BSR/ASHRAE/IES Addendum c
to ANSI/ASHRAE/IES Standard 100-2024

Public Review Draft

Proposed Addendum c to Standard 100-2024, Energy and Emissions Building Performance Standard for Existing Buildings

First Public Review (January 2025)
(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).

This standard is under continuous maintenance. To propose a change to the current standard, use the change submittal form available on the ASHRAE website, www.ashrae.org.

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(This foreword is not part of this standard. It is merely informative and does not contain requirements necessary for conformance to the standard. It has not been processed according to the ANSI requirements for a standard and may contain material that has not been subject to public review or a consensus process. Unresolved objectors on informative material are not offered the right to appeal at ASHRAE or ANSI.)

FOREWORD

This addendum revises the contents to Section 7.1.2 and 7.1.3 as well as NORMATIVE APPENDIX B to add U.S. Regional Tables for Source Energy Use Intensity Targets and Greenhouse Gas Emissions Intensity (GHGI) Targets to the normative section of the standard to provide Authority Having Jurisdiction (AHJ) organizations or local communities in the U.S. with an option to use regional performance target values. The values shown in these tables were reviewed and approved in ASHRAE Standard 100-2024.

Once this addendum has been published, the new tables will be added in the form of a downloadable spreadsheet on www.ashrae.org/100files. **During this public review period, the tables can be accessed at https://tinyurl.com/3wx89aca**

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.

Addendum c to Std. 100-2024

Modify Section 7 as follows:

7. ENERGY USE AND GREENHOUSE GAS EMISSIONS ANALYSIS AND TARGET REQUIREMENTS

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

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7.1.2 Energy Use Intensity Targets *Energy targets* based on *site energy* are shown in Table 7-2a in both I-P and SI units. *Energy targets* based on *source energy* are shown in Table 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 *energy target* calculations by *authorities having jurisdiction*.

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 4 (RECS) 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.

7.1.2.1 Source Energy Use Intensity Targets with Regional Conversion Factors. When an AHJ or a local community uses U.S. Regional Electricity Source Energy Conversion Factors in Table 5-3, the Source Energy Use Intensity (EUI) targets shall be the corresponding EUI targets from Table B2, available in section B2 of the Normative Appendix B Alternative Energy Intensity Targets.

7.1.2.~~1~~2 Source Energy Use Intensity Targets with Custom Source Energy Conversion Factors.

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7.1.3 Greenhouse Gas Intensity Targets. *GHGI targets* are shown in Table 7-4 in both I-P and SI units. *GHGI targets* were derived from *EUI targets* based on *site energy* as described in Section 7.1.2 using the GHG conversion factors shown in Table 5-2.

All *greenhouse gas intensity (GHGI) targets* were derived from 2012 Commercial Building Energy Consumption Survey (CBECS) 3 and 2015 Residential Energy Consumption Survey 4 (RECS) 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 numbers for each building category were derived from CBECS and RECS data representing all buildings in the building type/activity across all climatic conditions 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.

7.1.3.1 Greenhouse Gas Intensity (GHGI) Targets with Regional Conversion Factors. When an *AHJ* or a local community uses U.S. Regional Electricity Greenhouse Gas Intensity Factors in Table 5-4, the *GHGI targets* shall be the corresponding *GHGI* targets from Table B2, available in section B2 of the Normative Appendix B Alternative Energy Intensity Targets.

7.1.3.~~1~~2 Greenhouse Gas Intensity Targets with Custom Greenhouse Gas Emission Conversion Factors

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Add section to Normative Appendix B as follows:

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B2. ENERGY USE INTENSITY (EUI) AND GREENHOUSE GAS INTENSITY (GHGI) REGIONAL TARGETS TABLES. The region-specific EUI and GHGI targets Tables are available at www.ashrae.org/100files.

Table B2

		Source EUI (IP units)	Source EUI (SI units)	GHGI (IP units)	GHGI (SI units)
AKGD	ASCC Alaska Grid	B2-EUI-AKGD-IP	B2-EUI-AKGD-SI	B2-GHGI-AKGD-IP	B2-GHGI-AKGD-SI
AKMS	ASCC Miscellaneous	B2-EUI-AKMS-IP	B2-EUI-AKMS-SI	B2-GHGI-AKMS-IP	B2-GHGI-AKMS-SI
ERCT	ERCOT All	B2-EUI-ERCT-IP	B2-EUI-ERCT-SI	B2-GHGI-ERCT-IP	B2-GHGI-ERCT-SI
FRCC	FRCC All	B2-EUI-FRCC-IP	B2-EUI-FRCC-SI	B2-GHGI-FRCC-IP	B2-GHGI-FRCC-SI
HIMS	HICC Miscellaneous	B2-EUI-HIMS-IP	B2-EUI-HIMS-SI	B2-GHGI-HIMS-IP	B2-GHGI-HIMS-SI
HIOA	HICC Oahu	B2-EUI-HIOA-IP	B2-EUI-HIOA-SI	B2-GHGI-HIOA-IP	B2-GHGI-HIOA-SI
MROE	MRO East	B2-EUI-MROE-IP	B2-E		
MROW	MRO West	B2-EUI-MROW-IP	B2-E		
NYLI	NPCC Long Island	B2-EUI-NYLI-IP	B2-E		
NEWE	NPCC New England	B2-EUI-NEWE-IP	B2-E		
NYCW	NPCC NYC/Westchest	B2-EUI-NYCW-IP	B2-E		
NYUP	NPCC Upstate NY	B2-EUI-NYUP-IP	B2-E		
RFCE	RFC East	B2-EUI-RFCE-IP	B2-E		
RFCM	RFC Michigan	B2-EUI-RFCM-IP	B2-E		
RFCW	RFC West	B2-EUI-RFCW-IP	B2-E		
SRMW	SERC Midwest	B2-EUI-SRMW-IP	B2-EUI-SRMW-SI	B2-GHGI-SRMW-IP	B2-GHGI-SRMW-SI
SRMV	SERC Mississippi Val	B2-EUI-SRMV-IP	B2-EUI-SRMV-SI	B2-GHGI-SRMV-IP	B2-GHGI-SRMV-SI
SRSO	SERC South	B2-EUI-SRSO-IP	B2-EUI-SRSO-SI	B2-GHGI-SRSO-IP	B2-GHGI-SRSO-SI
SRTV	SERC Tennessee Vall	B2-EUI-SRTV-IP	B2-EUI-SRTV-SI	B2-GHGI-SRTV-IP	B2-GHGI-SRTV-SI
SRVC	SERC Virginia/Carolin	B2-EUI-SRVC-IP	B2-EUI-SRVC-SI	B2-GHGI-SRVC-IP	B2-GHGI-SRVC-SI
SPNO	SPP North	B2-EUI-SPNO-IP	B2-EUI-SPNO-SI	B2-GHGI-SPNO-IP	B2-GHGI-SPNO-SI
SPSO	SPP South	B2-EUI-SPSO-IP	B2-EUI-SPSO-SI	B2-GHGI-SPSO-IP	B2-GHGI-SPSO-SI
CAMX	WECC California	B2-EUI-CAMX-IP	B2-EUI-CAMX-SI	B2-GHGI-CAMX-IP	B2-GHGI-CAMX-SI
NWPP	WECC Northwest	B2-EUI-NWPP-IP	B2-EUI-NWPP-SI	B2-GHGI-NWPP-IP	B2-GHGI-NWPP-SI
RMPA	WECC Rockies	B2-EUI-RMPA-IP	B2-EUI-RMPA-SI	B2-GHGI-RMPA-IP	B2-GHGI-RMPA-SI
AZNM	WECC Southwest	B2-EUI-AZNM-IP	B2-EUI-AZNM-SI	B2-GHGI-AZNM-IP	B2-GHGI-AZNM-SI

Available during public review at
https://tinyurl.com/3wx89aca

Informative notes:

1. *The tables show all climate zones; however, each e-GRID subregion will not be applicable to all climate zones shown in the tables.*
2. *The Regional GHGI Conversion Factor and Regional Target tables were created by using Section 7.1.2.1 and Section 7.1.3.1 to apply the U.S. Regional electricity source and GHG factors (Tables 5-3 and 5-4).*

Informative Example: using Table B2 to determine Regional GHGI Conversion Factors and Regional Targets

A city buildings department (AHJ), located in Central Texas, decides to substitute the national grid electricity GHG emissions conversion factor in Table 5-2 with the appropriate regional factor in Table 5-4. The AHJ follows these steps:

1. The AHJ first determines the eGRID subregion for their area by searching for the applicable zip codes of their area within the EPA Power Profiler (https://www.epa.gov/egrid/power-profiler#/). The AHJ determines that the entire city is within the eGRID subregion of ERCT.
2. The AHJ is using IP units and their area is in climate zone 3A.
3. The AHJ substitutes the Grid electricity source energy conversion factor in table 5-2 (2.74) with the Source Energy Conversion Factor – Captured Energy Efficiency Approach for ERCT in Table 5-3 (2.51).
4. The AHJ substitutes the Greenhouse Gas Emissions Factor, GWP100 in Table 5-2 (0.326 lb CO2e/kBtu) with the IP ERCT number in Table 5-4 (0.328 lb CO2e/kBtu).
5. The AHJ locates the tables by opening Table B2 at www.ashrae.org/100files, and finding the tabs named B2-EUI-ERCT-IP and B2-GHGI-ERCT-IP.
6. The AHJ requires that buildings use tables B2-EUI-ERCT-IP and B2-GHGI-ERCT-IP for their EUI and GHGI targets.

In the above example, a qualified person determines the compliance for a high school located in Central Texas (climate zone 3A), where the AHJ has specified to use the eGRID subregion conversion factors for source EUI and GHGI calculations. The high school is 10,000 SF, with 400,000 kBtu/yr of grid electricity use and 100,000 kBtu/yr of grid natural gas use. The qualified person follows these steps:

1. The qualified person calculates the building's source EUI using the AHJ-specified conversion factors:
    a. 2.51 (Table 5-3 for ERCT, captured efficiency) for Source Energy for grid electricity x 400,000 kBtu/yr = 1,004,000 kBtu/yr Source Energy
    b. 1.09 (Table 5-2 for grid natural gas) for Source Energy for grid natural gas x 100,000 kBtu/yr = 109,000 kBtu/yr Source Energy
    c. Total Source Energy = 1,004,000 kBtu/yr + 109,000 kBtu/yr = 1,113,000 kBtu/yr
    d. Source EUI = 111.3 kBtu/SF/yr
2. The qualified person looks up the source EUI target within B2-EUI-ERCT-IP. They find the number corresponding to climate zone 3A and property type High School, 86 kBtu/SF/yr.
3. Summary: The building's source EUI is 111.3 kBtu/SF/yr and the target source EUI is 86 kBtu/SF/yr.
4. Next, the qualified person calculates the building's GHGI using the AHJ-specified conversion factors:
    a. 0.328 lb CO2e/kBtu (Table 5-4 for ERCT, IP units) for GHG for grid electricity x 400,000 kBtu/yr = 131,200 lb CO2e/kBtu
    b. 0.147 lb (Table 5-2 for grid natural gas) CO2e/kBtu for grid natural gas x 100,000 kBtu/yr = 14,700 lb CO2e/kBtu
    c. Total GHG emissions = 131,200 lb CO2e/kBtu + 14,700 lb CO2e/kBtu = 145,900 lb CO2e/kBtu
    d. GHGI = 14.59 lb CO2e/kBtu/SF/yr
5. The qualified person looks up the source EUI target within B2-EUI-ERCT-IP. The qualified person finds the number corresponding to climate zone 3A and the property type, High School, is 63 kBtu/SF/yr.
    a. The building's GHGI is 14.59 lb CO2e/kBtu/SF/yr and the target GHGI is 11.3 lb CO2e/kBtu/SF/yr.

Alternate Option for Website:
The region-specific GHGI conversion factor and region-specific target tables are crafted using the guidelines set forth in Section 7.1.2.1 and Section 7.1.3.1, incorporating U.S. Regional electricity source and greenhouse gas (GHG) factors as specified in Tables 5-3 and 5-4. These tables provide region-specific methodologies that reflect the unique energy use patterns and GHG emissions of various subnational geographic areas. By leveraging robust datasets that capture building activity energy use at the state, province, or city level, the tables account for diverse climate zones and distinct building archetypes within each region. Consequently, the resulting site or source energy use intensity (EUI) and greenhouse gas intensity (GHGI) metrics in these tables may vary from other methodologies presented in the ANSI/ASHRAE/IES Standard 100 tables in Section 7 for comparable climate zones. These region-specific conversion factors and region-specific targets allow local jurisdictions to use local, accurate and relevant benchmarks for energy performance and GHG emissions reduction, tailored to their regional characteristics.