Compliance Interpretation: Montgomery County Executive Regulation 12-20 Alternative Energy Performance Pathway for Green Globes for New Construction 2013

TO: Green Globes Users
Third-party Users in Montgomery County, Maryland

FROM: Micah I. Thomas, Sr. Director of Program Development & Compliance

CC: Green Globes Assessors
Green Globes Professionals

DATE: February 1, 2022

SUBJECT: Alternative Energy Performance pathway in Green Globes for New Construction 2013 for use in Montgomery County, MD

Green Building Initiative (GBI) issues this Compliance Interpretation for use of Green Globes in Montgomery County, Maryland, pursuant with compliance to Executive Regulation 12-20 Section 08.00.03.12. Montgomery County E.R. 12-20 specifies that any project utilizing an Alternative Compliance Path in Montgomery County must meet or exceed the published zEPI score identified in Section 701.5 of the Montgomery County Amended 2018 *International Green Construction Code*® (2018 IgCC®). This Compliance Interpretation guides project teams in meeting section 701.5 of the Montgomery County Amended 2018 IgCC with Green Globes for New Construction 2013 (NC 13).

GBI's Alternative Compliance Path for Montgomery County

GBI provides an Alternative Compliance Path (ACP) for project teams in Montgomery County to use Green Globes NC 13 for compliance with 2018 IgCC. Mandatory Green Globes criteria are identified in a separate *Green Globes NC 13 Montgomery County Criteria Checklist*, and projects must also achieve a minimum of 55% of all applicable points in Green Globes (Two Green Globes or higher).

This Compliance Interpretation supplements GBI's Checklist to guide project teams with meeting Section 701.5 of the Montgomery County Amended 2018 IgCC with Path E (#3.3.1.1.5.1) in Green Globes NC 13. Path E is separate from the other Energy Performance pathways in Green Globes and is intended for use only by projects located within Montgomery County, MD.

Projects in Montgomery County ***must*** complete Path E in Green Globes NC 13.

To obtain a copy of this Checklist and all documents for GBI's Montgomery County ACP, contact Sara Rademacher at sara@thegbi.org.

Green Globes Energy Performance-Based Compliance Overview

Project teams using GBI's Alternative Compliance Path for Montgomery County must meet or improve on zEPI score and CO_2e emissions targets as specified in the amended code (see amendments below). These must be determined by predictive modeling of both energy performance and CO_2e emissions.

Use *Green Globes Montgomery County Performance Calculator* for the necessary calculations and to identify whether the $zEPI_{target}$ has been met and annual CO_2e threshold achieved.

Path E (#3.3.1.1.5.1) in Green Globes NC 13 is provided for project teams to calculate their score in Green Globes. Path E requires energy modeling using ASHRAE 90.1-2016, Appendix G, which, along with the *Performance Calculator*, is necessary for Section 701.5 of the Montgomery County Amended 2018 IgCC.

Green Globes for New Construction 2013 Path E

Green Globes provides multiple, alternate paths to assess energy performance for new construction. Each path requires energy design modeling to establish the proposed energy performance (energy use) for a building. Path E is provided specifically for projects in Montgomery County. Projects must complete the zEPI and emission calculations in *Green Globes Montgomery County Performance Calculator* (provided separately).

Path E – ASHRAE 90.1-2016, Appendix G (up to 100 points)

Proposed model and baseline model requirements may be substituted from ASHRAE 90.2 Section 8 to model buildings that are not included in the scope of ASHRAE 90.1.

Calculations

The *Green Globes Montgomery County Performance Calculator* helps project teams with the energy and emission calculations as required by Section 701.5 of the Montgomery County Amended 2018 IgCC. The data tables and equations from the code are transcribed into the Excel-based calculator to help project teams compute and report their zEPI score and total CO_2e emissions of the proposed building.

Green Globes Points

Path E: Montgomery County Performance-Based Compliance, Appendix G earns up to 100 points for Assessing Energy Performance. Points are awarded based on an equivalence with other paths in Green Globes NC 13, including Path B that references ASHRAE 90.1-2010. Using the U.S. Department of Energy's Determination of Energy Savings analysis of ANSI/ASHRAE/IES Standard 90.1-2013[1] and the Preliminary Analysis of ANSI/ASHRAE/IES Standard 90.1-2019[2], equivalence for scoring in Green Globes NC 13 was determined.

[1] ANSI/ASHRAE/IES Standard 90.1-2013 Determination of Energy Savings: Quantitative Analysis. US Department of Energy. (August 2014). https://www.energycodes.gov/sites/default/files/2021-07/901-2013_finalCommercialDeterminationQuantitativeAnalysis_TSD.pdf

[2] Preliminary Energy Savings Analysis: ANSI/ASHRAE/IES Standard 90.1-2019. US Department of Energy. (April 2021). https://www.energycodes.gov/sites/default/files/2021-07/20210407_Standard_90.1-2019_Determination_TSD.pdf

Montgomery County Executive Regulation 12-20 Performance-Based Compliance Amendments to 2018 IgCC

GBI Notes

For energy calculations, Montgomery County requires that buildings use a modified 2018 IgCC code with source energy calculations based off ASHRAE 90.1-2016 Appendix G energy model requirements, which are worked into the zEPI index with specific calculations. The code requires that the proposed building have a zEPI score less than or equal to the $zEPI_{target}$ values listed in the code. Emission calculations by fuel source are also required to be submitted for compliance with the Performance Option.

Montgomery County's amendments to Section 701.5 Performance Option are listed below. Use the *Green Globes Montgomery County Performance Calculator* (provided separately) for calculations, and complete Path E to obtain a score in Green Globes NC 13.

Section 701.5.1. Performance-based compliance.

Compliance for buildings and their sites to be designed on a performance basis must be determined by predictive modeling of both energy performance and CO_2e emissions. Predictive energy modeling must use source energy kBtu unit measure based on compliance with Section 701.5.1.1. Predictive CO_2e emissions modeling must comply with Section 701.5.2.Energy modeling input and output data must be provided at the time of permit application submittal. The data must include, but is not limited to, source energy and energy units as metrics for calculation of a zEPI score.

Subsection 701.5.1.1 Energy performance modeling.

Performance-based designs must demonstrate a zEPI of not more than the zEPI target for the building type as shown in Table 701.5.1. zEPI must be determined under the following:

Equation: (Equation) zEPI = M x (Proposed building performance/Baseline building performance)

Where:

zEPI = zero energy performance index of the proposed building

zEPITarget = zero energy performance index target for compliance with this section

Energy modeling input and output data must be provided at the time of permit application submittal. The data must include, but is not limited to, source energy and energy units as metrics for calculation of a zEPI score.

Table 701.5.1
Building Type zEPI score calculation inputs

BUILDING TYPE	M	$zEPI_{target}$
Multifamily	78	42
Health	83	45

Hotel/motel	92	50
Office	71	39
Restaurant	92	50
Retail	61	33
School	81	44
Semi-heated storage	61	37
Other	78	42

Subsection 701.5.1.2 Modeling methodology.

The proposed building performance and the baseline building performance of the building and building site must be calculated under Appendix G to ASHRAE 90.1, as modified by Sections 701.5.1.3 and 701.5.1.4. The energy use modeling must include all energy used for building and site functions and anticipated occupancy.

Subsection 701.5.1.3 Energy units.

The building performance calculations in Section G3 of ASHRAE 90.1 must be based on energy use instead of energy cost. Energy use must be converted to consistent units by multiplying the nonrenewable energy fossil fuel use at the utility meter or measured point of delivery to Btus and multiplying by the conversion factor in Table 701.5.1.3.

Subsection 701.5.1.4 Site to source electric power conversion.

In calculating the proposed building performance and the baseline building performance, electric energy used must be calculated in source energy by multiplying the electric power use at the utility meter or measured point of delivery in Btus by the conversion factor in Tables 701.5.1.3 and 701.5.1.4

TABLE 701.5.1.3
ELECTRICITY GENERATION ENERGY CONVERSION FACTORS BY EPA eGRID SUB-REGION

eGRID 2018 SUB REGION ACRONYM	eGRID 2018 SUB REGION NAME	ENERGY CONVERSION FACTOR
RFCE	RFC East	2.86

TABLE 701.5.1.4
U.S. average building fuels energy conversion factors by fuel type:

FUEL TYPE	ENERGY CONVERSION FACTOR
Natural Gas	1.09
Fuel Oil	1.19
LPG	1.15
Purchased District Heating Hot Water	1.73
Purchased District Heating Steam	1.83
District Cooling	.62 (electric only)

701.5.2 (7.5.2) Annual Carbon Dioxide Equivalent (CO_2e) *(amended for Montgomery County)*

The proposed design shall have an annual CO_2e equal to or less than the annual CO_2e of the base-line building design multiplied by the building performance factor (BP) target determined from Table 701.5.2A (7.5.2A) (as amended) using the Performance Rating Method in ANSI/ASHRAE/IES Standard 90.1, Normative Appendix G. To determine the annual CO_2e for each energy source in the baseline building design and proposed design, the energy consumption shall be multiplied by the CO_2e emission factors from Table 701.5.2B (701.5.2B) (as amended).

TABLE 701.5.2A (7.5.2A)
Energy cost and CO_2e building performance factors (BPF)

BUILDING TYPE	BUILDING PERFORMANCE FACTOR (BPF)
Multifamily	0.66
Healthcare/hospital	0.51
Hotel/motel	0.48
Office	0.47
Restaurant	0.61
Retail	0.48
School	0.36
Semiheated warehouse	0.42
all others	0.5

TABLE 701.5.2B (7.5.2B)
CO_2e Emission factors

Energy Form	CO_2e, lb/kBtu	CO_2e, kg/MWh
Grid-delivered electricity and other fuels not specified in this table	1156	524
LP or propane	651	295
Fuel oil (residual)	738	335
Fuel oil (distillate)	715	324
Coal	892	405
Gasoline	744	337
Natural gas	681	309
District chilled water	339	154
District steam	1145	519
District hot water	1081	491

Please contact GBI with any questions:

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