



**BSR/ASHRAE/IES Addendum j
to ANSI/ASHRAE/IES Standard 100-2024**

Public Review Draft

Proposed Addendum j to Standard 100-2024, Energy Efficiency in Existing Buildings

**First Public Review (July 2026)
(Draft Shows Proposed Changes to Current Standard)**

This draft has been recommended for public review by the responsible project committee. To submit a comment on this proposed standard, go to the ASHRAE website at www.ashrae.org/standards-research--technology/public-review-drafts and access the online comment database. The draft is subject to modification until it is approved for publication by the Board of Directors and ANSI. Until this time, the current edition of the standard (as modified by any published addenda on the ASHRAE website) remains in effect. The current edition of any standard may be purchased from the ASHRAE Online Store at www.ashrae.org/bookstore or by calling 404-636-8400 or 1-800-727-4723 (for orders in the U.S. or Canada).

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FOREWORD

This addendum updates the Site EUI and GHGI targets in Standard 100-2024 based on new datasets and improved methodologies. This update represents a significant improvement to the existing default Site EUI and GHGI targets within Standard 100. These default targets have been improved, however, for jurisdictions with access to local benchmarking data, derivation of local EUI and GHGI targets are still encourage as described in Appendix J. Updated tables are available to the review via this link: https://files.ashrae.org/secure_share/wjxq8qal

Updates include:

- Aligning building types with those from the ENERGY STAR® Portfolio Manager system to help clarify building types and make it easier for buildings that benchmark using that system. Some building types are listed but marked as not having targets, due to limited data or other limitations that diminish the confidence in the targets as being representative for that property type.
- New EUI and GHGI tables based on new data and improved methodology, which is documented in the informative appendix G. Highlights include:
 - EUI tables are primarily based on the Commercial Building Energy Consumption Survey (CBECS) 2018 dataset. National median EUIs are derived from CBECS or industry surveys that are used by ENERGY STAR's scoring system.
 - Climate zone differentiation and the fractional portions of electricity and fossil fuels (used for GHGI calculation from EUI) is based on updated analysis using DOE prototype buildings.
 - Percentile differentiation (how the 25th percentile data is characterized) is based on a new analysis using ComStock data, which is a simulated dataset of the US building stock and calibrated to CBECS data. This analysis results in improved granularity of percentile differentiation across climate zones and property types.
- Relocation of EUI and GHGI targets and processes for buildings that are comprised of only dwelling units to be fully within section 10.
- Update to Informative Addendum G which describes the derivation of EUI targets for Standard 100.

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. Only these changes are open for review and comment at this time. Additional material is provided for context only and is not open for comment except as it relates to the proposed substantive changes.

Revise Section 4.1 as follows:

4.1 Compliance Forms. Forms used for compliance with standard are located in Normative Appendix A.

4.1.1 The *qualified person* shall

- a. Determine whether or not the *building* seeking compliance has *performance targets* according to Section 7.
- b. If applicable, establish the *performance targets* according to Section 7 or Section 10
- c. Complete Form B
- d. Indicate on Form A if this compliance is for the whole *building* or for individual tenant spaces in a multitenant *building*
- e. Submit Forms A, B, C-1, C-2, and C-3 to the *authority having jurisdiction (AHJ)*

Revise Section 4.2 as follows:

4.2 Building Type Requirements

4.2.1 ~~Nonresidential Buildings with Performance Targets.~~ 4.2.1.1 A *building* or *complex* of *buildings* whose majority of gross floor area has activities ~~number 1 through 50 and/or 55~~ listed in Table 7-1 and has *performance targets* and shall comply with the requirements of Sections 4.3, 4.4.1, and 4.4.2.

Exception to 4.2.1: A *building* consisting solely of individual dwelling units with activities listed in Table 10-1 may comply with the requirements of Section 10 instead of the requirements of Sections 4.3 and 4.4.

4.2.2 ~~Buildings without Performance Targets.~~ A *building* or *complex* of *buildings* whose majority of gross floor area does not have activities listed in Table 7-1 does not have performance targets and shall comply with the requirements of Sections 4.3 and 4.4.3.

~~4.2.2.1~~ The *qualified person* determining compliance shall

- ~~a. Determine whether or not the *building* seeking compliance has *performance targets* according to Section 7.~~
- ~~b. If applicable, establish the *performance targets* according to Section 7~~
- ~~c. Complete Form B~~
- ~~d. Indicate on Form A if this compliance is for the whole *building* or for individual tenant spaces in a multitenant *building*~~
- ~~e. Submit Forms A, B, C 1, C 2, and C 3 to the *authority having jurisdiction (AHJ)*~~

~~4.2.2.2~~ A *building* with activities number 49 through 52 in Table 7-1 shall comply with the requirements of Section 10.

~~4.2.2.3~~ The *qualified person* determining compliance shall indicate on Form A if this compliance is for the whole *building* or for individual dwellings in a multidwelling *building* and submit Forms A, B, C 1, C 2, and C 3 to the *AHJ*.

~~4.2.3 Buildings with Residential and Nonresidential Activities~~

~~4.2.3.1~~ Individual dwelling units in a multitenant *building* seeking compliance apart from the *building* shall comply with Section 10.

~~4.2.3.2~~ The *qualified person* determining compliance for *buildings* with both residential and nonresidential activities shall comply with Section 4.2.1.2.

Revise Sections 7.1.1 and 7.1.2 as follows:

7.1 Building Type, Energy Use Intensity Targets, and Greenhouse Gas Intensity Targets

7.1.1 Building Type. *Buildings* are divided into ~~55-86~~ types with activities as shown in Table 7-1.

Buildings with one or more activities listed in Table 7-1 as having targets are treated as Buildings with Performance Targets and have *EUI targets* defined in Table 7-2 and *GHGI targets* defined in Table 7-4. All other *buildings* are Buildings without Performance Targets. have *energy use intensity (EUI) targets* as shown in Table 7-2 or 7-3. *Buildings* listed in Table 7-1 as not having targets are treated as Buildings without Performance Targets.

Informative Note: The *building* types in Table 7-1 are based on the property use categories used in the commonly used *energy and emissions accounting system* ENERGY STAR® Portfolio Manager® developed by the U.S. Environmental

Protection Agency, and managed by the U.S. Department of Energy and Natural Resources Canada. Precise definitions of the *building* type names can be found in the ENERGY STAR Portfolio Manager “Glossary” at <https://portfoliomanager.energystar.gov/pm/glossary>

7.1.2 Energy Use Intensity Targets. *EUI targets* based on *site energy* are shown in Table 7-2 in both I-P and SI units. *EUI targets* based on *source energy* are shown in Table 7-3 in both I-P and SI units. *Site energy* electricity use and fossil-fuel use targets listed in Table 7-5 and 7-6, respectively, are for use in target calculations by *authorities having jurisdiction*. Table 7-5 and 7-6, along with most other tables in section 7, can be downloaded from ashrae.org/100files.

~~Informative note: All *EUI targets* and *greenhouse gas intensity (GHGI) targets* were derived from 2012 Commercial Building Energy Consumption Survey (CBECS)³ and 2015 Residential Energy Consumption Survey (RECS)⁴ 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 20 DOE climate zones using multipliers generated through simulation of a representative *building* for each group of *building* categories. Informative Appendix G gives a detailed explanation of *EUI target* table derivation and data sources.~~

Reviewers may refer to the linked excel spreadsheet here: https://files.ashrae.org/secure_share/wjxq8qal

Tables 7 & G downloadable spreadsheet will be added to ashrae.org/100files.

Replace Tables 7-1, 7-2, 7-4, and 7-7 with the following tables. Note that full strike through and underline is not shown for brevity and the tables are full replacements:

Table 7-1 Commercial and Residential Building Types/Activities

<u>Building Type</u>	<u>Has Target? (Yes/No)</u>	<u>Building Type</u>	<u>Has Target? (Yes/No)</u>
<u>Bank Branch</u>	<u>Yes</u>	<u>Barracks</u>	<u>Yes</u>
<u>Financial Office</u>	<u>Yes</u>	<u>Hotel</u>	<u>Yes</u>
<u>Adult Education</u>	<u>Yes</u>	<u>Urgent Care/Clinic/ Other Outpatient</u>	<u>Yes</u>
<u>College/University</u>	<u>Yes</u>	<u>Medical Office</u>	<u>Yes</u>
<u>K-12 School</u>	<u>Yes</u>	<u>Multifamily Housing</u>	<u>Yes</u>
<u>Pre-school/Daycare</u>	<u>Yes</u>	<u>Prison/Incarceration</u>	<u>Yes</u>
<u>Vocational School</u>	<u>Yes</u>	<u>Residence Hall/Dormitory</u>	<u>Yes</u>
<u>Other - Education</u>	<u>Yes</u>	<u>Other - Lodging/Residential</u>	<u>Yes</u>
<u>Convention Center</u>	<u>No</u>	<u>Manufacturing/Industrial Plant</u>	<u>No</u>
<u>Movie Theater</u>	<u>No</u>	<u>Mixed Use Property</u>	<u>No</u>
<u>Museum</u>	<u>No</u>	<u>Office</u>	<u>Yes</u>
<u>Performing Arts</u>	<u>No</u>	<u>Veterinary Office</u>	<u>Yes</u>
<u>Bowling Alley</u>	<u>No</u>	<u>Other</u>	<u>No</u>
<u>Fitness Center/Health Club/Gym</u>	<u>No</u>	<u>Parking</u>	<u>No</u>
<u>Ice/Curling Rink</u>	<u>No</u>	<u>Courthouse</u>	<u>Yes</u>
<u>Roller Rink</u>	<u>No</u>	<u>Drinking Water Treatment & Distribution</u>	<u>No</u>
<u>Swimming Pool</u>	<u>No</u>	<u>Fire Station</u>	<u>Yes</u>
<u>Other - Recreation</u>	<u>Yes</u>	<u>Library</u>	<u>Yes</u>
<u>Social/Meeting Hall</u>	<u>Yes</u>	<u>Mailing Center/Post Office</u>	<u>Yes</u>
<u>Indoor Arena</u>	<u>No</u>	<u>Police Station</u>	<u>Yes</u>
<u>Race Track</u>	<u>No</u>	<u>Transportation Terminal/Station</u>	<u>No</u>
<u>Stadium (Closed)</u>	<u>No</u>	<u>Wastewater Treatment Plant</u>	<u>No</u>
<u>Stadium (Open)</u>	<u>No</u>	<u>Other - Public Services</u>	<u>No</u>
<u>Other - Stadium</u>	<u>No</u>	<u>Worship Facility</u>	<u>Yes</u>
<u>Aquarium</u>	<u>No</u>	<u>Automobile Dealership</u>	<u>Yes</u>
<u>Casino</u>	<u>No</u>	<u>Enclosed Mall</u>	<u>Yes</u>
<u>Zoo</u>	<u>No</u>	<u>Lifestyle Center</u>	<u>Yes</u>
<u>Other - Entertainment/Public As- sembly</u>	<u>No</u>	<u>Strip Mall</u>	<u>Yes</u>
<u>Convenience Store with Gas Sta- tion</u>	<u>Yes</u>	<u>Other - Mall</u>	<u>Yes</u>
<u>Convenience Store without Gas Station</u>	<u>Yes</u>	<u>Retail Store</u>	<u>Yes</u>
<u>Fast Food Restaurant</u>	<u>Yes</u>	<u>Data Center (PUE)</u>	<u>No</u>
<u>Restaurant</u>	<u>Yes</u>	<u>Personal Services (Health/Beauty, Dry Cleaning, etc.)</u>	<u>Yes</u>
<u>Other - Restaurant/Bar</u>	<u>Yes</u>	<u>Repair Services (Vehicle, Shoe, Locksmith, etc.)</u>	<u>Yes</u>
<u>Supermarket/Grocery Store</u>	<u>Yes</u>	<u>Other - Services</u>	<u>Yes</u>
<u>Wholesale Club/Supercenter</u>	<u>Yes</u>	<u>Laboratory</u>	<u>No</u>
<u>Food Sales</u>	<u>Yes</u>	<u>Other - Technology/Science</u>	<u>No</u>
<u>Food Service</u>	<u>Yes</u>	<u>Energy/Power Station</u>	<u>No</u>

<u>Building Type</u>	<u>Has Target? (Yes/No)</u>	<u>Building Type</u>	<u>Has Target? (Yes/No)</u>
<u>Ambulatory Surgical Center</u>	<u>Yes</u>	<u>Other - Utility</u>	<u>No</u>
<u>Hospital (General Medical & Surgical)</u>	<u>Yes</u>	<u>Self-Storage Facility</u>	<u>Yes</u>
<u>Other/Specialty Hospital</u>	<u>Yes</u>	<u>Distribution Center</u>	<u>Yes</u>
<u>Residential Care Facility</u>	<u>Yes</u>	<u>Non-Refrigerated Warehouse</u>	<u>Yes</u>
<u>Outpatient Rehabilitation/Physical Therapy</u>	<u>Yes</u>	<u>Refrigerated Warehouse</u>	<u>Yes</u>
<u>Senior Care Community</u>	<u>Yes</u>	<u>Bar/Nightclub</u>	<u>No</u>

Informative Note: The source data is documented in Appendix G, Table G-Datasources.

Table 7-2a Building Activity Site Energy Use Intensity Targets (EUI_{IT}) (I-P)

Building Type	EUIs by Building Type by Climate Zone (kBtu/ft²·yr)																		
	ASHRAE Climate Zone																		
	0A	0B	1A	1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
Bank Branch	63.8	63.2	57.4	59.5	53.9	54.7	50.8	51.9	45.9	50.5	51.3	46.4	52.6	52.0	45.3	60.6	57.2	56.8	68.3
Financial Office	54.0	53.6	48.7	50.4	45.7	46.3	43.1	43.9	38.9	42.7	43.4	39.3	44.6	44.0	38.4	51.3	48.5	48.1	57.8
College/University	57.8	55.8	50.8	50.5	46.5	41.7	43.1	36.8	32.1	37.1	29.1	34.7	40.0	40.3	34.0	44.7	34.8	43.1	46.4
K-12 School	58.5	56.5	51.5	51.2	47.1	42.3	43.7	37.3	32.5	37.6	29.5	35.2	40.5	40.9	34.4	45.3	35.3	43.6	47.0
Pre-school/ Daycare	57.6	55.7	49.8	51.0	46.3	43.5	44.5	38.9	33.8	41.2	31.4	38.2	45.0	44.2	39.0	50.8	40.1	49.7	54.8
Adult Education	58.8	56.8	51.7	51.4	47.3	42.5	43.9	37.4	32.7	37.7	29.6	35.4	40.7	41.1	34.6	45.5	35.4	43.8	47.2
Vocational School	58.8	56.8	51.7	51.4	47.3	42.5	43.9	37.4	32.7	37.7	29.6	35.4	40.7	41.1	34.6	45.5	35.4	43.8	47.2
Other - Education	54.9	53.1	47.5	48.6	44.1	41.4	42.4	37.1	32.2	39.3	29.9	36.4	42.9	42.2	37.2	48.4	38.2	47.4	52.3
Convention Center	58.7	58.2	52.9	54.4	49.0	50.3	47.0	46.1	39.2	46.3	44.3	42.5	49.0	48.4	41.9	55.6	48.6	52.4	59.1
Social/Meeting Hall	58.7	58.2	52.9	54.4	49.0	50.3	47.0	46.1	39.2	46.3	44.3	42.5	49.0	48.4	41.9	55.6	48.6	52.4	59.1
Convenience Store with Gas Station	341.1	328.4	284.8	306.8	251.8	233.6	248.0	224.9	172.7	261.9	213.4	224.7	314.9	266.4	234.6	361.7	298.4	336.2	373.8
Convenience Store without Gas Station	341.1	328.4	284.8	306.8	251.8	233.6	248.0	224.9	172.7	261.9	213.4	224.7	314.9	266.4	234.6	361.7	298.4	336.2	373.8
Fast Food Restaurant	299.1	291.6	273.2	271.3	255.5	250.7	270.9	237.4	200.7	282.4	261.6	259.0	308.2	287.3	269.5	343.7	308.2	384.3	532.9
Restaurant	215.7	204.5	192.7	190.8	178.3	172.3	185.1	161.8	133.4	194.1	179.1	175.2	212.6	197.6	182.8	241.1	214.5	270.7	378.6
Other - Restaurant/ Bar	215.7	204.5	192.7	190.8	178.3	172.3	185.1	161.8	133.4	194.1	179.1	175.2	212.6	197.6	182.8	241.1	214.5	270.7	378.6
Supermarket/ Grocery Store	228.5	220.0	190.8	205.5	168.7	156.5	166.1	150.7	115.7	175.5	143.0	150.6	211.0	178.5	157.2	242.4	199.9	225.2	250.4
Wholesale Club/ Super- center	38.6	37.2	32.2	34.7	28.5	26.4	28.1	25.5	19.5	29.6	24.2	25.4	35.6	30.2	26.6	40.9	33.8	38.0	42.3
Food Sales	203.1	198.0	185.5	184.3	173.5	170.2	183.9	161.2	136.3	191.8	177.7	175.9	209.3	195.1	183.0	233.4	209.3	260.9	361.9
Food Service	221.2	215.7	202.1	200.7	189.0	185.4	200.4	175.6	148.4	208.9	193.6	191.6	228.0	212.5	199.4	254.2	228.0	284.3	394.3

Building Type	EUIs by Building Type by Climate Zone (kBtu/ft²·yr)																		
	ASHRAE Climate Zone																		
	0A	0B	1A	1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
Ambulatory Surgical Center	62.0	59.4	56.4	56.5	57.5	53.6	52.2	49.9	46.6	52.4	47.9	47.2	52.7	49.2	45.6	56.5	49.9	56.1	58.5
Hospital (General Medical & Surgical)	219.9	208.6	209.5	204.3	206.5	203.4	202.0	196.0	178.5	207.9	194.6	190.1	207.5	198.8	217.3	215.4	219.9	234.2	231.7
Other/ Specialty Hospital	199.1	188.9	189.7	185.0	187.0	184.1	182.9	177.4	161.6	188.2	176.1	172.1	187.8	179.9	196.7	195.0	199.0	212.0	209.7
Residential Care Facility	99.9	95.8	90.9	91.1	92.6	86.3	84.1	80.5	75.0	84.5	77.2	76.1	85.0	79.3	73.4	91.1	80.4	90.5	94.3
Outpatient Rehabilitation/ Physical Therapy	62.0	59.4	56.4	56.5	57.5	53.6	52.2	49.9	46.6	52.4	47.9	47.2	52.7	49.2	45.6	56.5	49.9	56.1	58.5
Senior Care Community	101.2	97.1	92.1	92.3	93.9	87.4	85.2	81.5	76.0	85.6	78.2	77.1	86.1	80.4	74.4	92.3	81.5	91.7	95.5
Barracks	98.2	98.1	92.9	95.0	89.2	86.8	87.6	81.8	73.5	86.6	83.7	82.4	89.6	88.2	82.4	96.0	77.3	92.2	82.1
Hotel	105.2	100.5	96.8	94.7	91.6	82.8	85.7	77.5	68.1	83.7	78.6	77.4	83.2	82.4	79.2	88.4	73.0	86.7	78.7
Urgent Care/ Clinic/Other Outpatient	73.1	70.0	66.5	66.6	67.7	63.1	61.5	58.8	54.9	61.8	56.4	55.7	62.1	58.0	53.7	66.6	58.8	66.2	68.9
Medical Office	76.2	75.5	68.6	71.1	64.4	65.3	60.7	61.9	54.8	60.3	61.2	55.4	62.8	62.1	54.2	72.4	68.3	67.8	81.5
Multifamily Housing	32.3	31.4	29.2	29.7	27.9	27.6	27.9	27.1	23.3	29.6	27.3	26.3	31.9	28.9	25.9	36.4	32.0	37.2	41.3
Prison/ Incarceration	76.3	75.7	68.7	70.8	63.7	65.4	61.1	59.9	50.9	60.2	57.7	55.3	63.8	63.0	54.5	72.3	63.2	68.1	76.9
Residence Hall/ Dormitory	74.4	72.2	67.3	66.6	60.7	70.9	67.1	66.5	58.2	71.6	60.2	66.7	77.9	72.8	64.2	88.9	69.2	80.6	89.4
Other - Lodging/ Residential	78.2	78.1	74.0	75.7	71.0	69.2	69.8	65.2	58.6	69.0	66.6	65.6	71.4	70.3	65.6	76.4	61.6	73.4	65.4
Office	54.0	53.6	48.7	50.4	45.7	46.3	43.1	43.9	38.9	42.7	43.4	39.3	44.6	44.0	38.4	51.3	48.5	48.1	57.8
Veterinary Office	72.0	71.4	64.8	67.2	60.9	61.7	57.4	58.5	51.8	57.0	57.9	52.4	59.4	58.7	51.2	68.4	64.6	64.1	77.1
Courthouse	58.5	58.0	52.7	54.2	48.8	50.1	46.8	45.9	39.0	46.1	44.2	42.3	48.9	48.2	41.8	55.4	48.5	52.2	58.9
Library	87.5	86.8	78.8	81.1	73.0	75.0	70.0	68.7	58.4	69.0	66.1	63.4	73.1	72.2	62.5	82.9	72.5	78.1	88.1
Mailing Center/ Post Office	42.8	42.4	38.6	39.7	35.7	36.7	34.2	33.6	28.6	33.8	32.3	31.0	35.8	35.3	30.6	40.5	35.5	38.2	43.1
Fire Station	76.3	75.7	68.7	70.8	63.7	65.4	61.1	59.9	50.9	60.2	57.7	55.3	63.8	63.0	54.5	72.3	63.2	68.1	76.9

Building Type	EUIs by Building Type by Climate Zone (kBtu/ft²·yr)																		
	ASHRAE Climate Zone																		
	0A	0B	1A	1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
Police Station	76.3	75.7	68.7	70.8	63.7	65.4	61.1	59.9	50.9	60.2	57.7	55.3	63.8	63.0	54.5	72.3	63.2	68.1	76.9
Worship Facility	35.1	34.8	31.6	32.5	29.3	30.0	28.1	27.5	23.4	27.7	26.5	25.4	29.3	28.9	25.0	33.2	29.1	31.3	35.3
Automobile Dealership	69.9	67.3	58.4	62.9	51.6	47.9	50.8	46.1	35.4	53.7	43.7	46.0	64.5	54.6	48.1	74.1	61.1	68.9	76.6
Enclosed Mall	43.3	42.7	36.0	39.1	34.0	31.5	32.3	28.6	24.4	34.5	28.4	31.3	42.1	36.0	32.6	47.4	40.0	54.0	57.9
Lifestyle Center	110.4	106.3	92.2	99.3	81.5	75.6	80.3	72.8	55.9	84.8	69.1	72.7	101.9	86.2	75.9	117.1	96.6	108.8	121.0
Strip Mall	109.9	108.4	91.2	99.2	86.2	79.9	82.0	72.6	61.9	87.5	72.0	79.3	106.7	91.2	82.7	120.3	101.4	136.9	146.8
Other - Mall	109.9	108.4	91.2	99.2	86.2	79.9	82.0	72.6	61.9	87.5	72.0	79.3	106.7	91.2	82.7	120.3	101.4	136.9	146.8
Retail Store	38.6	37.2	32.2	34.7	28.5	26.4	28.1	25.5	19.5	29.6	24.2	25.4	35.6	30.2	26.6	40.9	33.8	38.0	42.3
Personal Services (Health/ Beauty, Dry Cleaning, etc)	41.5	40.9	34.4	37.5	32.5	30.2	30.9	27.4	23.4	33.0	27.2	29.9	40.3	34.4	31.2	45.4	38.3	51.7	55.4
Repair Services (Vehi- cle, Shoe, Locksmith, etc)	41.5	40.9	34.4	37.5	32.5	30.2	30.9	27.4	23.4	33.0	27.2	29.9	40.3	34.4	31.2	45.4	38.3	51.7	55.4
Other - Services	41.5	40.9	34.4	37.5	32.5	30.2	30.9	27.4	23.4	33.0	27.2	29.9	40.3	34.4	31.2	45.4	38.3	51.7	55.4
Self-Storage Facility	14.6	15.7	12.2	13.7	11.4	12.2	15.4	11.5	9.0	25.5	15.8	16.7	35.8	23.4	15.3	50.8	33.1	44.1	46.5
Distribution Center	16.4	17.6	13.7	15.4	12.8	13.7	17.3	12.9	10.1	28.6	17.8	18.8	40.3	26.2	17.2	57.0	37.2	49.6	52.2
Non-Refrigerated Ware- house	16.4	17.6	13.7	15.4	12.8	13.7	17.3	12.9	10.1	28.6	17.8	18.8	40.3	26.2	17.2	57.0	37.2	49.6	52.2
Refrigerated Warehouse	64.9	69.7	54.1	61.1	50.9	54.2	68.4	51.2	39.9	113.2	70.4	74.3	159.3	103.9	68.1	225.7	147.2	196.3	206.6

Table 7-2b Building Activity Site Energy Use Intensity Targets (EUI_{IT}) (SI)

		EUIs by Building Type by Climate Zone (MJ/m ² ·yr)																		
		ASHRAE Climate Zone																		
No	Building Type	0A	0B	1A	1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
1	Bank Branch	724	718	652	676	612	620	577	589	521	573	582	527	597	590	515	688	650	644	775
2	Financial Office	613	608	552	572	519	526	489	499	441	485	493	446	506	500	436	583	550	546	656
4	College/University	656	633	577	573	527	473	489	417	364	421	331	394	454	458	386	507	395	489	526
5	K-12 School	665	641	584	581	535	480	496	423	369	426	335	400	460	464	391	514	401	495	533
6	Pre-school/ Daycare	654	633	566	579	525	493	505	442	384	468	356	433	511	502	443	577	455	565	622
3	Adult Education	667	644	587	583	537	482	498	425	371	428	336	401	462	466	392	516	402	497	536
7	Vocational School	667	644	587	583	537	482	498	425	371	428	336	401	462	466	392	516	402	497	536
8	Other - Education	623	603	539	552	501	470	481	421	366	446	340	413	487	479	422	550	434	538	593
9	Convention Center	666	660	600	618	556	571	533	523	445	525	503	482	556	549	476	631	552	594	671
19	Social/Meeting Hall	666	660	600	618	556	571	533	523	445	525	503	482	556	549	476	631	552	594	671
29	Convenience Store with Gas Station	3871	3728	3232	3482	2858	2652	2814	2553	1960	2972	2422	2551	3575	3024	2663	4106	3387	3816	4243
30	Convenience Store without Gas Station	3871	3728	3232	3482	2858	2652	2814	2553	1960	2972	2422	2551	3575	3024	2663	4106	3387	3816	4243
31	Fast Food Restaurant	3394	3309	3100	3080	2900	2845	3074	2694	2277	3206	2970	2939	3498	3261	3059	3901	3498	4361	6049
32	Restaurant	2449	2321	2188	2166	2023	1956	2101	1837	1515	2203	2033	1988	2414	2243	2075	2737	2435	3073	4298
33	Other - Restaurant/ Bar	2449	2321	2188	2166	2023	1956	2101	1837	1515	2203	2033	1988	2414	2243	2075	2737	2435	3073	4298
34	Supermarket/ Grocery Store	2594	2497	2166	2333	1915	1777	1886	1710	1313	1992	1623	1709	2395	2026	1784	2751	2269	2557	2843
35	Wholesale Club/ Super- center	438	422	366	394	323	300	319	289	222	336	274	289	405	342	301	465	383	432	480
36	Food Sales	2305	2247	2105	2091	1970	1932	2088	1830	1547	2177	2017	1996	2375	2214	2078	2649	2375	2962	4108
37	Food Service	2511	2448	2293	2278	2146	2105	2274	1993	1685	2372	2197	2175	2588	2412	2263	2886	2588	3226	4475

		EUIs by Building Type by Climate Zone (MJ/m ² ·yr)																		
		ASHRAE Climate Zone																		
No	Building Type	0A	0B	1A	1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
38	Ambulatory Surgical Center	704	675	641	642	652	608	592	567	529	595	544	536	598	559	517	642	567	637	664
39	Hospital (General Medical & Surgical)	2496	2368	2378	2319	2344	2309	2293	2225	2026	2360	2208	2157	2355	2256	2466	2445	2495	2658	2630
40	Other/ Specialty Hospital	2259	2144	2153	2100	2122	2090	2076	2014	1835	2137	1999	1953	2132	2042	2233	2214	2259	2407	2381
41	Residential Care Facility	1134	1087	1032	1034	1051	979	954	913	852	959	876	864	964	900	833	1034	913	1027	1070
42	Outpatient Rehabilitation/ Physical Therapy	704	675	641	642	652	608	592	567	529	595	544	536	598	559	517	642	567	637	664
43	Senior Care Community	1149	1102	1046	1048	1065	992	967	925	863	972	888	875	977	912	844	1048	925	1040	1084
44	Barracks	1115	1114	1054	1078	1012	986	994	929	835	983	950	935	1017	1001	935	1089	878	1047	932
45	Hotel	1194	1141	1099	1074	1039	939	973	880	773	950	892	878	944	935	899	1003	829	984	893
46	Urgent Care/ Clinic/Other Outpatient	829	795	755	756	769	716	698	668	623	701	641	632	705	659	609	756	668	751	782
47	Medical Office	865	857	779	807	731	741	689	703	622	684	695	629	713	705	615	821	776	769	925
48	Multifamily Housing	367	356	331	337	317	313	316	308	265	336	310	298	362	327	294	414	363	423	469
49	Prison/ Incarceration	867	859	780	803	723	742	693	680	578	683	654	627	724	715	619	820	718	773	872
50	Residence Hall/ Dormitory	845	820	763	755	689	805	762	755	661	812	683	757	884	826	728	1009	785	915	1014
52	Other - Lodging/ Residential	888	887	840	859	806	785	792	740	665	783	756	745	810	797	744	868	699	834	743
55	Office	613	608	552	572	519	526	489	499	441	485	493	446	506	500	436	583	550	546	656
56	Veterinary Office	817	810	736	763	691	700	651	665	588	646	657	595	674	666	581	776	733	727	875
59	Courthouse	664	658	598	616	554	569	531	521	443	524	502	481	555	548	474	629	550	592	669
62	Library	994	985	895	921	829	851	795	780	663	783	750	719	830	819	709	940	823	886	1000
63	Mailing Center/ Post Office	486	482	438	450	405	416	389	381	324	383	367	352	406	401	347	460	403	433	489
61	Fire Station	867	859	780	803	723	742	693	680	578	683	654	627	724	715	619	820	718	773	872

		EUIs by Building Type by Climate Zone (MJ/m ² ·yr)																		
		ASHRAE Climate Zone																		
No	Building Type	0A	0B	1A	1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
64	Police Station	867	859	780	803	723	742	693	680	578	683	654	627	724	715	619	820	718	773	872
68	Worship Facility	398	395	359	369	332	341	319	313	266	314	301	288	333	328	284	377	330	355	401
69	Automobile Dealership	793	764	662	713	586	543	577	523	402	609	496	523	732	620	546	841	694	782	869
70	Enclosed Mall	492	485	408	444	386	358	367	325	277	391	322	355	477	408	370	538	454	613	657
71	Lifestyle Center	1253	1206	1046	1127	925	858	911	826	634	962	784	826	1157	979	862	1329	1096	1235	1373
72	Strip Mall	1248	1231	1035	1126	978	907	930	824	703	993	817	900	1211	1036	939	1366	1151	1554	1666
73	Other - Mall	1248	1231	1035	1126	978	907	930	824	703	993	817	900	1211	1036	939	1366	1151	1554	1666
74	Retail Store	438	422	366	394	323	300	319	289	222	336	274	289	405	342	301	465	383	432	480
76	Personal Services (Health/ Beauty, Dry Cleaning, etc)	471	465	391	425	369	342	351	311	265	375	308	340	457	391	354	516	434	587	629
77	Repair Services (Vehi- cle, Shoe, Locksmith, etc)	471	465	391	425	369	342	351	311	265	375	308	340	457	391	354	516	434	587	629
78	Other - Services	471	465	391	425	369	342	351	311	265	375	308	340	457	391	354	516	434	587	629
83	Self-Storage Facility	166	178	138	156	130	138	175	131	102	289	180	190	407	265	174	576	376	501	527
84	Distribution Center	186	200	155	175	146	155	196	147	114	325	202	213	457	298	195	647	422	563	592
85	Non-Refrigerated Ware- house	186	200	155	175	146	155	196	147	114	325	202	213	457	298	195	647	422	563	592
86	Refrigerated Warehouse	736	791	614	693	577	615	777	581	453	1285	799	844	1808	1179	773	2562	1671	2228	2345

Table 7-4a Building Activity Greenhouse Gas Intensity (GHGI) Targets (I-P)

		<u>GHG Intensity by Building Type by Climate Zone (lb CO₂e/ft²·yr)</u>																		
		<u>ASHRAE Climate Zone</u>																		
<u>No</u>	<u>Building Type</u>	<u>0A</u>	<u>0B</u>	<u>1A</u>	<u>1B</u>	<u>2A</u>	<u>2B</u>	<u>3A</u>	<u>3B</u>	<u>3C</u>	<u>4A</u>	<u>4B</u>	<u>4C</u>	<u>5A</u>	<u>5B</u>	<u>5C</u>	<u>6A</u>	<u>6B</u>	<u>7</u>	<u>8</u>
1	Bank Branch	20.5	20.3	18.4	19.1	17.2	17.5	16.1	16.4	14.6	15.6	15.9	14.4	15.9	15.9	14.0	17.5	16.8	16.6	19.0
2	Financial Office	17.3	17.2	15.6	16.2	14.6	14.8	13.6	13.9	12.3	13.2	13.5	12.2	13.5	13.5	11.8	14.9	14.3	14.0	16.1
4	College/University	17.6	17.0	15.5	15.4	13.9	12.6	12.2	10.9	9.4	10.5	8.2	9.4	10.7	10.8	9.1	11.4	9.2	10.8	10.6
5	K-12 School	17.8	17.2	15.7	15.6	14.1	12.8	12.4	11.0	9.6	10.6	8.4	9.5	10.8	11.0	9.3	11.5	9.4	10.9	10.8
6	Pre-school/ Daycare	17.3	16.8	15.0	15.3	13.6	12.8	12.2	11.2	9.7	11.1	8.4	10.1	11.5	11.5	10.1	12.3	10.1	11.8	12.0
3	Adult Education	17.9	17.3	15.7	15.7	14.2	12.9	12.4	11.1	9.6	10.7	8.4	9.6	10.9	11.0	9.3	11.6	9.4	11.0	10.8
7	Vocational School	17.9	17.3	15.7	15.7	14.2	12.9	12.4	11.1	9.6	10.7	8.4	9.6	10.9	11.0	9.3	11.6	9.4	11.0	10.8
8	Other - Education	16.5	16.0	14.3	14.6	13.0	12.2	11.6	10.6	9.2	10.6	8.0	9.6	10.9	11.0	9.6	11.7	9.6	11.2	11.4
9	Convention Center	18.8	18.7	16.9	17.4	15.6	16.1	14.9	14.6	12.4	14.3	13.7	13.2	14.8	14.8	12.9	16.1	14.3	15.3	16.4
19	Social/Meeting Hall	18.8	18.7	16.9	17.4	15.6	16.1	14.9	14.6	12.4	14.3	13.7	13.2	14.8	14.8	12.9	16.1	14.3	15.3	16.4
29	Convenience Store with Gas Station	106.3	102.4	88.8	95.6	77.1	71.6	68.8	66.5	51.7	66.2	53.9	58.0	73.9	68.7	60.5	80.4	70.6	77.7	81.7
30	Convenience Store without Gas Station	106.3	102.4	88.8	95.6	77.1	71.6	68.8	66.5	51.7	66.2	53.9	58.0	73.9	68.7	60.5	80.4	70.6	77.7	81.7
31	Fast Food Restaurant	70.7	69.0	64.6	64.2	58.6	56.6	58.2	51.9	42.8	58.2	53.9	52.9	60.8	58.2	54.1	66.5	60.7	72.3	96.5
32	Restaurant	55.7	52.8	49.7	49.2	45.0	42.6	43.4	38.8	31.3	43.1	39.8	38.6	45.0	43.5	39.6	49.3	45.4	53.4	71.2
33	Other - Restaurant/ Bar	55.7	52.8	49.7	49.2	45.0	42.6	43.4	38.8	31.3	43.1	39.8	38.6	45.0	43.5	39.6	49.3	45.4	53.4	71.2
34	Supermarket/ Grocery Store	71.2	68.6	59.5	64.1	51.7	47.9	46.1	44.5	34.6	44.3	36.1	38.8	49.5	46.0	40.6	53.8	47.3	52.1	54.7
35	Wholesale Club/ Super- center	12.0	11.6	10.0	10.8	8.7	8.1	7.8	7.5	5.8	7.5	6.1	6.6	8.4	7.8	6.9	9.1	8.0	8.8	9.2
36	Food Sales	48.0	46.8	43.9	43.6	39.8	38.4	39.6	35.2	29.1	39.5	36.6	35.9	41.3	39.5	36.7	45.2	41.3	49.1	65.5
37	Food Service	52.3	51.0	47.8	47.5	43.4	41.9	43.1	38.4	31.7	43.1	39.9	39.1	44.9	43.0	40.0	49.2	44.9	53.5	71.4

		GHG Intensity by Building Type by Climate Zone (lb CO ₂ e/ft ² ·yr)																		
		ASHRAE Climate Zone																		
No	Building Type	0A	0B	1A	1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
38	Ambulatory Surgical Center	18.0	17.3	16.4	16.4	16.2	15.3	14.4	14.0	12.9	14.1	12.9	12.6	13.7	13.2	12.2	14.3	13.1	13.9	13.7
39	Hospital (General Medical & Surgical)	64.2	60.9	61.2	59.7	59.6	58.7	56.8	55.8	50.5	57.0	53.3	51.8	55.4	54.5	54.5	56.4	56.3	57.9	56.0
40	Other/ Specialty Hospital	58.1	55.1	55.4	54.0	53.9	53.1	51.4	50.5	45.7	51.6	48.3	46.9	50.1	49.3	49.3	51.0	51.0	52.4	50.7
41	Residential Care Facility	29.0	27.8	26.4	26.4	26.0	24.6	23.2	22.6	20.8	22.7	20.7	20.3	22.1	21.3	19.6	23.0	21.0	22.4	22.1
42	Outpatient Rehabilitation/ Physical Therapy	18.0	17.3	16.4	16.4	16.2	15.3	14.4	14.0	12.9	14.1	12.9	12.6	13.7	13.2	12.2	14.3	13.1	13.9	13.7
43	Senior Care Community	29.4	28.2	26.7	26.8	26.4	24.9	23.5	22.9	21.1	23.0	21.0	20.6	22.4	21.6	19.9	23.3	21.3	22.7	22.4
44	Barracks	24.1	24.1	22.8	23.3	21.6	20.8	20.7	19.3	17.0	20.2	19.5	18.7	20.7	20.5	18.6	22.4	17.9	21.5	19.1
45	Hotel	27.3	26.1	25.1	24.6	23.1	20.5	20.6	18.6	16.0	19.3	18.2	17.3	18.8	18.6	17.4	19.6	16.0	18.6	16.2
46	Urgent Care/ Clinic/Other Outpatient	21.2	20.3	19.3	19.3	19.1	18.0	17.0	16.5	15.2	16.6	15.2	14.9	16.1	15.6	14.3	16.8	15.4	16.4	16.2
47	Medical Office	24.4	24.2	22.0	22.8	20.6	20.9	19.2	19.6	17.4	18.7	19.0	17.2	19.0	19.0	16.7	21.0	20.1	19.8	22.7
48	Multifamily Housing	10.5	10.2	9.5	9.7	9.1	9.0	8.8	8.8	7.6	9.0	8.3	8.2	9.2	8.9	8.2	10.0	9.3	10.2	10.8
49	Prison/ Incarceration	24.5	24.3	22.0	22.7	20.3	20.9	19.3	19.0	16.2	18.7	17.9	17.2	19.3	19.3	16.8	20.9	18.6	19.9	21.4
50	Residence Hall/ Dormitory	24.3	23.5	21.9	21.7	19.8	23.1	21.2	21.4	18.9	21.7	18.2	20.9	22.5	22.4	20.3	24.4	20.1	22.1	23.4
52	Other - Lodging/ Residential	19.2	19.2	18.2	18.6	17.2	16.6	16.5	15.4	13.5	16.1	15.5	14.9	16.5	16.4	14.8	17.8	14.2	17.1	15.2
55	Office	17.3	17.2	15.6	16.2	14.6	14.8	13.6	13.9	12.3	13.2	13.5	12.2	13.5	13.5	11.8	14.9	14.3	14.0	16.1
56	Veterinary Office	23.1	22.9	20.8	21.5	19.4	19.7	18.2	18.6	16.4	17.7	17.9	16.3	17.9	18.0	15.8	19.8	19.0	18.7	21.4
59	Courthouse	18.8	18.6	16.9	17.4	15.6	16.0	14.8	14.6	12.4	14.3	13.7	13.1	14.8	14.8	12.9	16.0	14.3	15.2	16.4
62	Library	28.1	27.8	25.3	26.0	23.3	23.9	22.2	21.8	18.6	21.4	20.5	19.7	22.1	22.1	19.3	24.0	21.3	22.8	24.5
63	Mailing Center/ Post Office	13.7	13.6	12.4	12.7	11.4	11.7	10.8	10.7	9.1	10.5	10.0	9.6	10.8	10.8	9.4	11.7	10.4	11.2	12.0
61	Fire Station	24.5	24.3	22.0	22.7	20.3	20.9	19.3	19.0	16.2	18.7	17.9	17.2	19.3	19.3	16.8	20.9	18.6	19.9	21.4

		GHG Intensity by Building Type by Climate Zone (lb CO ₂ e/ft ² ·yr)																		
		ASHRAE Climate Zone																		
		0A	0B	1A	1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
No	Building Type																			
64	Police Station	24.5	24.3	22.0	22.7	20.3	20.9	19.3	19.0	16.2	18.7	17.9	17.2	19.3	19.3	16.8	20.9	18.6	19.9	21.4
68	Worship Facility	11.2	11.2	10.1	10.4	9.3	9.6	8.9	8.7	7.4	8.6	8.2	7.9	8.9	8.9	7.7	9.6	8.6	9.1	9.8
69	Automobile Dealership	21.8	21.0	18.2	19.6	15.8	14.7	14.1	13.6	10.6	13.6	11.0	11.9	15.1	14.1	12.4	16.5	14.5	15.9	16.7
70	Enclosed Mall	14.1	13.9	11.7	12.8	11.0	10.3	9.5	9.1	8.0	9.1	7.5	8.8	10.5	10.2	9.0	11.0	10.3	12.1	12.8
71	Lifestyle Center	34.4	33.1	28.7	30.9	25.0	23.2	22.3	21.5	16.7	21.4	17.4	18.8	23.9	22.2	19.6	26.0	22.8	25.1	26.4
72	Strip Mall	35.8	35.3	29.7	32.4	27.9	26.1	24.2	23.0	20.2	23.2	19.1	22.4	26.6	25.8	22.8	28.0	26.2	30.7	32.4
73	Other - Mall	35.8	35.3	29.7	32.4	27.9	26.1	24.2	23.0	20.2	23.2	19.1	22.4	26.6	25.8	22.8	28.0	26.2	30.7	32.4
74	Retail Store	12.0	11.6	10.0	10.8	8.7	8.1	7.8	7.5	5.8	7.5	6.1	6.6	8.4	7.8	6.9	9.1	8.0	8.8	9.2
76	Personal Services (Health/ Beauty, Dry Cleaning, etc)	13.5	13.3	11.2	12.2	10.5	9.8	9.1	8.7	7.6	8.8	7.2	8.5	10.0	9.7	8.6	10.6	9.9	11.6	12.2
77	Repair Services (Vehi- cle, Shoe, Locksmith, etc)	13.5	13.3	11.2	12.2	10.5	9.8	9.1	8.7	7.6	8.8	7.2	8.5	10.0	9.7	8.6	10.6	9.9	11.6	12.2
78	Other - Services	13.5	13.3	11.2	12.2	10.5	9.8	9.1	8.7	7.6	8.8	7.2	8.5	10.0	9.7	8.6	10.6	9.9	11.6	12.2
83	Self-Storage Facility	4.8	5.1	4.0	4.5	3.7	4.0	4.1	3.5	2.9	5.4	3.4	4.1	6.9	5.1	3.8	9.2	6.5	8.1	8.5
84	Distribution Center	5.3	5.7	4.5	5.0	4.2	4.4	4.6	4.0	3.3	6.1	3.8	4.6	7.7	5.8	4.3	10.3	7.3	9.1	9.5
85	Non-Refrigerated Ware- house	5.3	5.7	4.5	5.0	4.2	4.4	4.6	4.0	3.3	6.1	3.8	4.6	7.7	5.8	4.3	10.3	7.3	9.1	9.5
86	Refrigerated Warehouse	21.1	22.7	17.6	19.9	16.5	17.6	18.1	15.8	12.9	24.1	15.0	18.2	30.6	22.9	17.0	40.9	29.0	35.9	37.8

Table 7-4b Building Activity Greenhouse Gas Intensity (GHGI) Targets (SI)

		GHG Intensity by Building Type by Climate Zone (kg CO ₂ e/m ² ·yr)																		
		ASHRAE Climate Zone																		
No	Building Type	0A	0B	1A	1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
1	Bank Branch	99.8	98.9	89.9	93.1	84.0	85.2	78.5	80.2	71.1	76.3	77.5	70.3	77.5	77.7	68.2	85.6	82.2	80.9	92.7
2	Financial Office	84.5	83.8	76.1	78.9	71.2	72.2	66.5	68.0	60.2	64.6	65.7	59.5	65.7	65.8	57.7	72.5	69.6	68.5	78.5
4	College/University	85.8	82.8	75.5	75.0	67.8	61.6	59.6	53.0	46.0	51.2	40.2	45.8	52.1	52.9	44.5	55.5	45.1	52.7	51.9
5	K-12 School	87.0	84.0	76.5	76.0	68.7	62.4	60.3	53.7	46.6	51.9	40.7	46.5	52.8	53.6	45.1	56.2	45.7	53.4	52.6
6	Pre-school/ Daycare	84.6	81.9	73.2	74.9	66.3	62.7	59.5	54.4	47.3	54.0	41.2	49.0	55.9	56.1	49.1	60.0	49.1	57.4	58.5
3	Adult Education	87.4	84.3	76.8	76.4	69.0	62.7	60.6	54.0	46.8	52.1	40.9	46.7	53.0	53.8	45.3	56.5	45.9	53.6	52.8
7	Vocational School	87.4	84.3	76.8	76.4	69.0	62.7	60.6	54.0	46.8	52.1	40.9	46.7	53.0	53.8	45.3	56.5	45.9	53.6	52.8
8	Other - Education	80.7	78.0	69.8	71.4	63.2	59.7	56.7	51.9	45.0	51.5	39.2	46.7	53.3	53.5	46.8	57.1	46.8	54.7	55.7
9	Convention Center	91.8	91.0	82.7	85.1	76.3	78.4	72.5	71.3	60.7	70.0	67.0	64.4	72.3	72.3	63.0	78.5	69.9	74.6	80.2
19	Social/Meeting Hall	91.8	91.0	82.7	85.1	76.3	78.4	72.5	71.3	60.7	70.0	67.0	64.4	72.3	72.3	63.0	78.5	69.9	74.6	80.2
29	Convenience Store with Gas Station	518.7	499.4	433.1	466.5	376.3	349.2	335.9	324.3	252.0	322.8	263.0	282.9	360.7	335.3	295.3	392.1	344.3	379.1	398.7
30	Convenience Store without Gas Station	518.7	499.4	433.1	466.5	376.3	349.2	335.9	324.3	252.0	322.8	263.0	282.9	360.7	335.3	295.3	392.1	344.3	379.1	398.7
31	Fast Food Restaurant	345.1	336.4	315.2	313.1	285.9	276.1	284.2	253.2	208.7	284.0	263.1	258.1	296.4	283.8	263.9	324.5	296.4	352.8	470.7
32	Restaurant	271.5	257.4	242.6	240.2	219.7	207.8	212.0	189.5	152.8	210.4	194.1	188.4	219.4	212.5	193.4	240.3	221.3	260.3	347.6
33	Other - Restaurant/ Bar	271.5	257.4	242.6	240.2	219.7	207.8	212.0	189.5	152.8	210.4	194.1	188.4	219.4	212.5	193.4	240.3	221.3	260.3	347.6
34	Supermarket/ Grocery Store	347.5	334.6	290.2	312.5	252.1	233.9	225.1	217.3	168.9	216.3	176.2	189.5	241.6	224.7	197.9	262.7	230.7	254.0	267.1
35	Wholesale Club/ Super- center	58.7	56.5	49.0	52.8	42.6	39.5	38.0	36.7	28.5	36.5	29.8	32.0	40.8	37.9	33.4	44.4	39.0	42.9	45.1
36	Food Sales	234.3	228.5	214.0	212.6	194.2	187.5	193.0	171.9	141.8	192.8	178.6	175.3	201.3	192.7	179.2	220.4	201.3	239.6	319.6
37	Food Service	255.3	248.9	233.2	231.6	211.5	204.2	210.2	187.3	154.4	210.1	194.6	190.9	219.3	210.0	195.3	240.1	219.3	261.0	348.2

		GHG Intensity by Building Type by Climate Zone (kg CO ₂ e/m ² ·yr)																		
		ASHRAE Climate Zone																		
No	Building Type	0A	0B	1A	1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
38	Ambulatory Surgical Center	87.8	84.2	79.9	80.0	78.9	74.4	70.2	68.5	63.1	68.7	62.8	61.5	66.8	64.6	59.3	69.7	63.7	67.7	67.0
39	Hospital (General Medical & Surgical)	313.3	297.2	298.5	291.1	290.6	286.2	277.2	272.4	246.6	278.1	260.2	252.5	270.2	265.8	265.9	274.9	274.8	282.5	273.4
40	Other/ Specialty Hospital	283.6	269.1	270.2	263.5	263.1	259.1	250.9	246.6	223.2	251.7	235.5	228.6	244.6	240.6	240.7	248.9	248.8	255.8	247.5
41	Residential Care Facility	141.4	135.6	128.7	129.0	127.1	119.9	113.2	110.4	101.6	110.8	101.2	99.1	107.7	104.0	95.6	112.3	102.6	109.1	107.9
42	Outpatient Rehabilitation/ Physical Therapy	87.8	84.2	79.9	80.0	78.9	74.4	70.2	68.5	63.1	68.7	62.8	61.5	66.8	64.6	59.3	69.7	63.7	67.7	67.0
43	Senior Care Community	143.3	137.4	130.5	130.7	128.8	121.5	114.7	111.9	103.0	112.2	102.5	100.4	109.1	105.4	96.9	113.8	104.0	110.6	109.4
44	Barracks	117.6	117.5	111.2	113.8	105.2	101.7	101.1	94.4	82.9	98.4	95.1	91.4	101.1	100.2	90.7	109.1	87.2	104.8	93.3
45	Hotel	133.3	127.4	122.7	120.0	112.9	99.8	100.4	90.8	78.0	94.4	88.7	84.5	91.6	90.8	85.1	95.8	77.9	90.9	79.1
46	Urgent Care/ Clinic/Other Outpatient	103.4	99.2	94.2	94.3	92.9	87.7	82.8	80.7	74.3	81.0	74.0	72.5	78.7	76.1	69.9	82.1	75.1	79.8	78.9
47	Medical Office	119.2	118.1	107.3	111.2	100.4	101.7	93.7	95.8	84.9	91.1	92.6	83.9	92.6	92.8	81.4	102.2	98.2	96.6	110.7
48	Multifamily Housing	51.4	49.9	46.4	47.3	44.4	43.9	42.9	42.7	36.9	43.7	40.3	40.2	44.9	43.4	40.0	48.7	45.3	49.8	52.7
49	Prison/ Incarceration	119.4	118.4	107.5	110.7	99.2	101.9	94.3	92.7	78.9	91.0	87.2	83.7	94.0	94.1	81.9	102.1	90.8	97.0	104.3
50	Residence Hall/ Dormitory	118.4	114.9	107.0	105.9	96.6	112.8	103.2	104.6	92.1	105.7	88.9	102.0	109.6	109.4	99.3	118.9	97.9	107.8	114.1
52	Other - Lodging/ Residential	93.7	93.6	88.6	90.6	83.8	81.0	80.5	75.2	66.0	78.4	75.7	72.8	80.5	79.8	72.2	86.9	69.4	83.5	74.3
55	Office	84.5	83.8	76.1	78.9	71.2	72.2	66.5	68.0	60.2	64.6	65.7	59.5	65.7	65.8	57.7	72.5	69.6	68.5	78.5
56	Veterinary Office	112.7	111.7	101.4	105.1	94.9	96.2	88.6	90.6	80.2	86.1	87.5	79.3	87.5	87.7	77.0	96.6	92.8	91.3	104.6
59	Courthouse	91.5	90.7	82.4	84.8	76.1	78.1	72.3	71.0	60.5	69.7	66.8	64.2	72.0	72.1	62.8	78.2	69.6	74.3	80.0
62	Library	136.9	135.7	123.3	126.9	113.8	116.8	108.1	106.3	90.5	104.4	100.0	96.0	107.8	107.9	93.9	117.1	104.2	111.2	119.6
63	Mailing Center/ Post Office	67.0	66.4	60.3	62.1	55.7	57.1	52.9	52.0	44.3	51.0	48.9	46.9	52.7	52.8	45.9	57.3	50.9	54.4	58.5
61	Fire Station	119.4	118.4	107.5	110.7	99.2	101.9	94.3	92.7	78.9	91.0	87.2	83.7	94.0	94.1	81.9	102.1	90.8	97.0	104.3

		GHG Intensity by Building Type by Climate Zone (kg CO ₂ e/m ² ·yr)																		
		ASHRAE Climate Zone																		
		0A	0B	1A	1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
No	Building Type																			
64	Police Station	119.4	118.4	107.5	110.7	99.2	101.9	94.3	92.7	78.9	91.0	87.2	83.7	94.0	94.1	81.9	102.1	90.8	97.0	104.3
68	Worship Facility	54.9	54.4	49.4	50.9	45.6	46.8	43.3	42.6	36.3	41.8	40.1	38.5	43.2	43.2	37.7	46.9	41.7	44.6	48.0
69	Automobile Dealership	106.3	102.3	88.7	95.6	77.1	71.5	68.8	66.5	51.6	66.1	53.9	58.0	73.9	68.7	60.5	80.3	70.6	77.7	81.7
70	Enclosed Mall	68.9	68.0	57.2	62.2	53.8	50.1	46.6	44.3	38.8	44.6	36.7	43.2	51.1	49.7	43.9	53.9	50.3	59.0	62.2
71	Lifestyle Center	167.9	161.6	140.2	151.0	121.8	113.0	108.7	105.0	81.6	104.5	85.1	91.6	116.7	108.5	95.6	126.9	111.4	122.7	129.0
72	Strip Mall	174.8	172.4	145.1	157.9	136.4	127.1	118.2	112.3	98.5	113.1	93.1	109.5	129.7	126.0	111.3	136.7	127.6	149.6	157.9
73	Other - Mall	174.8	172.4	145.1	157.9	136.4	127.1	118.2	112.3	98.5	113.1	93.1	109.5	129.7	126.0	111.3	136.7	127.6	149.6	157.9
74	Retail Store	58.7	56.5	49.0	52.8	42.6	39.5	38.0	36.7	28.5	36.5	29.8	32.0	40.8	37.9	33.4	44.4	39.0	42.9	45.1
76	Personal Services (Health/ Beauty, Dry Cleaning, etc)	66.0	65.1	54.8	59.6	51.5	48.0	44.6	42.4	37.2	42.7	35.2	41.3	48.9	47.6	42.0	51.6	48.2	56.5	59.6
77	Repair Services (Vehi- cle, Shoe, Locksmith, etc)	66.0	65.1	54.8	59.6	51.5	48.0	44.6	42.4	37.2	42.7	35.2	41.3	48.9	47.6	42.0	51.6	48.2	56.5	59.6
78	Other - Services	66.0	65.1	54.8	59.6	51.5	48.0	44.6	42.4	37.2	42.7	35.2	41.3	48.9	47.6	42.0	51.6	48.2	56.5	59.6
83	Self-Storage Facility	23.2	24.9	19.4	21.8	18.1	19.3	19.9	17.3	14.2	26.5	16.5	20.0	33.5	25.1	18.6	44.8	31.8	39.4	41.4
84	Distribution Center	26.1	28.0	21.8	24.5	20.3	21.7	22.4	19.5	15.9	29.8	18.5	22.5	37.7	28.2	20.9	50.4	35.8	44.2	46.6
85	Non-Refrigerated Ware- house	26.1	28.0	21.8	24.5	20.3	21.7	22.4	19.5	15.9	29.8	18.5	22.5	37.7	28.2	20.9	50.4	35.8	44.2	46.6
86	Refrigerated Warehouse	103.2	110.8	86.1	97.1	80.4	85.7	88.5	77.0	63.1	117.8	73.2	89.0	149.1	111.7	82.8	199.4	141.6	175.1	184.2

Table 7-7 Building Operating Shifts Normalization Factor

<u>No.</u>	<u>Building Activity/Type</u>	<u>Weekly Hours</u>			<u>No.</u>	<u>Building Activity/Type</u>	<u>Weekly Hours</u>		
		<u>50 or Less</u>	<u>51 to 167</u>	<u>168</u>			<u>50 or Less</u>	<u>51 to 167</u>	<u>168</u>
<u>1</u>	<u>Bank Branch</u>	<u>1</u>	<u>1</u>	<u>1.4</u>	<u>46</u>	<u>Urgent Care/Clinic/Other Outpatient</u>	<u>1</u>	<u>1</u>	<u>1.5</u>
<u>2</u>	<u>Financial Office</u>	<u>1</u>	<u>1</u>	<u>1.4</u>	<u>47</u>	<u>Medical Office</u>	<u>1</u>	<u>1</u>	<u>1.5</u>
<u>4</u>	<u>College/University</u>	<u>0.8</u>	<u>1.3</u>	<u>1.3</u>	<u>48</u>	<u>Multifamily Housing</u>	<u>1</u>	<u>1</u>	<u>1</u>
<u>5</u>	<u>K-12 School</u>	<u>0.8</u>	<u>1.3</u>	<u>1.3</u>	<u>49</u>	<u>Prison/Incarceration</u>	<u>1</u>	<u>1</u>	<u>1</u>
<u>6</u>	<u>Pre-school/Daycare</u>	<u>0.8</u>	<u>1.3</u>	<u>1.3</u>	<u>50</u>	<u>Residence Hall/Dormitory</u>	<u>1</u>	<u>1</u>	<u>1</u>
<u>3</u>	<u>Adult Education</u>	<u>0.8</u>	<u>1.3</u>	<u>1.3</u>	<u>52</u>	<u>Other - Lodging/Residential</u>	<u>1</u>	<u>1</u>	<u>1</u>
<u>7</u>	<u>Vocational School</u>	<u>0.8</u>	<u>1.3</u>	<u>1.3</u>	<u>55</u>	<u>Office</u>	<u>1</u>	<u>1</u>	<u>1.4</u>
<u>8</u>	<u>Other - Education</u>	<u>0.8</u>	<u>1.3</u>	<u>1.3</u>	<u>56</u>	<u>Veterinary Office</u>	<u>1</u>	<u>1</u>	<u>1.5</u>
<u>18</u>	<u>Other - Recreation</u>	<u>0.8</u>	<u>1.5</u>	<u>1.5</u>	<u>59</u>	<u>Courthouse</u>	<u>1</u>	<u>1</u>	<u>1.4</u>
<u>19</u>	<u>Social/Meeting Hall</u>	<u>0.8</u>	<u>1.5</u>	<u>1.5</u>	<u>62</u>	<u>Library</u>	<u>0.7</u>	<u>1.5</u>	<u>1.5</u>
<u>29</u>	<u>Convenience Store with Gas Station</u>	<u>1</u>	<u>1</u>	<u>1.4</u>	<u>63</u>	<u>Mailing Center/Post Office</u>	<u>0.7</u>	<u>1.5</u>	<u>1.5</u>
<u>30</u>	<u>Convenience Store without Gas Station</u>	<u>1</u>	<u>1</u>	<u>1.4</u>	<u>61</u>	<u>Fire Station</u>	<u>0.8</u>	<u>0.8</u>	<u>1.1</u>
<u>31</u>	<u>Fast Food Restaurant</u>	<u>0.4</u>	<u>1.1</u>	<u>2.1</u>	<u>64</u>	<u>Police Station</u>	<u>0.8</u>	<u>0.8</u>	<u>1.1</u>
<u>32</u>	<u>Restaurant</u>	<u>0.4</u>	<u>1.1</u>	<u>2.1</u>	<u>68</u>	<u>Worship Facility</u>	<u>0.9</u>	<u>1.7</u>	<u>1.7</u>
<u>33</u>	<u>Other - Restaurant/Bar</u>	<u>0.4</u>	<u>1.1</u>	<u>2.1</u>	<u>69</u>	<u>Automobile Dealership</u>	<u>0.8</u>	<u>1.2</u>	<u>1.8</u>
<u>34</u>	<u>Supermarket/Grocery Store</u>	<u>1</u>	<u>1</u>	<u>1.4</u>	<u>70</u>	<u>Enclosed Mall</u>	<u>0.8</u>	<u>1.2</u>	<u>1.8</u>
<u>35</u>	<u>Wholesale Club/Supercenter</u>	<u>1</u>	<u>1</u>	<u>1.4</u>	<u>71</u>	<u>Lifestyle Center</u>	<u>0.8</u>	<u>1.2</u>	<u>1.8</u>
<u>36</u>	<u>Food Sales</u>	<u>1</u>	<u>1</u>	<u>1.4</u>	<u>72</u>	<u>Strip Mall</u>	<u>0.8</u>	<u>1.2</u>	<u>1.8</u>
<u>37</u>	<u>Food Service</u>	<u>1</u>	<u>1</u>	<u>1.4</u>	<u>73</u>	<u>Other - Mall</u>	<u>0.8</u>	<u>1.2</u>	<u>1.8</u>
<u>38</u>	<u>Ambulatory Surgical Center</u>	<u>1</u>	<u>1</u>	<u>1.5</u>	<u>74</u>	<u>Retail Store</u>	<u>0.8</u>	<u>1.2</u>	<u>1.8</u>
<u>39</u>	<u>Hospital (General Medical & Surgical)</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>76</u>	<u>Personal Services (Health/Beauty, Dry Clean- ing, etc)</u>	<u>0.7</u>	<u>1.5</u>	<u>1.5</u>
<u>40</u>	<u>Other/Specialty Hospital</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>77</u>	<u>Repair Services (Vehicle, Shoe, Locksmith, etc)</u>	<u>0.7</u>	<u>1.5</u>	<u>1.5</u>
<u>41</u>	<u>Residential Care Facility</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>78</u>	<u>Other - Services</u>	<u>0.7</u>	<u>1.5</u>	<u>1.5</u>
<u>42</u>	<u>Outpatient Rehabilita- tion/Physical Therapy</u>	<u>1</u>	<u>1</u>	<u>1.5</u>	<u>83</u>	<u>Self-Storage Facility</u>	<u>1</u>	<u>1</u>	<u>1</u>
<u>43</u>	<u>Senior Care Community</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>84</u>	<u>Distribution Center</u>	<u>0.7</u>	<u>1.4</u>	<u>2.1</u>
<u>44</u>	<u>Barracks</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>85</u>	<u>Non-Refrigerated Ware- house</u>	<u>0.7</u>	<u>1.4</u>	<u>2.1</u>
<u>45</u>	<u>Hotel</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>86</u>	<u>Refrigerated Warehouse</u>	<u>1</u>	<u>1</u>	<u>1</u>

Revise Section 10.1 as follows:

10.1 Compliance Requirements

10.1.1 Compliance Process. Residential *buildings* and dwelling units shall comply with the requirements of Section 10.4. Figure 10-1 illustrates the compliance process for residential *buildings* and dwelling units.

10.1.2 This section applies to individual dwelling and housing units that are covered under the Residential Energy Consumption Survey (RECS) ⁴ administered by the EIA and identified in table 10-1. ~~by activities numbered 51 through 55 in Table 7-1.~~

10.1.3 This section includes the following.

10.1.3.1 Attached/detached single-family houses.

10.1.3.2 Manufactured and modular housing units and mobile homes.

10.1.3.3 Individual dwelling units, such as apartments or condominiums, within multifamily housing *buildings* (when addressed separately from common areas), provided that all energy used in a dwelling unit is metered separately for that dwelling unit.

10.1.4 Multifamily *buildings* without separate dwelling unit metering for all energy sources, or in jurisdictions where whole *building* data is available from the utility company, are covered by the commercial sections of this standard in Sections 4 and 7 as *building type* 48, Multifamily Housing. ~~All other residential *buildings*, including multifamily housing unit common areas as well as those units without separate dwelling unit metering, are covered by the commercial sections of this standard in Sections 4 and 7 as *building type* 53.~~

10.1.5 ~~Barracks and dormitories are covered in Sections 4 and 7 as *building type* 35.~~ Barracks. Dormitories are covered in Sections 4 and 7 as *building type* Residence Hall/Dormitory. Other housing may be covered in sections 4 and 7 as *building type* Other - Lodging/Residential.

10.1.6 A multifamily *residential building* or an individual dwelling unit can be granted *conditional compliance* for up to 15 months following completion of Sections 10.2, 10.3, 10.4, 10.5, and 10.6. Within 15 months, the *building* or dwelling unit is reevaluated for its *energy use intensity (EUI)*, and the *conditional compliance* either becomes full compliance or is revoked and the *building* does not comply with the standard.

10.1.7 The timeline for compliance is shown in Informative Appendix D.

10.1.8 Compliance forms for reporting compliance to the *authority having jurisdiction (AHJ)* are found in Normative Appendix A.

Revise Sections 10.3.5 and 10.3.6 as follows:

10.3.5 The *EUI* and *EUI target* shall be reported on Form A. Compliance with this standard requires that the *building* annual gross energy consumption be less than or equal to the intensity value for the *building* types and *building* climate zone as listed in Table 10-1. ~~calculated per Section 7.2.~~

Exception to 10.3.5: The *AHJ* may adopt alternate *EUI targets*, such as those in Normative Appendix B, as desired.

Informative Note: Residential *EUI targets* listed in Table 10-1. ~~Tables 7-2, 7-3, 7-5, and 7-6~~ were derived from RECS 2015 data and represent the 25th bottom (low energy) percentile of energy use by each *building* category. The median numbers for each *building* category from RECS data representing all *buildings* in the *building* type across all climatic conditions were extrapolated to 20 DOE climate zones using multipliers generated through simulation of a representative *building* for each group of *building* categories. Refer to Informative Appendix G for more information.

10.3.6 Comparing Performance. Compare *building EUI* using the data from Form A with the *EUI targets* listed in Table 10-1 ~~Tables 7-2 and 7-3 for single-use *buildings*.~~

Insert New Table 10-1a and 10-1b:

Table 10-1a Residential Unit Site Energy Use Intensity Targets (EUI_{IT}) (I-P)

		<u>EUIs by Building Type by Climate Zone (kBtu/ft²·yr)</u>																			
		<u>ASHRAE Climate Zone</u>																			
<u>No.</u>	<u>Residential Building Type</u>	<u>0A</u>	<u>0B</u>	<u>1A</u>	<u>1B</u>	<u>2A</u>	<u>2B</u>	<u>3A</u>	<u>3B Coast</u>	<u>3B Other</u>	<u>3C</u>	<u>4A</u>	<u>4B</u>	<u>4C</u>	<u>5A</u>	<u>5B</u>	<u>5C</u>	<u>6A</u>	<u>6B</u>	<u>7</u>	<u>8</u>
<u>D-1</u>	<u>Mobile home</u>	<u>37</u>	<u>37</u>	<u>29</u>	<u>36</u>	<u>30</u>	<u>30</u>	<u>36</u>	<u>26</u>	<u>32</u>	<u>25</u>	<u>45</u>	<u>37</u>	<u>41</u>	<u>52</u>	<u>44</u>	<u>49</u>	<u>61</u>	<u>53</u>	<u>70</u>	<u>87</u>
<u>D-2</u>	<u>Single-family detached</u>	<u>32</u>	<u>32</u>	<u>25</u>	<u>30</u>	<u>26</u>	<u>26</u>	<u>31</u>	<u>22</u>	<u>28</u>	<u>22</u>	<u>38</u>	<u>32</u>	<u>35</u>	<u>44</u>	<u>37</u>	<u>36</u>	<u>52</u>	<u>45</u>	<u>60</u>	<u>74</u>
<u>D-3</u>	<u>Single-family attached</u>	<u>30</u>	<u>30</u>	<u>23</u>	<u>28</u>	<u>24</u>	<u>24</u>	<u>29</u>	<u>20</u>	<u>26</u>	<u>20</u>	<u>36</u>	<u>29</u>	<u>32</u>	<u>41</u>	<u>35</u>	<u>42</u>	<u>48</u>	<u>42</u>	<u>56</u>	<u>69</u>
<u>D-4</u>	<u>Apartment (in 2 to 4 unit <i>building</i>)</u>	<u>35</u>	<u>35</u>	<u>27</u>	<u>33</u>	<u>28</u>	<u>28</u>	<u>33</u>	<u>24</u>	<u>30</u>	<u>24</u>	<u>42</u>	<u>34</u>	<u>38</u>	<u>48</u>	<u>41</u>	<u>61</u>	<u>56</u>	<u>49</u>	<u>65</u>	<u>80</u>
<u>D-5</u>	<u>Apartment (in 5+ unit <i>building</i>)</u>	<u>27</u>	<u>28</u>	<u>21</u>	<u>26</u>	<u>22</u>	<u>22</u>	<u>27</u>	<u>19</u>	<u>24</u>	<u>19</u>	<u>33</u>	<u>27</u>	<u>30</u>	<u>38</u>	<u>32</u>	<u>42</u>	<u>45</u>	<u>39</u>	<u>52</u>	<u>64</u>

Table 10-1b Residential Unit Site Energy Use Intensity Targets (EUI_{IT}) (SI)

		<u>EUIs by Building Type by Climate Zone (MJ/m²·yr)</u>																			
		<u>ASHRAE Climate Zone</u>																			
<u>No.</u>	<u>Residential Building Type</u>	<u>0A</u>	<u>0B</u>	<u>1A</u>	<u>1B</u>	<u>2A</u>	<u>2B</u>	<u>3A</u>	<u>3B Coast</u>	<u>3B Other</u>	<u>3C</u>	<u>4A</u>	<u>4B</u>	<u>4C</u>	<u>5A</u>	<u>5B</u>	<u>5C</u>	<u>6A</u>	<u>6B</u>	<u>7</u>	<u>8</u>
<u>D-1</u>	<u>Mobile home</u>	<u>424</u>	<u>425</u>	<u>328</u>	<u>404</u>	<u>343</u>	<u>341</u>	<u>411</u>	<u>290</u>	<u>369</u>	<u>289</u>	<u>514</u>	<u>422</u>	<u>462</u>	<u>592</u>	<u>501</u>	<u>556</u>	<u>693</u>	<u>604</u>	<u>797</u>	<u>984</u>
<u>D-2</u>	<u>Single-family detached</u>	<u>360</u>	<u>361</u>	<u>279</u>	<u>343</u>	<u>292</u>	<u>290</u>	<u>349</u>	<u>247</u>	<u>313</u>	<u>245</u>	<u>437</u>	<u>359</u>	<u>392</u>	<u>502</u>	<u>426</u>	<u>409</u>	<u>589</u>	<u>513</u>	<u>677</u>	<u>835</u>
<u>D-3</u>	<u>Single-family attached</u>	<u>336</u>	<u>337</u>	<u>260</u>	<u>320</u>	<u>272</u>	<u>271</u>	<u>325</u>	<u>230</u>	<u>292</u>	<u>229</u>	<u>407</u>	<u>335</u>	<u>366</u>	<u>469</u>	<u>397</u>	<u>477</u>	<u>549</u>	<u>478</u>	<u>632</u>	<u>780</u>
<u>D-4</u>	<u>Apartment (in 2 to 4 unit <i>building</i>)</u>	<u>392</u>	<u>393</u>	<u>303</u>	<u>374</u>	<u>318</u>	<u>316</u>	<u>380</u>	<u>269</u>	<u>341</u>	<u>267</u>	<u>475</u>	<u>391</u>	<u>427</u>	<u>547</u>	<u>463</u>	<u>693</u>	<u>641</u>	<u>558</u>	<u>737</u>	<u>909</u>
<u>D-5</u>	<u>Apartment (in 5+ unit <i>building</i>)</u>	<u>312</u>	<u>313</u>	<u>242</u>	<u>297</u>	<u>253</u>	<u>251</u>	<u>302</u>	<u>214</u>	<u>272</u>	<u>213</u>	<u>378</u>	<u>311</u>	<u>340</u>	<u>435</u>	<u>369</u>	<u>477</u>	<u>510</u>	<u>444</u>	<u>587</u>	<u>724</u>

INFORMATIVE APPENDIX G DERIVATION OF ENERGY INTENSITY TARGETS FOR STANDARD 100

All tables in this appendix are located as a downloadable spreadsheet at ashrae.org/100files.

EUI targets were determined using source data also used by EPA ENERGY STAR for reporting national median site EUI. We first developed the national median site EUI divided by *building* type, based on data described in G-datasources, and using a similar cleaning method as EPA has used for past development of national median site EUI. This analysis was performed by Anna Brannon. *Building* types were chosen to align with ENERGY STAR Portfolio Manager Building Types. Many *building* types have the same reference dataset. Where it appeared that the *building* types did not have enough resemblance of the source data type, those *building* types were removed from table 7-2 but still appear in the G-tables referenced in this appendix.

The median EUI is multiplied by climate zone multipliers shown in Table G-CZ. Climate zone multipliers were developed by Grant Sheely, NBI, using PNNL work on *building* end uses for 90.1-2022. https://public.tableau.com/app/profile/doe-beep/viz/End-UseBreakdownAnalysisStandard90_1-2022_17053799230440/End-Use. Climate zone multipliers are the EUI of a *building* in each climate zone divided by the national average EUI, based on modeling of 90.1-2022 compliant *building* stock. Because the multipliers are for a limited number of *building* types, each *building* type was mapped to a climate zone multiplier category and is documented in Table G-datasources.

The median EUI by climate zone is then adapted to a specific percentile using percentile ratios (Table G-PR) developed by Ryan Meyer, West Monroe, using DOE ComStock datasets. Percentile ratios are the EUI of a specific percentile of all *buildings* of a specific type as modeled within ComStock divided by the median EUI of that *building* type. Again, multipliers are for a limited number of *building* types. The mapping from each *building* type to percentile ratio category is shown in Table G-DataSources.

The default percentile of 25% is used within the body of the standard, but percentile ratios for every 10th and 25th percentile are available through Table G-EUItCalc and Table G-GHGItCalc.

Fractional electricity EUIs are determined by multiplying the *EUI targets* by the fuel mix for that climate zone and *building* category. The fuel mix numbers are based on the percentage of site EUI attributed to electricity use in the average *building* for that climate zone. Fractional fossil fuel EUIs are determined by multiplying the *EUI targets* by 1-fuel mix for that climate zone and *building* category.

GHGI targets are created by multiplying the fractional electricity EUIs by the GHG emissions factor for grid electricity and adding the fractional fossil fuel EUI multiplied by the GHG emissions factor for grid natural gas.

Dwelling unit-only targets and schedule multipliers were developed prior to the aforementioned tables via the following methodology.

The 2015, 2018, and 2024 default target tables were originally developed ~~These analyses were originally conducted~~ by Terry R. Sharp of Oak Ridge National Laboratory (ORNL) in collaboration with the ANSI/ASHRAE/IES Standard 100 committee and Dr. Alexander Zhivov, the working group chair responsible for targets development, and are reproduced here with permission of ORNL. Much of the text of the original report has been replaced or modified by ASHRAE since its initial inclusion.

Tables G-6 and G-7 illustrates ~~example building energy efficiency targets in the form of total building energy use intensities (EUIs) (measured in kBtu/ft²-yr). Table G-6~~ G-4 shows the *site energy*-based *building* total energy use efficiency targets from Table 7-2. Table G-7 Table G-x shows the *source energy*-based equivalent values of Table 7-3. 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.

Notes:-

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*).
 1. ~~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 N15 for additional information). This is sometimes an important consideration because as much as three 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.
- The summary that follows provides an overview of the strategy used to derive the site and *source energy* targets in Standard 100 (Tables G-6 and G-7, respectively).

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

In this step, national *EUIs* (in kBtu/ft²·yr) were derived via analysis of the Energy Information Administration’s Commercial Buildings Energy Consumption Survey (CBECS) N12. 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 51 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 G-6 and G-7). ASHRAE climate zones are shown in Figure E-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) N16 for 16 different climate zones (Figure E-1). 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).

Notes:

1. 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.
2. The 16 different climate zones referenced in this document comprise the 8 zones shown in Figure E-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.

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 Griffith et al. 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 NREL for 16 different climate zones. These ratios are shown in Table G-1 and were used to derive zonal *EUIs* by *building* type by multiplying them by the CBECS RECSnational median *EUIs*. This step produced the site-based *building* total *EUIs* by *building* type and climate zone in Table G-3. A similar method was used to derive the zonal *EUIs* for *residential building* types using the RECS database, also listed in Table G-3.

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 *EUI 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 *EUI targets* by *building* type for each climate zone had been established.

These are the values provided in Table 10-1 G-6 and G-7, ~~equivalent but accounted for on a different basis.~~

~~In this way, high performance *EUI targets* were established by *building* type for each climate zone.~~

~~These results are summarized in Table G-4.~~

Step 3: Develop Schedule Multipliers

Beyond floor area, another major driver of energy use in *buildings* for many types of commercial *buildings* is operating hours. Table G-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 G-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: (a) 50 or fewer weekly operating hours, (b) 168 operating hours, and (c) 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 G-5.