**BSR/ASHRAE Addendum *g* to
ANSI/ASHRAE Standard 209-2018**

First Public Review Draft

Proposed Addendum *g* to Standard 209-2018, Energy Simulation Aided Design for Buildings except Low-Rise Residential Buildings

First Public Review Draft (April 2024)
(Draft shows Proposed Changes to Current Standard)

Foreword

The committee proposes the following changes to 5.7 General Modeling Cycle Requirements (excludes 5.7.4 and 5.7.5) below. The main reasons for the changes are to (1) expand beyond cost to other metrics, (2) add flexibility to the requirements regarding a financial analysis, and (3) add informative notes/clarify the language.

Proposed Changes

3.2 Definitions

baseline: the building design or level of energy performance used as the basis of comparison against other project alternatives, usually based on a hypothetical design defined by <u>energy codes</u>/building standards, <u>the lowest first cost option, existing conditions, standard practice</u>, or based on the ~~currently proposed~~ <u>current</u> building design at the time of modeling cycle analysis.

5.7 General Modeling Cycle Requirements. This section lists requirements that are common to all of the *modeling cycles* included within the standard. Cycle-specific requirements are included in their respective sections.

5.7.1 Energy Baselines and Goals. Prior to engaging a specific *modeling cycle*, review and update the following project-level items:
a. The *baseline* or *baselines* used for comparison during energy analysis
b. The energy performance goals as reported in Section 5.6.4

5.7.2 Input Data

5.7.2.1 Prior to each *modeling cycle*, the *project team* shall discuss the purpose, input data, and analysis methodology for each *modeling cycle*.

5.7.2.2 The input data necessary to perform the analysis, in conjunction with the purpose and goals of each *modeling cycle*, shall be gathered by the *energy modeler* and jointly supplied by the *project team*.

5.7.2.3 Where project-specific modeling inputs are provided, they shall be used in place of ~~assumptions or simulation program default inputs.~~ <u>user-defined assumptions, *simulation program* default inputs, or modeling inputs from Informative Appendix C.</u>

<u>Informative Note:</u> <u>It is important to clearly document all assumptions including those related to plug and process equipment for other members of the design team. These assumptions may significantly affect equipment sizing and energy consumption.</u>

In addition, for predictive analysis, special consideration should be given to input values such as weather, occupant behavior, plug/process loads, and overlooked loads. See Informative Appendix X: Predictive Energy Modeling for more details.

5.7.2.4 Input data shall be subject to quality assurance review as described in Section 5.7.4.2.

5.7.2.5 ~~When a *modeling cycle* requires the comparison of *project alternatives*, the *project team* shall identify the first-cost implications of each alternative. This shall include calculation of the incremental costs of individual strategies or bundles of strategies relative to a *baseline* cost. Include added construction costs as well as reductions in construction costs due to the~~ If first-cost implications of *project alternatives* are provided by the project team, the cost estimates shall include the impact of downsizing or elimination of building systems, such as in the case of alternatives that reduce heating or cooling loads.

~~Exception to 5.7.2.5:~~ ~~Quantification of first-cost impacts are not required for the Simple Box Modeling Cycles #1, and are only required for all *modeling cycles* if they are required by the owner/owner representative.~~

5.7.3 Reporting. At a minimum, provide the following information, and explicitly display all units of measure.

5.7.3.1 Narrative. For each *modeling cycle*, provide a written narrative of the following items:

a. A discussion of energy consumption results and a ~~A~~ comparison ~~of the modeling results~~ to the energy performance goal.
b. A discussion of the impact to the building peak heating and cooling loads
c. A financial analysis of the overall costs and savings if first cost implications of *project alternatives* are provided by the *project team.*
d. Discussion of areas of uncertainty in the analysis
e. Recommendations for building design strategies and acceptance, rejection, or modification of alternatives that were analyzed
f. Recommendations for additional analysis
g. Discussion of the impact on future maintenance and operations

5.7.3.2 Input Data Reporting. For each *modeling cycle*, provide the following information:

a. Project title
b. Project location and weather station name and type
c. A narrative description of the building, including use type, occupancy, *gross floor area*, conditioned floor area, number of stories, occupancy pattern or patterns, internal loads, and schedules
d. *Simulation program* and version
e. A narrative description of the *energy model baseline*, including discussion of why the selected *baseline* is appropriate for the current analysis (if applicable)
f. Utility rates, greenhouse gas emission factors, site to source ratios as applicable

g. A narrative description of any on-site energy generation

h. For each *project alternative*, provide a narrative description of the alternative, including analysis methodology utilized, relevant *baseline*, and proposed parameters and values

i. A summary table of the major *energy modeling* inputs

Informative Note: See Appendix E for a list of energy modeling inputs.

5.7.3.3 Output Data Reporting. For the *baseline*, and for each *project alternative*, report the following annual results:

a. Total *site energy* consumption

b. Total *site energy* consumption per unit *gross floor area*

c. *Site energy* consumption by *energy end use*

d. Total energy cost, greenhouse gas emissions, source energy as applicable

e. Consumption by *energy source*

f. Cost, greenhouse gas emissions, source energy by *energy source* as applicable

g. Peak cooling demand and time of occurrence (date, day of week, day type, hour)

h. Peak heating demand and time of occurrence (date, day of week, day type, hour)

i. Calendar month peak electric demand and time of occurrence (date, day of week, day type, hour)

j. Calendar month peak energy consumption by *energy source*

k. Unmet heating and cooling load hours

l. Construction cost as determined per Section 5.7.2.5 as applicable

m. On-site energy generation as applicable

n. Any other modeling output relevant to the project performance goals