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602.1.2.1, Table 602.1.2.1, 602.2.1, Table 602.2.1

Proponent: Bridget Herring, Mathis Consulting Company, representing self

Revise as follows:

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.

TABLE 602.1.2.1
ELECTRICITY GENERATION ENERGY CONVERSION FACTORS BY EPA eGRID SUB-REGION[a]

eGRID ~~2007~~ SUB-REGION ACRONYM	eGRID ~~2007~~ SUB-REGION NAME	ENERGY CONVERSION FACTOR
AKGD	ASCC Alaska Grid	~~2.97~~ 3.41
AKMS	ASCC Miscellaneous	~~1.76~~ 3.27
ERCT	ERCOT All	~~2.93~~ 2.89
FRCC	FRCC All	~~2.97~~ 2.99
HIMS	HICC Miscellaneous	~~3.82~~ 3.61
HIOA	HICC Oahu	~~3.14~~ 3.53
~~MORE~~ MROE	MRO East	~~3.40~~ 3.21
MROW	MRO West	~~3.41~~ 3.63
NYLI	NPCC Long Island	~~3.20~~ 3.57
NEWE	NPCC New England	~~3.01~~ 2.80
NYCW	NPCC NYC/Westchester	~~3.32~~ 3.10
NYUP	NPCC Upstate NY	~~2.51~~ 2.82
RFCE	RFC East	~~3.15~~ 3.11
RFCM	RFC Michigan	~~3.05~~ 3.18
RFCW	RFC West	~~3.14~~ 3.26
SRMW	SERC Midwest	~~3.24~~ 3.46
SRMV	SERC Mississippi Valley	~~3.00~~ ~~3.15~~
SRSO	SERC South	~~3.08~~ 3.05
SRTV	SERC Tennessee Valley	~~3.11~~ 3.23
SRVC	SERC Virginia/Carolina	~~3.13~~ 3.14
SPNO	SPP North	~~3.53~~ 3.69
SPSO	SPP South	~~3.05~~ 3.31
CAMX	WECC California	~~2.61~~ 2.99

NWPP	WECC Northwest	~~2.26~~ 3.05
RMPA	WECC Rockies	~~3.18~~ 3.41
AZNM	WECC Southwest	~~2.95~~ 2.89

~~a. Sources: EPA eGrid2007 version 1.1, 2005 data; EPA eGrid regional gross grid loss factors; EIA Table 8.4a (Sum tables 8.4b and 8.4c) and Table 8.2c (Breakout of Table 8.2b), 2005 data.~~

602.2.1 Onsite 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_2e conversion factor in Table 602.2.1 based on the EPA eGRID Sub-region in which the building is located.

TABLE 602.2.1
ELECTRICITY EMISSION RATE BY EPA eGRID SUB-REGION[a]

eGRID ~~2007~~ SUB-REGION ACRONYM	eGRID ~~2007~~ SUB-REGION NAME	~~2005~~ CO_2e RATE (lbs/MWh)
AKGD	ASCC Alaska Grid	~~1270~~ 1647
AKMS	ASCC Miscellaneous	~~515~~ 1826
ERCT	ERCOT All	~~1417~~ 1449
FRCC	FRCC All	~~1416~~ 1579
HIMS	HICC Miscellaneous	~~1595~~ 2046
HIOA	HICC Oahu	~~18591~~ 2046
~~MORE~~ MROE	MRO East	~~1971~~ 2135
MROW	MRO West	~~1957~~ 2432
NYLI	NPCC Long Island	~~1651~~ 1678
NEWE	NPCC New England	~~999~~ 1402
NYCW	NPCC NYC/Westchester	~~874~~ 1408
NYUP	NPCC Upstate NY	~~774~~ 1584
RFCE	RFC East	~~1224~~ 1874
RFCM	RFC Michigan	~~1680~~ 2084
RFCW	RFC West	~~1652~~ 2463
SRMW	SERC Midwest	~~1966~~ 2463
SRMV	SERC Mississippi Valley	~~1094~~ 1504
SRSO	SERC South	~~1601~~ 1864
SRTV	SERC Tennessee Valley	~~1623~~ 2160
SRVC	SERC Virginia/Carolina	~~1220~~ 1923
SPNO	SPP North	~~2106~~ 2451
SPSO	SPP South	~~1780~~ 1818
CAMX	WECC California	~~768~~ 1294

eGRID ~~2007~~ SUB-REGION ACRONYM	eGRID ~~2007~~ SUB-REGION NAME	~~2005~~ CO_2e RATE (lbs/MWh)
NWPP	WECC Northwest	~~958~~ 1698
RMPA	WECC Rockies	~~1999~~ 2088
AZNM	WECC Southwest	~~1391~~ 1473

~~a. Sources: EPA eGRID2007 Version 1.1, 2005 data; EPA eGrid regional gross grid loss factor.~~

Reason: Changes in electricity consumption (such as those attributable to a new building complying with IgCC) are not distributed uniformly within or across the grid. For this reason, it is important to distinguish between electricity conversion factors for inventory purposes and conversion factors for investment purposes. Although average primary energy and emissions calculations may be suitable for inventory and benchmarking purposes, they do not necessarily provide accurate information when making competitive energy efficiency design or investment decisions. The regional average factors in the 2012 IgCC do not reflect the impact of these decisions on incremental primary energy consumption or pollutant emissions and can be even more misleading than national average factors in many situations. This is especially true for regions that have large fractions of hydropower or nuclear power. Marginal calculation methodologies are more accurate than either national or regional average calculations for evaluating the impacts of changes in electricity consumption, such as comparing new building energy efficiency design options or evaluating competing retrofit measures.

Keith and Biewald developed a methodology implemented by the EPA for calculating marginal (or non-baseload) power plant emission rates based on the capacity factor of each plant. EPA implemented this methodology in the eGRID database to list the emissions of "non-baseload" power plants for application in marginal generation scenarios and analyses. The Keith and Biewald non-baseload methodology was used in development of the primary energy and CO2e emission factors for each eGRID sub-region in this proposal. The attached document and conference paper in the bibliography each provide additional details on the use of marginal methodologies including the Keith and Biewald non-baseload methodology.

Bibliography:

EPA eGRID original data:
http://www.epa.gov/cleanenergy/energy-resources/egrid/index.html

Leslie, N. and Marek Czachorski. 2014. Options for Determining Marginal Primary Energy and Greenhouse Gas Emission Factors (NY-14-C057). ASHRAE Transactions, Vol. 120, pt.

1. Atlanta: American Society of Heating, Refrigerating and Air-conditioning Engineers, Inc.

Cost Impact: Will not increase the cost of construction.

GEW32-14: TABLE602.1.2.1-HERRING1014