building activity energy target value in Table 7-2a or Table 7-2b for the appropriate building activities/types and climate, and S is the building operating shifts normalization factor in Table 7-3.

7.2.3 Energy targets for buildings with multiple activities shall be determined using weighted averages of building activity energy target for each area with a single activity, per the following equation, and reported on Normative Annex C, Form B:

$$\mathrm{EUI}t = (A \times S \times \mathrm{EUI}_{t1})_1 + (A \times S \times \mathrm{EUI}_{t1})_2 + \ldots + (A \times S \times \mathrm{EUI}_{t1})_i + \ldots + (A \times S \times \mathrm{EUI}_{t1})_n$$

where

$(A)_i$ = percentage of the gross floor area with single building activity i

$(\mathrm{EUI}_{t1})_i$ = building activity target from Table 7-2a or Table 7-2b for space i

$(S)_i$ = operating shifts normalization factor from Table 7-3 for space i

$(A \times S \times \mathrm{EUI}_{t1})_i$ = the weighted space EUI target for space i

Exceptions:

1. Spaces where more than 75% of the gross floor area has a unique building activity shall be reported as a single-use building or as a multiuse building in accordance with either Section 7.2.2 or Section 7.2.3.
2. Spaces less than 10% of the gross floor area with a unique building activity can combine their floor area with the floor area within the building that has a similar building activity as determined by the EM or other qualified person.
3. Spaces in buildings with multiple activities that are not listed in Table 7-1 and have a total combined area, $\sum A_{nontarget}$, comprising less than 10% of the building gross floor area (A_{gross}) can be excluded from building energy target calculations if the energy use of such space is metered separately. The energy target for the remaining part of the building shall be calculated after deducting the unlisted building type floor area from the building gross floor area ($A_{gross} - \sum A_{nontarget}$).
4. Spaces in multiple-activities buildings with activities not listed in Table 7-1 comprising more than 10% but not more than 50% of the gross floor area shall comply with either Section 7.2.3, Exception 3, or Sections 4.1, 4.2, 4.3.1, and 4.3.3.

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Revise Table 7-2 as shown below and add new Tables 7-2b through 7-2d. The remainder of Table 7-2 is unchanged.

TABLE 7-2a Building Activity Site Energy Targets (EUI_{t1}) (I-P Units)[1]

		EUIs by Building Type by Climate Zone (kBtu/ft^2·yr)																
		ASHRAE Climate Zone																
No.	Commercial Building Type	1A	2A	2B	3A	3B Coast	3B Other	3C	4A	4B	4C	5A	5B	5C[2,1]	6A	6B	7	8
[. . .]																		

~~*Notes:*~~

~~1. Targets listed in Table 7-2 were derived from Commercial Building Energy Consumption Survey (CBECS) 2003 and Residential Energy Consumption Survey (RECS) 2005 data by Oak Ridge National Laboratory (ORNL) and the U.S. Department of Energy (DOE) and represent the 25th bottom (low energy) percentile of energy use by each building category. The median numbers for each building category from CBECS and RECS data representing all buildings in the building type/activity across all climatic conditions were extrapolated to 17 DOE climate zones using multipliers generated through simulation of a representative building for each group of building categories. Informative Annex J gives a detailed explanation of target table derivation.~~

~~2.~~1. Zone 5C values based on U.S. building stock. ~~(A Canadian building sample was not available at the time of table development.)~~

TABLE 7-2a Building Activity Site Energy Targets (EUI_{t1}) (SI Units)[1]

		EUIs by Building Type by Climate Zone (MJ/m^2·yr)																
		ASHRAE Climate Zone																
No.	Commercial Building Type	1A	2A	2B	3A	3B Coast	3B Other	3C	4A	4B	4C	5A	5B	5C[2,1]	6A	6B	7	8
[. . .]																		

~~*Notes:*~~

~~1. Targets listed in Table 7-2 were derived from Commercial Building Energy Consumption Survey (CBECS) 2003 and Residential Energy Consumption Survey (RECS) 2005 data by Oak Ridge National Laboratory (ORNL) and the U.S. Department of Energy (DOE) and represent the 25th bottom (low energy) percentile of energy use by each building category. The median numbers for each building category from CBECS and RECS data representing all buildings in the building type/activity across all climatic conditions were extrapolated to 17 DOE climate zones using multipliers generated through simulation of a representative building for each group of building categories. Informative Annex J gives a detailed explanation of target table derivation.~~

~~2.~~1. Zone 5C values based on U.S. building stock. ~~(A Canadian building sample was not available at the time of table development.)~~

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TABLE 7-2b Building Activity Source Energy Targets (EUI_{t1}) (I-P Units)

No.	Commercial Building Type	EUIs by Building Type by Climate Zone (kBtu/ft²·yr)																
		ASHRAE Climate Zone																
		1A	2A	2B	3A	3B Coast	3B Other	3C	4A	4B	4C	5A	5B	5C[1]	6A	6B	7	8
1	Admin/professional office	123	127	113	130	95	112	93	109	91	118	91	90	91	101	94	109	152
2	Bank/other financial	174	180	161	185	134	159	133	155	129	167	129	128	131	143	134	154	216
3	Government office	153	158	142	162	118	140	117	136	113	147	113	113	115	126	117	136	190
4	Medical office (nondiag.)	105	108	97	111	81	95	80	93	77	100	77	77	77	86	80	93	130
5	Mixed-use office	142	146	131	151	110	130	108	126	105	136	105	104	105	116	109	126	176
6	Other office	119	122	110	126	91	108	90	105	87	114	88	87	89	97	91	105	147
7	Laboratory	561	555	493	548	425	477	446	463	397	522	394	404	424	436	421	468	622
8	Distribution/ship center	39	49	48	62	31	51	40	64	52	64	67	65	56	92	80	113	212
9	Nonrefrig. warehouse	19	24	23	30	15	25	19	31	25	31	32	31	28	45	39	55	102
10	Convenience store	424	460	391	476	367	401	396	396	343	458	337	349	391	364	357	392	494
11	Convenience store + gas	341	370	315	384	296	323	319	319	276	369	271	281	316	293	287	316	398
12	Grocery/food market	353	383	326	397	306	334	330	330	286	382	281	291	325	303	297	326	412
13	Other food sales	107	116	99	120	93	101	100	100	87	116	85	88	98	92	90	99	125
14	Fire/police station	207	204	182	202	156	176	164	170	146	192	145	149	157	160	155	172	229
15	Other public order/safety	188	186	166	184	142	160	150	155	133	175	132	136	143	146	141	157	209
16	Medical office (diagnostic)	105	102	94	100	87	93	75	76	70	82	57	64	66	58	60	58	66
17	Clinic/other outpatient health	158	152	141	150	130	139	112	114	105	123	86	96	98	88	90	86	98
18	Refrigerated warehouse	217	215	191	212	164	185	173	179	154	202	153	156	164	169	163	181	241
19	Religious worship	74	73	65	72	56	63	59	61	52	69	52	53	56	57	55	62	82
20	Entertainment/culture	73	72	64	71	55	62	58	60	52	68	51	53	56	57	55	61	81
21	Library	193	191	170	188	146	164	153	159	137	179	136	139	145	150	145	161	214
22	Recreation	83	82	73	81	63	71	66	69	59	77	58	60	63	65	62	69	92
23	Social/meeting	87	86	76	85	66	74	69	72	61	81	61	62	66	67	65	72	96
24	Other public assembly	89	88	78	87	67	76	71	73	63	83	62	64	68	69	67	74	99
25	College/university	194	193	175	196	130	169	142	175	141	190	154	145	156	177	160	194	288
26	Elementary/middle school	119	117	104	117	88	101	90	97	82	105	80	79	82	87	82	92	135
27	High school	142	141	127	143	95	123	103	125	100	138	108	103	110	124	113	136	201
28	Preschool/daycare	153	151	134	151	113	130	115	125	106	136	103	102	108	112	105	119	175
29	Other classroom education	79	79	71	80	53	69	58	70	56	77	60	57	63	69	63	76	113
30	Fast food	824	844	759	868	685	768	708	730	642	828	626	650	691	683	664	739	934
31	Restaurant/cafeteria	445	458	407	471	364	412	384	396	347	455	338	351	389	367	360	400	504
32	Other food service	243	250	222	258	199	225	210	216	190	248	185	192	213	201	197	219	275
33	Hospital/inpatient health	446	450	405	442	386	399	365	343	295	394	262	273	316	267	260	270	311
34	Nursing home/assisted living	265	262	233	259	200	225	210	218	187	246	186	191	199	206	199	221	294
35	Dormitory/fraternity/sorority	127	134	122	148	91	125	112	138	111	158	123	119	122	141	132	160	224
36	Hotel	156	160	140	161	135	141	135	131	119	153	108	118	124	115	117	122	141

1. Zone 5C values based on U.S. building stock.

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TABLE 7-2b Building Activity Source Energy Targets (EUI_{f1}) (I-P Units) *[Continued]*

No.	Commercial Building Type	EUIs by Building Type by Climate Zone (kBtu/ft²·yr)																
		ASHRAE Climate Zone																
		1A	2A	2B	3A	3B Coast	3B Other	3C	4A	4B	4C	5A	5B	5C[1]	6A	6B	7	8
37	Motel or inn	175	166	151	160	138	146	130	123	114	140	100	109	115	105	104	108	129
38	Other lodging	167	158	145	152	132	139	124	118	109	133	95	104	110	100	100	103	123
39	Vehicle dealership	154	158	141	165	109	138	118	142	119	151	128	126	136	147	138	163	234
40	Retail store	88	90	81	94	62	79	68	82	68	87	73	72	77	84	79	93	134
41	Other retail	154	157	141	164	108	137	118	142	118	151	127	126	133	146	137	162	233
42	Post office/postal center	134	133	118	131	102	114	107	111	95	125	94	97	101	104	101	112	149
43	Repair shop	90	89	79	87	68	76	71	74	63	83	63	64	68	70	67	75	99
44	Vehicle service/repair shop	104	103	91	101	79	88	82	86	73	97	73	75	77	81	78	87	115
45	Vehicle storage/maintenance	45	45	40	44	34	38	36	37	32	42	32	32	35	35	34	38	50
46	Other service	190	188	167	185	144	161	151	157	134	176	133	137	143	147	142	158	210
47	Strip shopping mall	186	185	167	194	132	165	143	171	142	185	154	152	166	177	167	199	284
48	Enclosed mall	177	176	159	185	126	157	136	163	135	176	147	144	159	169	159	189	270
No.	Residential Building Type	ASHRAE Climate Zone																
		1A	2A	2B	3A	3B Coast	3B Other	3C	4A	4B	4C	5A	5B	5C[1]	6A	6B	7	8
49	Mobile home	119	126	115	139	86	118	106	130	104	148	116	112	115	133	124	151	210
50	Single-family (detached)	89	94	85	104	64	88	79	96	77	110	86	83	84	98	92	112	156
51	Single-family (attached)	102	108	98	119	73	101	90	111	89	127	99	96	98	113	106	129	180
52	Apartment building (2 to 4 units)	150	158	144	175	107	148	133	163	131	186	146	141	143	166	156	189	264
53	Apartment building (5+ units)	102	108	98	119	73	101	90	111	89	126	99	96	98	113	106	129	180

1. Zone 5C values based on U.S. building stock.

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TABLE 7-2b Building Activity Source Energy Targets (EUI_{t1}) (SI Units)

No.	Commercial Building Type	EUIs by Building Type by Climate Zone ($MJ/m^2 \cdot yr$)																
		ASHRAE Climate Zone																
		1A	2A	2B	3A	3B Coast	3B Other	3C	4A	4B	4C	5A	5B	5C[1]	6A	6B	7	8
1	Admin/professional office	1394	1437	1289	1478	1075	1273	1061	1237	1029	1338	1032	1025	1037	1143	1069	1234	1730
2	Bank/other financial	1979	2040	1829	2098	1526	1807	1505	1755	1460	1899	1465	1454	1489	1623	1517	1752	2455
3	Government office	1740	1794	1608	1845	1342	1588	1324	1543	1284	1669	1288	1279	1303	1427	1334	1540	2159
4	Medical office (nondiag.)	1187	1224	1097	1259	916	1084	903	1053	876	1139	879	873	877	974	910	1051	1473
5	Mixed-use office	1613	1662	1490	1710	1244	1472	1227	1430	1190	1547	1194	1185	1197	1322	1236	1428	2001
6	Other office	1346	1388	1244	1428	1038	1229	1024	1194	993	1292	997	990	1010	1104	1032	1192	1671
7	Laboratory	6375	6301	5602	6224	4821	5414	5060	5255	4510	5922	4477	4588	4813	4948	4780	5317	7064
8	Distribution/ship center	439	559	540	709	351	583	458	731	587	723	761	733	638	1048	912	1281	2404
9	Nonrefrig. warehouse	213	271	261	343	170	282	221	354	284	350	368	355	319	507	441	620	1163
10	Convenience store	4812	5219	4446	5407	4166	4556	4501	4498	3897	5203	3823	3966	4441	4129	4049	4449	5614
11	Convenience store + gas	3877	4205	3581	4356	3356	3670	3626	3623	3140	4192	3080	3195	3590	3327	3262	3584	4522
12	Grocery/food market	4010	4349	3704	4506	3471	3796	3750	3748	3247	4335	3186	3305	3696	3441	3374	3707	4678
13	Other food sales	1214	1317	1121	1364	1051	1149	1135	1135	983	1313	964	1001	1117	1042	1021	1122	1416
14	Fire/police station	2348	2320	2063	2292	1775	1994	1863	1935	1661	2181	1649	1689	1782	1822	1760	1958	2601
15	Other public order/safety	2140	2115	1880	2089	1618	1817	1698	1764	1513	1987	1502	1540	1622	1661	1604	1784	2371
16	Medical office (diagnostic)	1196	1153	1066	1139	986	1056	852	860	792	933	652	728	745	664	682	654	745
17	Clinic/other outpatient health	1793	1730	1600	1708	1479	1584	1278	1290	1189	1400	978	1093	1117	996	1024	981	1118
18	Refrigerated warehouse	2470	2441	2170	2411	1868	2097	1960	2036	1747	2294	1734	1777	1861	1917	1852	2060	2736
19	Religious worship	838	828	736	818	633	711	665	690	593	778	588	603	638	650	628	699	928
20	Entertainment/culture	830	821	730	811	628	705	659	685	587	771	583	598	638	645	623	693	920
21	Library	2192	2167	1926	2140	1658	1862	1740	1807	1551	2036	1539	1577	1649	1701	1644	1828	2429
22	Recreation	945	934	831	923	715	803	750	779	669	878	664	680	718	734	709	788	1047
23	Social/meeting	986	975	866	963	746	837	783	813	697	916	692	709	745	765	739	822	1092
24	Other public assembly	1010	998	887	986	764	858	802	832	714	938	709	727	771	784	757	842	1119
25	College/university	2207	2194	1985	2222	1479	1920	1617	1990	1599	2153	1745	1645	1766	2013	1822	2205	3267
26	Elementary/middle school	1350	1329	1178	1328	998	1142	1017	1105	931	1197	904	902	931	986	927	1046	1538
27	High school	1611	1601	1441	1621	1074	1394	1171	1424	1141	1564	1222	1167	1250	1409	1283	1544	2287
28	Preschool/daycare	1741	1713	1519	1712	1286	1473	1311	1425	1200	1543	1165	1163	1223	1272	1194	1348	1982
29	Other classroom education	901	895	806	907	601	780	655	797	638	875	683	653	718	788	717	863	1279
30	Fast food	9354	9588	8619	9855	7782	8720	8040	8291	7288	9405	7104	7385	7844	7760	7543	8387	10609
31	Restaurant/cafeteria	5055	5199	4619	5351	4130	4682	4361	4496	3942	5162	3843	3987	4414	4172	4088	4547	5720
32	Other food service	2763	2842	2525	2925	2257	2559	2384	2458	2155	2822	2101	2179	2420	2280	2234	2485	3126
33	Hospital/inpatient health	5069	5113	4597	5015	4385	4536	4149	3891	3351	4474	2977	3098	3590	3035	2954	3064	3537
34	Nursing home/ assisted living	3008	2973	2643	2937	2275	2554	2388	2480	2128	2794	2112	2165	2260	2335	2256	2509	3333
35	Dormitory/fraternity/ sorority	1439	1522	1388	1684	1033	1424	1277	1568	1257	1789	1402	1352	1383	1601	1500	1819	2541

1. Zone 5C values based on U.S. building stock.

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TABLE 7-2b Building Activity Source Energy Targets (EUI_{t1}) (SI Units) *[Continued]*

No.	Commercial Building Type	EUIs by Building Type by Climate Zone ($MJ/m^2 \cdot yr$)																
		ASHRAE Climate Zone																
		1A	2A	2B	3A	3B Coast	3B Other	3C	4A	4B	4C	5A	5B	5C[1]	6A	6B	7	8
36	Hotel	1772	1815	1585	1832	1532	1599	1534	1483	1352	1733	1231	1344	1409	1304	1330	1382	1600
37	Motel or inn	1983	1883	1719	1812	1565	1655	1480	1401	1296	1585	1131	1236	1303	1191	1185	1222	1464
38	Other lodging	1895	1799	1642	1731	1495	1581	1414	1339	1238	1515	1081	1181	1250	1138	1132	1168	1399
39	Vehicle dealership	1753	1794	1604	1871	1233	1566	1343	1617	1347	1720	1448	1431	1542	1665	1563	1851	2654
40	Retail store	1004	1027	918	1071	706	896	769	926	771	984	829	819	877	953	895	1059	1519
41	Other retail	1747	1787	1599	1864	1228	1560	1338	1611	1342	1714	1443	1426	1516	1659	1557	1844	2645
42	Post office/postal center	1527	1509	1342	1491	1155	1297	1212	1259	1080	1418	1072	1099	1143	1185	1145	1273	1692
43	Repair shop	1017	1005	894	993	769	864	807	838	719	945	714	732	771	789	763	848	1127
44	Vehicle service/ repair shop	1180	1166	1037	1152	892	1002	936	973	835	1096	828	849	877	916	885	984	1307
45	Vehicle storage/ maintenance	512	506	450	500	387	435	407	422	362	476	360	369	399	397	384	427	567
46	Other service	2156	2131	1895	2105	1630	1831	1711	1777	1525	2003	1514	1552	1622	1674	1617	1798	2389
47	Strip shopping mall	2107	2104	1891	2207	1502	1869	1624	1941	1609	2103	1753	1721	1888	2014	1896	2255	3225
48	Enclosed mall	2006	2004	1801	2102	1430	1780	1546	1848	1532	2003	1669	1638	1808	1918	1806	2147	3071
No.	Residential Building Type	ASHRAE Climate Zone																
		1A	2A	2B	3A	3B Coast	3B Other	3C	4A	4B	4C	5A	5B	5C[1]	6A	6B	7	8
49	Mobile home	1354	1431	1305	1584	971	1340	1201	1474	1182	1683	1319	1272	1303	1506	1411	1711	2389
50	Single-family (detached)	1005	1062	969	1176	721	995	892	1095	878	1249	979	944	957	1118	1047	1270	1774
51	Single-family (attached)	1157	1223	1115	1354	830	1145	1027	1260	1011	1438	1127	1087	1117	1287	1206	1462	2042
52	Apartment building (2 to 4 units)	1698	1796	1638	1987	1219	1681	1507	1850	1484	2111	1655	1596	1622	1889	1770	2147	2998
53	Apartment building (5+ units)	1155	1221	1114	1351	829	1143	1025	1258	1009	1436	1125	1085	1117	1285	1204	1460	2039

1. Zone 5C values based on U.S. building stock.

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TABLE 7-2c Building Activity Electricity Site Energy Use Targets ($ELUI_{f1}$) (I-P Units)

No.	Commercial Building Type	Electricity Site Energy Use EUIs by Building Type by Climate Zone (kBtu/ft²·yr)																
		ASHRAE Climate Zone																
		1A	2A	2B	3A	3B Coast	3B Other	3C	4A	4B	4C	5A	5B	5C[1]	6A	6B	7	8
1	Admin/professional office	39	40	34	41	29	34	28	29	23	36	19	22	24	21	21	22	31
2	Bank/other financial	55	57	49	58	41	48	39	41	33	51	26	31	34	29	29	31	44
3	Government office	49	50	43	51	36	42	35	36	29	45	23	27	30	26	26	28	39
4	Medical office (nondiag.)	33	34	29	35	24	29	24	24	20	31	16	18	20	17	18	19	26
5	Mixed-use office	45	46	40	48	33	39	32	33	27	41	22	25	27	24	24	26	36
6	Other office	38	39	33	40	28	33	27	28	22	35	18	21	23	20	20	21	30
7	Laboratory	178	176	149	173	128	144	132	122	101	159	81	97	110	89	93	95	127
8	Distribution/ship center	12	16	14	20	9	16	12	17	13	19	14	16	15	19	18	23	43
9	Nonrefrig. warehouse	6	8	7	10	5	8	6	8	6	9	7	8	7	9	9	11	21
10	Convenience store	135	146	118	151	111	121	118	105	87	139	69	84	101	74	78	80	101
11	Convenience store + gas	108	118	95	121	89	98	95	84	70	112	56	68	82	60	63	64	81
12	Grocery/food market	112	122	99	126	92	101	98	87	73	116	57	70	84	62	65	67	84
13	Other food sales	34	37	30	38	28	31	30	26	22	35	17	21	26	19	20	20	25
14	Fire/police station	66	65	55	64	47	53	49	45	37	58	30	36	41	33	34	35	47
15	Other public order/safety	60	59	50	58	43	48	44	41	34	53	27	33	37	30	31	32	43
16	Medical office (diagnostic)	33	32	28	32	26	28	22	20	18	25	12	15	17	12	13	12	13
17	Clinic/other outpatient health	50	48	43	48	39	42	33	30	27	38	18	23	26	18	20	18	20
18	Refrigerated warehouse	69	68	58	67	50	56	51	47	39	61	31	38	43	34	36	37	49
19	Religious worship	23	23	20	23	17	19	17	16	13	21	11	13	15	12	12	13	17
20	Entertainment/culture	23	23	19	23	17	19	17	16	13	21	11	13	15	12	12	12	17
21	Library	61	61	51	60	44	50	45	42	35	55	28	33	38	31	32	33	44
22	Recreation	26	26	22	26	19	21	20	18	15	24	12	14	16	13	14	14	19
23	Social/meeting	28	27	23	27	20	22	20	19	16	25	12	15	17	14	14	15	20
24	Other public assembly	28	28	24	27	20	23	21	19	16	25	13	15	18	14	15	15	20
25	College/university	62	61	53	62	39	51	42	45	35	57	30	34	39	35	34	38	56
26	Elementary/middle school	38	37	31	37	27	30	27	26	21	32	16	19	21	18	18	19	28
27	High school	45	45	38	45	29	37	31	33	26	42	22	25	29	25	25	28	41
28	Preschool/daycare	49	48	40	48	34	39	34	33	27	41	21	25	28	23	23	24	36
29	Other classroom education	25	25	21	25	16	21	17	19	14	23	12	14	16	14	14	16	23
30	Fast food	261	268	230	275	207	232	210	193	163	252	128	156	179	139	146	151	191
31	Restaurant/cafeteria	141	145	123	149	110	125	114	105	88	138	69	84	101	75	79	82	103
32	Other food service	77	79	67	82	60	68	62	57	48	76	38	46	55	41	43	45	56
33	Hospital/inpatient health	142	143	122	140	117	121	108	90	75	120	54	66	82	55	57	55	64
34	Nursing home/assisted living	84	83	70	82	61	68	62	58	48	75	38	46	52	42	44	45	60
35	Dormitory/fraternity/sorority	40	43	37	47	28	38	33	36	28	48	25	29	32	29	29	33	46
36	Hotel	50	51	42	51	41	43	40	34	30	46	22	28	32	23	26	25	29

1. Zone 5C values based on U.S. building stock.

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TABLE 7-2c Building Activity Electricity Site Energy Use Targets ($ELUI_{f1}$) (I-P Units) *[Continued]*

No.	Commercial Building Type	Electricity Site Energy Use EUIs by Building Type by Climate Zone (kBtu/ft²·yr)																
		ASHRAE Climate Zone																
		1A	2A	2B	3A	3B Coast	3B Other	3C	4A	4B	4C	5A	5B	5C[1]	6A	6B	7	8
37	Motel or inn	55	53	46	50	42	44	39	33	29	42	20	26	30	21	23	22	26
38	Other lodging	53	50	44	48	40	42	37	31	28	41	20	25	29	20	22	21	25
39	Vehicle dealership	49	50	43	52	33	42	35	38	30	46	26	30	35	30	30	33	48
40	Retail store	28	29	24	30	19	24	20	22	17	26	15	17	20	17	17	19	27
41	Other retail	49	50	43	52	33	42	35	37	30	46	26	30	35	30	30	33	47
42	Post office/postal center	43	42	36	42	31	35	32	29	24	38	19	23	26	21	22	23	30
43	Repair shop	28	28	24	28	20	23	21	19	16	25	13	15	18	14	15	15	20
44	Vehicle service/repair shop	33	33	28	32	24	27	24	23	19	29	15	18	20	16	17	18	23
45	Vehicle storage/maintenance	14	14	12	14	10	12	11	10	8	13	6	8	9	7	7	8	10
46	Other service	60	60	50	59	43	49	45	41	34	54	27	33	37	30	31	32	43
47	Strip shopping mall	59	59	50	62	40	50	42	45	36	56	32	36	43	36	37	41	58
48	Enclosed mall	56	56	48	59	38	47	40	43	34	54	30	35	41	34	35	39	55
No.	Residential Building Type	ASHRAE Climate Zone																
		1A	2A	2B	3A	3B Coast	3B Other	3C	4A	4B	4C	5A	5B	5C[1]	6A	6B	7	8
49	Mobile home	38	40	35	44	26	36	31	34	27	45	24	27	30	27	27	31	43
50	Single-family (detached)	28	30	26	33	19	26	23	25	20	33	18	20	22	20	20	23	32
51	Single-family (attached)	32	34	30	38	22	30	27	29	23	39	20	23	26	23	23	26	37
52	Apartment building (2 to 4 units)	47	50	44	55	32	45	39	43	33	57	30	34	37	34	34	39	54
53	Apartment building (5+ units)	32	34	30	38	22	30	27	29	23	38	20	23	26	23	23	26	37

1. Zone 5C values based on U.S. building stock.

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TABLE 7-2c Building Activity Electricity Site Energy Use Targets ($ELUI_{f1}$) (SI Units)

No.	Commercial Building Type	Electricity Site Energy Use EUIs by Building Type by Climate Zone ($MJ/m^2 \cdot yr$)																
		ASHRAE Climate Zone																
		1A	2A	2B	3A	3B Coast	3B Other	3C	4A	4B	4C	5A	5B	5C[1]	6A	6B	7	8
1	Admin/professional office	443	456	390	468	325	385	315	327	262	407	212	246	269	233	235	252	353
2	Bank/other financial	628	648	553	664	461	546	447	464	372	578	300	350	386	331	334	357	501
3	Government office	552	569	486	584	406	480	393	408	327	508	264	308	338	291	293	314	440
4	Medical office (nondiag.)	377	389	332	398	277	328	268	278	223	347	180	210	228	199	200	214	300
5	Mixed-use office	512	528	451	541	376	445	364	378	303	471	245	285	310	270	272	291	408
6	Other office	427	441	376	452	314	372	304	315	253	393	204	238	262	225	227	243	341
7	Laboratory	2024	2000	1694	1970	1458	1637	1501	1388	1148	1802	918	1103	1249	1009	1052	1084	1441
8	Distribution/ship center	139	178	163	224	106	176	136	193	150	220	156	176	166	214	201	261	490
9	Nonrefrig warehouse	67	86	79	109	51	85	66	93	72	106	75	85	83	103	97	126	237
10	Convenience store	1528	1657	1344	1711	1260	1378	1335	1188	992	1583	784	954	1152	842	891	907	1145
11	Convenience store + gas	1231	1335	1083	1379	1015	1110	1076	957	799	1275	631	768	931	678	718	731	922
12	Grocery/food market	1273	1381	1120	1426	1050	1148	1112	990	827	1319	653	795	959	702	742	756	954
13	Other food sales	385	418	339	432	318	348	337	300	250	399	198	241	290	212	225	229	289
14	Fire/police station	745	737	624	725	537	603	553	511	423	663	338	406	462	372	387	399	531
15	Other public order/safety	679	671	569	661	489	549	504	466	385	605	308	370	421	339	353	364	483
16	Medical office (diagnostic)	380	366	322	360	298	319	253	227	202	284	134	175	193	135	150	133	152
17	Clinic/other outpatient health	569	549	484	541	447	479	379	341	303	426	200	263	290	203	225	200	228
18	Refrigerated warehouse	784	775	656	763	565	634	582	538	445	698	355	427	483	391	407	420	558
19	Religious worship	266	263	223	259	192	215	197	182	151	237	121	145	166	133	138	142	189
20	Entertainment/culture	264	261	221	257	190	213	196	181	150	235	120	144	166	131	137	141	188
21	Library	696	688	582	677	501	563	516	477	395	619	316	379	428	347	362	373	495
22	Recreation	300	297	251	292	216	243	223	206	170	267	136	164	186	150	156	161	214
23	Social/meeting	313	309	262	305	225	253	232	215	178	279	142	171	193	156	163	168	223
24	Other public assembly	321	317	268	312	231	259	238	220	182	285	145	175	200	160	167	172	228
25	College/university	701	696	597	703	445	577	476	515	398	652	343	384	448	394	387	431	639
26	Elementary/middle school	429	422	356	420	302	345	302	292	237	364	185	217	241	201	204	213	314
27	High school	511	508	436	513	325	421	347	376	290	476	250	281	324	287	282	315	466
28	Preschool/daycare	553	544	459	542	389	445	389	376	305	469	239	280	317	259	263	275	404
29	Other classroom education	286	284	244	287	182	236	194	210	162	266	140	157	186	161	158	176	261
30	Fast food	2969	3044	2606	3119	2353	2637	2385	2189	1856	2861	1456	1776	2035	1583	1660	1711	2164
31	Restaurant/cafeteria	1605	1650	1397	1693	1249	1416	1294	1187	1004	1570	788	959	1145	851	899	927	1167
32	Other food service	877	902	764	926	683	774	707	649	549	858	431	524	628	465	492	507	638
33	Hospital/inpatient health	1609	1623	1390	1587	1326	1372	1231	1028	853	1361	610	745	931	619	650	625	721
34	Nursing home/assisted living	955	944	799	929	688	772	708	655	542	850	433	521	586	476	496	512	680
35	Dormitory/fraternity/sorority	457	483	420	533	312	431	379	414	320	544	287	325	359	327	330	371	518
36	Hotel	563	576	479	580	463	483	455	392	344	527	252	323	366	266	293	282	326

1. Zone 5C values based on U.S. building stock.

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TABLE 7-2c Building Activity Electricity Site Energy Use Targets ($ELUI_{f1}$) (SI Units) *[Continued]*

No.	Commercial Building Type	Electricity Site Energy Use EUIs by Building Type by Climate Zone ($MJ/m^2 \cdot yr$)																
		ASHRAE Climate Zone																
		1A	2A	2B	3A	3B Coast	3B Other	3C	4A	4B	4C	5A	5B	5C[1]	6A	6B	7	8
37	Motel or inn	630	598	520	573	473	500	439	370	330	482	232	297	338	243	261	249	299
38	Other lodging	602	571	497	548	452	478	419	354	315	461	221	284	324	232	249	238	285
39	Vehicle dealership	557	569	485	592	373	473	398	427	343	523	297	344	400	340	344	377	541
40	Retail store	319	326	278	339	213	271	228	244	196	299	170	197	228	194	197	216	310
41	Other retail	555	567	483	590	371	472	397	426	342	521	296	343	393	338	343	376	539
42	Post office/postal center	485	479	406	472	349	392	359	332	275	431	220	264	297	242	252	260	345
43	Repair shop	323	319	270	314	233	261	239	221	183	287	146	176	200	161	168	173	230
44	Vehicle service/repair shop	375	370	314	365	270	303	278	257	213	333	170	204	228	187	195	201	267
45	Vehicle storage/maintenance	163	161	136	158	117	132	121	111	92	145	74	89	103	81	84	87	116
46	Other service	685	677	573	666	493	554	508	469	388	609	310	373	421	341	356	367	487
47	Strip shopping mall	669	668	572	699	454	565	482	512	410	640	359	414	490	411	417	460	658
48	Enclosed mall	637	636	544	665	432	538	459	488	390	609	342	394	469	391	397	438	626
No.	Residential Building Type	ASHRAE Climate Zone																
		1A	2A	2B	3A	3B Coast	3B Other	3C	4A	4B	4C	5A	5B	5C[1]	6A	6B	7	8
49	Mobile home	430	454	395	501	294	405	356	389	301	512	270	306	338	307	310	349	487
50	Single-family (detached)	319	337	293	372	218	301	265	289	224	380	201	227	248	228	230	259	362
51	Single-family (attached)	367	388	337	428	251	346	305	333	257	437	231	261	290	263	265	298	416
52	Apartment building (2 to 4 units)	539	570	495	629	369	508	447	489	378	642	339	384	421	385	389	438	611
53	Apartment building (5+ units)	367	388	337	428	251	346	304	332	257	437	231	261	290	262	265	298	416

1. Zone 5C values based on U.S. building stock.

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TABLE 7-2d Building Activity Fossil Fuel Site Energy Use Targets ($FEUI_{f1}$) (I-P Units)

No.	Commercial Building Type	Fossil Fuel Site Energy Use EUIs by Building Type by Climate Zone (kBtu/ft²·yr)																
		ASHRAE Climate Zone																
		1A	2A	2B	3A	3B Coast	3B Other	3C	4A	4B	4C	5A	5B	5C[2]	6A	6B	7	8
1	Admin/professional office	0	0	5	0.4	4	5	6	17	16	5	30	20	15	33	27	36	50
2	Bank/other financial	0	0	7	0.5	6	7	8	24	23	6	42	28	22	47	38	51	71
3	Government office	0	0	6	0.5	5	6	7	21	21	6	37	25	19	41	33	44	62
4	Medical office (nondiag.)	0	0	4	0.3	4	4	5	14	14	4	25	17	13	28	23	30	43
5	Mixed-use office	0	0	6	0.4	5	6	7	19	19	5	34	23	18	38	31	41	58
6	Other office	0	0	5	0.4	4	5	5	16	16	4	29	19	15	32	26	34	48
7	Laboratory	0	0	21	1.5	18	21	27	71	72	20	128	90	71	143	119	154	204
8	Distribution/ship center	0	0	2	0.2	1	2	2	10	9	2	22	14	9	30	23	37	69
9	Nonrefrig. warehouse	0	0	1	0.1	1	1	1	5	5	1	11	7	5	15	11	18	34
10	Convenience store	0	0	17	1.3	16	17	24	61	62	18	109	78	66	119	100	129	162
11	Convenience store + gas	0	0	14	1.1	13	14	19	49	50	14	88	63	53	96	81	104	131
12	Grocery/food market	0	0	14	1.1	13	15	20	51	52	15	91	65	55	99	84	107	135
13	Other food sales	0	0	4	0.3	4	4	6	15	16	4	28	20	16	30	25	32	41
14	Fire/police station	0	0	8	0.6	7	8	10	26	27	7	47	33	26	53	44	57	75
15	Other public order/safety	0	0	7	0.5	6	7	9	24	24	7	43	30	24	48	40	52	68
16	Medical office (diagnostic)	0	0	4	0.3	4	4	5	12	13	3	19	14	11	19	17	19	22
17	Clinic/other outpatient health	0	0	6	0.4	6	6	7	18	19	5	28	21	16	29	25	28	32
18	Refrigerated warehouse	0	0	8	0.6	7	8	10	28	28	8	50	35	27	55	46	59	79
19	Religious worship	0	0	3	0.2	2	3	4	9	9	3	17	12	9	19	16	20	27
20	Entertainment/culture	0	0	3	0.2	2	3	3	9	9	3	17	12	9	19	15	20	27
21	Library	0	0	7	0.5	6	7	9	25	25	7	44	31	24	49	41	53	70
22	Recreation	0	0	3	0.2	3	3	4	11	11	3	19	13	11	21	18	23	30
23	Social/meeting	0	0	3	0.2	3	3	4	11	11	3	20	14	11	22	18	24	32
24	Other public assembly	0	0	3	0.2	3	3	4	11	11	3	20	14	11	23	19	24	32
25	College/university	0	0	8	0.6	6	7	9	27	25	7	48	31	26	56	44	61	91
26	Elementary/middle school	0	0	5	0.3	4	4	5	15	15	4	26	18	14	28	23	30	44
27	High school	0	0	6	0.4	4	5	6	19	18	5	35	23	18	41	32	45	66
28	Preschool/daycare	0	0	6	0.4	5	6	7	19	19	5	33	23	18	37	30	39	57
29	Other classroom education	0	0	3	0.2	2	3	3	11	10	3	20	13	11	23	18	25	37
30	Fast food	0	0	33	2.4	30	33	43	113	117	32	203	145	116	224	187	242	306
31	Restaurant/cafeteria	0	0	18	1.3	16	18	23	61	63	17	110	78	65	121	101	131	165
32	Other food service	0	0	10	0.7	9	10	13	33	34	10	60	43	36	66	55	72	90
33	Hospital/inpatient health	0	0	18	1.2	17	17	22	53	54	15	85	61	53	88	73	89	102
34	Nursing home/assisted living	0	0	10	0.7	9	10	13	34	34	9	60	42	33	67	56	72	96
35	Dormitory/fraternity/sorority	0	0	5	0.4	4	5	7	21	20	6	40	26	20	46	37	53	73
36	Hotel	0	0	6	0.5	6	6	8	20	22	6	35	26	21	38	33	40	46

1. Zone 5C values based on U.S. building stock.

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TABLE 7-2d Building Activity Fossil Fuel Site Energy Use Targets ($FEUI_{f1}$) (I-P Units) *[Continued]*

No.	Commercial Building Type	Fossil Fuel Site Energy Use EUIs by Building Type by Climate Zone (kBtu/ft²·yr)																
		ASHRAE Climate Zone																
		1A	2A	2B	3A	3B Coast	3B Other	3C	4A	4B	4C	5A	5B	5C[2]	6A	6B	7	8
37	Motel or inn	0	0	7	0.5	6	6	8	19	21	5	32	24	19	34	29	35	42
38	Other lodging	0	0	6	0.4	6	6	7	18	20	5	31	23	18	33	28	34	40
39	Vehicle dealership	0	0	6	0.5	5	6	7	22	22	6	41	28	23	48	39	53	77
40	Retail store	0	0	4	0.3	3	3	4	13	12	3	24	16	13	28	22	31	44
41	Other retail	0	0	6	0.5	5	6	7	22	21	6	41	28	22	48	39	53	76
42	Post office/postal center	0	0	5	0.4	4	5	6	17	17	5	31	22	17	34	28	37	49
43	Repair shop	0	0	3	0.2	3	3	4	11	12	3	20	14	11	23	19	25	33
44	Vehicle service/repair shop	0	0	4	0.3	3	4	5	13	13	4	24	17	13	26	22	28	38
45	Vehicle storage/maintenance	0	0	2	0.1	1	2	2	6	6	2	10	7	6	11	10	12	16
46	Other service	0	0	7	0.5	6	7	9	24	24	7	43	30	24	48	40	52	69
47	Strip shopping mall	0	0	7	0.5	6	7	9	26	26	7	50	34	28	58	47	65	93
48	Enclosed mall	0	0	7	0.5	5	7	8	25	25	7	48	32	27	55	45	62	89
No.	Residential Building Type	ASHRAE Climate Zone																
		1A	2A	2B	3A	3B Coast	3B Other	3C	4A	4B	4C	5A	5B	5C[1]	6A	6B	7	8
49	Mobile home	0	0	5	0.4	4	5	6	20	19	6	38	25	19	44	35	49	69
50	Single-family (detached)	0	0	4	0.3	3	4	5	15	14	4	28	18	14	32	26	37	51
51	Single-family (attached)	0	0	4	0.3	3	4	5	17	16	5	32	21	16	37	30	42	59
52	Apartment building (2 to 4 units)	0	0	6	0.5	5	6	8	25	24	7	47	31	24	55	44	62	87
53	Apartment building (5+ units)	0	0	4	0.3	3	4	5	17	16	5	32	21	16	37	30	42	59

1. Zone 5C values based on U.S. building stock.

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TABLE 7-2d Building Activity Fossil Fuel Site Energy Use Targets ($FEUI_{f1}$) (SI Units)

No.	Commercial Building Type	Fossil Fuel Site Energy Use EUIs by Building Type by Climate Zone ($MJ/m^2 \cdot yr$)																
		ASHRAE Climate Zone																
		1A	2A	2B	3A	3B Coast	3B Other	3C	4A	4B	4C	5A	5B	5C[2]	6A	6B	7	8
1	Admin/professional office	0	0	56	4	47	55	64	191	187	51	336	228	174	375	301	405	568
2	Bank/other financial	0	0	80	6	66	79	91	271	265	73	476	324	250	532	427	575	805
3	Government office	0	0	70	5	58	69	80	238	233	64	419	284	218	468	376	505	708
4	Medical office (nondiag.)	0	0	48	4	40	47	54	162	159	44	286	194	147	319	256	345	483
5	Mixed-use office	0	0	65	5	54	64	74	221	216	59	388	264	201	434	348	468	656
6	Other office	0	0	54	4	45	54	62	184	180	50	324	220	169	362	291	391	548
7	Laboratory	0	0	244	18	210	236	305	811	819	227	1455	1021	807	1623	1346	1744	2317
8	Distribution/ship center	0	0	24	2	15	25	28	113	107	28	247	163	107	344	257	420	789
9	Nonrefrig. warehouse	0	0	11	1	7	12	13	55	52	13	120	79	53	166	124	203	382
10	Convenience store	0	0	194	15	181	198	271	694	708	200	1243	882	744	1355	1140	1459	1841
11	Convenience store + gas	0	0	156	12	146	160	218	559	570	161	1001	711	602	1091	919	1176	1484
12	Grocery/food market	0	0	161	13	151	165	226	578	590	166	1036	735	620	1129	950	1216	1534
13	Other food sales	0	0	49	4	46	50	68	175	178	50	314	223	187	342	288	368	465
14	Fire/police station	0	0	90	6	77	87	112	299	301	84	536	376	299	598	496	642	853
15	Other public order/safety	0	0	82	6	70	79	102	272	275	76	488	342	272	545	452	585	778
16	Medical office (diagnostic)	0	0	46	3	43	46	51	133	144	36	212	162	125	218	192	215	245
17	Clinic/other outpatient health	0	0	70	5	64	69	77	199	216	54	318	243	187	327	288	322	367
18	Refrigerated warehouse	0	0	94	7	81	91	118	314	317	88	564	395	312	629	522	676	898
19	Religious worship	0	0	32	2	28	31	40	107	108	30	191	134	107	213	177	229	304
20	Entertainment/culture	0	0	32	2	27	31	40	106	107	30	190	133	107	211	175	227	302
21	Library	0	0	84	6	72	81	105	279	282	78	500	351	276	558	463	600	797
22	Recreation	0	0	36	3	31	35	45	120	121	34	216	151	120	241	200	259	344
23	Social/meeting	0	0	38	3	32	36	47	125	127	35	225	158	125	251	208	270	358
24	Other public assembly	0	0	39	3	33	37	48	128	130	36	231	162	129	257	213	276	367
25	College/university	0	0	86	6	64	83	97	301	284	82	544	356	290	633	495	694	1028
26	Elementary/middle school	0	0	51	4	43	50	61	171	169	46	294	201	156	324	261	343	504
27	High school	0	0	63	5	47	61	70	220	207	60	397	260	209	462	361	506	750
28	Preschool/daycare	0	0	66	5	56	64	79	220	218	59	379	259	205	417	336	442	650
29	Other classroom education	0	0	35	3	26	34	39	123	116	34	222	145	120	259	202	283	420
30	Fast food	0	0	375	28	339	380	484	1279	1323	361	2309	1643	1315	2546	2124	2751	3480
31	Restaurant/cafeteria	0	0	201	15	180	204	262	694	716	198	1249	887	740	1368	1151	1491	1876
32	Other food service	0	0	110	8	98	111	143	379	391	108	683	485	406	748	629	815	1026
33	Hospital/inpatient health	0	0	200	14	191	198	250	600	608	172	968	689	602	996	832	1005	1160
34	Nursing home/ assisted living	0	0	115	8	99	111	144	383	386	107	687	482	379	766	635	823	1093
35	Dormitory/fraternity/ sorority	0	0	60	5	45	62	77	242	228	69	456	301	232	525	422	597	833

1. Zone 5C values based on U.S. building stock.

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TABLE 7-2d Building Activity Fossil Fuel Site Energy Use Targets ($FEUI_{f1}$) (SI Units) *[Continued]*

No.	Commercial Building Type	Fossil Fuel Site Energy Use EUIs by Building Type by Climate Zone ($MJ/m^2 \cdot yr$)																
		ASHRAE Climate Zone																
		1A	2A	2B	3A	3B Coast	3B Other	3C	4A	4B	4C	5A	5B	5C[2]	6A	6B	7	8
36	Hotel	0	0	69	5	67	70	92	229	245	66	400	299	236	428	375	453	525
37	Motel or inn	0	0	75	5	68	72	89	216	235	61	368	275	218	391	334	401	480
38	Other lodging	0	0	71	5	65	69	85	207	225	58	351	263	209	373	319	383	459
39	Vehicle dealership	0	0	70	5	54	68	81	249	245	66	471	318	259	546	440	607	871
40	Retail store	0	0	40	3	31	39	46	143	140	38	269	182	147	313	252	347	498
41	Other retail	0	0	70	5	53	68	81	249	244	66	469	317	254	544	439	605	868
42	Post office/postal center	0	0	58	4	50	56	73	194	196	54	349	244	192	389	322	418	555
43	Repair shop	0	0	39	3	33	38	49	129	131	36	232	163	129	259	215	278	370
44	Vehicle service/repair shop	0	0	45	3	39	44	56	150	152	42	269	189	147	300	249	323	429
45	Vehicle storage/ maintenance	0	0	20	1	17	19	24	65	66	18	117	82	67	130	108	140	186
46	Other service	0	0	82	6	71	80	103	274	277	77	492	345	272	549	455	590	784
47	Strip shopping mall	0	0	82	6	65	81	98	299	292	81	570	383	316	661	534	740	1058
48	Enclosed mall	0	0	78	6	62	77	93	285	278	77	543	365	303	629	509	704	1007
No.	Residential Building Type	ASHRAE Climate Zone																
		1A	2A	2B	3A	3B Coast	3B Other	3C	4A	4B	4C	5A	5B	5C[1]	6A	6B	7	8
49	Mobile home	0	0	57	4	42	58	72	227	215	65	429	283	218	494	397	561	784
50	Single-family (detached)	0	0	42	3	31	43	54	169	159	48	318	210	160	367	295	417	582
51	Single-family (attached)	0	0	49	4	36	50	62	194	183	55	366	242	187	422	340	480	670
52	Apartment building (2 to 4 units)	0	0	71	6	53	73	91	285	269	81	538	355	272	620	498	704	983
53	Apartment building (5+ units)	0	0	48	4	36	50	62	194	183	55	366	241	187	422	339	479	669

1. Zone 5C values based on U.S. building stock.

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Revise Section 10.3.6 as shown.

10.3.6 Comparing Performance. Compare building EUI using the data from Form C with the energy targets listed in Table 10-2a or Table 10-2b for single-use buildings:

Revise Table 10-2 table number and add new Table 10-2b as shown. The remainder of Table 10-2 is unchanged.

TABLE 10-2a Building Activity Site Energy Targets, kBtu/ft^2·yr (I-P Units)

TABLE 10-2a Building Activity Site Energy Targets, MJ/m^2·yr (SI Units)

TABLE 10-2b Building Activity Source Energy Targets, kBtu/ft^2·yr (I-P Units)

No.	Residential Building Type	ASHRAE Climate Zone																
		1A	2A	2B	3A	3B-Coast	3B-Other	3C	4A	4B	4C	5A	5B	5C[1]	6A	6B	7	8
49	Mobile/manufactured home	119	126	115	139	86	118	106	130	104	148	116	112	115	133	124	151	210
50	Single-family detached	89	94	85	104	64	88	79	96	77	110	86	83	84	98	92	112	156
51	Single-family attached	102	108	98	119	73	101	90	111	89	127	99	96	98	113	106	129	180
52	Apartment (in 2 to 4 unit building)	150	158	144	175	107	148	133	163	131	186	146	141	143	166	156	189	264
53	Apartment (in 5+ unit building)	102	108	98	119	73	101	90	111	89	126	99	96	98	113	106	129	180

1. Zone 5C values based on U.S. building stock.

TABLE 10-2b Building Activity Source Energy Targets, MJ/m^2·yr (SI Units)

No.	Residential Building Type	ASHRAE Climate Zone																
		1A	2A	2B	3A	3B-Coast	3B-Other	3C	4A	4B	4C	5A	5B	5C[1]	6A	6B	7	8
49	Mobile/manufactured home	1354	1431	1305	1584	971	1340	1201	1474	1182	1683	1319	1272	1303	1506	1411	1711	2389
50	Single-family detached	1005	1062	969	1176	721	995	892	1095	878	1249	979	944	957	1118	1047	1270	1774
51	Single-family attached	1157	1223	1115	1354	830	1145	1027	1260	1011	1438	1127	1087	1117	1287	1206	1462	2042
52	Apartment (in 2 to 4 unit building)	1698	1796	1638	1987	1219	1681	1507	1850	1484	2111	1655	1596	1622	1889	1770	2147	2998
53	Apartment (in 5+ unit building)	1155	1221	1114	1351	829	1143	1025	1258	1009	1436	1125	1085	1117	1285	1204	1460	2039

1. Zone 5C values based on U.S. building stock.

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Revise Normative Annex A as shown. Revise Table A-1 and add new Tables A-2, A-3 and A-4 as shown. The remainder of Table A-1 is unchanged.

(This is a normative annex and is part of this standard.)

NORMATIVE ANNEX A
ALTERNATE~~I~~VE ENERGY INTENSITY TARGETS

A1. ALTERNATIVE SITE ENERGY USE INTENSITY AND SOURCE ENERGY USE INTENSITY TARGETS TABLES

The alternative targets listed in Table~~s~~ A-1~~(I-P and SI) provides a listing of alternative energy targets for use by authorities having jurisdiction~~ and A-2, and fuel-specific targets listed in Tables A-3 and A-4, for use in target calculations by authorities having jurisdiction, ~~The targets listed in Table A-1~~ were derived from Commercial Building Energy Consumption Survey (CBECS) 2003 and Residential Energy Consumption Survey (RECS) 2005 data by Oakridge National Lab (ORNL) and the U.S. Department of Energy (DOE) and represent the 40th bottom (low energy) percentile of energy use by each building category.

The median numbers for each building category from CBECS and RECS data representing all buildings in the building category across all climatic conditions were extrapolated to 17 DOE climate zones using multipliers generated through simulation of representative building for each group of building categories. Zone 5C values are based on U.S. building stock (a Canadian building sample was not available at the time of table development.) Refer to Informative Annex J for further information on derivation of energy use targets.

A1.1 Alternative Source Energy Use Intensity Target Calculations. Electricity use and fossil fuel use targets listed in Tables A-3 and A-4 shall be permitted to be used in source energy EUI target (EUI_{t1}) calculations by authorities having jurisdiction in accordance with Equation A-1.

$$EUI_{t1} = ELUI_{t1} \times SEF_{el} + FEUI_{t1} \times SEF_{fe} \qquad \text{(A-1)}$$

where

$ELUI_{t1}$ = local electricity use target EUI from Table A-3

SEF_{el} = local source energy conversion factor for electricity

$FEUI_{t1}$ = local fossil fuel energy use target EUI from Table A-4

SEF_{fe} = local source energy conversion factor for fossil fuel energy use

Informative Note: Tables A-3 and A-4 should not be applied separately for individual energy sources. The tables are used in accordance with Equation A-1 to determine the appropriate source energy target.

TABLE A-1 Alternative Building Activity Site Energy ~~Use~~ Targets (I-P Units)

TABLE A-1 Alternative Building Activity Site Energy ~~Use~~ Targets (SI Units)

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TABLE A-2 Alternative Building Activity Source Energy Targets (I-P Units)

No.	Commercial Building Type	EUIs by Building Type by Climate Zone (kBtu/ft^2-yr)																
		ASHRAE Climate Zone																
		1A	2A	2B	3A	3B Coast	3B Other	3C	4A	4B	4C	5A	5B	5C[1]	6A	6B	7	8
1	Admin/professional office	148	154	139	157	116	136	112	131	110	143	109	110	121	122	114	132	184
2	Bank/other financial	211	217	197	225	162	194	160	189	156	204	157	156	172	173	161	188	263
3	Government office	186	192	171	197	145	171	143	165	138	178	138	136	151	152	144	165	231
4	Medical office (nondiag.)	126	132	119	135	98	116	95	112	94	123	94	93	103	103	98	113	158
5	Mixed-use office	173	176	159	182	133	156	132	153	126	166	128	127	140	141	132	152	214
6	Other office	145	148	133	153	110	130	109	127	105	137	106	106	116	118	110	128	179
7	Laboratory	680	674	598	664	515	578	541	562	481	634	479	490	532	528	510	568	756
8	Distribution/ship center	47	60	58	75	38	64	48	79	62	76	81	78	76	113	98	137	258
9	Nonrefrig. warehouse	22	28	29	38	17	29	22	38	30	38	40	39	37	55	48	66	124
10	Convenience store	513	558	474	579	445	489	482	480	417	558	409	423	460	442	433	476	600
11	Convenience store + gas	416	450	382	467	358	393	387	387	335	450	330	341	371	355	349	383	483
12	Grocery/food market	428	466	396	482	370	405	401	402	346	464	341	354	384	368	361	397	500
13	Other food sales	129	142	119	147	113	124	121	122	105	140	104	108	116	111	110	120	152
14	Fire/police station	252	249	220	244	191	214	199	208	177	234	175	181	196	195	187	209	278
15	Other public order/safety	230	227	202	222	173	194	182	189	163	213	160	164	179	177	171	192	254
16	Medical office (diagnostic)	129	123	113	122	104	113	90	91	85	99	70	78	85	71	74	70	79
17	Clinic/other outpatient health	192	186	171	182	159	171	137	139	126	149	104	117	128	107	110	105	120
18	Refrigerated warehouse	265	261	231	257	199	225	210	218	186	245	185	190	206	205	197	220	293
19	Religious worship	88	88	78	88	66	75	70	74	64	82	62	65	70	70	68	75	100
20	Entertainment/culture	88	88	78	88	66	75	70	74	62	82	62	65	69	70	66	73	98
21	Library	233	233	205	229	176	199	185	194	165	219	164	168	183	182	175	195	259
22	Recreation	101	101	90	100	75	87	81	84	71	93	72	73	79	79	76	85	113
23	Social/meeting	104	104	93	103	81	90	84	86	76	99	74	76	83	83	80	88	117
24	Other public assembly	107	107	95	106	81	93	87	88	76	99	75	78	84	85	82	90	120
25	College/university	236	233	212	238	157	206	172	212	171	229	187	176	194	216	194	235	349
26	Elementary/middle school	145	142	127	141	107	121	109	117	99	128	96	97	106	105	100	111	164
27	High school	173	170	153	172	116	150	126	153	122	166	130	125	139	150	138	165	244
28	Preschool/daycare	186	183	162	182	139	156	140	153	128	166	125	125	137	135	128	145	212
29	Other classroom education	98	95	87	97	64	84	70	86	69	93	74	69	78	85	76	92	137
30	Fast food	1002	1024	922	1052	833	934	860	887	779	1004	760	791	852	829	807	897	1133
31	Restaurant/cafeteria	542	554	494	573	442	500	465	480	422	552	411	426	461	446	437	487	611
32	Other food service	296	302	269	313	243	275	255	263	229	301	225	233	252	244	239	265	335
33	Hospital/inpatient health	542	548	491	536	468	486	443	416	358	479	319	330	381	325	315	327	378
34	Nursing home/assisted living	321	318	283	313	243	272	255	265	227	298	226	231	251	250	241	269	357
35	Dormitory/fraternity/sorority	154	164	147	182	110	153	137	167	135	193	149	145	157	171	159	194	273
36	Hotel	189	195	171	197	165	171	165	158	144	184	132	145	154	139	142	149	171

1. Zone 5C values based on U.S. building stock.

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TABLE A-2 Alternative Building Activity Source Energy Targets (I-P Units)

No.	Commercial Building Type	EUIs by Building Type by Climate Zone (kBtu/ft^2-yr)																
		ASHRAE Climate Zone																
		1A	2A	2B	3A	3B Coast	3B Other	3C	4A	4B	4C	5A	5B	5C[1]	6A	6B	7	8
37	Motel or inn	211	202	185	194	168	176	157	151	138	169	121	132	143	128	128	132	156
38	Other lodging	202	192	176	185	159	168	151	143	133	161	115	125	137	122	122	124	150
39	Vehicle dealership	189	192	171	200	133	168	143	172	144	184	155	153	164	179	167	197	284
40	Retail store	107	110	98	116	75	95	81	98	83	105	89	89	94	102	96	113	162
41	Other retail	186	192	171	200	130	168	143	172	144	184	155	153	163	177	167	197	282
42	Post office/postal center	164	161	145	160	124	139	129	134	115	152	115	117	127	126	122	135	180
43	Repair shop	110	107	95	106	81	93	87	91	78	102	75	78	85	85	82	90	120
44	Vehicle service/repair shop	126	126	110	122	95	107	101	105	89	117	89	91	99	98	94	105	139
45	Vehicle storage/maintenance	54	54	49	53	40	46	45	45	39	50	38	39	43	43	42	45	60
46	Other service	230	227	202	225	173	197	182	191	163	213	162	166	180	179	173	192	256
47	Strip shopping mall	227	224	202	235	162	199	174	208	172	225	187	184	197	216	203	241	344
48	Enclosed mall	214	214	194	225	153	191	165	198	163	213	179	175	188	205	193	229	329
No.	Residential Building Type	ASHRAE Climate Zone																
		1A	2A	2B	3A	3B Coast	3B Other	3C	4A	4B	4C	5A	5B	5C[1]	6A	6B	7	8
49	Mobile home	145	154	139	169	104	145	129	158	126	181	141	136	148	162	152	182	256
50	Single-family (detached)	107	113	104	125	78	107	95	117	94	134	104	102	110	120	112	135	190
51	Single-family (attached)	123	132	119	144	90	121	109	134	108	155	121	117	126	137	130	156	218
52	Apartment building (2 to 4 units)	183	192	176	213	130	179	163	198	158	225	177	171	185	201	189	229	321
53	Apartment building (5+ units)	123	129	119	144	90	121	109	134	108	155	121	117	126	137	130	156	218

1. Zone 5C values based on U.S. building stock.

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TABLE A-2 Alternative Building Activity Source Energy Targets (SI Units)

No.	Commercial Building Type	EUIs by Building Type by Climate Zone ($MJ/m^2 \cdot yr$)																
		ASHRAE Climate Zone																
		1A	2A	2B	3A	3B Coast	3B Other	3C	4A	4B	4C	5A	5B	5C[1]	6A	6B	7	8
1	Admin/ professional office	1681	1753	1576	1778	1313	1543	1273	1493	1250	1624	1243	1251	1369	1388	1290	1494	2092
2	Bank/other financial	2397	2468	2232	2561	1838	2199	1814	2144	1770	2321	1778	1766	1949	1964	1834	2135	2989
3	Government office	2111	2182	1937	2241	1641	1937	1623	1873	1562	2022	1564	1545	1715	1729	1630	1878	2626
4	Medical office (nondiag.)	1431	1502	1346	1529	1116	1313	1082	1276	1067	1392	1071	1055	1169	1174	1109	1281	1793
5	Mixed-use office	1967	2003	1805	2063	1510	1773	1496	1737	1432	1890	1457	1447	1586	1601	1494	1729	2433
6	Other office	1645	1681	1510	1743	1247	1477	1241	1439	1198	1558	1200	1202	1321	1345	1245	1452	2028
7	Laboratory	7727	7655	6795	7540	5843	6565	6142	6379	5467	7194	5442	5568	6041	5998	5795	6447	8581
8	Distribution/ship center	537	680	657	854	427	722	541	896	703	862	921	883	863	1281	1109	1558	2924
9	Nonrefrig. warehouse	250	322	328	427	197	328	255	434	338	431	450	442	421	619	543	747	1409
10	Convenience store	5831	6332	5384	6579	5055	5548	5474	5456	4738	6332	4649	4808	5228	5016	4912	5401	6810
11	Convenience store + gas	4722	5115	4333	5299	4071	4464	4392	4398	3801	5105	3749	3876	4210	4034	3962	4355	5486
12	Grocery/ food market	4865	5294	4497	5477	4202	4596	4551	4560	3931	5271	3878	4023	4358	4184	4097	4504	5678
13	Other food sales	1467	1610	1346	1672	1280	1412	1369	1384	1198	1591	1178	1226	1322	1259	1245	1366	1729
14	Fire/police station	2862	2826	2495	2774	2167	2429	2260	2362	2005	2652	1992	2061	2225	2220	2128	2369	3159
15	Other public order/ safety	2611	2576	2298	2525	1970	2199	2069	2144	1848	2420	1821	1864	2029	2007	1947	2177	2882
16	Medical office (diagnostic)	1467	1395	1280	1387	1182	1280	1018	1032	963	1127	793	883	966	811	838	790	897
17	Clinic/other outpatient health	2182	2111	1937	2063	1805	1937	1559	1574	1432	1691	1178	1325	1449	1217	1245	1195	1366
18	Refrigerated warehouse	3005	2969	2626	2916	2265	2561	2387	2470	2109	2785	2100	2159	2338	2327	2241	2498	3330
19	Religious worship	1002	1002	886	996	755	854	796	842	729	928	707	736	794	790	770	854	1131
20	Entertainment/ culture	1002	1002	886	996	755	854	796	842	703	928	707	736	788	790	747	833	1110
21	Library	2647	2647	2331	2596	2002	2265	2101	2199	1874	2486	1864	1913	2079	2071	1992	2220	2946
22	Recreation	1145	1145	1018	1138	854	985	923	950	807	1061	814	834	901	897	860	961	1281
23	Social/meeting	1180	1180	1050	1174	919	1018	955	977	859	1127	836	859	940	939	906	1003	1323
24	Other public assembly	1216	1216	1083	1209	919	1050	987	1004	859	1127	857	883	959	961	928	1025	1366
25	College/university	2683	2647	2410	2704	1783	2344	1957	2409	1945	2599	2121	1994	2205	2448	2206	2671	3962
26	Elementary/ middle school	1645	1610	1444	1600	1215	1379	1241	1330	1119	1459	1093	1104	1208	1195	1132	1259	1857
27	High school	1967	1932	1740	1956	1313	1707	1432	1737	1380	1890	1478	1423	1577	1708	1562	1878	2775
28	Preschool/daycare	2111	2075	1838	2063	1576	1773	1591	1737	1458	1890	1414	1423	1561	1537	1449	1644	2412
29	Other classroom education	1109	1073	985	1103	722	952	796	977	781	1061	836	785	882	961	860	1046	1558

1. Zone 5C values based on U.S. building stock.

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TABLE A-2 Alternative Building Activity Source Energy Targets (SI Units) *[Continued]*

No.	Commercial Building Type	EUIs by Building Type by Climate Zone ($MJ/m^2 \cdot yr$)																
		ASHRAE Climate Zone																
		1A	2A	2B	3A	3B Coast	3B Other	3C	4A	4B	4C	5A	5B	5C[1]	6A	6B	7	8
30	Fast food	11375	11626	10472	11950	9454	10603	9771	10071	8852	11404	8634	8978	9672	9414	9168	10182	12872
31	Restaurant/ cafeteria	6153	6296	5613	6508	5023	5679	5283	5456	4790	6266	4670	4832	5235	5059	4958	5529	6938
32	Other food service	3363	3434	3053	3556	2757	3119	2896	2986	2603	3415	2549	2649	2861	2775	2717	3010	3800
33	Hospital/inpatient health	6153	6224	5581	6082	5318	5515	5029	4723	4061	5437	3621	3753	4329	3693	3577	3714	4291
34	Nursing home/ assisted living	3649	3613	3217	3556	2757	3086	2896	3013	2577	3382	2571	2625	2852	2839	2739	3053	4056
35	Dormitory/ fraternity/sorority	1753	1860	1674	2063	1247	1740	1559	1900	1536	2188	1692	1643	1785	1943	1811	2199	3095
36	Hotel	2146	2218	1937	2241	1871	1937	1878	1792	1640	2089	1500	1643	1749	1580	1607	1686	1943
37	Motel or inn	2397	2289	2101	2205	1904	2002	1782	1710	1562	1923	1371	1496	1629	1452	1449	1494	1772
38	Other lodging	2289	2182	2002	2098	1805	1904	1719	1629	1510	1823	1307	1423	1551	1388	1381	1409	1708
39	Vehicle dealership	2146	2182	1937	2276	1510	1904	1623	1954	1640	2089	1757	1742	1857	2028	1902	2241	3223
40	Retail store	1216	1252	1116	1316	854	1083	923	1113	937	1193	1007	1006	1063	1153	1087	1281	1836
41	Other retail	2111	2182	1937	2276	1477	1904	1623	1954	1640	2089	1757	1742	1856	2007	1902	2241	3202
42	Post office/postal center	1860	1824	1641	1814	1412	1576	1464	1520	1302	1724	1307	1325	1443	1430	1381	1537	2049
43	Repair shop	1252	1216	1083	1209	919	1050	987	1032	885	1160	857	883	966	961	928	1025	1366
44	Vehicle service/ repair shop	1431	1431	1247	1387	1083	1215	1146	1194	1015	1326	1007	1030	1119	1110	1064	1195	1580
45	Vehicle storage/ maintenance	608	608	558	605	460	525	509	516	443	564	428	442	486	491	475	512	683
46	Other service	2611	2576	2298	2561	1970	2232	2069	2172	1848	2420	1842	1889	2046	2028	1970	2177	2903
47	Strip shopping mall	2576	2540	2298	2667	1838	2265	1973	2362	1953	2553	2121	2085	2238	2455	2309	2732	3906
48	Enclosed mall	2432	2432	2199	2561	1740	2167	1878	2253	1848	2420	2035	1987	2131	2327	2196	2604	3736
		ASHRAE Climate Zone																
No.	Residential Building Type	1A	2A	2B	3A	3B Coast	3B Other	3C	4A	4B	4C	5A	5B	5C[1]	6A	6B	7	8
49	Mobile home	1645	1753	1576	1920	1182	1641	1464	1792	1432	2055	1607	1545	1684	1836	1720	2071	2903
50	Single-family (detached)	1216	1288	1182	1423	886	1215	1082	1330	1067	1525	1178	1153	1247	1366	1268	1537	2156
51	Single-family (attached)	1395	1502	1346	1636	1018	1379	1241	1520	1224	1757	1371	1325	1436	1558	1471	1772	2476
52	Apartment building (2 to 4 units)	2075	2182	2002	2418	1477	2035	1846	2253	1796	2553	2014	1938	2106	2284	2151	2604	3650
53	Apartment building (5+ units)	1395	1467	1346	1636	1018	1379	1241	1520	1224	1757	1371	1325	1435	1558	1471	1772	2476

1. Zone 5C values based on U.S. building stock.

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TABLE A-3 Alternative Building Activity Electricity Site Energy Use Targets (I-P Units)

No.	Commercial Building Type	Electricity Site Energy Use EUIs by Building Type by Climate Zone (kBtu/ft^2·yr)																
		ASHRAE Climate Zone																
		1A	2A	2B	3A	3B Coast	3B Other	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
1	Admin/professional office	47	49	42	50	35	41	33	35	28	44	22	26	31	25	25	27	38
2	Bank/other financial	67	69	59	71	49	59	47	50	40	62	32	37	45	35	36	38	54
3	Government office	59	61	52	62	44	52	42	44	35	54	28	33	39	31	32	34	47
4	Medical office (nondiag.)	40	42	36	43	30	35	28	30	24	37	19	22	27	21	21	23	32
5	Mixed-use office	55	56	48	57	40	47	39	40	32	51	26	31	36	29	29	31	44
6	Other office	46	47	40	49	33	39	32	33	27	42	22	25	30	24	24	26	36
7	Laboratory	216	214	181	210	156	175	160	148	123	193	98	118	138	108	112	116	154
8	Distribution/ship center	15	19	17	24	11	19	14	21	16	23	17	19	20	23	21	28	53
9	Nonrefrig. warehouse	7	9	9	12	5	9	7	10	8	12	8	9	10	11	11	13	25
10	Convenience store	163	177	143	183	135	148	143	127	106	170	84	102	119	90	95	97	122
11	Convenience store + gas	132	143	115	148	108	119	115	102	85	137	68	82	96	72	77	78	99
12	Grocery/food market	136	148	120	153	112	122	119	106	88	141	70	85	100	75	79	81	102
13	Other food sales	41	45	36	47	34	38	36	32	27	43	21	26	30	23	24	25	31
14	Fire/police station	80	79	66	77	58	65	59	55	45	71	36	44	51	40	41	43	57
15	Other public order/safety	73	72	61	70	52	59	54	50	41	65	33	39	46	36	38	39	52
16	Medical office (diagnostic)	41	39	34	39	31	34	27	24	22	30	14	19	22	15	16	14	16
17	Clinic/other outpatient health	61	59	52	57	48	52	41	37	32	45	21	28	33	22	24	21	25
18	Refrigerated warehouse	84	83	70	81	60	68	62	57	47	75	38	46	53	42	43	45	60
19	Religious worship	28	28	24	28	20	23	21	20	16	25	13	16	18	14	15	15	20
20	Entertainment/culture	28	28	24	28	20	23	21	20	16	25	13	16	18	14	14	15	20
21	Library	74	74	62	72	53	60	55	51	42	67	34	41	48	37	39	40	53
22	Recreation	32	32	27	32	23	26	24	22	18	28	15	18	21	16	17	17	23
23	Social/meeting	33	33	28	33	24	27	25	23	19	30	15	18	21	17	18	18	24
24	Other public assembly	34	34	29	34	24	28	26	23	19	30	15	19	22	17	18	18	25
25	College/university	75	74	64	75	47	62	51	55	43	69	37	41	49	42	41	46	68
26	Elementary/middle school	46	45	38	45	32	37	32	31	25	39	20	23	28	21	22	23	33
27	High school	55	54	46	55	35	45	37	40	31	51	27	30	36	31	30	34	50
28	Preschool/daycare	59	58	49	57	42	47	42	40	33	51	26	30	36	28	28	30	43
29	Other classroom education	31	30	26	31	19	25	21	23	18	28	15	17	20	17	17	19	28
30	Fast food	318	325	279	333	252	282	255	234	198	305	156	190	221	169	178	183	231
31	Restaurant/cafeteria	172	176	149	181	134	151	138	127	107	168	84	102	120	91	96	99	125
32	Other food service	94	96	81	99	73	83	76	69	58	91	46	56	65	50	53	54	68
33	Hospital/inpatient health	172	174	149	169	142	147	131	110	91	146	65	79	99	66	69	67	77
34	Nursing home/assisted living	102	101	86	99	73	82	76	70	58	91	46	56	65	51	53	55	73
35	Dormitory/fraternity/sorority	49	52	45	57	33	46	41	44	34	59	31	35	41	35	35	39	56
36	Hotel	60	62	52	62	50	52	49	42	37	56	27	35	40	28	31	30	35

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TABLE A-3 Alternative Building Activity Electricity Site Energy Use Targets (I-P Units) *[Continued]*

No.	Commercial Building Type	Electricity Site Energy Use EUIs by Building Type by Climate Zone (kBtu/ft²·yr)																
		ASHRAE Climate Zone																
		1A	2A	2B	3A	3B Coast	3B Other	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
37	Motel or inn	67	64	56	61	51	53	47	40	35	52	25	32	37	26	28	27	32
38	Other lodging	64	61	53	58	48	51	45	38	34	49	24	30	35	25	27	25	31
39	Vehicle dealership	60	61	52	63	40	51	42	45	37	56	32	37	42	36	37	40	58
40	Retail store	34	35	30	37	23	29	24	26	21	32	18	21	24	21	21	23	33
41	Other retail	59	61	52	63	39	51	42	45	37	56	32	37	42	36	37	40	58
42	Post office/postal center	52	51	44	51	38	42	38	35	29	46	24	28	33	26	27	28	37
43	Repair shop	35	34	29	34	24	28	26	24	20	31	15	19	22	17	18	18	25
44	Vehicle service/repair shop	40	40	33	39	29	32	30	28	23	36	18	22	26	20	21	21	28
45	Vehicle storage/maintenance	17	17	15	17	12	14	13	12	10	15	8	9	11	9	9	9	12
46	Other service	73	72	61	71	52	59	54	51	41	65	33	40	47	36	38	39	52
47	Strip shopping mall	72	71	61	74	49	60	52	55	44	68	38	44	51	44	45	49	70
48	Enclosed mall	68	68	59	71	46	58	49	52	41	65	37	42	49	42	43	47	67
No.	**Residential Building Type**	**ASHRAE Climate Zone**																
		1A	2A	2B	3A	3B Coast	3B Other	3C	4A	4B	4C	5A	5B	5C[1]	6A	6B	7	8
49	Mobile home	46	49	42	54	31	44	38	42	32	55	29	33	38	33	33	37	52
50	Single-family (detached)	34	36	31	40	24	32	28	31	24	41	21	24	29	25	25	28	39
51	Single-family (attached)	39	42	36	46	27	37	32	35	27	47	25	28	33	28	29	32	44
52	Apartment building (2 to 4 units)	58	61	53	67	39	54	48	52	40	68	36	41	48	41	42	47	66
53	Apartment building (5+ units)	39	41	36	46	27	37	32	35	27	47	25	28	33	28	29	32	44

1. Zone 5C values based on U.S. building stock.

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TABLE A-3 Alternative Building Activity Electricity Site Energy Use Targets (SI Units)

No.	Commercial Building Type	Electricity Site Energy Use EUIS by Building Type by Climate Zone ($MJ/m^2 \cdot yr$)																
		ASHRAE Climate Zone																
		1A	2A	2B	3A	3B Coast	3B Other	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
1	Admin/professional office	534	556	476	563	397	467	378	394	318	494	255	301	355	283	284	305	427
2	Bank/other financial	761	784	675	810	556	665	538	566	451	706	364	425	506	401	403	435	610
3	Government office	670	693	586	709	496	586	481	495	398	615	321	372	445	353	359	383	535
4	Medical office (nondiag.)	454	477	407	484	338	397	321	337	272	424	220	254	303	239	244	261	366
5	Mixed-use office	625	636	546	653	457	536	444	459	365	575	299	348	411	327	329	353	496
6	Other office	522	534	457	552	377	447	368	380	305	474	246	289	343	274	274	296	414
7	Laboratory	2453	2430	2055	2386	1767	1985	1822	1685	1392	2188	1115	1339	1567	1223	1275	1315	1750
8	Distribution/ship center	170	216	199	270	129	218	160	237	179	262	189	212	224	261	244	318	596
9	Nonrefrig. warehouse	79	102	99	135	60	99	76	115	86	131	92	106	109	126	120	152	287
10	Convenience store	1851	2010	1628	2082	1529	1678	1624	1441	1207	1926	953	1156	1357	1023	1081	1101	1389
11	Convenience store + gas	1499	1624	1310	1677	1231	1350	1303	1161	968	1553	768	932	1092	823	872	888	1119
12	Grocery/food market	1544	1681	1360	1733	1271	1390	1350	1204	1001	1603	795	967	1131	853	901	919	1158
13	Other food sales	466	511	407	529	387	427	406	366	305	484	242	295	343	257	274	279	353
14	Fire/police station	908	897	754	878	655	735	670	624	510	807	408	496	577	453	468	483	644
15	Other public order/safety	829	818	695	799	596	665	614	566	471	736	373	448	526	409	428	444	588
16	Medical office (diagnostic)	466	443	387	439	357	387	302	272	245	343	162	212	251	165	184	161	183
17	Clinic/other outpatient health	693	670	586	653	546	586	463	416	365	514	242	319	376	248	274	244	279
18	Refrigerated warehouse	954	943	794	923	685	774	708	652	537	847	430	519	607	475	493	509	679
19	Religious worship	318	318	268	315	228	258	236	222	186	282	145	177	206	161	169	174	231
20	Entertainment/culture	318	318	268	315	228	258	236	222	179	282	145	177	204	161	164	170	226
21	Library	840	840	705	822	606	685	623	581	477	756	382	460	539	422	438	453	601
22	Recreation	363	363	308	360	258	298	274	251	206	323	167	201	234	183	189	196	261
23	Social/meeting	375	375	318	371	278	308	283	258	219	343	171	206	244	192	199	205	270
24	Other public assembly	386	386	328	383	278	318	293	265	219	343	176	212	249	196	204	209	279
25	College/university	852	840	725	855	536	705	576	624	484	787	417	466	560	479	468	522	775
26	Elementary/middle school	522	511	437	507	367	417	368	351	285	444	224	265	313	244	249	257	379
27	High school	625	613	526	619	397	516	425	459	351	575	303	342	409	348	344	383	566
28	Preschool/daycare	670	659	556	653	476	536	472	459	371	575	290	342	405	313	319	335	492
29	Other classroom education	352	341	298	349	218	288	236	258	199	323	171	189	229	196	189	213	318
30	Fast food	3611	3691	3167	3782	2859	3206	2898	2660	2254	3469	1770	2159	2510	1920	2017	2077	2625
31	Restaurant/cafeteria	1953	1999	1697	2060	1519	1717	1567	1441	1220	1906	957	1162	1358	1032	1091	1128	1415
32	Other food service	1067	1090	923	1126	834	943	859	789	663	1039	523	637	742	566	598	614	775
33	Hospital/inpatient health	1953	1976	1688	1925	1608	1668	1492	1247	1034	1654	742	903	1123	753	787	758	875
34	Nursing home/ assisted living	1158	1147	973	1126	834	933	859	796	656	1029	527	631	740	579	603	623	827
35	Dormitory/fraternity/ sorority	556	591	506	653	377	526	463	502	391	666	347	395	463	396	398	448	631

1. Zone 5C values based on U.S. building stock.

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TABLE A-3 Alternative Building Activity Electricity Site Energy Use Targets (SI Units) *[Continued]*

No.	Commercial Building Type	Electricity Site Energy Use EUIS by Building Type by Climate Zone ($MJ/m^2 \cdot yr$)																
		ASHRAE Climate Zone																
		1A	2A	2B	3A	3B Coast	3B Other	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
36	Hotel	681	704	586	709	566	586	557	473	418	635	307	395	454	322	354	344	396
37	Motel or inn	761	727	635	698	576	606	529	452	398	585	281	360	423	296	319	305	361
38	Other lodging	727	693	606	664	546	576	510	430	385	555	268	342	402	283	304	287	348
39	Vehicle dealership	681	693	586	720	457	576	481	516	418	635	360	419	482	414	418	457	657
40	Retail store	386	397	338	416	258	328	274	294	239	363	206	242	276	235	239	261	374
41	Other retail	670	693	586	720	447	576	481	516	418	635	360	419	482	409	418	457	653
42	Post office/postal center	591	579	496	574	427	476	434	401	331	524	268	319	374	292	304	313	418
43	Repair shop	397	386	328	383	278	318	293	272	225	353	176	212	251	196	204	209	279
44	Vehicle service/repair shop	454	454	377	439	328	367	340	315	259	403	206	248	290	226	234	244	322
45	Vehicle storage/ maintenance	193	193	169	191	139	159	151	136	113	171	88	106	126	100	105	104	139
46	Other service	829	818	695	810	596	675	614	573	471	736	378	454	531	414	433	444	592
47	Strip shopping mall	818	806	695	844	556	685	585	624	497	777	435	501	581	501	508	557	797
48	Enclosed mall	772	772	665	810	526	655	557	595	471	736	417	478	553	475	483	531	762
No.	Residential Building Type	ASHRAE Climate Zone																
		1A	2A	2B	3A	3B Coast	3B Other	3C	4A	4B	4C	5A	5B	5C[1]	6A	6B	7	8
49	Mobile home	522	556	476	608	357	496	434	473	365	625	329	372	437	374	379	422	592
50	Single-family (detached)	386	409	357	450	268	367	321	351	272	464	242	277	324	279	279	313	440
51	Single-family (attached)	443	477	407	518	308	417	368	401	312	534	281	319	372	318	324	361	505
52	Apartment building (2 to 4 units)	659	693	606	765	447	615	548	595	457	777	413	466	546	466	473	531	744
53	Apartment building (5+ units)	443	466	407	518	308	417	368	401	312	534	281	319	372	318	324	361	505

1. Zone 5C values based on U.S. building stock.

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TABLE A-4 Alternative Building Activity Fossil Fuel Site Energy Use Targets (I-P Units)

No.	Commercial Building Type	Fossil Fuel Site Energy Use EUIs by Building Type by Climate Zone (kBtu/ft^2·yr)																
		ASHRAE Climate Zone																
		1A	2A	2B	3A	3B Coast	3B Other	3C	4A	4B	4C	5A	5B	5C[1]	6A	6B	7	8
1	Admin/professional office	0	0	6	0.4	5	6	7	20	20	5	36	25	20	40	32	43	60
2	Bank/other financial	0	0	9	0.6	7	8	10	29	28	8	51	35	29	57	45	62	86
3	Government office	0	0	7	0.6	6	7	9	25	25	7	45	30	25	50	40	54	76
4	Medical office (nondiag.)	0	0	5	0.4	4	5	6	17	17	5	31	21	17	34	28	37	52
5	Mixed-use office	0	0	7	0.5	6	7	8	24	23	6	42	28	23	46	37	50	70
6	Other office	0	0	6	0.4	5	6	7	20	19	5	34	24	19	39	31	42	59
7	Laboratory	0	0	26	1.9	22	25	33	87	87	24	156	109	89	173	144	186	248
8	Distribution/ship center	0	0	3	0.2	2	3	3	12	11	3	26	17	13	37	28	45	84
9	Nonrefrig. warehouse	0	0	1	0.1	1	1	1	6	5	1	13	9	6	18	13	22	41
10	Convenience store	0	0	21	1.6	19	21	29	74	76	21	133	94	77	145	122	156	197
11	Convenience store + gas	0	0	17	1.3	16	17	23	60	61	17	107	76	62	117	98	126	158
12	Grocery/food market	0	0	17	1.4	16	18	24	62	63	18	111	79	64	121	102	130	164
13	Other food sales	0	0	5	0.4	5	5	7	19	19	5	34	24	20	36	31	39	50
14	Fire/police station	0	0	10	0.7	8	9	12	32	32	9	57	40	33	64	53	68	91
15	Other public order/safety	0	0	9	0.6	8	8	11	29	30	8	52	37	30	58	48	63	83
16	Medical office (diagnostic)	0	0	5	0.3	5	5	5	14	15	4	23	17	14	23	21	23	26
17	Clinic/other outpatient health	0	0	7	0.5	7	7	8	21	23	6	34	26	21	35	31	35	39
18	Refrigerated warehouse	0	0	10	0.7	9	10	13	34	34	9	60	42	35	67	56	72	96
19	Religious worship	0	0	3	0.2	3	3	4	11	12	3	20	14	12	23	19	25	33
20	Entertainment/culture	0	0	3	0.2	3	3	4	11	11	3	20	14	12	23	19	24	32
21	Library	0	0	9	0.6	8	9	11	30	30	8	53	37	31	60	49	64	85
22	Recreation	0	0	4	0.3	3	4	5	13	13	4	23	16	13	26	21	28	37
23	Social/meeting	0	0	4	0.3	4	4	5	13	14	4	24	17	14	27	22	29	38
24	Other public assembly	0	0	4	0.3	4	4	5	14	14	4	25	17	14	28	23	30	39
25	College/university	0	0	9	0.7	7	9	10	32	30	9	58	38	32	68	53	74	110
26	Elementary/middle school	0	0	6	0.4	5	5	7	18	18	5	31	22	18	35	28	36	54
27	High school	0	0	7	0.5	5	7	8	24	22	6	42	28	23	49	39	54	80
28	Preschool/daycare	0	0	7	0.5	6	7	8	24	23	6	40	28	23	44	36	47	70
29	Other classroom education	0	0	4	0.3	3	4	4	13	12	4	24	15	13	28	21	30	45
30	Fast food	0	0	40	3.0	36	41	52	137	142	39	247	176	143	272	227	294	372
31	Restaurant/cafeteria	0	0	22	1.6	19	22	28	74	77	21	134	95	77	146	123	160	200
32	Other food service	0	0	12	0.9	11	12	15	41	42	12	73	52	42	80	67	87	110
33	Hospital/inpatient health	0	0	21	1.5	20	21	27	64	65	18	104	74	64	107	89	107	124
34	Nursing home/assisted living	0	0	12	0.9	11	12	15	41	41	11	74	51	42	82	68	88	117
35	Dormitory/fraternity/sorority	0	0	6	0.5	5	7	8	26	25	7	48	32	26	56	45	64	89
36	Hotel	0	0	7	0.6	7	7	10	24	26	7	43	32	26	46	40	49	56

1. Zone 5C values based on U.S. building stock.

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TABLE A-4 Alternative Building Activity Fossil Fuel Site Energy Use Targets (I-P Units) *[Continued]*

No.	Commercial Building Type	Fossil Fuel Site Energy Use EUIs by Building Type by Climate Zone (kBtu/ft²·yr)																
		ASHRAE Climate Zone																
		1A	2A	2B	3A	3B Coast	3B Other	3C	4A	4B	4C	5A	5B	5C[1]	6A	6B	7	8
37	Motel or inn	0	0	8	0.5	7	8	9	23	25	6	39	29	24	42	36	43	51
38	Other lodging	0	0	8	0.5	7	7	9	22	24	6	37	28	23	40	34	41	49
39	Vehicle dealership	0	0	7	0.6	6	7	9	27	26	7	50	34	27	59	47	65	93
40	Retail store	0	0	4	0.3	3	4	5	15	15	4	29	20	16	33	27	37	53
41	Other retail	0	0	7	0.6	6	7	9	27	26	7	50	34	27	58	47	65	92
42	Post office/postal center	0	0	6	0.5	5	6	8	21	21	6	37	26	21	41	34	44	59
43	Repair shop	0	0	4	0.3	4	4	5	14	14	4	25	17	14	28	23	30	39
44	Vehicle service/repair shop	0	0	5	0.3	4	5	6	16	16	4	29	20	17	32	26	35	46
45	Vehicle storage/maintenance	0	0	2	0.2	2	2	3	7	7	2	12	9	7	14	12	15	20
46	Other service	0	0	9	0.6	8	9	11	29	30	8	53	37	30	59	49	63	84
47	Strip shopping mall	0	0	9	0.7	7	9	10	32	31	9	61	41	33	71	57	79	113
48	Enclosed mall	0	0	8	0.6	7	8	10	31	30	8	58	39	31	67	54	75	108
No.	**Residential Building Type**	**ASHRAE Climate Zone**																
		1A	2A	2B	3A	3B Coast	3B Other	3C	4A	4B	4C	5A	5B	5C[1]	6A	6B	7	8
49	Mobile home	0	0	6	0.5	5	6	8	24	23	7	46	30	25	53	43	60	84
50	Single-family (detached)	0	0	5	0.4	3	5	6	18	17	5	34	23	18	39	31	44	62
51	Single-family (attached)	0	0	5	0.4	4	5	7	21	20	6	39	26	21	45	36	51	72
52	Apartment building (2 to 4 units)	0	0	8	0.6	6	8	10	31	29	9	58	38	31	66	53	75	105
53	Apartment building (5+ units)	0	0	5	0.4	4	5	7	21	20	6	39	26	21	45	36	51	72

1. Zone 5C values based on U.S. building stock.

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TABLE A-4 Alternative Building Activity Fossil Fuel Site Energy Use Targets (SI Units)

No.	Commercial Building Type	Fossil Fuel Site Energy Use EUIs by Building Type by Climate Zone (MJ/m^2-yr)																
		ASHRAE Climate Zone																
		1A	2A	2B	3A	3B Coast	3B Other	3C	4A	4B	4C	5A	5B	5C[1]	6A	6B	7	8
1	Admin/professional office	0	0	69	5	57	67	77	230	227	62	404	278	230	455	363	490	686
2	Bank/other financial	0	0	97	7	80	96	109	331	321	89	578	393	327	644	516	700	980
3	Government office	0	0	84	6	71	84	98	289	284	78	508	344	288	567	459	616	861
4	Medical office (nondiag.)	0	0	59	4	49	57	65	197	194	53	348	235	196	385	312	420	588
5	Mixed-use office	0	0	79	6	66	77	90	268	260	72	474	322	266	525	421	567	798
6	Other office	0	0	66	5	54	64	75	222	217	60	390	267	221	441	351	476	665
7	Laboratory	0	0	296	21	254	286	370	984	993	276	1769	1239	1013	1968	1632	2115	2815
8	Distribution/ship center	0	0	29	2	19	31	33	138	128	33	299	196	145	420	312	511	959
9	Nonrefrig. warehouse	0	0	14	1	9	14	15	67	61	17	146	98	71	203	153	245	462
10	Convenience store	0	0	234	19	220	242	329	842	860	243	1511	1070	876	1646	1383	1772	2234
11	Convenience store + gas	0	0	189	15	177	194	264	678	690	196	1219	862	706	1323	1116	1428	1800
12	Grocery/food market	0	0	196	15	183	200	274	703	714	202	1261	895	730	1372	1154	1478	1863
13	Other food sales	0	0	59	5	56	61	82	214	217	61	383	273	222	413	351	448	567
14	Fire/police station	0	0	109	8	94	106	136	364	364	102	648	458	373	728	599	777	1036
15	Other public order/safety	0	0	100	7	86	96	124	331	336	93	592	415	340	658	548	714	945
16	Medical office (diagnostic)	0	0	56	4	51	56	61	159	175	43	258	196	162	266	236	259	294
17	Clinic/ other outpatient health	0	0	84	6	79	84	94	243	260	65	383	295	243	399	351	392	448
18	Refrigerated warehouse	0	0	114	8	99	111	144	381	383	107	683	480	392	763	631	819	1092
19	Religious worship	0	0	39	3	33	37	48	130	132	36	230	164	133	259	217	280	371
20	Entertainment/culture	0	0	39	3	33	37	48	130	128	36	230	164	132	259	210	273	364
21	Library	0	0	101	7	87	99	126	339	340	95	606	426	349	679	561	728	966
22	Recreation	0	0	44	3	37	43	56	147	147	41	265	186	151	294	242	315	420
23	Social/meeting	0	0	46	3	40	44	57	151	156	43	272	191	158	308	255	329	434
24	Other public assembly	0	0	47	3	40	46	59	155	156	43	279	196	161	315	261	336	448
25	College/university	0	0	104	8	77	101	117	364	345	99	662	431	362	770	599	840	1246
26	Elementary/middle school	0	0	63	5	53	60	75	205	203	56	355	246	203	392	319	413	609
27	High school	0	0	76	6	57	74	86	268	251	72	481	317	264	560	440	616	910
28	Preschool/daycare	0	0	80	6	69	77	96	268	265	72	460	317	262	504	408	539	791
29	Other classroom education	0	0	43	3	31	41	48	151	142	41	272	175	148	315	242	343	511
30	Fast food	0	0	456	34	412	462	588	1554	1607	437	2807	1997	1621	3088	2582	3340	4222
31	Restaurant/cafeteria	0	0	244	18	219	247	318	842	870	240	1518	1075	878	1660	1396	1814	2276
32	Other food service	0	0	133	10	120	136	174	461	473	131	829	589	480	910	765	987	1246
33	Hospital/inpatient health	0	0	243	17	232	240	303	729	737	208	1177	835	726	1211	1007	1218	1407
34	Nursing home/ assisted living	0	0	140	10	120	134	174	465	468	130	836	584	478	931	771	1001	1330
35	Dormitory/fraternity/ sorority	0	0	73	6	54	76	94	293	279	84	550	366	299	637	510	721	1015

1. Zone 5C values based on U.S. building stock.

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TABLE A-4 Alternative Building Activity Fossil Fuel Site Energy Use Targets (SI Units) *[Continued]*

No.	Commercial Building Type	Fossil Fuel Site Energy Use EUIs by Building Type by Climate Zone (MJ/m^2-yr)																
		ASHRAE Climate Zone																
		1A	2A	2B	3A	3B Coast	3B Other	3C	4A	4B	4C	5A	5B	5C[1]	6A	6B	7	8
36	Hotel	0	0	84	6	81	84	113	276	298	80	488	366	293	518	453	553	637
37	Motel or inn	0	0	91	6	83	87	107	264	284	74	446	333	273	476	408	490	581
38	Other lodging	0	0	87	6	79	83	103	251	274	70	425	317	260	455	389	462	560
39	Vehicle dealership	0	0	84	6	66	83	98	301	298	80	571	387	311	665	536	735	1057
40	Retail store	0	0	49	4	37	47	56	172	170	46	327	224	178	378	306	420	602
41	Other retail	0	0	84	6	64	83	98	301	298	80	571	387	311	658	536	735	1050
42	Post office/postal center	0	0	71	5	61	69	88	234	236	66	425	295	242	469	389	504	672
43	Repair shop	0	0	47	3	40	46	59	159	161	44	279	196	162	315	261	336	448
44	Vehicle service/repair shop	0	0	54	4	47	53	69	184	184	51	327	229	188	364	300	392	518
45	Vehicle storage/ maintenance	0	0	24	2	20	23	31	80	80	22	139	98	82	161	134	168	224
46	Other service	0	0	100	7	86	97	124	335	336	93	599	420	343	665	555	714	952
47	Strip shopping mall	0	0	100	8	80	99	119	364	354	98	690	464	375	805	650	896	1281
48	Enclosed mall	0	0	96	7	76	94	113	348	336	93	662	442	357	763	618	854	1225
No.	Residential Building Type	ASHRAE Climate Zone																
		1A	2A	2B	3A	3B Coast	3B Other	3C	4A	4B	4C	5A	5B	5C[1]	6A	6B	7	8
49	Mobile home	0	0	69	5	51	71	88	276	260	79	522	344	282	602	485	679	952
50	Single-family (detached)	0	0	51	4	39	53	65	205	194	58	383	256	209	448	357	504	707
51	Single-family (attached)	0	0	59	5	44	60	75	234	222	67	446	295	241	511	414	581	812
52	Apartment building (2to 4 units)	0	0	87	7	64	89	111	348	326	98	655	431	353	749	606	854	1197
53	Apartment building (5+ units)	0	0	59	5	44	60	75	234	222	67	446	295	241	511	414	581	812

1. Zone 5C values based on U.S. building stock.

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Revise Informative Annex J and add new Tables J-6, J-7, J-8, and J-9 as shown.

INFORMATIVE ANNEX J
DERIVATION OF ~~BUILDING~~ ENERGY-~~USE~~ INTENSITY TARGETS

These analyses were conducted by Terry R. Sharp of Oak Ridge National Laboratory (ORNL) in collaboration with the ASHRAE Standard 100 committee and Dr. Alexander Zhivov, the working group chair responsible for targets development, and are reprinted here with permission of ORNL (ref. Report No. ORNL/TM-2014/215).

Tables J-6 and J-7 illustrate example building energy efficiency targets in the form of total building energy use intensities (measured in kBtu/ft^2·yr). Table J-6 shows the site-energy-based[1] building total energy use efficiency targets from Table 7-2. Table J-7 shows the source-energy-based equivalent values[2] of Table 7-2. The different forms (site or source) have distinct advantages depending on the goal of the user or authority. Both could provide equivalent, alternate methods of complying with the efficient building targets of Standard 100 (if the source-based alternative were added) or serve as high-performance building targets for other standards, codes, programs, or entities.

The summary that follows provides an overview of the strategy used to derive the site and source energy targets in Standard 100 (Tables J-6 and J-7, respectively).

~~Step 1: Generate Site-Energy-Based Building Total Energy-Use Intensities by Building Type and Climate Zone~~

~~National building total energy-use intensities (EUIs) (kBtu/ft^2·yr [MJ/m^2·yr]) are derived via analysis of the CBECS of 2003 and the RECS of 2005. The EUIs are site-energy based[1] and are national median values. The building EUI values are derived based on building types as classified by the "PBAPLUS8" variable in the CBECS database and the "TYPEHUQ" variable in the RECS database. This classification yielded over 50 different building types for the analysis (48 commercial and 5 residential). A goal of this step was to develop building EUIs by climate zone because EUIs for any given building type differ significantly depending on their climatological location.~~

Step 1: Generate Building Total Energy Use Intensities by Building Type by Climate Zone

In this step, national building total energy use intensities (EUIs in kBtu/ft^2·yr) were derived via analysis of the DOE Energy Information Administration's Commercial Buildings Energy Consumption Survey (DOE 2003). The EUIs derived are national median values. The building EUI values were derived based on building types as classified by the PBAPLUS8 variable in the CBECS database. This classification yielded 48 different commercial building types for the analysis (five additional residential building types are included in Standard 100). A goal of this step was to develop building EUIs by climate zone, because EUIs for any given building type differ significantly depending on their climatological location (variations are typically large for site-energy-based EUIs and small for source-energy-based EUIs; compare Tables J-6 and J-7). ASHRAE climates zones are shown in Figure J-1.

To identify representative zonal EUIs (CBECS observations by building type and climate zone were insufficient for this), zonal EUI ratios (EUI for climate zones divided by a national EUI) were provided from building simulation modeling performed by the National Renewable Energy Laboratory (NREL; Deru, et al. 2011) for 16 different climate zones (Figure J-1)[3,4]. These ratios were used to derive zonal EUIs by building type by multiplying them by CBECS national median EUIs. This step produced representative total EUIs by building type and climate zone (both on a site and source basis).

The CBECS database, via a simple parsing method, was found inadequate to provide reliable EUI values by climate zone for a large number of commercial U.S. building types. This was primarily due to insufficient sample size when the data were parsed by building type and climate zone. A similar problem was noted by Griffin et al. (2008). As a result, an alternative method was utilized to derive EUIs by climate zone. Zonal EUI ratios (EUI for climate zone/EUI national) were provided from building simulation modeling performed by the National Renewable Energy Laboratory (NREL) (Deru et al. 2011) for 16 different climate zones. These ratios are

1. Site energy (also called "secondary energy") is the energy produced from raw fuel, such as electricity supplied by the grid or heat received from a district heating system (typically measured at the end use or building). ~~"Site" energy use refers to energy use measured at the building, usually by the electric, natural gas, and other energy meters.~~
2. Source energy (also called "primary energy") represents and accounts for the raw fuel (energy) that is consumed to create heat or generate electricity for the end user or building (see ASHRAE Standard 105 for additional information). This is sometimes an important consideration because as much as 3 units of raw fuel (energy) may be required to generate a single unit of energy for the end user or building, such as for electricity supplied by the grid or heat received from a district heating system.~~In the zonal EUI ratio calculation, consistent with the basis for the "EUI for climate zone" term, the "EUI national" term was also based on NREL simulation results. It is not identical to a CBECS or RECS national value.~~
3. In the zonal EUI ratio calculation, consistent with the basis for the "EUI for climate zone" term, the "EUI national" term was also based on NREL simulation results. It is not identical to a CBECS national value.~~The 16 different climate zones referenced in this document consist of the eight zones shown in Figure J-1 (color coded) split into the moist (A), dry (B), and marine (C) regions as delineated in the figure. Note that the small climate zone (both in geographical area and number of buildings) identifiable as Climate Zone 7B in Figure J-1 was not analyzed by NREL and is not represented in this analysis. These are further described by Briggs et al. (2003).~~
4. The 16 different climate zones referenced in this document comprise the 8 zones shown in Figure J-1 (color coded) split into moist (A), dry (B), and marine (C) regions. The small climate zone (both in geographical area and number of buildings) 7B was not analyzed.

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shown in Table J-1 and were used to derive zonal EUIs by building type by multiplying them by the CBECS national median EUIs. This step produced the site-based building total EUIs by building type and climate zone in Table J-3. A similar method was used to derive the zonal EUIs for residential building types using the RECS database (DOE 2005), (also listed in Table J-3).

Step 2: Identify Representative 25th Percentile Values by Climate Zone

The ASHRAE Standard 100 committee wanted to use the top (best) performing 25th percentile of an EUI distribution for each building type as the energy target for buildings. In this respect (there are considerable differences in others), this approach is similar to the criteria that EPA uses for its highly recognized ENERGY STAR® designation awarded to commercial buildings. The challenge was to identify representative 25th percentile values when there was no climate-zone EUI distribution available.

This was accomplished by comparing the 25th percentile values from the CBECS/RECS national distributions to the distribution medians—the 50th percentile value (by building type). A simple ratio of the 25th to 50th percentiles was developed for each building type. These ratios were then multiplied by the climate-zone based EUIs developed in Step 1 to approximate a 25th percentile EUI value in each climate zone.

Step 2: Identifying Zonal Efficiency Targets—The Top 25th Percentile EUI Values by Climate Zone

The committee, in developing the targets in Standard 100, wanted to use the top (best) performing 25th percentile of an EUI distribution for each building type as the energy target for buildings. In this respect (there are considerable differences in others), this approach is similar to the criteria that EPA uses for its highly recognized Energy Star designation awarded to commercial buildings. The challenge was to identify representative 25th percentile values when there was no climate-zone EUI distribution available.

This was accomplished by comparing the 25th percentile values from the CBECS national distributions to the national distribution medians—the 50th percentile value (by building type). A simple ratio of the 25th to 50th percentiles was developed for each building type. These ratios were then multiplied by the climate-zone-based EUIs developed in Step 1 to approximate the higher-performance 25th percentile EUI value in each climate zone.

At this point, high-performance energy targets by building type for each climate zone had been established. These are the values provided in Tables J-6 and J-7, equivalent but accounted for on a different basis.

In this way, high-performance energy targets were established by building type for each climate zone. These results are summarized in Table J-4.

Step 3: Develop Schedule Multipliers

Beyond floor area, another major driver of energy use in buildings is operating hours. While perhaps a minimal concern for residential buildings (24/7 operation for residential is assumed), they are a significant energy-use driver for many types of commercial buildings. As a result, ORNL conducted an analysis to investigate the impact of schedule by building type and used that to develop a set of schedule multipliers that could be used to adjust building energy-use intensities for schedule such that the comparison of a user's building to Standard 100 targets could be a more reliable (i.e., like) comparison. An example of this need is illustrated by comparing an EUI from an office building operated for three shifts to one that is operated for only one shift. All other influences including building size being the same, the three-shift building would be expected to be considerably more energy intensive that the one-shift building.

Beyond floor area, another major driver of energy use in buildings for many types of commercial buildings is operating hours. Table J-5 can be used to account for the impact of different operational shifts when benchmarking a building to the Standard 100 targets. Recent analysis shows that this table is directly applicable to the equivalent source-energy-based targets provided in Table J-7.

Derivation of schedule multipliers began with a graphic, histogram-based inspection of the weekly operating hours of all CBECS observations by building type (the national sample). From these, three dominant weekly operating hours categories emerged: (1) 50 or fewer weekly operating hours, (2) 168 operating hours, and (3) between 50 and 168 operating hours. Based on these, median national EUIs for the CBECS observations in each of these three operational categories were calculated by building type. These were then divided by the CBECS national medians by building type (for all operational categories) to derive ratios for shift multipliers by building type. The resulting shift multipliers are summarized in Table J-5.

BUILDING ENERGY USE TARGETS BY FUEL TYPE

To develop targets by individual fuel type, representative energy use fractions (median values) by energy type and climate zone were derived from the parsed data. These fractions were then multiplied by the total energy targets in Table 7-2 to produce the analogous zonal building efficiency targets by fuel type shown in Tables J-8 and J-9.

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TABLE J-1 Ratios of Climate Zonal EUI to Average of All EUIs by Building Type

ASHRAE Climate Zone:	1A	2A	2B	3A	3B Coast	3B Other	3C	4A	4B	4C	5A	5B	6A	6B	7	8
Building Type	**Climate Zone EUI Ratio**															
All office	0.91	0.94	0.91	0.97	0.76	0.90	0.78	1.06	0.92	0.94	1.12	0.97	1.25	1.10	1.35	1.89
Large office	0.88	0.95	0.88	0.98	0.80	0.89	0.81	1.07	0.88	0.98	1.07	0.91	1.15	1.01	1.21	1.63
Medium office	0.98	0.97	0.98	0.97	0.78	0.93	0.77	1.05	0.91	0.93	1.11	0.96	1.24	1.09	1.33	1.86
Small office	0.87	0.90	0.89	0.95	0.71	0.89	0.75	1.06	0.96	0.91	1.19	1.06	1.36	1.21	1.50	2.17
Warehouse	0.52	0.66	0.69	0.84	0.45	0.75	0.61	1.13	0.95	0.92	1.50	1.26	2.07	1.70	2.53	4.75
Stand-alone retail	0.85	0.87	0.85	0.91	0.65	0.83	0.73	1.03	0.90	0.90	1.17	1.01	1.35	1.20	1.50	2.16
Strip mall	0.89	0.89	0.87	0.94	0.69	0.86	0.77	1.08	0.94	0.96	1.24	1.06	1.43	1.27	1.60	2.29
Primary school	0.98	0.97	0.93	0.97	0.79	0.90	0.83	1.06	0.93	0.94	1.10	0.96	1.20	1.06	1.27	1.87
Secondary school	0.91	0.90	0.89	0.92	0.66	0.86	0.74	1.06	0.88	0.95	1.15	0.96	1.33	1.14	1.46	2.16
Supermarket	0.83	0.90	0.84	0.94	0.78	0.86	0.87	1.02	0.92	0.97	1.10	1.00	1.19	1.10	1.29	1.62
Fast food	0.89	0.91	0.90	0.95	0.81	0.91	0.86	1.04	0.96	0.97	1.13	1.03	1.24	1.14	1.34	1.70
Restaurant	0.88	0.91	0.88	0.94	0.79	0.89	0.86	1.04	0.95	0.97	1.12	1.02	1.22	1.13	1.33	1.68
Hospital	1.02	1.03	1.00	1.01	0.96	0.99	0.94	1.03	0.92	0.97	1.00	0.91	1.02	0.94	1.03	1.19
Outpatient heath care	1.08	1.04	1.05	1.03	0.97	1.03	0.86	1.02	0.98	0.91	0.98	0.96	1.00	0.97	0.99	1.12
Motel	1.07	1.01	1.01	0.98	0.92	0.97	0.90	1.00	0.96	0.92	1.02	0.97	1.08	1.01	1.10	1.32
Hotel	0.93	0.96	0.91	0.97	0.88	0.92	0.91	1.03	0.98	0.99	1.08	1.03	1.15	1.11	1.22	1.41
Midrise apartment	0.78	0.82	0.82	0.92	0.61	0.84	0.78	1.12	0.93	1.04	1.27	1.07	1.45	1.28	1.65	2.30

Note: The "All Office" category was calculated from the large, medium, and small office numbers.

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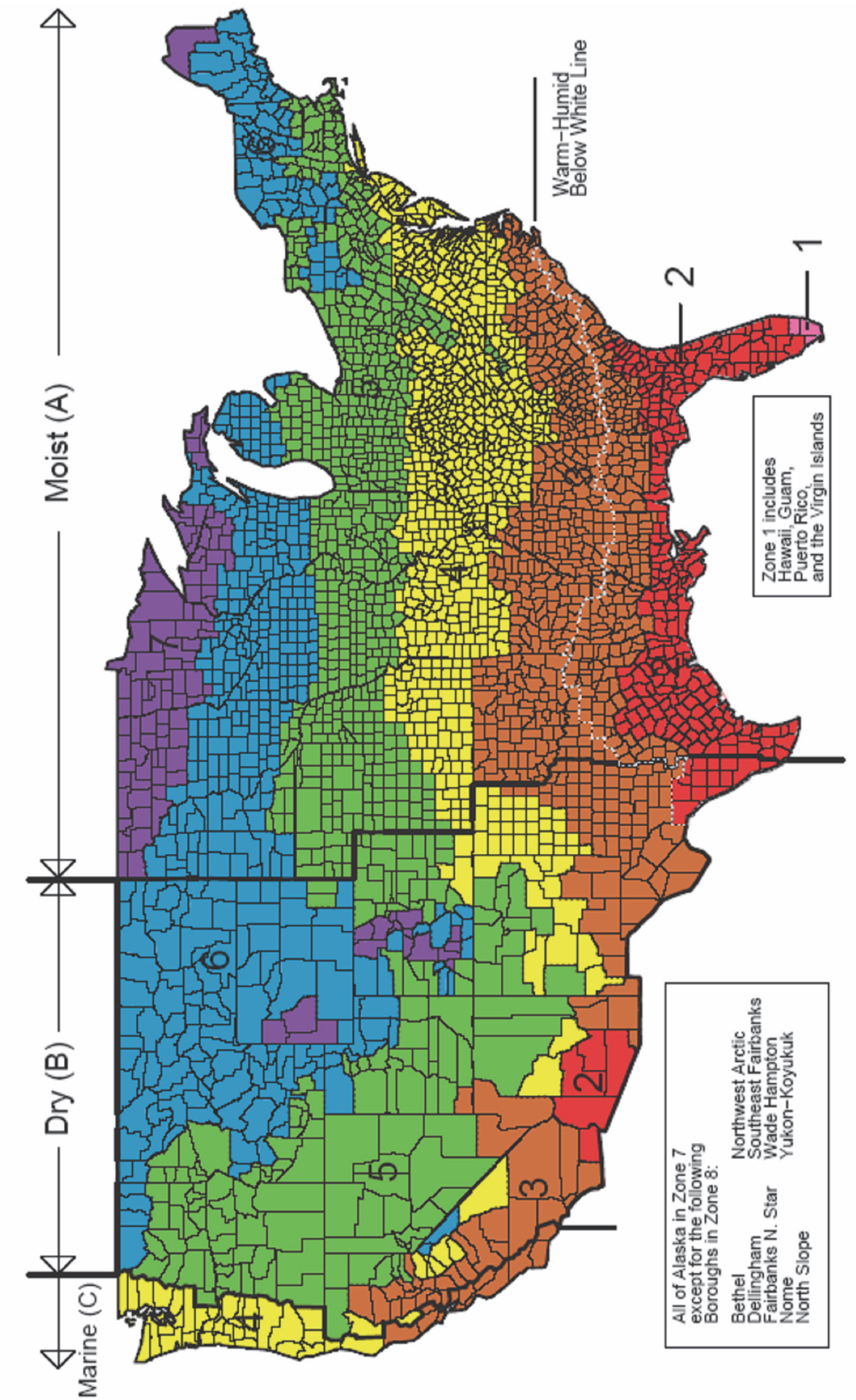

FIGURE J-1 U.S. climate zone map (ASHRAE Transactions, Briggs et al., 2003).

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TABLE J-2 ASHRAE U.S. Climate Zones

Zone	Thermal Criteria	Representative U.S. City
1A	5000 < CDD10°C	Miami
2A	3500 < CDD10°C ≤ 5000	Houston
2B	3500 < CDD10°C ≤ 5000	Phoenix
3A	2500 < CDD10°C ≤ 3500	Atlanta
3B—Coast	2500 < CDD10°C ≤ 3500	Los Angles
3B—Other	2500 < CDD10°C ≤ 3500	Las Vegas
3C	HDD18°C ≤ 2000	San Francisco
4A	CDD10°C ≤ 2500 and HDD18°C ≤ 3000	Baltimore
4B	CDD10°C ≤ 2500 and HDD18°C ≤ 3000	Albuquerque
4C	2000 < HDD18°C ≤ 3000	Seattle
5A	3000 < HDD18°C ≤ 4000	Chicago
5B	3000 < HDD18°C ≤ 4000	Denver
6A	4000 < HDD18°C ≤ 5000	Minneapolis
6B	4000 < HDD18°C ≤ 5000	Helena
7	5000 < HDD18°C ≤ 7000	Duluth
8	7000 < HDD18°C	Fairbanks

Notes:
1. Climate zones are more fully described in the references (Briggs, et al.; Deru, et al.).
2. Representative cities were used for simulation modeling.

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TABLE J-3 CBE CS/RECS Total Site-Based Energy-Use Intensities[1]

		EUIs by Building Type by Climate Zone (kBtu/sf-yr)																
		ASHRAE Climate Zone																
Building Category	Commercial Building Type	1A	2A	2B	3A	3B-Coast	3B-Other	3C	4A	4B	4C	5A	5B	5C[2]	6A	6B	7	8
Education	College/university	88	88	86	89	64	83	72	103	86	92	112	93	93	129	111	142	210
Education	Elementary/middle school	54	53	51	53	43	50	46	58	51	52	60	53	50	66	58	70	103
Education	High school	64	64	63	65	47	61	53	75	63	67	81	68	68	94	81	103	153
Education	Other classroom education	36	36	35	36	26	34	29	42	35	38	46	38	38	53	45	58	86
Education	Preschool/daycare	70	68	66	69	56	64	59	75	66	66	78	68	65	85	75	90	133
Enclosed mall	Enclosed mall	80	80	78	84	62	77	69	97	84	86	111	95	97	128	114	144	206
Food Sales	Convenience store	192	208	193	217	181	198	202	237	214	224	255	231	239	276	256	298	376
Food Sales	Convenience store with gas	155	168	156	175	146	160	163	191	172	181	205	186	192	223	206	240	303
Food Sales	Grocery/food market	160	174	161	181	151	165	168	197	178	187	212	192	199	230	213	248	313
Food Sales	Other food sales	48	53	49	55	46	50	51	60	54	57	64	58	60	70	64	75	95
Food Service	Fast food	374	383	375	396	339	379	361	436	400	405	474	430	422	519	476	561	710
Food Service	Other food service	110	113	110	117	98	111	107	129	118	122	140	127	129	153	141	166	209
Food Service	Restaurant/cafeteria	202	208	201	215	180	204	196	237	216	222	256	232	237	279	258	304	383
Inpatient Health Care	Hospital/inpatient health	202	204	200	201	191	197	186	205	184	193	198	180	192	203	186	205	237
Laboratory	Laboratory	255	252	244	250	210	236	227	277	247	255	299	267	258	331	302	356	473
Lodging	Dormitory/fraternity/sorority	57	61	60	68	45	62	57	83	69	77	94	79	74	107	95	122	170
Lodging	Hotel	71	72	69	74	67	70	69	78	74	75	82	78	75	87	84	92	107
Lodging	Motel or inn	79	75	75	73	68	72	66	74	71	68	75	72	70	80	75	82	98
Lodging	Other lodging	76	72	71	70	65	69	63	70	68	65	72	69	67	76	71	78	94
Nursing	Nursing home/assisted living	120	119	115	118	99	111	107	130	117	120	141	126	122	156	142	168	223
Office	Admin/professional office	56	57	56	59	47	55	48	65	56	58	69	60	56	77	67	83	116
Office	Bank/other financial	79	81	80	84	66	79	68	92	80	82	98	85	80	109	96	117	164
Office	Government office	69	72	70	74	58	69	59	81	70	72	86	74	70	95	84	103	144
Office	Medical office (non-diagnostic)	47	49	48	51	40	47	41	55	48	49	59	51	48	65	57	70	99
Office	Mixed-use office	64	66	65	69	54	64	55	75	65	67	80	69	65	88	78	96	134
Office	Other office	54	55	54	57	45	53	46	63	55	56	66	58	54	74	65	80	112
Outpatient Health Care	Clinic/other outpatient health	72	69	70	69	64	69	57	68	65	60	65	64	60	67	65	66	75
Outpatient Health Care	Medical office (diagnostic)	48	46	46	46	43	46	38	45	43	40	43	42	40	44	43	44	50
Public Assembly	Entertainment/culture	33	33	32	33	27	31	30	36	32	33	39	35	34	43	39	46	62
Public Assembly	Library	88	87	84	86	72	81	78	95	85	88	103	92	89	114	104	122	163
Public Assembly	Other public assembly	40	40	39	40	33	37	36	44	39	40	47	42	41	52	48	56	75
Public Assembly	Recreation	38	37	36	37	31	35	34	41	37	38	44	40	38	49	45	53	70
Public Assembly	Social/meeting	39	39	38	39	32	36	35	43	38	39	46	41	40	51	47	55	73
Public Order & Safety	Fire/police station	94	93	90	92	77	87	84	102	91	94	110	98	95	122	111	131	174
Public Order & Safety	Other public order and safety	85	84	82	84	70	79	76	93	83	86	100	90	87	111	101	119	159
Religious Worship	Religious worship	33	33	32	33	28	31	30	36	33	34	39	35	34	44	40	47	62
Retail (except malls)	Other retail	70	71	70	75	53	68	60	85	74	74	96	83	82	111	98	123	177
Retail (except malls)	Retail store	40	41	40	43	31	39	35	49	42	42	55	48	47	64	56	71	102
Retail (except malls)	Vehicle dealership/showroom	70	72	70	75	54	68	60	85	74	74	97	83	82	111	99	124	178
Service	Other service	86	85	82	85	71	80	77	94	84	86	101	90	87	112	102	120	160
Service	Post office/postal center	61	60	58	60	50	56	54	66	59	61	71	64	62	79	72	85	113
Service	Repair shop	41	40	39	40	33	38	36	44	39	41	48	43	41	53	48	57	75
Service	Vehicle service/repair shop	47	47	45	46	39	44	42	51	46	47	55	49	48	61	56	66	87
Service	Vehicle storage/maintenance	20	20	20	20	17	19	18	22	20	21	24	21	21	27	24	29	38
Strip Shopping Mall	Strip shopping mall	84	84	82	89	65	81	73	102	88	91	117	100	102	135	120	151	216
Warehouse	Distribution/shipping center	18	22	24	28	15	25	21	38	32	31	51	43	34	70	58	86	161
Warehouse	Non-refrigerated warehouse	8	11	11	14	7	12	10	19	16	15	25	21	16	34	28	41	78
Warehouse	Refrigerated warehouse	99	97	94	97	81	91	88	107	96	99	116	103	100	128	117	138	183
Residential	Apartment (in 2-4 unit building)	68	72	71	80	53	73	68	97	81	91	110	93	87	126	112	144	201
Residential	Apartment (in 5+ unit building)	46	49	48	54	36	50	46	66	55	62	75	63	59	86	76	98	136
Residential	Mobile/manufactured home	54	57	57	64	42	58	54	78	65	73	88	74	70	101	89	115	160
Residential	Single-family attached	46	49	49	54	36	50	46	66	55	62	75	63	59	86	76	98	137
Residential	Single-family detached	40	42	42	47	31	43	40	58	48	54	65	55	52	75	66	85	119

[1] Based on U.S. DOE/EIA Commercial Building and Residential Energy Consumption Surveys (CBECS 2003 and RECS 2005).

[2] Zone 5C values based on U.S. building stock (a Canadian building sample was not available at the time of table development).

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TABLE J-4 Energy-Use Intensity Targets

		EUIs by Building Type by Climate Zone (kBtu/sf-yr)															
		ASHRAE Climate Zone															
No.	Commercial Building Type	1A	2A	2B	3A	3B	3B	3C	4A	4B	4C	5A	5B	6A	6B	7	8
1	Admin/professional office	39	40	39	42	33	39	33	46	40	40	48	42	54	47	58	81
2	Bank/other financial	55	57	56	59	46	55	47	65	56	57	68	59	76	67	82	115
3	Government office	49	50	49	52	41	48	42	57	49	50	60	52	67	59	72	101
4	Medical office (non-diag)	33	34	33	35	28	33	28	39	34	34	41	36	46	40	49	69
5	Mixed-use office	45	46	45	48	38	45	39	53	46	47	56	48	62	55	67	94
6	Other office	38	39	38	40	32	37	32	44	38	39	47	40	52	46	56	78
7	Laboratory	178	176	171	175	147	165	159	194	173	179	209	187	232	211	249	331
8	Distribution/ship center	12	16	16	20	11	18	14	27	23	22	36	30	49	40	60	113
9	Non-refrig warehouse	6	8	8	10	5	9	7	13	11	11	17	14	24	19	29	54
10	Convenience store	135	146	135	152	127	139	141	166	150	157	178	162	193	179	208	263
11	Convenience store+gas	108	118	109	122	102	112	114	133	121	126	144	130	156	144	168	212
12	Grocery/food market	112	122	113	127	106	116	118	138	125	131	149	135	161	149	174	219
13	Other food sales	34	37	34	38	32	35	36	42	38	40	45	41	49	45	53	66
14	Fire/police station	66	65	63	64	54	61	59	71	64	66	77	69	85	78	92	122
15	Other public order/safety	60	59	57	59	49	55	53	65	58	60	70	63	78	71	84	111
16	Medical office (diagnostic)	33	32	32	32	30	32	27	32	30	28	30	30	31	30	31	35
17	Clinic/other outpatient health	50	48	49	48	45	48	40	48	46	42	46	45	47	45	46	52
18	Refrigerated warehouse	69	68	66	68	57	64	62	75	67	69	81	72	90	82	96	128
19	Religious worship	23	23	22	23	19	22	21	25	23	23	27	25	30	28	33	43
20	Entertainment/culture	23	23	22	23	19	21	21	25	23	23	27	24	30	28	32	43
21	Library	61	61	59	60	50	57	55	67	60	61	72	64	80	73	86	114
22	Recreation	26	26	25	26	22	24	24	29	26	26	31	28	34	31	37	49
23	Social/meeting	28	27	26	27	23	26	25	30	27	28	32	29	36	33	39	51
24	Other public assembly	28	28	27	28	23	26	25	31	27	28	33	30	37	33	39	52
25	College/university	62	61	60	62	45	58	50	72	60	65	78	65	90	78	99	147
26	Elementary/middle school	38	37	36	37	30	35	32	41	36	36	42	37	46	41	49	72
27	High school	45	45	44	46	33	42	37	52	44	47	57	48	66	57	72	107
28	Preschool/daycare	49	48	46	48	39	45	41	52	46	47	54	47	60	53	63	93
29	Other classroom education	25	25	25	25	18	24	21	29	25	26	32	27	37	32	40	60
30	Fast food	261	268	263	277	237	266	253	305	280	284	332	301	364	333	393	497
31	Restaurant/cafeteria	141	145	141	150	126	143	137	166	151	156	179	163	195	181	213	268
32	Other food service	77	79	77	82	69	78	75	91	83	85	98	89	107	99	116	146
33	Hospital/inpatient health	142	143	140	141	134	138	130	143	129	135	139	126	142	130	144	166
34	Nursing home/assisted living	84	83	81	83	69	78	75	91	82	84	99	88	109	100	118	156
35	Dormitory/fraternity/sorority	40	43	42	47	31	43	40	58	48	54	65	55	75	66	85	119
36	Hotel	50	51	48	52	47	49	48	55	52	52	57	55	61	59	65	75
37	Motel or inn	55	53	52	51	48	50	46	52	50	48	53	50	56	52	57	69
38	Other lodging	53	50	50	49	46	48	44	49	48	46	50	48	53	50	55	66
39	Vehicle dealership/showroom	49	50	49	53	38	48	42	60	52	52	68	58	78	69	87	124
40	Retail store	28	29	28	30	21	27	24	34	30	30	39	33	45	40	50	71
41	Other retail	49	50	49	52	37	48	42	59	52	52	67	58	78	69	86	124
42	Post office/postal center	43	42	41	42	35	39	38	46	41	43	50	45	56	51	60	79
43	Repair shop	28	28	27	28	23	26	25	31	28	28	33	30	37	34	40	53
44	Vehicle service/repair shop	33	33	32	32	27	31	29	36	32	33	39	35	43	39	46	61
45	Vehicle storage/maintenance	14	14	14	14	12	13	13	16	14	14	17	15	19	17	20	27
46	Other service	60	60	58	59	50	56	54	65	59	60	71	63	78	71	84	112
47	Strip shopping mall	59	59	58	62	46	57	51	71	62	63	82	70	94	84	106	151
48	Enclosed mall	56	56	55	59	44	54	49	68	59	60	78	67	90	80	101	144
		ASHRAE Climate Zone															
	Residential Building Type	1A	2A	2B	3A	3B	3B	3C	4A	4B	4C	5A	5B	6A	6B	7	8
49	Mobile home	38	40	40	45	30	41	38	54	45	51	62	52	71	62	80	112
50	SF-detached	28	30	30	33	22	30	28	40	34	38	46	38	52	46	60	83
51	SF-attached	32	34	34	38	25	35	32	46	39	43	53	44	60	53	69	96
52	Apartment building (2-4 units)	47	50	50	56	37	51	47	68	57	64	77	65	89	78	101	140
53	Apartment building (5+ units)	32	34	34	38	25	35	32	46	39	43	53	44	60	53	68	96

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TABLE J-5 Operating Shift Multipliers

Operating Shift Multipliers					Operating Shift Multipliers				
		Weekly Hours					Weekly Hours		
No.	Building Activity/Type	50 or less	51 to 167	168	No.	Building Activity/Type	50 or less	51 to 167	168
1	Admin/professional office	1.0	1.0	1.4	28	Preschool/daycare	0.8	1.3	1.3
2	Bank/other financial	1.0	1.0	1.4	29	Other classroom education	0.8	1.3	1.3
3	Government office	1.0	1.0	1.4	30	Fast food	0.4	1.1	2.1
4	Medical office (non-diag)	1.0	1.0	1.4	31	Restaurant/cafeteria	0.4	1.1	2.1
5	Mixed-use office	1.0	1.0	1.4	32	Other food service	0.4	1.1	2.1
6	Other office	1.0	1.0	1.4	33	Hospital/inpatient health	1.0	1.0	1.0
7	Laboratory	1.0	1.0	1.0	34	Nursing home/assisted living	1.0	1.0	1.0
8	Distribution/ship center	0.7	1.4	2.1	35	Dormitory/fraternity/sorority	1.0	1.0	1.0
9	Non-refrig warehouse	0.7	1.4	2.1	36	Hotel	1.0	1.0	1.0
10	Convenience store	1.0	1.0	1.4	37	Motel or inn	1.0	1.0	1.0
11	Convenience store+gas	1.0	1.0	1.4	38	Other lodging	1.0	1.0	1.0
12	Grocery/food market	1.0	1.0	1.4	39	Vehicle dealership/showroom	0.8	1.2	1.8
13	Other food sales	1.0	1.0	1.4	40	Retail store	0.8	1.2	1.8
14	Fire/police station	0.8	0.8	1.1	41	Other retail	0.8	1.2	1.8
15	Other public order/safety	0.8	0.8	1.1	42	Post office/postal center	0.7	1.5	1.5
16	Medical office (diagnostic)	1.0	1.0	1.5	43	Repair shop	0.7	1.5	1.5
17	Clinic/other outpatient health	1.0	1.0	1.5	44	Vehicle service/repair shop	0.7	1.5	1.5
18	Refrigerated warehouse	1.0	1.0	1.0	45	Vehicle storage/maintenance	0.7	1.5	1.5
19	Religious worship	0.9	1.7	1.7	46	Other service	0.7	1.5	1.5
20	Entertainment/culture	0.8	1.5	1.5	47	Strip shopping mall	1.0	1.0	1.0
21	Library	0.8	1.5	1.5	48	Enclosed mall	1.0	1.0	1.0
22	Recreation	0.8	1.5	1.5	Residential Building Activity/Type				
23	Social/meeting	0.8	1.5	1.5	49	Mobile home	1.0	1.0	1.0
24	Other public assembly	0.8	1.5	1.5	50	SF-detached	1.0	1.0	1.0
25	College/university	0.8	1.3	1.3	51	SF-attached	1.0	1.0	1.0
26	Elementary/middle school	0.8	1.3	1.3	52	Apartment building (2-4 units)	1.0	1.0	1.0
27	High school	0.8	1.3	1.3	53	Apartment building (5+ units)	1.0	1.0	1.0

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TABLE J-6 Building Total Energy Use Targets (Site Energy)

Energy Use Targets by Building Activity (EUI) (I-P Units)[1]																		
No.	Commercial Building Type	EUIs by Building Type by Climate Zone (kBtu/ft^2-yr)																
		ASHRAE Climate Zone																
		1A	2A	2B	3A	3B Coast	3B Other	3C	4A	4B	4C	5A	5B	5C[2]	6A	6B	7	8
1	Admin/professional office	39	40	39	42	33	39	33	46	40	40	48	42	39	54	47	58	81
2	Bank/other financial	55	57	56	59	46	55	47	65	56	57	68	59	56	76	67	82	115
3	Government office	49	50	49	52	41	48	42	57	49	50	60	52	49	67	59	72	101
4	Medical office(non-diagnostic)	33	34	33	35	28	33	28	39	34	34	41	36	33	46	40	49	69
5	Mixed-use office	45	46	45	48	38	45	39	53	46	47	56	48	45	62	55	67	94
6	Other office	38	39	38	40	32	37	32	44	38	39	47	40	38	52	46	56	78
7	Laboratory	178	176	171	175	147	165	159	194	173	179	209	187	181	232	211	249	331
8	Distribution/shipping center	12	16	16	20	11	18	14	27	23	22	36	30	24	49	40	60	113
9	Nonrefrigerated warehouse	6	8	8	10	5	9	7	13	11	11	17	14	12	24	19	29	54
10	Convenience store	135	146	135	152	127	139	141	166	150	157	178	162	167	193	179	208	263
11	Convenience store with gas	108	118	109	122	102	112	114	133	121	126	144	130	135	156	144	168	212
12	Grocery store/food market	112	122	113	127	106	116	118	138	125	131	149	135	139	161	149	174	219
13	Other food sales	34	37	34	38	32	35	36	42	38	40	45	41	42	49	45	53	66
14	Fire station/police station	66	65	63	64	54	61	59	71	64	66	77	69	67	85	78	92	122
15	Other public order and safety	60	59	57	59	49	55	53	65	58	60	70	63	61	78	71	84	111
16	Medical office (diagnostic)	33	32	32	32	30	32	27	32	30	28	30	30	28	31	30	31	35
17	Clinic/other outpatient health	50	48	49	48	45	48	40	48	46	42	46	45	42	47	45	46	52
18	Refrigerated warehouse	69	68	66	68	57	64	62	75	67	69	81	72	70	90	82	96	128
19	Religious worship	23	23	22	23	19	22	21	25	23	23	27	25	24	30	28	33	43
20	Entertainment/culture	23	23	22	23	19	21	21	25	23	23	27	24	24	30	28	32	43
21	Library	61	61	59	60	50	57	55	67	60	61	72	64	62	80	73	86	114
22	Recreation	26	26	25	26	22	24	24	29	26	26	31	28	27	34	31	37	49
23	Social/meeting	28	27	26	27	23	26	25	30	27	28	32	29	28	36	33	39	51
24	Other public assembly	28	28	27	28	23	26	25	31	27	28	33	30	29	37	33	39	52
25	College/university	62	61	60	62	45	58	50	72	60	65	78	65	65	90	78	99	147
26	Elementary/middle school	38	37	36	37	30	35	32	41	36	36	42	37	35	46	41	49	72
27	High school	45	45	44	46	33	42	37	52	44	47	57	48	47	66	57	72	107
28	Preschool/daycare	49	48	46	48	39	45	41	52	46	47	54	47	46	60	53	63	93
29	Other classroom education	25	25	25	25	18	24	21	29	25	26	32	27	27	37	32	40	60
30	Fast food	261	268	263	277	237	266	253	305	280	284	332	301	295	364	333	393	497
31	Restaurant/cafeteria	141	145	141	150	126	143	137	166	151	156	179	163	166	195	181	213	268
32	Other food service	77	79	77	82	69	78	75	91	83	85	98	89	91	107	99	116	146
33	Hospital/inpatient health	142	143	140	141	134	138	130	143	129	135	139	126	135	142	130	144	166
34	Nursing home/assisted living	84	83	81	83	69	78	75	91	82	84	99	88	85	109	100	118	156
35	Dormitory/fraternity/sorority	40	43	42	47	31	43	40	58	48	54	65	55	52	75	66	85	119
36	Hotel	50	51	48	52	47	49	48	55	52	52	57	55	53	61	59	65	75
37	Motel or inn	55	53	52	51	48	50	46	52	50	48	53	50	49	56	52	57	69
38	Other lodging	53	50	50	49	46	48	44	49	48	46	50	48	47	53	50	55	66
39	Vehicle dealership/showroom	49	50	49	53	38	48	42	60	52	52	68	58	58	78	69	87	124
40	Retail store	28	29	28	30	21	27	24	34	30	30	39	33	33	45	40	50	71
41	Other retail	49	50	49	52	37	48	42	59	52	52	67	58	57	78	69	86	124
42	Post office/postal center	43	42	41	42	35	39	38	46	41	43	50	45	43	56	51	60	79
43	Repair shop	28	28	27	28	23	26	25	31	28	28	33	30	29	37	34	40	53
44	Vehicle service/repair shop	33	33	32	32	27	31	29	36	32	33	39	35	33	43	39	46	61
45	Vehicle storage/maintenance	14	14	14	14	12	13	13	16	14	14	17	15	15	19	17	20	27
46	Other service	60	60	58	59	50	56	54	65	59	60	71	63	61	78	71	84	112
47	Strip shopping mall	59	59	58	62	46	57	51	71	62	63	82	70	71	94	84	106	151
48	Enclosed mall	56	56	55	59	44	54	49	68	59	60	78	67	68	90	80	101	144
49	Mobile home	38	40	40	45	30	41	38	54	45	51	62	52	49	71	62	80	112
50	SF-detached	28	30	30	33	22	30	28	40	34	38	46	38	36	52	46	60	83
51	SF-attached	32	34	34	38	25	35	32	46	39	43	53	44	42	60	53	69	96
52	Aptmt-in 2-4 unit	47	50	50	56	37	51	47	68	57	64	77	65	61	89	78	101	140
53	Aptmt in 5+ unit	32	34	34	38	25	35	32	46	39	43	53	44	42	60	53	68	96

[1] Based on U.S. DOE/EIA Commercial Buildings and Residential Energy Consumption Surveys (CBECS 2003 and RECS 2005).

[2] Zone 5C values based on U.S. building stock (A Canadian building sample was not available at the time of table development.)

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TABLE J-7 Building Total Energy Use Targets (Source Energy)

Energy Use Targets by Building Activity (EUI) (I-P Units)[1]																		
No.	Commercial Building Type	EUIs by Building Type by Climate Zone (source kBtu/ft^2-yr)																
		ASHRAE Climate Zone																
		1A	2A	2B	3A	3B Coast	3B Other	3C	4A	4B	4C	5A	5B	5C[2]	6A	6B	7	8
1	Admin/professional office	123	127	113	130	95	112	93	109	91	118	91	90	91	101	94	109	152
2	Bank/other financial	174	180	161	185	134	159	133	155	129	167	129	128	131	143	134	154	216
3	Government office	153	158	142	162	118	140	117	136	113	147	113	113	115	126	117	136	190
4	Medical office(non-diagnostic)	105	108	97	111	81	95	80	93	77	100	77	77	77	86	80	93	130
5	Mixed-use office	142	146	131	151	110	130	108	126	105	136	105	104	105	116	109	126	176
6	Other office	119	122	110	126	91	108	90	105	87	114	88	87	89	97	91	105	147
7	Laboratory	561	555	493	548	425	477	446	463	397	522	394	404	424	436	421	468	622
8	Distribution/shipping center	39	49	48	62	31	51	40	64	52	64	67	65	56	92	80	113	212
9	Nonrefrigerated warehouse	19	24	23	30	15	25	19	31	25	31	32	31	28	45	39	55	102
10	Convenience store	424	460	391	476	367	401	396	396	343	458	337	349	391	364	357	392	494
11	Convenience store with gas	341	370	315	384	296	323	319	319	276	369	271	281	316	293	287	316	398
12	Grocery store/food market	353	383	326	397	306	334	330	330	286	382	281	291	325	303	297	326	412
13	Other food sales	107	116	99	120	93	101	100	100	87	116	85	88	98	92	90	99	125
14	Fire station/police station	207	204	182	202	156	176	164	170	146	192	145	149	157	160	155	172	229
15	Other public order and safety	188	186	166	184	142	160	150	155	133	175	132	136	143	146	141	157	209
16	Medical office (diagnostic)	105	102	94	100	87	93	75	76	70	82	57	64	66	58	60	58	66
17	Clinic/other outpatient health	158	152	141	150	130	139	112	114	105	123	86	96	98	88	90	86	98
18	Refrigerated warehouse	217	215	191	212	164	185	173	179	154	202	153	156	164	169	163	181	241
19	Religious worship	74	73	65	72	56	63	59	61	52	69	52	53	56	57	55	62	82
20	Entertainment/culture	73	72	64	71	55	62	58	60	52	68	51	53	56	57	55	61	81
21	Library	193	191	170	188	146	164	153	159	137	179	136	139	145	150	145	161	214
22	Recreation	83	82	73	81	63	71	66	69	59	77	58	60	63	65	62	69	92
23	Social/meeting	87	86	76	85	66	74	69	72	61	81	61	62	66	67	65	72	96
24	Other public assembly	89	88	78	87	67	76	71	73	63	83	62	64	68	69	67	74	99
25	College/university	194	193	175	196	130	169	142	175	141	190	154	145	156	177	160	194	288
26	Elementary/middle school	119	117	104	117	88	101	90	97	82	105	80	79	82	87	82	92	135
27	High school	142	141	127	143	95	123	103	125	100	138	108	103	110	124	113	136	201
28	Preschool/daycare	153	151	134	151	113	130	115	125	106	136	103	102	108	112	105	119	175
29	Other classroom education	79	79	71	80	53	69	58	70	56	77	60	57	63	69	63	76	113
30	Fast food	824	844	759	868	685	768	708	730	642	828	626	650	691	683	664	739	934
31	Restaurant/cafeteria	445	458	407	471	364	412	384	396	347	455	338	351	389	367	360	400	504
32	Other food service	243	250	222	258	199	225	210	216	190	248	185	192	213	201	197	219	275
33	Hospital/inpatient health	446	450	405	442	386	399	365	343	295	394	262	273	316	267	260	270	311
34	Nursing home/assisted living	265	262	233	259	200	225	210	218	187	246	186	191	199	206	199	221	294
35	Dormitory/fraternity/sorority	127	134	122	148	91	125	112	138	111	158	123	119	122	141	132	160	224
36	Hotel	156	160	140	161	135	141	135	131	119	153	108	118	124	115	117	122	141
37	Motel or inn	175	166	151	160	138	146	130	123	114	140	100	109	115	105	104	108	129
38	Other lodging	167	158	145	152	132	139	124	118	109	133	95	104	110	100	100	103	123
39	Vehicle dealership/show room	154	158	141	165	109	138	118	142	119	151	128	126	136	147	138	163	234
40	Retail store	88	90	81	94	62	79	68	82	68	87	73	72	77	84	79	93	134
41	Other retail	154	157	141	164	108	137	118	142	118	151	127	126	133	146	137	162	233
42	Post office/postal center	134	133	118	131	102	114	107	111	95	125	94	97	101	104	101	112	149
43	Repair shop	90	89	79	87	68	76	71	74	63	83	63	64	68	70	67	75	99
44	Vehicle service/repair shop	104	103	91	101	79	88	82	86	73	97	73	75	77	81	78	87	115
45	Vehicle storage/maintenance	45	45	40	44	34	38	36	37	32	42	32	32	35	35	34	38	50
46	Other service	190	188	167	185	144	161	151	157	134	176	133	137	143	147	142	158	210
47	Strip shopping mall	186	185	167	194	132	165	143	171	142	185	154	152	166	177	167	199	284
48	Enclosed mall	177	176	159	185	126	157	136	163	135	176	147	144	159	169	159	189	270
49	Mobile home	119	126	115	139	86	118	106	130	104	148	116	112	115	133	124	151	210
50	SF-detached	89	94	85	104	64	88	79	96	77	110	86	83	84	98	92	112	156
51	SF-attached	102	108	98	119	73	101	90	111	89	127	99	96	98	113	106	129	180
52	Aptmt-in 2-4 unit	150	158	144	175	107	148	133	163	131	186	146	141	143	166	156	189	264
53	Aptmt in 5+ unit	102	108	98	119	73	101	90	111	89	126	99	96	98	113	106	129	180

[1] Based on U.S. DOE/EIA Commercial Buildings and Residential Energy Consumption Surveys (CBECS 2003 and RECS 2005).

[2] Zone 5C values based on U.S. building stock (A Canadian building sample was not available at the time of table development.)

Note: Site to source multipliers used to create Table 2: electricity- 3.15 kBtu source/kWh site; fossil fuel- 1.09 kBtu source/kBtu site, except for College/University buildings where fossil fuel- 1.22 kBtu source/kBtu site was used (since often on district heating systems).

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TABLE J-8 Building Electricity Use Targets

Energy Use Targets by Building Activity (EUI) (I-P Units)[1]																		
No.	Commercial Building Type	Electric EUIs by Building Type by Climate Zone (kBtu/ft^2-yr)																
		ASHRAE Climate Zone																
		1A	2A	2B	3A	3B Coas	3B Othe	3C	4A	4B	4C	5A	5B	5C[2]	6A	6B	7	8
1	Admin/professional office	39	40	34	41	29	34	28	29	23	36	19	22	24	21	21	22	31
2	Bank/other financial	55	57	49	58	41	48	39	41	33	51	26	31	34	29	29	31	44
3	Government office	49	50	43	51	36	42	35	36	29	45	23	27	30	26	26	28	39
4	Medical office(non-diagnostic)	33	34	29	35	24	29	24	24	20	31	16	18	20	17	18	19	26
5	Mixed-use office	45	46	40	48	33	39	32	33	27	41	22	25	27	24	24	26	36
6	Other office	38	39	33	40	28	33	27	28	22	35	18	21	23	20	20	21	30
7	Laboratory	178	176	149	173	128	144	132	122	101	159	81	97	110	89	93	95	127
8	Distribution/shipping center	12	16	14	20	9	16	12	17	13	19	14	16	15	19	18	23	43
9	Nonrefrigerated warehouse	6	8	7	10	5	8	6	8	6	9	7	8	7	9	9	11	21
10	Convenience store	135	146	118	151	111	121	118	105	87	139	69	84	101	74	78	80	101
11	Convenience store with gas	108	118	95	121	89	98	95	84	70	112	56	68	82	60	63	64	81
12	Grocery store/food market	112	122	99	126	92	101	98	87	73	116	57	70	84	62	65	67	84
13	Other food sales	34	37	30	38	28	31	30	26	22	35	17	21	26	19	20	20	25
14	Fire station/police station	66	65	55	64	47	53	49	45	37	58	30	36	41	33	34	35	47
15	Other public order and safety	60	59	50	58	43	48	44	41	34	53	27	33	37	30	31	32	43
16	Medical office (diagnostic)	33	32	28	32	26	28	22	20	18	25	12	15	17	12	13	12	13
17	Clinic/other outpatient health	50	48	43	48	39	42	33	30	27	38	18	23	26	18	20	18	20
18	Refrigerated warehouse	69	68	58	67	50	56	51	47	39	61	31	38	43	34	36	37	49
19	Religious worship	23	23	20	23	17	19	17	16	13	21	11	13	15	12	12	13	17
20	Entertainment/culture	23	23	19	23	17	19	17	16	13	21	11	13	15	12	12	12	17
21	Library	61	61	51	60	44	50	45	42	35	55	28	33	38	31	32	33	44
22	Recreation	26	26	22	26	19	21	20	18	15	24	12	14	16	13	14	14	19
23	Social/meeting	28	27	23	27	20	22	20	19	16	25	12	15	17	14	14	15	20
24	Other public assembly	28	28	24	27	20	23	21	19	16	25	13	15	18	14	15	15	20
25	College/university	62	61	53	62	39	51	42	45	35	57	30	34	39	35	34	38	56
26	Elementary/middle school	38	37	31	37	27	30	27	26	21	32	16	19	21	18	18	19	28
27	High school	45	45	38	45	29	37	31	33	26	42	22	25	29	25	25	28	41
28	Preschool/daycare	49	48	40	48	34	39	34	33	27	41	21	25	28	23	23	24	36
29	Other classroom education	25	25	21	25	16	21	17	19	14	23	12	14	16	14	14	16	23
30	Fast food	261	268	230	275	207	232	210	193	163	252	128	156	179	139	146	151	191
31	Restaurant/cafeteria	141	145	123	149	110	125	114	105	88	138	69	84	101	75	79	82	103
32	Other food service	77	79	67	82	60	68	62	57	48	76	38	46	55	41	43	45	56
33	Hospital/inpatient health	142	143	122	140	117	121	108	90	75	120	54	66	82	55	57	55	64
34	Nursing home/assisted living	84	83	70	82	61	68	62	58	48	75	38	46	52	42	44	45	60
35	Dormitory/fraternity/sorority	40	43	37	47	28	38	33	36	28	48	25	29	32	29	29	33	46
36	Hotel	50	51	42	51	41	43	40	34	30	46	22	28	32	23	26	25	29
37	Motel or inn	55	53	46	50	42	44	39	33	29	42	20	26	30	21	23	22	26
38	Other lodging	53	50	44	48	40	42	37	31	28	41	20	25	29	20	22	21	25
39	Vehicle dealership/showroom	49	50	43	52	33	42	35	38	30	46	26	30	35	30	30	33	48
40	Retail store	28	29	24	30	19	24	20	22	17	26	15	17	20	17	17	19	27
41	Other retail	49	50	43	52	33	42	35	37	30	46	26	30	35	30	30	33	47
42	Post office/postal center	43	42	36	42	31	35	32	29	24	38	19	23	26	21	22	23	30
43	Repair shop	28	28	24	28	20	23	21	19	16	25	13	15	18	14	15	15	20
44	Vehicle service/repair shop	33	33	28	32	24	27	24	23	19	29	15	18	20	16	17	18	23
45	Vehicle storage/maintenance	14	14	12	14	10	12	11	10	8	13	6	8	9	7	7	8	10
46	Other service	60	60	50	59	43	49	45	41	34	54	27	33	37	30	31	32	43
47	Strip shopping mall	59	59	50	62	40	50	42	45	36	56	32	36	43	36	37	41	58
48	Enclosed mall	56	56	48	59	38	47	40	43	34	54	30	35	41	34	35	39	55
49	Mobile home	38	40	35	44	26	36	31	34	27	45	24	27	30	27	27	31	43
50	SF-detached	28	30	26	33	19	26	23	25	20	33	18	20	22	20	20	23	32
51	SF-attached	32	34	30	38	22	30	27	29	23	39	20	23	26	23	23	26	37
52	Aptmt-in 2-4 unit	47	50	44	55	32	45	39	43	33	57	30	34	37	34	34	39	54
53	Aptmt in 5+ unit	32	34	30	38	22	30	27	29	23	38	20	23	26	23	23	26	37

[1] Based on U.S. DOE/EIA Commercial Buildings and Residential Energy Consumption Surveys (CBECS 2003 and RECS 2005).

[2] Zone 5C values based on U.S. building stock (A Canadian building sample was not available at the time of table development.)

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TABLE J-9 Building Fossil Fuel Use Targets

Building Activity Electricity Targets (EUI) (I-P Units)[1]																		
No.	Commercial Building Type	Fossil Fuel EUIs by Building Type by Climate Zone (kBtu/ft^2-yr)																
		ASHRAE Climate Zone																
		1A	2A	2B	3A	3B Coast	3B Other	3C	4A	4B	4C	5A	5B	5C[2]	6A	6B	7	8
1	Admin/professional office	0	0	5	0.4	4	5	6	17	16	5	30	20	15	33	27	36	50
2	Bank/other financial	0	0	7	0.5	6	7	8	24	23	6	42	28	22	47	38	51	71
3	Government office	0	0	6	0.5	5	6	7	21	21	6	37	25	19	41	33	44	62
4	Medical office(non-diagnostic)	0	0	4	0.3	4	4	5	14	14	4	25	17	13	28	23	30	43
5	Mixed-use office	0	0	6	0.4	5	6	7	19	19	5	34	23	18	38	31	41	58
6	Other office	0	0	5	0.4	4	5	5	16	16	4	29	19	15	32	26	34	48
7	Laboratory	0	0	21	1.5	18	21	27	71	72	20	128	90	71	143	119	154	204
8	Distribution/shipping center	0	0	2	0.2	1	2	2	10	9	2	22	14	9	30	23	37	69
9	Nonrefrigerated warehouse	0	0	1	0.1	1	1	1	5	5	1	11	7	5	15	11	18	34
10	Convenience store	0	0	17	1.3	16	17	24	61	62	18	109	78	66	119	100	129	162
11	Convenience store with gas	0	0	14	1.1	13	14	19	49	50	14	88	63	53	96	81	104	131
12	Grocery store/food market	0	0	14	1.1	13	15	20	51	52	15	91	65	55	99	84	107	135
13	Other food sales	0	0	4	0.3	4	4	6	15	16	4	28	20	16	30	25	32	41
14	Fire station/police station	0	0	8	0.6	7	8	10	26	27	7	47	33	26	53	44	57	75
15	Other public order and safety	0	0	7	0.5	6	7	9	24	24	7	43	30	24	48	40	52	68
16	Medical office (diagnostic)	0	0	4	0.3	4	4	5	12	13	3	19	14	11	19	17	19	22
17	Clinic/other outpatient health	0	0	6	0.4	6	6	7	18	19	5	28	21	16	29	25	28	32
18	Refrigerated warehouse	0	0	8	0.6	7	8	10	28	28	8	50	35	27	55	46	59	79
19	Religious worship	0	0	3	0.2	2	3	4	9	9	3	17	12	9	19	16	20	27
20	Entertainment/culture	0	0	3	0.2	2	3	3	9	9	3	17	12	9	19	15	20	27
21	Library	0	0	7	0.5	6	7	9	25	25	7	44	31	24	49	41	53	70
22	Recreation	0	0	3	0.2	3	3	4	11	11	3	19	13	11	21	18	23	30
23	Social/meeting	0	0	3	0.2	3	3	4	11	11	3	20	14	11	22	18	24	32
24	Other public assembly	0	0	3	0.2	3	3	4	11	11	3	20	14	11	23	19	24	32
25	College/university	0	0	8	0.6	6	7	9	27	25	7	48	31	26	56	44	61	91
26	Elementary/middle school	0	0	5	0.3	4	4	5	15	15	4	26	18	14	28	23	30	44
27	High school	0	0	6	0.4	4	5	6	19	18	5	35	23	18	41	32	45	66
28	Preschool/daycare	0	0	6	0.4	5	6	7	19	19	5	33	23	18	37	30	39	57
29	Other classroom education	0	0	3	0.2	2	3	3	11	10	3	20	13	11	23	18	25	37
30	Fast food	0	0	33	2.4	30	33	43	113	117	32	203	145	116	224	187	242	306
31	Restaurant/cafeteria	0	0	18	1.3	16	18	23	61	63	17	110	78	65	121	101	131	165
32	Other food service	0	0	10	0.7	9	10	13	33	34	10	60	43	36	66	55	72	90
33	Hospital/inpatient health	0	0	18	1.2	17	17	22	53	54	15	85	61	53	88	73	89	102
34	Nursing home/assisted living	0	0	10	0.7	9	10	13	34	34	9	60	42	33	67	56	72	96
35	Dormitory/fraternity/sorority	0	0	5	0.4	4	5	7	21	20	6	40	26	20	46	37	53	73
36	Hotel	0	0	6	0.5	6	6	8	20	22	6	35	26	21	38	33	40	46
37	Motel or inn	0	0	7	0.5	6	6	8	19	21	5	32	24	19	34	29	35	42
38	Other lodging	0	0	6	0.4	6	6	7	18	20	5	31	23	18	33	28	34	40
39	Vehicle dealership/showroom	0	0	6	0.5	5	6	7	22	22	6	41	28	23	48	39	53	77
40	Retail store	0	0	4	0.3	3	3	4	13	12	3	24	16	13	28	22	31	44
41	Other retail	0	0	6	0.5	5	6	7	22	21	6	41	28	22	48	39	53	76
42	Post office/postal center	0	0	5	0.4	4	5	6	17	17	5	31	22	17	34	28	37	49
43	Repair shop	0	0	3	0.2	3	3	4	11	12	3	20	14	11	23	19	25	33
44	Vehicle service/repair shop	0	0	4	0.3	3	4	5	13	13	4	24	17	13	26	22	28	38
45	Vehicle storage/maintenance	0	0	2	0.1	1	2	2	6	6	2	10	7	6	11	10	12	16
46	Other service	0	0	7	0.5	6	7	9	24	24	7	43	30	24	48	40	52	69
47	Strip shopping mall	0	0	7	0.5	6	7	9	26	26	7	50	34	28	58	47	65	93
48	Enclosed mall	0	0	7	0.5	5	7	8	25	25	7	48	32	27	55	45	62	89
49	Mobile home	0	0	5	0.4	4	5	6	20	19	6	38	25	19	44	35	49	69
50	SF-detached	0	0	4	0.3	3	4	5	15	14	4	28	18	14	32	26	37	51
51	SF-attached	0	0	4	0.3	3	4	5	17	16	5	32	21	16	37	30	42	59
52	Aptmt-in 2-4 unit	0	0	6	0.5	5	6	8	25	24	7	47	31	24	55	44	62	87
53	Aptmt in 5+ unit	0	0	4	0.3	3	4	5	17	16	5	32	21	16	37	30	42	59

[1] Based on U.S. DOE/EIA Commercial Buildings and Residential Energy Consumption Surveys (CBECS 2003 and RECS 2005).

[2] Zone 5C values based on U.S. building stock (A Canadian building sample was not available at the time of table development.)

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Revise Informative Annex K as shown. The remainder of Informative Annex K is unchanged.

INFORMATIVE ANNEX K
~~ALTERNATIVE METHODS FOR ENERGY TARGETS AND~~ FUEL HEAT CONTENT CONVERSION VALUES —OTHER FUELS

~~K1. ALTERNATIVE METHODS FOR ENERGY TARGETS~~

~~Section 4.4.2 of the standard allows alternative energy targets established by the adopting authority having jurisdiction (AHJ). Normative Annex A is one such alternative and others are allowed under the standard. The AHJ may choose to adopt source energy measurement, such as Primary Energy Index (PEI) or Cost Energy Index (CEI), using the processes and procedures incorporated within ANSI/ASHRAE Standard 105-2014, *Standard Methods of Determining, Expressing, and Comparing Building Energy Performance and Greenhouse Gas Emissions*. The AHJ may choose to use locally appropriate factors for source (primary) energy.~~

K~~2~~1. FUEL HEAT CONTENT CONVERSION VALUES —OTHER FUELS

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ASHRAE is concerned with the impact of its members' activities on both the indoor and outdoor environment. ASHRAE's members will strive to minimize any possible deleterious effect on the indoor and outdoor environment of the systems and components in their responsibility while maximizing the beneficial effects these systems provide, consistent with accepted Standards and the practical state of the art.

ASHRAE's short-range goal is to ensure that the systems and components within its scope do not impact the indoor and outdoor environment to a greater extent than specified by the Standards and Guidelines as established by itself and other responsible bodies.

As an ongoing goal, ASHRAE will, through its Standards Committee and extensive Technical Committee structure, continue to generate up-to-date Standards and Guidelines where appropriate and adopt, recommend, and promote those new and revised Standards developed by other responsible organizations.

Through its *Handbook*, appropriate chapters will contain up-to-date Standards and design considerations as the material is systematically revised.

ASHRAE will take the lead with respect to dissemination of environmental information of its primary interest and will seek out and disseminate information from other responsible organizations that is pertinent, as guides to updating Standards and Guidelines.

The effects of the design and selection of equipment and systems will be considered within the scope of the system's intended use and expected misuse. The disposal of hazardous materials, if any, will also be considered.

ASHRAE's primary concern for environmental impact will be at the site where equipment within ASHRAE's scope operates. However, energy source selection and the possible environmental impact due to the energy source and energy transportation will be considered where possible. Recommendations concerning energy source selection should be made by its members.

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ASHRAE, founded in 1894, is a global society advancing human well-being through sustainable technology for the built environment. The Society and its members focus on building systems, energy efficiency, indoor air quality, refrigeration, and sustainability. Through research, Standards writing, publishing, certification and continuing education, ASHRAE shapes tomorrow's built environment today.

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