





*Strike Section 602 of the International Green Construction Code in its entirety and insert new Section 602 in the Green Construction Code as follows.*

## **SECTION 602 MODELED PERFORMANCE PATHWAY REQUIREMENTS**

**602.1 Performance-based compliance.** Compliance for buildings and their sites to be designed on a performance basis shall be determined by predictive modeling. Predictive modeling shall use source energy kBtu/sf.-y unit measure based on compliance with Section 602.1.1 ~~and CO<sub>2</sub>e emissions in Section 602.3.~~ Where a building has mixed uses, all uses shall be included in the performance-based compliance.

**602.1.1 zEPI.** Performance-based designs shall demonstrate a zEPI of not more than 51 as determined in accordance with Equation 6-1 for energy use reduction ~~and shall demonstrate a CO<sub>2</sub>e emissions reduction in accordance with Section 602.2 and Equation 6-2 for CO<sub>2</sub>e.~~

$$zEPI = 57 \times (EUI_p/EUI) \quad \text{(Equation 6-1)}$$

Where:

EUI<sub>p</sub> = the proposed energy use index in source kBtu/sfy for the proposed design of the building and its site calculated in accordance with Section 602.1.2.

EUI = the base annual energy use index in source kBtu/sf-y for a baseline building and its site calculated in accordance with Section 602.1.2.

**602.1.2 Base annual energy use index.** The proposed energy use index (EUI<sub>p</sub>) of the building and building site shall be calculated in accordance with Equation 6-1 and Appendix G to ASHRAE 90.1, as modified by this. Sections 602.1.2.1 through 602.1.2.3. The annual energy use shall include all energy used for building functions and its anticipated occupancy.

### **602.1.2.1 Modifications to Appendix G of ASHRAE**



**90.1.** The performance rating in Section G1.2 of ASHRAE 90.1 shall be based on energy use converted to consistent units in accordance with Sections 602.1.2.2 and 602.1.2.3, instead of energy cost.

**602.1.2.2 Electric power.** In calculating the annual energy use index, electric energy used shall be consistent units by converting the electric power use at the utility meter or measured point of delivery to Btus and multiplying by the conversion factor in Table 602.1.2.1 based on the geographical location of the building.

**TABLE 602.1.2.1  
ELECTRICITY GENERATION ENERGY CONVERSION FACTORS  
BY EPA eGRID SUB-REGION<sup>a</sup>**

**TABLE 602.1.2.1  
ELECTRICITY GENERATION ENERGY CONVERSION FACTORS  
BY EPA eGRID SUB-REGION<sup>a</sup>**

eGRID 2007 Sub-region Acronym	eGRID 2007 Sub-region Name	Energy Conversion Factor
AKGD	ASCC Alaska Grid	2.97
AKMS	ASCC Miscellaneous	1.76
ERCT	ERCOT All	2.93
FRCC	FRCC All	2.97
HIMS	HICC Miscellaneous	3.82
HIOA	HICC Oahu	3.14
MORE	MRO East	3.40
MROW	MRO West	3.41
NYLI	NPCC Long Island	3.20
NEWE	NPCC New England	3.01
NYCW	NPCC NYC/Westchester	3.32
NYUP	NPCC Upstate NY	2.51
RFCE	RFC East	3.15
RFCM	RFC Michigan	3.05
RFCW	RFC West	3.14
SRMW	SERC Midwest	3.24
SRMV	SERC Mississippi Valley	3.00
SRSO	SERC South	3.08
SRTV	SERC Tennessee Valley	3.11
SRVC	SERC Virginia/Carolina	3.13
SPNO	SPP North	3.53
SPSO	SPP South	3.05
CAMX	WECC California	2.61
NWPP	WECC Northwest	2.26
RMPA	WECC Rockies	3.18
AZNM	WECC Southwest	2.95

**602.1.2.3 Non-renewable energy.** In calculating the



annual energy use index, for fuel other than electrical power, energy use shall be converted to consistent units by multiplying the non-renewable energy fossil fuel use at the utility *meter* or measured point of delivery to Btu's and multiplying by the conversion factor in Table 602.1.2.2. ~~The conversion factor for energy sources not included in Table 602.1.2.2 shall be 1.1. Conversion factors for purchased district heating shall be 1.35 for hot water and 1.45 for steam. The conversion factor for district cooling shall be 0.33 times the value in Table 602.1.2.1 based on the EPA eGRID Sub-region in which the *building* is located.~~

**TABLE 602.1.2.2  
U.S. AVERAGE BUILDING FUELS ENERGY CONVERSION  
FACTORS BY FUEL TYPE<sup>a</sup>**

**TABLE 602.1.2.2  
U.S. AVERAGE BUILDING FUELS ENERGY CONVERSION  
FACTORS BY FUEL TYPE<sup>a</sup>**

Fuel Type	Energy Conversion Factor
Natural Gas	1.09
Fuel Oil	1.13
LPG	1.12

<u>Fuel Type</u>	<u>Energy Conversion Factor</u>
<u>Natural Gas</u>	<u>1.09</u>
<u>Fuel Oil</u>	<u>1.13</u>
<u>LPG</u>	<u>1.12</u>
<u>Purchased heat (hot water)</u>	<u>1.35</u>
<u>Purchased heat (steam)</u>	<u>1.45</u>
<u>District cooling</u>	<u>1.033</u>
<u>Other</u>	<u>1.1</u>

**602.1.3 Registered design professional in responsible charge of building energy simulation.** For purposes of this section, and where it is required that documents be prepared by a registered design professional, the code official is authorized to require the owner to engage and designate on the building permit application a registered design professional who shall act as the registered design professional in responsible charge of building energy simulation. Modelers engaged by the registered design professional in responsible charge of building energy simulation shall



be certified by an approved accrediting entity. Where the circumstances require, the owner shall designate a substitute registered design professional in responsible charge of building energy simulation who shall perform the duties required of the original registered design professional in responsible charge of building energy simulation. The code official shall be notified in writing by the owner whenever the registered design professional in responsible charge of building energy simulation is changed or is unable to continue to perform the duties.

~~**602.2 Annual direct and indirect CO<sub>2</sub>e emissions.** The CO<sub>2</sub>e emissions calculations for the building and building site shall be determined in accordance with Sections 602.2.1 and 602.2.2. The emissions associated with the proposed design shall be less than or equal to the CO<sub>2</sub>e emissions associated with the standard reference design in accordance with Equation 6-2.~~

~~$CO_2e_{pd} \geq (zEPI \times CO_2e_{srbd})/57$  (Equation 6-2)~~

Where:

~~zEPI = the minimum score in accordance with Section 602.1.1~~

~~CO<sub>2</sub>e<sub>pd</sub> = emissions associated with the proposed design~~

~~CO<sub>2</sub>e<sub>srbd</sub> = emissions associated with the standard reference budget design in accordance with Section 602.1.2~~

~~**602.2.1 On-site electricity.** Emissions associated with use of electric power shall be based on electric power excluding any renewable or recovered waste energy covered under Section 602.2.1 Emissions shall be calculated by converting the electric power used by the building at the electric utility meter or measured point of delivery, to MWHs, and multiplying by the CO<sub>2</sub>e conversion factor in Table 602.2.1 based on the EPA eGRID Sub-region in which the building is located.~~

~~**602.2.2 On-site non-renewable energy.** Emissions associated with the use of non-renewable energy sources other than electrical power such as natural gas, fuel oil, and propane shall be calculated by multiplying the fossil fuel~~



energy used by the building and its site at the utility meter by the national emission factors in Table 602.2.2 and the conversions required by this section. Emissions associated with fossil fuels not specified in Table 602.2.2 shall be calculated by multiplying the fossil fuel used by the building at the utility meter by 250. Emissions associated with purchased district energy shall be calculated by multiplying the energy used by the building at the utility meter by 150 for hot water and steam, and for district cooling, the factors from Table 602.2.2 based on the eGRID Subregion in which the building is located.

**TABLE 602.1.2.1  
ELECTRICITY EMISSION RATE BY EPA eGRID SUB-REGION<sup>a</sup>**

**TABLE 602.2.1  
ELECTRICITY EMISSION RATE BY EPA eGRID SUB-REGION<sup>a</sup>**

eGRID 2007 Sub-region Acronym	eGRID 2007 Sub-region Name	2005 CO <sub>2</sub> e Rate (lbs/MWh)
AKGD	ASCC Alaska Grid	1270
AKMS	ASCC Miscellaneous	515
ERCT	ERCOT All	1417
FRCC	FRCC All	1416
HIMS	HICC Miscellaneous	1595
HIOA	HICC Oahu	18591
MORE	MRO East	1971
MROW	MRO West	1957
NYLI	NPCC Long Island	1651
NEWE	NPCC New England	999
NYCW	NPCC NYC/Westchester	874
NYUP	NPCC Upstate NY	774
RFCE	RFC East	1224
RFCM	RFC Michigan	1680
RFCW	RFC West	1652
SRMW	SERC Midwest	1966
SRMV	SERC Mississippi Valley	1094
SRSO	SERC South	1601
SRTV	SERC Tennessee Valley	1623
SRVC	SERC Virginia/Carolina	1220
SPNO	SPP North	2106
SPSO	SPP South	1780
CAMX	WECC California	768
NWPP	WECC Northwest	958
RMPA	WECC Rockies	1999
AZNM	WECC Southwest	1391



**TABLE 602.2.2  
FOSSIL FUEL EMISSION FACTORS**

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<b>Emission Rate (lb/MMBtu HHV)</b>	<b>Natural Gas as Stationary Fuel</b>	<b>Fuel Oil as Stationary Fuel</b>	<b>Propane as Stationary Fuel</b>
CO <sub>2</sub> e	137.35	200.63	162.85

For SI: MMBtu = 1,000,000 Btu = 10 terms; HHV = High Heating value

**602.2.3 Annual direct and indirect CO<sub>2</sub>e emissions associated with on-site use of fossil fuels and purchased district energy.** Emissions associated with the use of natural gas, fuel oil and, propane shall be calculated by multiplying the natural gas, fuel oil, and propane delivered to the building at the utility meter by the corresponding emission factors in Table 602.2.1 Emissions associated with fossil fuels not listed shall be calculated by multiplying the fossil fuel delivered to the building at the utility meter by 250. Emissions associated with purchased district heating shall be calculated by multiplying the heating energy delivered to the building at the utility meter by 150 for hot water and steam, and for district cooling, the factors from Table 602.2.1 based on the eGRID Sub-region in which the building is located.