

STANDARD

**ANSI/ASHRAE/IES Addendum d to
ANSI/ASHRAE/IES Standard 100-2018**

Energy Efficiency in Existing Buildings

Approved by the ASHRAE Standards Committee on June 24, 2023; by the Illuminating Engineering Society on January 28, 2023; and by the American National Standards Institute on July 25, 2023.

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FOREWORD

Addendum d adds U.S. regional energy conversion factors to the normative section of the standard that provides authorities having jurisdiction with the option to use regional U.S. energy conversion factor values for electricity. The values shown in the new table were reviewed and approved in ANSI/ASHRAE Standard 105-2021, Standard Methods of Determining, Expressing, and Comparing Building Energy Performance and Greenhouse Gas Emissions.

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

Addendum d to Standard 100-2018

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

3. DEFINITIONS

[...]

source energy: site energy plus the estimated energy consumed or lost in the extraction, processing, and transportation of primary energy forms such as coal, oil, natural gas, biomass, and nuclear fuel; energy consumed in conversion to other energy forms; and energy consumed or lost in transmission and distribution to the building site. ~~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.~~

[...]

Modify Section 5 as shown. The remainder of Section 5 is unchanged.

5. ENERGY MANAGEMENT PLAN

[...]

5.2.3 Energy Conversion Factors. Site energy and source energy shall be calculated according to the following methods.

5.2.3.1 Site Energy Conversion Factors. The *site energy* content of different 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, the conversion factors in Table 5-2a shall be used. (See also Informative Annex K.)

Informative Note: Form C can be used to calculate *site energy*.

5.2.3.2 Source Energy Conversion Factors. Source energy shall be calculated per the following equation:

$$\text{Source Energy} = (\text{Site Energy} \times \text{SEF})_1 + (\text{Site Energy} \times \text{SEF})_2 + \dots + (\text{Site Energy} \times \text{SEF})_n$$

where

Site Energy_i = site energy associated with energy form i (where i equals 1 to n)

SEF_i = source energy conversion factor associated with energy form i (where i equals 1 to n)

The authority having jurisdiction shall be permitted to the following:

- Substitute the national electricity source energy conversion factor in Table 5-2b with the appropriate regional factor in Table 5-2c applicable to the building location.

- b. Substitute other *source energy* conversion factors for electricity and other energy forms following the processes and procedures incorporated within ANSI/ASHRAE Standard 105, *Standard Methods of Determining, Expressing and Comparing Building Energy Performance and Greenhouse Gas Emissions*
- c. Substitute other locally appropriate *source energy* conversion factors.

[...]

Modify Table 5-2b as shown. The remainder of Table 5-2b is unchanged.

Table 5-2b U.S. Source Energy ~~Primary Energy~~ Conversion Factors

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

Informative 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, *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.

Informative Note: Energy accounting and conversion factors shown in Tables 5-2b and 5-2c are based on *site energy* using conversion factors in Table 5-2a converted to *source energy* for buildings in the United States. Section 4.4.2 of this standard allows alternative *energy targets* established by the adopting *AHJ*. The *AHJ* may use the captured energy efficiency approach or the infinite energy efficiency approach for regional conversion factors. For further information about these approaches, see ANSI/ASHRAE Standard 105, Informative Appendix J and Informative Appendix K.

Table 5-2c U.S. Regional Electricity Source Energy Conversion Factors

<u>eGrid 2018 Subregion Acronym</u>	<u>eGrid 2018 Subregion Name</u>	<u>Source Energy Conversion Factor—Captured Energy Efficiency Approach</u>	<u>Source Energy Conversion Factor—Infinite Energy Efficiency Approach</u>
<u>AKGD</u>	<u>ASCC Alaska Grid</u>	<u>2.66</u>	<u>2.46</u>
<u>AKMS</u>	<u>ASCC Miscellaneous</u>	<u>1.91</u>	<u>1.21</u>
<u>ERCT</u>	<u>ERCOT All</u>	<u>2.51</u>	<u>2.31</u>
<u>FRCC</u>	<u>FRCC All</u>	<u>2.77</u>	<u>2.62</u>
<u>HIMS</u>	<u>HICC Miscellaneous</u>	<u>2.90</u>	<u>2.51</u>
<u>HIOA</u>	<u>HICC Oahu</u>	<u>3.51</u>	<u>3.06</u>
<u>MROE</u>	<u>MRO East</u>	<u>3.07</u>	<u>2.88</u>
<u>MROW</u>	<u>MRO West</u>	<u>2.69</u>	<u>2.35</u>
<u>NYLI</u>	<u>NPCC Long Island</u>	<u>3.36</u>	<u>2.79</u>
<u>NEWE</u>	<u>NPCC New England</u>	<u>2.77</u>	<u>2.26</u>
<u>NYCW</u>	<u>NPCC NYC/Westchester</u>	<u>2.94</u>	<u>2.88</u>
<u>NYUP</u>	<u>NPCC Upstate NY</u>	<u>2.23</u>	<u>1.72</u>
<u>RFCE</u>	<u>RFC East</u>	<u>2.95</u>	<u>2.83</u>
<u>RFCM</u>	<u>RFC Michigan</u>	<u>2.97</u>	<u>2.82</u>
<u>RFCW</u>	<u>RFC West</u>	<u>3.08</u>	<u>3.01</u>

Informative Note: Energy accounting and conversion factors shown in Tables 5-2b and 5-2c are based on *site energy* using conversion factors in Table 5-2a converted to *source energy* for buildings in the United States. Section 4.4.2 of this standard allows alternative *energy targets* established by the adopting *AHJ*. The *AHJ* may use the captured energy efficiency approach or the infinite energy efficiency approach for regional conversion factors. For further information about these approaches, please see ANSI/ASHRAE Standard 105.

Table 5-2c U.S. Regional Electricity Source Energy Conversion Factors (Continued)

eGrid 2018 Subregion Acronym	eGrid 2018 Subregion Name	Source Energy Conversion Factor—Captured Energy Efficiency Approach	Source Energy Conversion Factor—Infinite Energy Efficiency Approach
<u>SRMW</u>	<u>SERC Midwest</u>	<u>3.14</u>	<u>3.08</u>
<u>SRMV</u>	<u>SERC Mississippi Valley</u>	<u>2.78</u>	<u>2.71</u>
<u>SRSO</u>	<u>SERC South</u>	<u>2.86</u>	<u>2.72</u>
<u>SRTV</u>	<u>SERC Tennessee Valley</u>	<u>2.94</u>	<u>2.81</u>
<u>SRVC</u>	<u>SERC Virginia/Carolina</u>	<u>2.99</u>	<u>2.81</u>
<u>SPNO</u>	<u>SPP North</u>	<u>2.67</u>	<u>2.37</u>
<u>SPSO</u>	<u>SPP South</u>	<u>2.61</u>	<u>2.31</u>
<u>CAMX</u>	<u>WECC California</u>	<u>2.07</u>	<u>1.55</u>
<u>NWPP</u>	<u>WECC Northwest</u>	<u>1.93</u>	<u>1.28</u>
<u>RMPA</u>	<u>WECC Rockies</u>	<u>2.59</u>	<u>2.27</u>
<u>AZNM</u>	<u>WECC Southwest</u>	<u>2.87</u>	<u>2.71</u>

Informative Note: Energy accounting and conversion factors shown in Tables 5-2b and 5-2c are based on *site energy* using conversion factors in Table 5-2a converted to *source energy* for buildings in the United States. Section 4.4.2 of this standard allows alternative *energy targets* established by the adopting *AHJ*. The *AHJ* may use the captured energy efficiency approach or the infinite energy efficiency approach for regional conversion factors. For further information about these approaches, please see ANSI/ASHRAE Standard 105.

Modify Section 7 as shown. The remainder of Section 7 is unchanged.

7. ENERGY-USE ANALYSIS AND TARGET REQUIREMENTS

[...]

7.1.2 Energy Targets. [...]

7.1.2.1 Source Energy Targets with Custom Source Energy Conversion Factors. When an *AHJ* uses a custom source energy conversion factor (any factors other than those in Table 5-2b), it shall use Tables 7-2c and 7-2d to generate *source energy* targets in conjunction with the *source energy* conversion factors used to calculate *source energy* in Section 5.2. Performance targets shall be calculated using the following equation:

$$EUI_{t1} = (ELUI_{t1} \times SEF_{el}) + (FEUI_{t1} \times SEF_{fe})$$

where

$ELUI_{t1}$ = electricity use target *EUI* from Table 7-2c

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

$FEUI_{t1}$ = fossil fuel *energy use target EUI* from Table 7-2d

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

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*.

Modify Section 11 as shown.

ASHRAE. 2021. ANSI/ASHRAE Standard 105. *Standard Methods of Determining, Expressing, and Comparing Building Energy Performance and Greenhouse Gas Emissions*. Peachtree Corners, GA: ASHRAE.

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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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